

SEX EDUCATION AND CONTRACEPTIVE USE AT COITAL DEBUT
AMONG US TEEN MALES

By

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LIST OF ABBREVIATIONS

STD – Sexually Transmitted Disease

US – United States

HIV – Human Immunodeficiency Virus

NSFG – National Survey of Family Growth

AOE – Abstinence-Only Education

UoM – University of Michigan

NCHS – National Center for Health Statistics

PSU – Primary Sampling Units

ACASI – Audio Computer-Assisted Self-Interviewing

IUD – Intrauterine Device

NM – Neither abstinence nor methods messages- containing sex education

AM – Abstinence message-containing sex education

MM – Methods message-containing sex education

CM – Comprehensive sex education

MSA – Metropolitan Statistically Area

OR – Odds Ratio

CI – Confidence Interval

IV - Intravenous

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Abstract

Objective

Adolescent contraceptive use is an important determinant of teen pregnancy, abortion and sexually transmitted disease rates in the United States. In spite of a similar age at sexual debut, U.S. rates remain elevated above those of other developed countries. Although sex education continues to play a central role in the effort to reduce US teen pregnancy and STD rates, the content of the education and the effect that this information has on adolescent behaviors like contraceptive choice is not well understood. This is particularly true for boys.

The objective of this thesis was to determine whether exposure to sex education regarding methods of contraception, STDs and Human Immunodeficiency Virus prevention are independent factors associated with greater condom use at first sexual intercourse among US adolescent males and with more frequent use of a hormonal method by the boy's partner compared to exposure to abstinence messages.

Methods

This thesis comprises a secondary data-analysis of a sample of never-married males aged 15-19 from the nationally representative weighted database, the 2006-2008 National Survey of Family Growth. Analyses were performed using Stata/IC version 11.1 (College Station, TX). Descriptive statistics were generated to compare demographic and socioeconomic variables between sex education groups. The primary outcome variable was contraceptive use at coital debut; measures of association and multiple logistic regression were used to analyze the influence of formal sex education after adjusting for confounders.

Results

We found that receipt of sex education that included an abstinence message was statistically significantly associated with increased condom use at first intercourse compared to receiving other types of education among never-married male adolescents age 15 to 19 who reported formal sex education prior to coital debut. We did not find a statistically significant relationship between type of sex education and reliable contraceptive use at first coitus. Those who received abstinence education without methods education prior to first coitus had 5.6 times the odds of using a condom the first time they had sex compared to those with neither abstinence nor methods education after adjustment for school enrollment, year in school and the importance of religion in their life (OR=5.6, 95% CI [1.82-17.2]) and six times the odds of using a condom compared to those who received methods education without abstinence education (OR=6.09, 95% CI [1.81-20.45]).

Conclusions

The results of our study, demonstrated that receipt of sex education that included an abstinence message without messages about methods of birth control was associated with increased reported condom use at first intercourse. Additionally, we found that type of sex education was not associated with reported reliable contraceptive use at first coitus. These results suggest that programs containing abstinence messages should be examined for their benefit in motivating male use of condoms. The apparent lack of association between education about methods of birth control and use of such methods among teenage boys leads to concern over the content and delivery of these programs and suggests that new approaches may need to be developed.

Chapter 1: Introduction

Adolescent contraceptive use is an important determinant of teen pregnancy, abortion and sexually transmitted disease (STD) rates in the US. In spite of a similar age at sexual debut, U.S. rates remain elevated above those of other developed countries (1-3). Although sex education continues to play a central role in the effort to reduce US teen pregnancy and STD rates, the content of the education and the effect that this information has on adolescent behaviors like contraceptive choice is not well understood (4-6). This is particularly true for boys.

The societal, individual, and economic costs of teen pregnancy are steep. Pregnancy outcomes for teens are worse than for women who give birth in their 20s, including higher rates of neonatal and infant mortality, preterm-birth and low birth weight babies, as well as an increased risk of instrument delivery and maternal anemia (7-9). Children born to teenage mothers are more likely to be placed in foster care and more likely to have a report of abuse or neglect (9,10). They are also more likely to have lower cognitive attainment scores and proficiency scores when they enter kindergarten and are less likely to graduate from high school (11). Daughters of teen mothers are more likely to be teenage mothers themselves while males born to teenage mothers are more likely to experience incarceration by the time they are in their 30s and 40s (12-15). The socioeconomic costs of teen pregnancy are often greater for teen parents from disadvantaged backgrounds, perpetuating social and economic inequities (9). Estimates indicate that over 80% of teen pregnancies are unplanned, compared to around 50% of all pregnancies (16,17). The estimated public sector cost attributable to births to teen

mothers was \$9.1 billion in 2004 (18). This cost is largely due to the social service needs of the newborn including healthcare, foster care, and lost tax revenue due to lower earnings of teen parents (18).

In this analysis, we examine whether exposure to sex education regarding methods of contraception, STDs and HIV prevention are independent factors associated with greater condom use at first sexual intercourse among US adolescent males and with more frequent use of a hormonal method by the boy's partner compared to exposure to abstinence messages. The National Survey of Family Growth (NSFG) is a validated, population-based nationally representative survey of 15-44 year-olds in US households regarding a variety of reproductive health attitudes, behaviors and outcomes. For this secondary analysis, we will use data from 1386 adolescent male respondents in the 2006-2008 cycle of the NSFG. The analysis comprises complete descriptive statistics as well as multiple logistic regression analyses with adjustment for confounders. The results of this analysis could have important implications for national policies, curricula, and funding priorities aimed at reducing the burden of STDs, unplanned pregnancy and abortion among teens in the US.

BACKGROUND AND RATIONALE

Sex, pregnancy and STDs

Overall, 42% of never-married female teenagers and 43% of never-married male teenagers in the US report having had sexual intercourse (1). This rate has remained stable in the past several years, but as compared to the 1980s is significantly lower (19). Among those teens who have had sex, the mean age at first coitus is approximately 14

years old but this age varies greatly depending on race, ethnicity, and gender (20). Similar rates of intercourse and age at first coitus are seen in other developed countries; however, the US continues to demonstrate higher rates of teen pregnancy, abortion, and sexually transmitted diseases than most other industrialized countries (1,3).

Looking more closely at teen pregnancy rates over time, the slow but steady decline in rates from 1991-2005 appears to be due to an increase contraceptive use, but also to delayed coital debut (21, 22). In 2005-2006, an increase in teen pregnancy rate was seen, paralleled by a decline in the rate of effective contraceptive use (22). Rates again declined in 2008 and 2009 (1, 23). Overall since 2002, an increase in condom use and dual protection was reported among teen males (1).

Teens and young adults continue to bear a disproportionate burden of STDs as well as unintended pregnancy, with the highest rates of Chlamydia and gonorrhea occurring in the 15-19 and 19-24 year-old age groups (24). Furthermore, though gonorrhea rates decreased in these groups in 2008-2009 compared to previous years, Chlamydia rates increased, indicating continuing need for effective prevention programs (24). Elevated STD rates among these groups place them at risk for the potential sequelae of STDs, including infertility, pelvic inflammatory disease, epididymitis, malignancy and pregnancy complications (25,26). Aside from the risks posed to individuals, the costs of treating both acute infections as well as diagnosing and addressing their sequelae are considerable (26).

Sex Education of US teens

Though most young men report receiving formal sex education, the proportion that report specific instruction on birth control declined sharply from the late 1990s to 2002 and then saw little change from 2002-2008. This parallels the pattern of those that received education regarding HIV/STDs (19, 27). Most recently (2006-2008), males remained less likely than females to receive education regarding methods of birth control (62% of male teens compared to 70% of female teens) (27). During this time, federal policy strongly supported a form of sex education teaching only abstinence messages (abstinence-only education--AOE) (28,29). Under Section 510 of the 1996 Social Security Act, abstinence-only education is defined as an “educational or motivational program” which follows 8 principles (30). These include that AOE “teaches that abstinence from sexual activity is the only certain way to avoid out-of-wedlock pregnancy, sexually transmitted diseases, and other associated health problems” and “teaches that a mutually faithful monogamous relationship in the context of marriage is the expected standard of human sexual activity” (30).

Though this definition of abstinence-only programs may not be consistent with how other groups define abstinence, it has been the requirement to receive federal Title V funds for sex education (6). Abstinence-only approaches have been criticized by many public health experts who argue that it is inconsistent with the fact that few Americans wait until marriage to have sexual intercourse and that there is no evidence that consensual sexual activity outside of marriage is harmful psychologically or physically (6). Furthermore, many abstinence-only programs have been found to have curricula that contain inaccurate information regarding contraception effectiveness and risks of

abortion, among other reproductive health issues (31). Concerns have been raised regarding abstinence-only approaches and the educational needs of sexually active teens which are ignored in these programs, as well as the potential negative impact these programs may have on gay, lesbian, bisexual or transgender youth by promoting sexual intercourse in the context of marriage as the only acceptable norm (6). A position paper from the Society for Adolescent Medicine highlights “complete and accurate HIV/AIDS and sexual health information” as a basic human right articulated by many international bodies including the United Nations, and raises the concern that restrictive abstinence-only policies may obstruct this right (29).

Funding for abstinence-only education was an important federal policy from the 1990s until 2010, when the Obama administration made some notable alterations to national sex education policy in the fiscal year 2010 budget (28). Federal policy is shifting under the Obama administration, which is emphasizing comprehensive, evidence-based education and has created the Office of Adolescent Health to coordinate US Department of Health and Human Services activities related to adolescent health and education (32). However, despite more funding available for programs using evidence-based strategies aimed at both abstinence and appropriate contraceptive education, Title V funding remains available to states for abstinence-only education programs (28,33). However, recent legislation has been proposed in the House that would eliminate this funding in favor of funding for Personal Responsibility Education Programs (32). Additionally, many states have stopped taking federal funds for abstinence-only programs, with legislation requiring sexuality education to be medically accurate, age-

appropriate and to include instruction on both abstinence and contraception being introduced in these states and others (32, 34).

Outcomes associated with sex education type

Peer reviewed research regarding outcomes associated with different types of sex education is sparse and the methods have significant limitations including varying classifications of sex education, no inclusion of contraceptive practices, or outcomes that poorly reflect risky behavior. In an ecological study, states with no mandate to cover abstinence in sex education curriculum were found to have lower rates of teen STD infection than states that mandated coverage of abstinence or mandated “emphasis” of abstinence in sex education programs (35). In data from 2002, one analysis found a protective effect against teen pregnancy from "comprehensive sex education," and no effect with abstinence-only education; this analysis found neither type of sex education to significantly impact reported STDs or likelihood of engaging in sexual activity (36). Among males, formal sex education in general has been associated with greater likelihood of not having had sex by age 15 and of using contraception at first intercourse (37). However, in this analysis, types of sex education were not differentiated by content.

The effect of abstinence-only education has been examined among those who take a virginity pledge, as representing their commitment to abstinence. Though data are inconsistent regarding the efficacy of abstinence-only programs in terms of delaying the initiation of sexual intercourse, it does appear that those teens who took a virginity pledge are less likely to use contraception if they do initiate sexual intercourse in their adolescence (6,38). When teens who reported taking a virginity pledge are matched for

characteristics having to do with other predictors of sexual activity and compared to a group of non-pledgers, they have not been found to differ on measures of STDs, age at first sex, or proportion having premarital sex (38).

Recently, the suggestion that inclusion of an abstinence messages in sex education programs may diminish the impact of methods-based education has been examined. Among teen girls, sex education including “instruction about birth control methods” has been associated with increased use of a reliable birth control method at first intercourse compared to curriculum that included an abstinence message (39). This association has not been studied in adolescent males. The specific effect of including abstinence messages and the effect of including messages regarding methods of birth control on sexual behaviors of adolescent boys are thus not well understood.

Some specific interventions designed to deliver different types of sexual education have been examined by randomized controlled trials. A recent randomized controlled trial did find a specific, theory-based abstinence-only intervention to be effective in delaying sexual debut; comprehensive programs in the same trial were associated with decreased likelihood of multiple partners (40). However, most trials of abstinence-only programs have not shown effects on incidence of unprotected vaginal sex, frequency of vaginal sex, number of partners, sexual initiation or condom use (41-43). In contrast, an HIV/STD intervention performed by Community-Based Organizations was recently found to increase condom use and the portion of condom-protected sex among the teens in the trial (44).

The behavior of and influences on adolescent males

The influences on sexual risk-taking behavior appear to differ between males and females (45,46). Males and females report different types of formal sex education and also report differences in sex and birth control topics discussed with their parents (27). For example, 38% of teen boys say they have talked to their parents about how to use a condom, compared to 29% of girls; in contrast, 63% of teen girls say they have talked to their parents about how to say no to sex while only 42% of teen boys have (27).

Furthermore, contraceptive practices also reportedly differ between males and female adolescents. The percentage of teens reporting condom use is higher among males than females and dual use of a hormonal method along with condoms is increasingly reported among males (1).

Condom use and hormonal methods are both important means of contraception but only condom use will protect against STDs. Since few studies have evaluated the impact of sexual education messages on male contraceptive behavior, this analysis attempts to fill that gap and in an effort to show that type of sexual education has the potential to influence contraceptive practices at first intercourse among teen boys in the US. Identifying types of education that increase contraceptive use will help to reduce the disproportionate burden of STDs that teens bear in the US.

MATERIALS AND METHODS

Overview of Design

This study is a cross-sectional analysis of the NSFG data collected from 2006 to 2008 to identify any association that may exist between formal sexual education topics and use of contraception at coital debut. Both descriptive statistics and regression modeling of key outcome variables (as defined below) were used.

The National Survey of Family Growth

The NSFG is a cross-sectional, nationally representative survey conducted by the University of Michigan's Institute for Social Research (UoM) in partnership with the National Center for Health Statistics (NCHS). This study used the most recently released data, from interviews conducted in 2006-2008. This is the first data set released as a part of the survey using the continuous method; prior to this, the survey has been conducted 6 times in discrete cycles since 1973. Males were first included in the 2002 cycle.

The survey is designed as a national fertility survey and collects data regarding pregnancy rate, determinants of birth and pregnancy (such as sexual activity, contraceptive use, infertility and sterilization), marriage, divorce and cohabitation, medical services used for birth control, infertility, adoption, behaviors related to the risk of HIV and other STDs, men's roles in raising children, and attitudes about marriage, children and families (47).

Study Subjects: The survey samples men and women aged 15-44 in US households; it is designed to over-sample certain groups including teenagers, Hispanic men and women and non-Hispanic black men and women (47).

Selection criteria: A computer program selects subjects for the NSFG randomly after a screening process identifies eligible persons in a selected household. Selection criteria for eligibility include: being 15-44 years old and living at the address being screened (including those living away from the household, such as in a college dormitory, sorority or fraternity). The analysis for this study was limited to those who are male, aged 15-19, whose marital status is “never been married” and who have had heterosexual sex.

Sample Design: The participants in the NSFG were randomly selected through a five-stage stratified cluster design, as follows (48):

- (1) 110 Primary Sampling Units (PSUs) were identified; the eight largest metropolitan areas in the US were included in each of the 4 years of interviewing; the remainder of the PSUs were divided among the 4 years so that sampling in each year was of a nationally representative sample of 25 PSUs from smaller metropolitan and non-metropolitan areas (with the exception of the first year, which comprised 27 additional PSUs).
- (2) Census blocks within each PSU were then stratified into 4 domains, which were defined to oversample black and Hispanic persons for the second stage of selection. (The four domains were: 1) non-minority, 2) more than 10% black persons, but less than 10% Hispanic persons, 3) more than 10% Hispanic but less than 10% black persons, and 4) more than 10% black and more than 10% Hispanic persons.) Blocks or groups of blocks (segments) were then chosen by domain with probabilities in proportion to the 2000 US Census. Individual housing units were listed within each chosen segment.

- (3) The third stage consisted of selecting individual housing units from the lists within each segment; this stage oversampled from housing lists within domains 2, 3, 4 to obtain information on an adequate number of black and Hispanic persons.
- (4) In the fourth stage, an individual within each selected housing unit was chosen from a list of all eligible persons in the household (this list was generated by a “screening interview” to identify all eligible persons within the household). Selection of individuals within households was random, but each person had a probability of being selected according to a measure of size, in which teenagers (aged 15-19), and women received larger measures of size to increase the sample size of these populations.
- (5) The final 2 weeks of each quarter of interviewing (the end of a 12-week period) were concentrated on a smaller number of housing units that had not yet been screened in an effort to reduce non-response bias (48).

Subject recruitment: Households in each segment were sent letters and brochures regarding who was sponsoring the survey, who was conducting it, why it was being done, the voluntary nature of participation and confidentiality protections. Interviewers then visited housing units selected in the third stage of sampling and attempted to list all persons there if the unit was found to be occupied. Among those eligible, one respondent was chosen at random, through a computer program, to participate in the study. If the person chosen was a college student living away from home, the participant was interviewed by an interviewer working in the area nearest the college or university. Adults selected signed Informed Consent forms. If a minor (aged 15-17, 15-18, 15-19 or 15-20 depending on state law) was selected for the sample, the minor’s parents first gave

their consent prior to the minor being contacted; the minor was then asked to give his or her assent. Subjects who participated were remunerated with \$40 (47).

Measurement and Data collection: All interviews were conducted by female interviewers. Interviewers were trained in three parts: 1) home study of the NSFG Interviewer Project Manual and DVD, 2) general interviewer training at UoM, and 3) an NSFG project-specific training, which largely consisted of hands-on practice administering the NSFG questionnaire. Bilingual interviewers received an additional day of training on conducting the interview in Spanish.

In the field, interviewers first verified addresses listed in step 2 of the sampling procedure. Housing units to visit were chosen and mapped electronically for the interviewer. After selecting a participant during the screening interview, data collection was carried out by interviewers in the participant's home. During the interview, the interviewer read questions from a laptop computer provided by the study and entered responses directly into that computer. Interviews were conducted in a private setting, with pausing of the interview if another member of the household entered the room, to ensure respondent privacy. After the interviewer-administered portion, the interviewer instructed the participant on how to use the laptop to listen to questions and enter answers during the Audio Computer-Assisted Self-Interviewing (ACASI) portion. Privacy was ensured during this portion by providing headphones and muting the questions so that only the respondent could hear them. After the interview, the laptop was locked and data was stored electronically.

During data collection, interviewers also collected "paradata," such as information about the housing units and unsuccessful and successful contacts and

interviews. These paradata were used by the study administrators to identify a subset of cases on which to focus in the last 2 weeks of each 12-week sampling period in order to direct efforts of the interviewers to maximize the possibility of successful interviews while representing the full target population as much as possible (47).

Quality control: Several quality control methods were conducted by the survey administrators. One method was “Production Review Interviews,” in which a field quality control coordinator used a prepared script to be interviewed by the field interviewer (47). Interviewers were then given feedback; if an interviewer did not “pass” this review, she stopped fieldwork until problem areas were addressed with her supervisor and she successfully “passed” a review interview.

Another method of quality control was aimed at detecting falsification by the interviewer. In this “verification” process, some of the survey respondents and screeners were called back to verify that they had been interviewed or screened and to verify some of the information collected (47). If the responses suggested falsification, a rigorous process was undertaken to confirm this and then to determine the extent to which that particular interviewer’s data had been corrupted. The interviewer was terminated if discovered to have falsified data, and steps were taken to correct falsified data.

Further quality control was in the form of the interviewer’s capability to enter comments in the response system to clarify answers or self-assessed errors during the interview. These comments were used to improve the computer system, training, data editing or questionnaire for the next year.

Data were gathered electronically during the interview and sent securely to the contractor (the Institute for Social Research at the UoM), who ran computer programs on

the paradata collected in order to improve sample selection. Data were collected continuously, and each month a preliminary data file was produced. In this system, data processing could be started as data were collected, with the goal of releasing data in a more timely manner. Recoding and item imputation with logical imputation and regression imputation was done as data became available (47).

Data management

Much of the data management had already been conducted by the NSFG contracting groups and the NCHS prior to our receiving it. The data used in this analysis has been imputed, cleaned and thoroughly evaluated for error. Several recodes were made for the public use files, and many of the independent and dependent variables have already been created. Further management of data for this project consisted of cleaning the data to extract any missing variables, merging data from the downloadable public use files and the separate ACASI file, and constructing variables not defined already (see variables section below).

Variables

The NSFG collects information about sexual activity, pregnancy, family planning, marriages and other relationships, child raising and contraceptive use. It also includes questions regarding demographic characteristics, health conditions and services, residence, work experience and attitudes. Though the survey has been conducted since 1973, males were included for the first time in 2002. ACASI has been used for especially sensitive portions of the questionnaire since 1995. Questionnaires used in the NSFG have

been revised since the first cycle to include more questions and more answer choices around STDs, HIV, pregnancy wanted-ness and planning. Questionnaires for the continuous NSFG were based on 2002 questionnaires, with only moderate revisions using the 2002 cycle as a pretest for the continuous NSFG. During the continuous cycle NSFG (2006-2010), questionnaires were updated each year with only minor revisions. Questionnaires and the ACASI portion were offered in both English and Spanish (47). Variables for this analysis come mostly from the sections on “sex education, sexual experience, and sterilization and infertility,” and “recent sexual partners and first sexual partner,” as well as some from demographic characteristics, health conditions and health services, and residence, work experience and attitudes. Responses regarding STI experience substance use and some sexual activity variables come from the ACASI portion of the survey.

Primary Outcome Variables: Respondents who reported having had heterosexual intercourse were asked whether “any methods to prevent pregnancy or sexually transmitted disease” were used “that first time that you had sexual intercourse.” If so, they were then asked to list all methods used. Primary outcomes for regression analysis were whether: a) the respondent used a condom or b) he believes his partner used a reliable contraceptive method. We also examined any contraceptive use and dual contraceptive use (defined as reliable contraceptive use in addition to condom use) in descriptive and cross-tab analyses. Intrauterine Device (IUD), coil, loop, Norplant, injectable contraceptive, contraceptive transdermal patch, contraceptive vaginal ring, or oral contraceptive pill use were considered reliable contraceptive use. Of note, both “coil” and “loop” were included in the question stem under the category of intrauterine

device, though it is not conceivable that these methods were used as they are not available.

Table 1: Primary Outcome Variables for logistic regression

Variable	Question	Definition of Outcome	How data will be collapsed for analysis
Condom Use	Whether “any methods to prevent pregnancy or sexually transmitted disease” were used “that first time that you had sexual intercourse.” If answer was yes, the respondent was asking to identify which methods from a list provided.	If the respondent indicated that he used a condom, his answer will be “condom use”	dichotomous, 1= “condom use” 0= “no condom use”
Reliable method use	Whether “any methods to prevent pregnancy or sexually transmitted disease” were used “that first time that you had sexual intercourse.” If answer was yes, the respondent was asking to identify which methods from a list provided.	Reliable methods will include: IUD, coil, loop, Norplant, injectable contraceptive, contraceptive transdermal patch, contraceptive vaginal ring, or oral contraceptive pill	dichotomous, 1=“reliable method use” 0= “no reliable method use”

Main predictor variables: The association between type of formal sex education and contraceptive use at first coitus were examined using several categories of formal sex education. Respondents were asked a series of questions about whether they had “ever had any formal instruction at school, church or some other place” regarding “how to say no to sex,” “methods of birth control,” “sexually transmitted diseases,” or “how to prevent HIV/AIDS.” We combined STD and HIV/AIDS messaging exposure in this analysis, as they are likely to represent similar exposures, and there were very few (3 subjects) who reported receiving one type but not the other. Respondents were also asked whether they had received sex education instruction prior to their coital debut. We used only education received prior to first coitus. Additionally, because we were interested in the differential effects of type of sex education, we excluded those who had no formal sex

education prior to first coitus from our primary analysis. The four groups used for comparison in logistic regression are defined in the following table.

Table 2: Primary Predictor Variable: Sex Education groups

Formal Sex Education Groups – Main comparisons	
Neither Abstinence nor Methods Messages (NM) Includes all who answered yes to education regarding “HIV/AIDS” and/or “STDs” and “no” to receiving formal sex education regarding “methods of birth control” and to receiving formal sex education regarding “how to say no to sex”	62
Abstinence messages (AM) Includes all who answered “yes” to receiving formal sex education regarding “how to say no to sex” and “no” to receiving formal sex education regarding “methods of birth control,” (may have answered “yes” to receiving education regarding “HIV/AIDS” and/or “STDs”).	139
Methods messages (MM) Includes all who answered “yes” to receiving formal sex education regarding “methods of birth control” and “no” to receiving formal sex education regarding “how to say no to sex” (may have answered yes to education regarding “HIV/AIDS” and/or “STDs”)	55
Comprehensive messages (CM) Includes all who answered “yes” both to receiving formal sex education regarding “methods of birth control” and to receiving education regarding “how to say no to sex” (as well as “yes” to receiving education regarding “HIV/AIDS” and/or “STDs”)	290

Potential confounding variables: Potential confounding variables are those known or suspected to be related to contraception use at first intercourse and to the likelihood of receiving certain sexual education messages. Some of the variables that were included have been associated with risky sexual behavior patterns (such as more sexual partners and younger age at first coitus) but have not been analyzed for their associations with contraceptive use specifically (49). These were included in this analysis, as an influence on sexual behavior likely extends to contraceptive use.

Socioeconomic and demographic variables include age at interview and age at first coitus as continuous variables, as these showed good linearity with Lowess smoother curves in our sample. Race (Black or African American, white, or other groups) and Hispanic ethnicity were included. Education was included as whether or not the

respondent is enrolled in school and the highest grade level achieved by the respondent. Highest level of education of both mother and father were included as measures of socioeconomic status (coded as less than high school graduate, high school diploma or GED, or some college or more). Another marker of socioeconomic status, insurance coverage, was coded as private health insurance, Medicaid, single service plans (e.g. covering dental, prescriptions or vision), state-sponsored health plan (including Military), or none. Many variables attempting to capture family environment have been associated with sexual risk behaviors (45,49). We included family intactness (operationalized as living with both parents (yes/no) and ever living on own (yes/no). Mother's age when she gave birth to her first child was also included.

Place of residence is categorized using Metropolitan Statistical Areas (MSA) as defined by the US Office of Management and Budget. These areas are divided into three possible categories: 1) large urban city, 2) Metropolitan cities near a central city, 3) all other types of areas. Respondent's categories were assigned based on their address at the time of the interview and 2000 census data.

Parental discussion of sex topics has been associated with increased condom use and has been hypothesized to explain some of the difference in contraceptive use across racial and ethnic groups. Respondents were asked about whether they talked with their parents about several sex topics, including how to say no to sex, methods of birth control, where to get birth control, STDs, HIV/AIDS, and how to use a condom. These variables were included as covariates and defined similarly to methods of formal sex education variables, with categories for abstinence, contraceptive topics and STDs and HIV.

Religion was incorporated into the analysis as denomination (subjects were coded as currently identifying as Catholic, Protestant, other, or no religion). “Religiosity,” which is broadly defined as “a set of institutionalized beliefs, doctrines and rituals, and ethical standards for how to live a good life,” (50), has been associated with delayed sexual activity in teens, as well as less sexual risk taking in other regards. This construct was included as measured by two variables: frequency of religious service attendance (at least weekly/less frequently) and importance of religion in daily life (not/somewhat/very important).

Substance use has consistently been shown to be associated with riskier sexual behavior (45, 51-53). Substance use questions come from the ACASI questionnaire, in which subjects were asked about the frequency of use in the “past 12 months.” Responses regarding marijuana, cocaine, crack, methamphetamine, and injection drug use were analyzed. Alcohol use was evaluated for both frequency of any use as well as of binge drinking, which were both included. Frequency will be coded for substance use variables as 1) never, 2) once or twice during the year, 3) several times during the year or once a month or 4) weekly or daily for alcohol or marijuana and 1) never, 2) once or twice to several times in the year or 3) about once a month or more for other substances.

Statistical Issues

Weighting of Subjects

Subjects in the NSFG are assigned sampling weights to account for the difference in sampling rates of Hispanics, blacks, teens and women in the survey. Additional weights also account for response rates and coverage rates, to make the sample

appropriate for making nationally representative estimates. Weights for the 2006-2008 data were constructed using the entire sample from these two years and were used for all analyses in this project. Cluster and strata variables were also accounted for in the analysis.

Overview of Analysis

Prevalence of formal sex education was calculated among all teen boys in the study. Prevalences of the different types of sex education were then determined among those who received sex education. Each estimate was stratified by age at interview, race, ethnicity, marital status, school status, education level, mother's education, father's education, mother's age at first birth, health insurance status, place of residence, family intactness, parental sex topics discussed, current religion, religiosity and substance use.

Univariate associations between sex education category and contraceptive use at first coitus were examined using Chi-square tests. Associations between the exposure variable (sex education) and potential confounders (age at interview, race, ethnicity, marital status, school status, education level, mother's education, father's education, mother's age at first birth, health insurance status, place of residence, family intactness, parental sex topics discussed, current religion and religiosity) were evaluated using Chi-square tests, as were associations between potential confounders and outcome variables.

Univariate analyses were followed by multivariate logistic regression models using those variables determined to be associated with outcome variables to construct crude and adjusted Odds Ratios and 95% Confidence Intervals. We tested those characteristics that were associated with reliable use or condom use at the 0.20 level or less in backward stepwise selection procedures to identify separate logistic regression

models to predict reliable use and condom at first intercourse. We retained sex education group in the model, as it was the primary predictor of interest, and other variables if they were significant at the 0.05 level. An independent variable other than the primary predictor was considered a confounder if adjustment for it altered the crude OR of primary predictor variable by 20% or more.

Sample size and Power Calculations

The public use data set contains information regarding 1386 males aged 15-19 years. These data were included in descriptive analyses. Of these, 546 were unmarried, reported having had heterosexual intercourse prior to their interview and reported receiving some type of sex education prior to first coitus. Sample sizes in each sex education (exposure) group are included in Table 3 above.

We used PASS software for all power calculations to determine the minimal detectable difference in proportions that could be detected at the $\alpha=.05$ and $\beta=.20$ level with the size of the sample available. The study was powered to be able to detect changes of 10-21% in contraceptive use outcomes (depending on whether the true rate of contraceptive use was closer to 80% or 40%, which we anticipated would vary by type of contraception outcome) when comparing between different sex education groups. These were reasonable effect sizes to anticipate, as previous studies have shown 20% increases in some types of contraceptive use with different types of sex education (39). The range of possible proportions for contraceptive outcomes considered was large, as previous studies have reported a wide range of percentage of teens using different types of

contraception (from 15% for dual use to 80% for condom use at first sex). Detectable differences for different comparisons are shown in Table 4 below.

Outcome proportions for contraceptive use in power calculations were based on proportions observed in previous studies involving the entire teen population or the female subset. Therefore, they are likely to vary from the proportions observed in our analysis. However, power calculations were designed to be conservative, thereby making it unlikely that the true proportions in our sample would be lower than those used in our calculations.

Table 3: Effect size calculations

Sex Education comparison groups	N1	N2	P1 (Contraceptive use)	Minimum Detectable (increase)* Difference
AM vs NM	139	62	.20	0.20
			.30	0.21
			.40	0.21
			.50	0.21
			.60	0.19
			.70	0.17
			.80	0.14
MM vs NM	55	62	.20	.20
			.30	.25
			.40	.26
			.50	.25
			.60	.23
			.70	.20
			.80	.16
AM vs CM	139	290	.20	.13
			.30	.14
			.40	.14
			.50	.14
			.60	.14
			.70	.12
			.80	.10
MM vs CM	55	290	.20	.18
			.30	.20
			.40	.20
			.50	.20
			.60	.19
			.70	.17
			.80	.14

*Alpha level = 0.05, Power = 80%

Human Subjects Protections

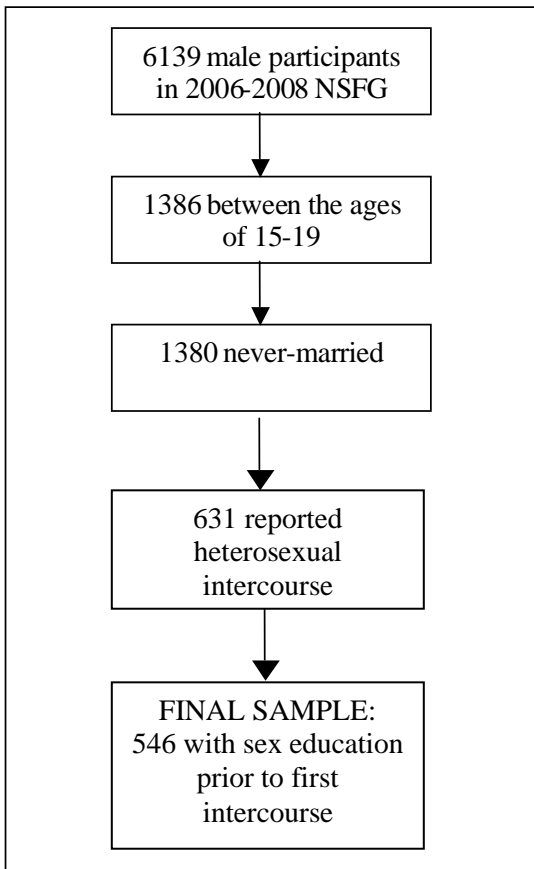
This analysis used public use data files, which the NCHS Disclosure Review Board and the NCHS Confidentiality Officer reviewed to ensure minimal risk of disclosure. Changes recommended by these bodies were implemented, including suppressing or collapsing variables considered to have the potential to identify very small groups. In the public use data files, all directly identifying information (e.g. names and addresses) have been eliminated, and the state and Census region of residence withheld (54). Any variables considered potentially useable to indirectly identify individuals have been recorded or re-categorized. Other variables were perturbed to reduce the possibility of indirect identification; this was done to preserve statistical information while minimizing risk of disclosure (54).

CHAPTER THREE: RESULTS

Descriptive and Demographic Characteristics of the Sample

Of the 6139 men who participated in the 2006-2008 NSFG, 1386 were adolescents (15-19 years old at the time of the interview) of which our sample for primary analysis comprised the 546 never-married teens who reported having had heterosexual sex and reporting having received some type of sex education prior to first intercourse (1 participant was excluded due to having missing data regarding sex education).

Figure 1. Development of Final sample from total male participants in 2006-2008 NSFG



This group was further separated by reported exposure to abstinence and methods messaging: 62 (12.75%) neither Abstinence nor Methods messages (NM), 139 (25.58%)

abstinence messages (AM), 55 (12.86%) methods messages (MM) and 290 (48.81%) both types of sex education (“comprehensive messages,” CM) (see Table 4). Of note, as we included only those with *some* type of sex education, the NM group comprises those who received either HIV or STD education or both. Because we were concerned about the large proportion among those with AM who had not received HIV/STD education (n=20 of 139) compared to the number without HIV/STD education in the MM group (n=1) and the CM group (n=0), (see Table 23) we examined the effect of limiting our sample to only those who reported receiving HIV or STD education prior to first sex. As there was only a minimal effect on our primary associations, we included all 546 subjects in our final sample (see Tables 24-28 for analyses limited to only those with HIV/STD education). Demographic characteristics of the entire sample and differences between those who had *any* sex education prior to coital debut and those who had *none* are presented in the Appendix (Table 29-33).

Table 4. Distribution of Abstinence and Methods messages among sexually experienced never-married teens with some type of sex education prior to coital debut

	Total	Type of Sex Education			
		No Abstinence or Methods (NM)	Abstinence No Methods (AM)	Methods No Abstinence (MM)	Comprehensive (CM)
n (weighted %)	546 (100)	62 (12.75)	139 (25.58)	55 (12.86)	290 (48.81)

Demographics of Sex Education Groups

There were no significant differences between the sex education groups in terms of race, current school enrollment, education level of either parent, place of residence or various family environment characteristics (Tables 5 and 6). Those reporting methods messages (MM) were oldest at first coitus (MM 15.8 years, AM 15.4 years, CM 15.4 years, NM 14.5 years; $p = 0.005$). Those receiving neither abstinence nor methods competed fewer years of schooling than the other groups ($p = 0.0095$) and were more

likely to be ethnically Hispanic ($p = 0.028$). Greater proportions of those in the AM, MM and CM groups had private insurance (AM 57.7% , MM 63.1%, CM 63.0%) than those in the NM group (24.12%) ($p=0.0148$).

Table 5. Descriptive Characteristics for Never-married, Sexually-experienced teens by Formal Sex Education Group

Characteristic	Formal Sex Education Category					p-value *
	Total***	NM	AM	MM	CM	
n (weighted %)	546 (100)	62 (12.75)	139 (25.58)	55 (12.86)	290 (48.81)	
Average Age in years (weighted average)	17.58 (17.52)	17.32 (17.36)	17.50 (17.55)	17.65 (17.62)	17.65 (17.51)	0.697**
Average Age at First Coitus (weighted average) in years	15.25 (15.33)	14.34 (14.46)	15.12 (15.41)	15.60 (15.84)	15.44 (15.38)	0.005**
Race	n (weighted %)					0.1463
Other	107 (16.44)	13 (14.72)	22 (16.63)	18 (23.61)	54 (14.9)	
Black	133 (20.11)	17 (19.73)	41 (23.19)	6 (2.85)	69 (23.15)	
White	306 (63.45)	32 (65.55)	76 (60.18)	31 (73.54)	167 (61.95)	
Ethnicity						
Hispanic	140 (17.60)	23 (31.71)	37 (21.99)	21 (18.59)	59 (11.36)	0.0276
Non-Hispanic	406 (82.40)	39 (68.29)	102 (78.01)	34 (81.41)	231 (88.64)	
Current School Enrollment						0.3723
Yes	399 (74.06)	41 (64.65)	98 (74.76)	35 (67.27)	225 (77.95)	
No	147 (25.94)	21 (35.35)	41 (25.24)	20 (32.73)	65 (22.05)	
Education Level						0.0095
9 th grade or less	102 (19.33)	22 (43.15)	28 (17.22)	13 (19.22)	39 (14.24)	
10 th grade	87 (16.56)	13 (22.53)	24 (16.45)	5 (6.18)	45 (17.80)	
11 th grade	147 (25.62)	13 (16.54)	43 (26.97)	13 (28.74)	78 (26.46)	
12 th grade	144 (26.19)	10 (9.43)	34 (31.49)	21 (40.43)	79 (24.02)	
1-2 years of college	66 (12.31)	4 (8.34)	10 (7.86)	3 (5.43)	49 (17.49)	
Mother's Education						0.0993
Less than HS grad	86 (12.20)	21 (25.51)	21 (11.44)	10 (10.05)	34 (9.70)	
HS grad or GED	196 (41.60)	19 (44.90)	58 (50.20)	17 (39.16)	102 (36.88)	
Some college	153 (24.41)	18 (23.79)	33 (20.10)	15 (21.54)	87 (27.58)	
Bachelor's degree or higher	109 (21.78)	4 (5.80)	26 (18.26)	13 (29.25)	66 (25.84)	
Father's Education						0.2033
Less than HS grad	79 (11.20)	18 (23.05)	17 (10.81)	9 (13.95)	35 (7.58)	
HS grad or GED	186 (32.84)	21 (34.88)	49 (29.34)	13 (20.45)	103 (37.42)	
Some college	112 (20.50)	10 (10.85)	23 (17.50)	13 (22.02)	66 (24.20)	
Bachelor's degree or higher	97 (21.35)	7 (9.54)	28 (24.37)	11 (28.30)	51 (21.03)	
Missing/Don't know	72 (14.10)	6 (21.68)	22 (17.99)	9 (15.29)	35 (9.78)	
Place of Residence						0.9431
MSA, Central City	199 (28.61)	29 (35.90)	57 (29.77)	22 (26.04)	91 (26.78)	
MSA, other	231 (46.33)	20 (39.93)	54 (47.43)	25 (45.75)	132 (47.59)	
Not MSA	116 (25.05)	13 (24.17)	28 (22.81)	8 (28.21)	67 (25.63)	
Health Insurance Status						0.0148
Private	287 (56.67)	18 (24.12)	70 (57.66)	29 (63.1)	170 (62.97)	
Medicaid, CHIP or state-sponsored	149 (25.44)	22 (34.79)	48 (32.47)	12 (19.42)	67 (20.89)	
Medicare, military, other govt.	29 (6.31)	8 (18.14)	7 (3.99)	3 (5.98)	11 (4.52)	
Single Service, IHS or None	81 (11.58)	14 (22.96)	14 (5.88)	11 (11.50)	42 (11.62)	

*P-value is Pearson's from cross tab unless otherwise indicated

**P-value from linear regression

***Column totals do not add to 546 for all variables due to missing or "don't know" responses

Table 6. Family Environment Characteristics for Never-married, Sexually-experiences teens by Formal Sex Education Group

Characteristic	Formal Sex Education Group					p-value*
	Total**	NM	AM	MM	CM	
n (weighted %)	546 (100)	62 (12.75)	139 (25.58)	55 (12.86)	290 (48.81)	
N (weighted %)						
Always lived with both parents from birth to 18						0.7708
Yes	228 (48.43)	21 (43.37)	51 (48.26)	30 (56.55)	126 (47.70)	
No	318 (51.57)	41 (56.63)	88 (51.74)	25 (43.45)	164 (52.30)	
Ever Lived On Own						0.6910
Yes	80 (14.96)	14 (21.17)	25 (15.17)	7 (11.87)	34 (14.05)	
No	464 (85.04)	48 (78.83)	112 (84.83)	48 (88.13)	256 (85.95)	
Mother's age at her first delivery						0.4763
Less than 18 years	81 (15.88)	13 (15.60)	22 (17.63)	7 (23.28)	39 (13.08)	
18-19 years	108 (18.02)	10 (12.54)	37 (27.45)	6 (7.45)	55 (17.29)	
20-24 years	187 (32.61)	25 (40.98)	41 (25.83)	20 (28.43)	101 (35.09)	
25-29 years	111 (22.03)	8 (15.00)	25 (19.61)	17 (31.07)	61 (22.74)	
30 or older	52 (10.75)	6 (15.88)	13 (8.81)	4 (9.54)	29 (10.74)	
Mother-figure had no children	7 (0.72)	0 (0.00)	1 (0.68)	1 (0.23)	5 (1.06)	

*P-value is Pearson's from cross tab unless otherwise indicated

**Column totals do not add to 546 for all variables due to missing or "don't know" responses

Though those who reported receiving AM had the lowest percentage who reported "no religion," there were not any significant differences in the proportions reporting different religions across the sex education groups on the whole ($p=0.1520$) (Table 7). There were also no significant differences in frequency of religious service attendance or importance of religion in daily life between the different sex education groups. These results are presented in Table 7. Of note, only those who reported a religious affiliation were asked about the importance of religion in their daily life; those with no religion are included as their own category for this variable.

Table 7. Religious Characteristics of Never-married Sexually-experienced teens by Formal Sex Ed Groups

Characteristic	Formal Sex Education Group					p-value*
	Total**	NM	AM	MM	CM	
n (%)	546 (100)	62 (12.75)	139 (25.58)	55 (12.86)	290 (48.81)	
Religion						0.1520
None	123 (25.30)	16 (33.84)	26 (16.68)	16 (31.7)	65 (25.9)	
Catholic	157 (26.39)	25 (38.88)	33 (23.69)	20 (33.05)	79 (22.8)	
Protestant	239 (43.82)	20 (26.77)	72 (54.66)	16 (28.94)	131 (46.52)	
Other	27 (4.48)	1 (0.51)	8 (4.98)	3 (6.32)	15 (4.78)	
Frequency of Daily Service Attendance						0.8094
Less than weekly	423 (79.57)	46 (83.85)	98 (76.1)	44 (80.6)	235 (80.01)	
Weekly or more	122 (20.43)	16 (16.15)	41 (23.9)	11 (19.4)	54 (19.99)	
Importance of Religion						0.4691

in Daily Life					
Not	54 (9.84)	3 (3.92)	12 (7.81)	7 (16.14)	32 (10.79)
Somewhat	222 (39.31)	27 (35.34)	63 (45.12)	17 (27.53)	115 (40.42)
Very	145 (25.52)	16 (26.90)	37 (30.32)	15 (24.64)	77 (22.88)
No religion	123 (25.33)	16 (33.84)	26 (16.75)	16 (31.70)	65 (25.91)

*P-value is Pearson's from cross tab unless otherwise indicated

**Column totals do not add to 546 for all variables due to missing or "don't know" responses

Parental Discussion and Formal Sex Education

Most respondents reported having some discussion with their parents regarding sex education topics (79.26%). Among those who had some discussion, STDs were the most common topic (63.67%) followed by how to use a condom and how to prevent HIV/AIDS (52.85% and 49.12%, respectively). Fewer respondents reported parental discussion of birth control methods, where to get birth control or abstinence (42.11%, 29.36% and 41.38% respectively). Whether or not respondents talked with their parents about any sex education topic (yes/no) was not different among the formal sex education groups ($p = 0.7476$).

We found significant differences on the actual topic of parental discussions between sex education groups (Table 8). Those in the CM group had the highest proportion reporting discussion of abstinence, methods of birth control and where to get birth control. The AM and MM groups were similar with respect to parental discussion of abstinence (AM 41.34%, MM 38.06%); as expected, more in the MM group reported discussion of methods of birth control (AM 25.08%, MM 49.29%) and where to get birth control (AM 19.11%, MM 36.96%). The NM group had the smallest proportion reporting parental discussion in all three categories. There were no significant differences between groups in the proportion that reported having talked to parents about STDs, HIV/AIDS or How to Use a Condom (see Table 8). Results were similar when looking at

parental discussion of sex education topics by comparing those with any sex education to those with none (these results are presented in Table 32).

Table 8. Parental Discussion of Sex Education Topics for Never-married, Sexually-experiences teens by Formal Sex Education Group

Characteristic	Formal Sex Education					p-value*
	Total**	NM	AM	MM	CM	
n (weighted%)	546 (100)	62 (12.75)	139 (25.58)	55 (12.86)	290 (48.81)	
	n (weighted %)					
Parental Discussion						0.7476
No	125 (20.74)	13 (20.68)	39 (22.72)	17 (27.06)	56 (18.06)	
Yes	421 (79.26)	49 (79.32)	100 (77.28)	38 (72.94)	234 (81.94)	
Topics Discussed						
Abstinence						0.0078
No	340 (58.62)	52 (87.23)	92 (58.66)	45 (61.94)	151 (50.25)	
Yes	206 (41.38)	10 (12.77)	47 (41.34)	10 (38.06)	139 (49.75)	
Methods of birth control						0.0006
No	338 (57.89)	52 (82.64)	111 (74.92)	34 (50.71)	141 (44.39)	
Yes	208 (42.11)	10 (17.36)	28 (25.08)	21 (49.29)	149 (55.61)	
Where to get birth control						0.0172
No	397 (70.64)	55 (88.72)	114 (80.89)	41 (63.04)	187 (62.55)	
Yes	149 (29.36)	7 (11.28)	25 (19.11)	14 (36.96)	103 (37.45)	
STDs						0.0829
No	211 (36.33)	23 (37.88)	65 (48.11)	28 (40.52)	95 (28.64)	
Yes	335 (63.67)	39 (62.12)	74 (51.89)	27 (59.48)	195 (71.36)	
How to Prevent HIV/AIDS						0.0843
No	261 (50.88)	30 (57.83)	76 (62.51)	28 (38.85)	127 (46.14)	
Yes	285 (49.12)	32 (42.17)	63 (37.49)	27 (61.15)	163 (53.86)	
How to use a Condom						0.7453
No	269 (47.15)	32 (55.86)	70 (44.28)	30 (44.79)	137 (47.00)	
Yes	277 (52.85)	30 (44.14)	69 (55.72)	25 (55.21)	153 (53.00)	

*P-value is Pearson's from cross tab unless otherwise indicated

**Column totals do not add to 546 for all variables due to missing or "don't know" responses

Sex Education and Substance Use

We examined substance use among the sample as we considered it a marker of high-risk behavior. Overall, the majority of teens in the sample reported some alcohol use in the 12 months prior to the interview (22.98% reported never using alcohol) (see Table 9). In all categories of substance use, those who reported never having had sex were more likely to report never having used substances (alcohol, marijuana, cocaine, crack, methamphetamines or IV drugs) (see Table 33). Because the number who had used many of these drugs was so low, we constructed composite measures: any substance use (including alcohol), any drug use (excluding alcohol, but including marijuana) and any hard substance use (excluding marijuana). On the whole, 80.48% (n = 437) reported

some type of substance use including alcohol, while only 8.38% (n = 46) reported any hard drug use. Examining substance use among the sex education groups, only the composite measure of any substance use was significantly associated with formal sex education group. The MM group had the lowest percentage reporting any substance use (61.98% compared to over 80% in all other groups; p=0.0281).

Table 9. Substance Use among Never-married Sexually-experienced teens by Formal Sex Education Group

	Formal Sex Education					p-value*
	Total**	NM	AM	MM	CM	
n (weighted %)	546 (100)	62 (12.75)	139 (25.58)	55 (12.86)	290 (48.81)	
Alcohol consumption (last 12 months)						0.5001
Never	123 (22.98)	15 (23.62)	35 (20.41)	16 (40.54)	57 (19.55)	
Once or twice	108 (16.98)	13 (10.31)	26 (19.87)	13 (15.35)	56 (17.64)	
Several times-once a month	186 (35.49)	22 (37.30)	49 (35.57)	13 (26.11)	102 (37.45)	
About once a week or about once a day	127 (24.54)	12 (28.78)	29 (24.15)	12 (18.00)	74 (25.36)	
Binge drinking (last 12 months)						0.2453
Never	227 (38.25)	27 (35.05)	61 (32.80)	26 (53.38)	113 (37.98)	
Once or twice	78 (16.62)	8 (15.48)	20 (24.20)	8 (15.75)	42 (13.17)	
Several times-once a month	149 (28.05)	24 (42.44)	34 (22.38)	11 (20.70)	80 (29.19)	
About once a week or about once a day	90 (17.08)	3 (7.04)	24 (20.61)	9 (10.17)	54 (19.67)	
Marijuana Use (last 12 months)						0.1210
Never	289 (51.31)	32 (39.15)	70 (50.43)	32 (68.21)	155 (50.52)	
Once or twice	88 (16.92)	13 (27.65)	27 (24.24)	5 (2.67)	43 (14.01)	
Several times-once a month	76 (15.17)	7 (16.05)	21 (15.02)	7 (10.27)	41 (16.32)	
About once a week or about once a day	91 (16.60)	10 (17.16)	21 (10.31)	10 (18.86)	50 (19.16)	
Cocaine Use (last 12 months)						0.6752
Never	506 (92.43)	58 (87.82)	127 (89.51)	50 (94.21)	271 (94.70)	
Once or twice, several times or about once a month	34 (7.10)	4 (12.18)	11 (9.59)	4 (5.58)	15 (4.87)	
About once a month or more	6 (0.46)	0 (0)	1 (0.90)	1 (0.21)	4 (0.42)	
Crack (last 12 months)						0.6556
Never	540 (99.24)	62 (100.00)	136 (98.13)	55 (100.00)	287 (99.43)	
Once or twice, several times or about once a month	5 (0.58)	0 (0.00)	2 (1.20)	0 (0.00)	3 (0.57)	
About once a month or more	1 (0.17)	0 (0.00)	1 (0.67)	0 (0.00)	0 (0.00)	
Meth (last 12 months)						0.1910
Never	534 (97.35)	60 (99.09)	134 (92.93)	54 (99.50)	286 (98.63)	
Once or twice, several times or about once a month	11 (2.46)	2 (0.91)	4 (6.30)	1 (0.50)	4 (1.37)	
About once a month or more	1 (0.20)	0 (0.00)	1 (0.77)	0 (0.00)	0 (0.00)	
IV drug use (last 12 months)						0.0571
Never	541 (98.97)	62 (100.00)	136 (98.62)	54 (95.03)	289 (99.92)	
Once or twice, several times or about once a month	5 (1.03)	0 (0.00)	3 (1.38)	1 (4.97)	1 (0.08)	
About once a month or more	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	
Any substance use						0.0281
No	107 (19.52)	13 (17.48)	28 (15.28)	15 (38.02)	51 (17.42)	

Yes	437 (80.48)	49 (82.52)	111 (84.72)	39 (61.98)	238 (82.58)	
Any Drug Use (not including alcohol)						0.0986
No	289 (51.31)	32 (39.15)	70 (50.43)	32 (68.21)	155 (50.52)	
Yes	255 (48.69)	30 (60.85)	69 (49.57)	22 (31.79)	134 (49.48)	
Any hard drug use (not including pot)						0.7321
No	500 (91.62)	57 (87.40)	126 (89.23)	49 (93.71)	268 (93.42)	
Yes	46 (8.38)	5 (12.60)	13 (10.77)	6 (6.29)	22 (6.58)	

*P-value is Pearson's from cross tab unless otherwise indicated

**Column totals do not add to 546 for all variables due to missing or "don't know" responses

Contraceptive Use in the Sample

A majority of teens in the sample reported using a contraceptive method at first intercourse (88.06%; n = 475). Most teens reported condom use at first intercourse (82.28%; n = 447) while fewer reported use of a reliable method (defined in Methods section) (24.14%; n = 101). Specific types of contraceptive used by all never-married respondents who reported having heterosexual intercourse are presented in Table 34. Contraceptive use in terms of condom use, reliable contraceptive use or dual use, at first intercourse was not related to whether or not any type of formal sex education was received (see Table 35).

Though a greater proportion of the AM group reported use of any type of a birth control method at first coitus (93.35%, compared to 89.14% in the CM group, 83.95% in the MM group and 77.48% in the NM group), these differences were not statistically significant (p=0.0509). This difference was likely due to a difference in condom use reported, with 91.49% (n=117) of the AM group, 84.61% of the CM group, 67.47% of the NM group, and 69.79% of the MM group reporting condom use (p=0.0097) (Table 10). There was no statistically significant difference in the percent that reported use of a reliable method at coital debut (p=0.3153).

Table 10. Contraceptive Use Outcomes by Formal Sex Education Category

Characteristic	Formal Sex Education Group					p-value*
	Total ** n (weighted %)	NM n (weighted %)	AM n (weighted %)	MM n (weighted %)	CM n (weighted %)	
Use of a birth control method at coital debut						0.0509
Yes	475 (88.06)	51 (77.48)	121 (93.35)	45 (83.95)	258 (89.14)	
No	71 (11.94)	11 (22.52)	18 (6.65)	10 (16.05)	32 (10.86)	
Reliable Use						0.3153
Yes	101 (24.14)	14 (21.17)	26 (32.31)	10 (29.87)	51 (19.13)	
No	445 (75.86)	48 (78.83)	113 (67.69)	45 (70.13)	239 (80.87)	
Dual Use						0.2044
Yes	89 (20.93)	11 (15.37)	24 (31.44)	7 (17.37)	47 (17.81)	
No	457 (79.07)	51 (84.63)	115 (68.56)	48 (82.63)	243 (82.19)	
Condom Use						0.0097
Yes	447 (82.28)	44 (67.47)	117 (91.49)	40 (69.79)	246 (84.61)	
No	99 (17.72)	18 (32.53)	22 (8.51)	15 (30.21)	44 (15.39)	

*P-value is Pearson's from cross tab unless otherwise indicated

**Column totals do not add to 546 for all variables due to missing or "don't know" responses

Model Building: Reliable contraceptive use

We used multivariate logistic regression to further examine the relationship between formal sex education group and reliable contraceptive use while adjusting for potential confounders or other important factors. To begin, the relationships between demographic characteristics, family environment characteristics, religious characteristics and substance use characteristics, and reliable contraceptive use at first coitus were examined.

Univariate analyses: demographic and family environment characteristics

Table 11 presents descriptive statistics as well as univariate logistic regression analyses of demographic characteristics and family environment characteristics and reliable contraceptive use. There was a higher proportion reporting reliable contraceptive use among white respondents (29.31%) compared to black respondents (19.19%) or those who reported their race as "other" (10.23%; $p=0.0011$). Non-Hispanic respondents were

more likely to report reliable contraceptive use (27.22% compared to 9.72%; $p=0.0165$). Those with private health insurance were more likely to report reliable contraceptive use than those in any of the other insurance categories (private 29.43%, Medicaid, CHIP or state-sponsored 19.65%, Medicare, military, other government insurance 15.20%, Single Service, IHS or None 13.03%; $p= 0.0340$). We retained other characteristics that did not reach statistical significance at 0.05 but showed an association with a p-value from the Wald statistic of 0.20 or less for consideration in the model. The only such variable was age at first coitus.

Table 11. Association between Subject and Family Environment Characteristics and Use of a Reliable Method at Coital Debut

Characteristic	Total	Reliable Contraceptive Use		Wald test (F-statistic)	p-value	Unadjusted OR	95% CI
		No	Yes				
	n (weighted %)	n (weighted %)	n (weighted %)				
Total	546 (100)	445 (75.86)	101 (24.14)				
Respondent Age (weighted average) years	17.58 (17.52)	17.57 (17.52)	17.59 (17.51)	0.00	0.9924	1.00	[0.76 – 1.30]
Average Age at First Coitus (weighted average) years	15.25 (15.16)	15.33 (15.18)	15.23 (15.57)	3.13	0.0809	1.17	[0.98 – 1.39]
Race				7.53	0.0011		
Other	107 (16.44)	94 (89.77)	13 (10.23)			Referent	
Black	133 (20.11)	114 (80.81)	19 (19.19)			2.08	[0.83 – 5.23]
White	306 (63.45)	237 (70.69)	69 (29.31)			3.64	[1.86 – 7.11]
Ethnicity				6.02	0.0165		
Hispanic	140 (17.60)	125 (90.28)	15 (9.72)			Referent	
Non-Hispanic	406 (82.40)	320 (72.78)	86 (27.22)			3.47	[1.26 – 9.55]
Current School Enrollment				1.29	0.2596		
Yes	399 (74.06)	321 (73.82)	78 (26.18)			Referent	
No	147 (25.94)	124 (81.68)	23 (18.68)			0.63	[0.28 – 1.41]
Completed Schooling				0.70	0.5961		
9 th grade or less	102 (19.33)	88 (82.67)	14 (17.33)			Referent	
10 th grade	87 (16.56)	67 (77.83)	20 (22.17)			1.36	[0.53 – 3.50]
11 th grade	147 (25.62)	121 (70.21)	26 (29.79)			2.02	[0.67 – 6.13]
12 th grade	144 (26.19)	118 (72.73)	26 (27.27)			1.79	[0.61 – 5.21]
1 – 2 years college	66 (12.31)	51 (80.91)	15 (19.09)			1.13	[0.32 – 3.91]
Mother's Education				1.15	0.3331		
Less than HS grad	86 (12.20)	71 (86.00)	15 (14.00)			Referent	
HS grad or GED	196 (41.60)	156 (73.53)	40 (26.47)			2.21	[0.90 – 5.44]
Some college	153 (24.41)	128 (76.71)	25 (23.29)			1.86	[0.61 – 5.64]
Bachelor's degree or higher	109 (21.78)	89 (73.86)	20 (26.14)			2.17	[0.81 – 5.81]
Father's Education				0.74	0.5709		

Less than HS grad	79 (11.20)	68 (74.76)	11 (25.24)			Referent	
HS grad or GED	186 (32.84)	150 (78.83)	36 (21.17)			0.80	[0.21 – 3.05]
Some college	112 (20.50)	87 (70.25)	25 (29.75)			1.25	[0.38 – 4.15]
Bachelor’s degree or higher	97 (21.35)	76 (73.00)	21 (27.00)			1.10	[0.43 – 2.81]
Don’t know/missing	72 (14.10)	64 (82.29)	8 (17.71)			0.64	[0.25 – 1.63]
Health Insurance Status				3.05	0.0340		
Private	287 (56.67)	222 (70.57)	65 (29.43)			Referent	
Medicaid, CHIP or state-sponsored	149 (25.44)	128 (80.35)	21 (19.65)			0.59	[0.29 – 1.17]
Medicare, military, other govt.	29 (6.31)	25 (84.80)	4 (15.20)			0.43	[0.08 – 2.28]
Single Service, IHS or None	81 (11.58)	70 (86.97)	11 (13.03)			0.36	[0.17 – 0.77]
Place of Residence				1.63	0.2021		
MSA, Central City	199 (28.61)	168 (82.23)	31 (17.77)			Referent	
MSA, other	231 (46.33)	192 (76.80)	39 (23.20)			1.40	[0.54 – 3.59]
No MSA	116 (25.05)	85 (66.84)	31 (33.16)			2.30	[0.92 – 5.72]
Always lived with both parents from birth to 18				0.34	0.5624		
Yes	228 (48.43)	182 (74.36)	46 (25.64)			Referent	
No	318 (51.57)	263 (77.26)	55 (22.74)			0.85	[0.50 – 1.47]
Ever Lived On Own				0.14	0.7085		
Yes	80 (14.96)	63 (78.56)	17 (21.44)			Referent	Referent
No	464 (85.04)	380 (75.37)	84 (24.63)			1.20	[0.46 – 3.12]
Mother’s age at her first delivery				0.56	0.7324		
Less than 18 years	81 (15.88)	70 (68.75)	11 (31.25)			Referent	
18-19 years	108 (18.02)	93 (77.68)	15 (22.32)			0.63	[0.15 – 2.60]
20-24 years	187 (32.61)	153 (81.54)	34 (18.46)			0.50	[0.14 – 1.82]
25-29 years	111 (22.03)	79 (72.95)	32 (27.05)			0.82	[0.23 – 2.86]
30 or older	52 (10.75)	45 (72.58)	7 (27.42)			0.83	[0.20 – 3.48]
Mother-figure had no children	7 (0.72)	5 (67.73)	2 (32.27)			1.05	[0.11 – 9.81]

*P-value is Pearson’s from cross tab unless otherwise indicated

**Column totals do not add to 546 for all variables due to missing or “don’t know” responses

Univariate analyses: religious characteristics

There were higher proportions of respondents reporting reliable contraception use among those who identified as Catholic or Protestant (30.11% and 29.52% respectively) compared to those who identified as “other” religion or none (6.20% and 11.78% respectively) (p=0.0121). Those who said religion was ‘not,’ ‘somewhat’ or ‘very’ important in their daily life had higher proportions of condom use (24.65%, 30.88%, and 25.96% respectively), while fewer of those who had answered “no religion” (and thus were not asked about importance) reported reliable contraceptive use (11.78%). As

reported in Table 12, frequency of attendance at religious services was not significantly associated with reliable contraceptive use.

Table 12. Association between Religious Characteristics and Reliable Contraceptive Use at Coital Debut

Characteristic	Reliable Contraceptive Use at First Intercourse			Wald test (F-statistic)	p-value	OR	95% CI
	Total	No	Yes				
	n (weighted %)	n (weighted %)	n (weighted %)				
Religion				3.91	0.0121	Referent	
None	123 (25.30)	104 (88.22)	19 (11.78)				
Catholic	157 (26.39)	125 (69.89)	32 (30.11)			3.23	[1.09 – 9.51]
Protestant	239 (43.82)	192 (70.48)	47 (29.52)			3.14	[1.40 – 7.00]
Other	27 (4.48)	24 (93.80)	3 (6.20)			0.49	[0.11 – 2.22]
Frequency of Religious Service Attendance				0.06	0.8107	Referent	
Less than weekly	423 (79.57)	346 (75.53)	77 (24.47)				
Weekly or more	122 (20.43)	98 (77.09)	24 (22.91)			0.92	[0.45 – 1.87]
Importance of Religion in Daily Life				2.85	0.0436	Referent	
Not	54 (9.84)	43 (75.35)	11 (24.65)				
Somewhat	222 (39.31)	179 (69.12)	43 (30.88)			1.37	[0.44 – 4.26]
Very	145 (25.52)	117 (74.04)	28 (25.96)			1.07	[0.31 – 3.72]
No religion	123 (25.33)	104 (88.22)	19 (11.78)			0.41	[0.12 – 1.35]

*P-value is Pearson's from cross tab unless otherwise indicated

**Column totals do not add to 546 for all variables due to missing or "don't know" responses

Univariate analyses: parental discussion

Reliable contraceptive use was not associated with whether the respondent talked with his parents about sex education topics overall ($p=0.4293$), but was associated with whether or not several specific sex education topics were discussed. Reliable contraceptive use was more likely among those who reported discussing abstinence (34.13% used reliable contraception; $p=0.0259$) or methods of birth control (31.78% used reliable contraception; $p=0.0183$) compared to those who did not discuss these topics. No other topics were significantly associated with reliable contraceptive use (see Table 13). As with the other demographic characteristics, those parental discussion topics that were associated with reliable contraceptive use at the 0.20 level (how to prevent HIV/AIDS and how to use a condom) were considered for the multivariate model.

Table 13. Association between Parental Discussion and Reliable Contraceptive Use at Coital Debut

Characteristic	Total	Reliable Contraceptive Use		Wald test (F-Statistic)	P-value	OR	95% CI
		No n (weighted %)	Yes n (weighted %)				
Parental Discussion							
No	125 (20.74)	104 (80.48)	21 (19.52)	0.63	0.4293	Referent	[0.60 – 3.26]
Yes	421 (79.26)	341 (74.65)	80 (25.35)				
Topics Discussed							
Abstinence				5.17	0.0259	Referent	Referent
No	340 (58.62)	286 (82.91)	54 (17.09)				
Yes	206 (41.38)	159 (65.87)	47 (34.13)			2.51	[1.12 – 5.64]
Methods of birth control				5.83	0.0183	Referent	Referent
No	338 (57.89)	282 (81.41)	56 (18.59)				
Yes	208 (42.11)	163 (68.22)	45 (31.78)			2.04	[1.13 – 3.68]
Where to get birth control				1.61	0.2083	Referent	Referent
No	397 (70.64)	328 (78.02)	69 (21.98)				
Yes	149 (29.36)	117 (70.66)	32 (29.34)			1.47	[0.80 – 2.71]
STDs				0.49	0.4879	Referent	referent
No	211 (36.33)	175 (78.21)	36 (21.79)				
Yes	335 (63.67)	270 (74.52)	65 (25.48)			1.23	[0.68 – 2.21]
How to Prevent HIV/AIDS				2.63	0.1089	Referent	Referent
No	261 (50.88)	219 (79.91)	42 (20.09)				
Yes	285 (49.12)	226 (71.66)	59 (28.34)			1.57	[0.90 – 2.74]
How to use a Condom				2.70	0.1046	Referent	Referent
No	269 (47.15)	222 (82.34)	47 (17.66)				
Yes	277 (52.85)	223 (70.07)	54 (29.93)			1.99	[0.86 – 4.59]

*P-value is Pearson’s from cross tab unless otherwise indicated

**Column totals do not add to 546 for all variables due to missing or “don’t know” responses

Univariate analyses: substance use and reliable contraceptive use

Finally, we examined the relationship between substance use and reliable contraceptive use (Table 14). Of those who reported marijuana use about once a week or once a day only 7.57% reported using reliable contraception, while between 25% and 29% of those reporting less marijuana use used reliable contraception (p=0.0120). Reliable contraception use did not differ by use of other substances.

Table 14. Association between Substance Use Characteristics and Reliable Contraceptive at Use Coital Debut

Characteristic	Reliable contraceptive use			Wald Test F-statistic	p-value	OR	95% CI
	Total n (weighted %)	No n (weighted %)	Yes n (weighted %)				
Alcohol consumption (last 12 months)				0.64	0.5933		
Never	123 (22.98)	96 (69.48)	27 (30.52)			Referent	
Once or twice	108 (16.98)	90 (80.23)	18 (19.77)			0.56	[0.22 – 1.45]
Several times-once a month	186 (35.49)	150 (76.87)	36 (21.13)			0.68	[0.31 – 1.52]
About once a week or about once a day	127 (24.54)	107 (77.27)	20 (22.73)			0.67	[0.28 – 1.61]
Binge drinking (last 12 months)				0.37	0.7727		
Never	227 (38.25)	190 (77.90)	37 (22.10)			Referent	
Once or twice	78 (16.62)	62 (75.10)	16 (24.90)			1.17	[0.45 – 3.02]
Several times-once a month	149 (28.05)	120 (77.17)	29 (22.83)			1.04	[0.54 – 2.03]
About once a week or about once a day	90 (17.08)	71 (69.77)	19 (30.23)			1.53	[0.66 – 3.54]
Marijuana Use (last 12 months)				3.92	0.0120		
Never	289 (51.31)	227 (71.69)	62 (28.31)			Referent	
Once or twice	88 (16.92)	73 (73.52)	15 (26.48)			0.91	[0.34 – 2.46]
Several times-once a month	76 (15.17)	62 (74.09)	14 (25.91)			0.89	[0.41 – 1.89]
About once a week or about once a day	91 (16.60)	81 (92.43)	10 (7.57)			0.21	[0.08 – 0.55]
Cocaine Use (last 12 months)				0.00	0.9878		
Never	506 (92.43)	411 (75.76)	95 (24.24)			Referent	
Once or twice, or several times	34 (7.10)	28 (75.52)	6 (24.48)			1.01	[0.18 – 5.57]
About once a month or more	6 (0.46)	6 (100.00)	0 (0.00)				
Crack (last 12 months)				-	0.4575*		
Never	540 (99.24)	439 (75.67)	101 (24.33)			-	-
Once or twice or several times	5 (0.58)	5 (100.00)	0 (0.00)			-	-
About once a month or more	1 (0.17)	1 (100.00)	0 (0.00)			-	-
Meth (last 12 months)				1.33	0.2533		
Never	534 (97.35)	435 (76.51)	99 (23.49)			Referent	
Once or twice, or several times	11 (2.46)	9 (48.22)	2 (51.78)			3.50	[0.40 – 30.52]
About once a month or more	1 (0.20)	1 (100.00)	0 (0.00)			-	-
IV drug use (last 12 months)				-	-		
Never	541 (98.97)	440 (75.61)	101 (24.39)			-	-
Once or twice or several times	5 (1.03)	5 (100.00)	0 (0)			-	-
About once a month or more	0 (0.00)	0 (0.00)	0 (0.00)			-	-
Any substance use				2.53	0.1159		
No	107 (19.52)	82 (67.56)	25 (32.44)			referent	
Yes	437 (80.48)	361 (77.85)	76 (22.15)			0.59	[0.31 – 1.14]
Any Drug Use (not including EtOH)				2.15	0.1465		
No	289 (51.31)	227 (71.69)	62 (28.31)			Referent	

Yes	255 (48.69)	216 (80.14)	39 (19.86)	0.06	0.8066	0.63	[0.33 – 1.18]
Any hard drug use (not including pot)							
No	500 (91.62)	406 (75.56)	94 (24.44)			Referent	
Yes	46 (8.38)	39 (79.09)	7 (20.91)			0.82	[0.16 – 4.19]

*p value from Pearson's X^2

Model building: variable selection

Variables tested in the backward selection were age at coital debut, race, Hispanic ethnicity, insurance status, place of residence, religion, religious importance, parental discussion topics (abstinence, methods of birth control, where to get birth control, HIV/AIDS, how to use a condom), and marijuana use. After backward selection, variables remaining in the model (in addition to sex education group) were race, ethnicity, religion, parental discussion of methods of birth control and marijuana use.

Next, variables that were not selected by backward selection were added to the preliminary model to test for confounding. We also tested variables that were associated with formal sex education group at the .10 level but not with the outcome (i.e. mother's education level) at this stage. The inclusion of insurance status changed the association by more than 20% in one category and was considered for the final model. However, its inclusion also changed the significance of our other selected covariates (race and Hispanic ethnicity) and so was not included in the final model. Table 15 presents odds of reliable contraceptive use for all the predictor variables included in the final model.

After adjustment for race, Hispanic Ethnicity, religion, parental discussion of birth control and marijuana use, there was no statistically significant association between Formal Sex Education category and reported reliable contraceptive use at first coitus in our sample.

Table 15. Odds of Reliable Contraceptive Use at Coital Debut by Significant Predictors

Characteristic	Adjusted OR*	95% CI	Wald Statistic	p-value
Formal Sex Education			1.59	0.2004
Neither (NM)	Referent			
Abstinence (AM)	1.47	[0.44 – 4.95]		
Methods (MM)	1.17	[0.37 – 3.70]		
Comprehensive (CM)	0.59	[0.21 – 1.66]		
Race			4.09	0.0208
Other	Referent			
Black	1.26	[0.40 – 4.03]		
White	2.72	[1.19 – 6.21]		
Hispanic ethnicity			4.42	0.0390
Hispanic	Referent			
Non-Hispanic	2.72	[1.07 – 12.27]		
Religion			4.43	0.0065
No religion	Referent			
Catholic	3.52	[1.45 – 8.56]		
Protestant	2.80	[1.24 – 6.26]		
Other	0.50	[0.10 – 2.61]		
Parental discussion of birth control			5.33	0.0237
No	Referent			
Yes	2.10	[1.11 – 3.98]		
Marijuana Use (last 12 months)			4.22	0.0084
Never	Referent			
Once or twice	0.98	[0.40 – 2.39]		
Several times-once a month	0.76	[0.35 – 1.67]		
About once a week or about once a day	0.19	[0.07 – 0.50]		

*Adjusted for other significant predictors in the model

Model Building: Formal Sex Education Group and Condom use

We used a similar model-building strategy to model the relationship between formal sex education and condom use at first coitus.

Univariate analyses: demographic and family environment characteristics and condom use

Table 16 presents descriptive statistics and univariate analyses for demographic characteristics and condom use. Age at first sex, education level of the respondent, and whether the respondent had always lived with both parents were associated with condom use at first sex. Reported condom use was more likely among those who were older at first sex ($p=0.0166$), those who had completed higher grades at the time of the interview ($p=0.0150$), and those who had always lived with both parents ($p=0.0367$). Though not statistically significant, race, school enrollment, father's education, place of resident,

whether the respondent had ever lived on his own, and mother's age at her first delivery were related at less than 0.20 level and were considered in backward selection.

Table 16. Association between Subject and Family Environment Characteristics and Condom Use at Coital Debut

Characteristic	Total	Condom Use		Wald test F-statistic	p-value	OR	95% CI
		No	Yes				
Total		99 (17.22)	447 (82.28)				
Respondent Age (weighted average) years	17.58 (17.52)	17.63 (17.35)	17.56 (17.55)	1.06	0.306	1.13	[0.89 – 1.43]
Average Age at First Coitus (weighted average) years	15.25 (15.33)	14.87 (14.79)	15.34 (15.44)	6.01	0.0166	1.28	[1.05 – 1.57]
		n (weighted %)	n (weighted %)				
Race				2.55	0.0849		
Other	107 (16.44)	30 (28.11)	77 (71.89)			Reference	
Black	133 (20.11)	25 (21.69)	108 (78.31)			1.41	[0.52 – 3.84]
White	306 (63.45)	44 (13.77)	262 (86.23)			2.45	[1.01 – 5.95]
Ethnicity				0.72	0.3997		
Hispanic	140 (17.60)	36 (20.97)	104 (79.03)			Referent	
Non-Hispanic	406 (82.40)	63 (17.03)	343 (82.97)			1.29	[0.71 – 2.37]
Current School Enrollment				3.29	0.0739		
Yes	399 (74.06)	59 (15.17)	340 (84.83)			Referent	
No	147 (25.94)	40 (25.01)	107 (74.99)			0.54	[0.27 – 1.06]
Education				3.32	0.0150		
9 th grade or less	102 (19.33)	25 (24.29)	77 (75.71)			Referent	
10 th grade	87 (16.56)	13 (13.78)	74 (86.22)			2.01	[0.71 – 5.69]
11 th grade	147 (25.62)	33 (26.14)	114 (73.86)			0.91	[0.38 – 2.17]
12 th grade	144 (26.19)	20 (10.87)	124 (89.13)			2.63	[1.42 – 4.86]
1-2 years college/grad school	66 (12.31)	8 (9.75)	58 (90.25)			2.97	[0.76 – 11.62]
Mother's Education				1.57	0.2039		
Less than HS grad	86 (12.20)	26 (24.25)	60 (75.75)			Referent	
HS grad or GED	196 (41.60)	27 (14.08)	169 (85.92)			1.95	[0.95 – 4.02]
Some college	153 (24.41)	26 (23.48)	127 (76.52)			1.04	[0.45 – 2.40]
Bachelor's degree or higher	109 (21.78)	20 (14.64)	89 (85.36)			1.87	[0.70 – 4.95]
Father's Education				2.45	0.0540		
Less than HS grad	79 (11.20)	21 (36.92)	58 (63.08)			Referent	
HS grad or GED	186 (32.84)	28 (17.05)	158 (82.95)			2.85	[1.15 – 7.07]
Some college	112 (20.50)	15 (10.63)	97 (89.37)			4.92	[1.63 – 14.86]
Bachelor's degree or higher	97 (21.35)	16 (11.71)	81 (88.29)			4.41	[1.23 – 15.85]
Don't Know/Missing	72 (14.10)	19 (23.45)	53 (76.55)			1.91	[0.63 – 5.79]
Health Insurance Status				1.03	0.3837		
Private	287 (56.67)	45 (13.99)	242 (86.01)			Referent	
Medicaid, CHIP or state-sponsored	149 (25.44)	28 (22.88)	121 (77.12)			0.55	[0.23 – 1.30]
Medicare, military, other govt.	29 (6.31)	7 (12.43)	22 (87.57)			1.15	[0.37 – 3.52]
Single Service, IHS or None	81 (11.58)	19 (27.54)	62 (72.46)			0.43	[0.13 – 1.39]
Place of Residence				2.71	0.0732		
MSA, central city	199 (28.61)	42 (24.07)	157 (75.93)			Referent	

MSA, other	231 (46.33)	38 (14.24)	193 (85.76)			1.91	[1.09 – 3.33]
Not MSA	116 (25.05)	19 (16.90)	97 (83.10)			1.56	[0.64 – 3.77]
Always lived with both parents from birth to 18				4.53	0.0367		
Yes	228 (48.43)	39 (12.99)	189 (87.01)			Referent	
No	318 (51.57)	60 (22.16)	258 (77.84)			0.52	[0.29 – 0.96]
Ever Lived On Own				2.42	0.1241		
Yes	80 (14.96)	24 (25.23)	56 (74.77)			Referent	
No	464 (85.04)	74 (16.36)	390 (83.64)			1.73	[0.86 – 3.47]
Mother’s age at her first delivery				1.59	0.1867		
Less than 18 years	81 (15.88)	22 (26.44)	59 (73.56)			Referent	
18-19 years	108 (18.02)	20 (12.84)	88 (87.16)			2.44	[1.09 – 5.44]
20-24 years	187 (32.61)	30 (18.75)	157 (81.25)			1.56	[0.72 – 3.37]
25-29 years	111 (22.03)	19 (12.25)	92 (87.75)			2.57	[0.81 – 8.18]
30 or older	52 (10.75)	8 (22.31)	44 (77.69)			1.25	[0.42 – 3.70]
Mother-figure had no children	7 (0.72)	0 (0.00)	7 (100.00)			-	-

Univariate analyses: religious characteristics and condom use

Table 17 presents associations between condom use at first coitus and religious characteristics of the respondent. As with reliable contraceptive use, importance of religion was related to condom use ($p=0.0423$). Those who said religion was “not important” in his daily life had the highest proportion reporting condom use (91.14%), while those who said it was “somewhat” important or had no reported religion had similar percentages of reported condom use (85.83% and 85.55%, respectively) and those who reported that religion was “very important” had the lowest proportion of condom use (70.58%). Unlike with reliable contraceptive use, religion of the respondent was not related to condom use ($p=0.5197$). Again, frequency of religious service attendance was not related to condom use ($p=0.4200$).

Table 17. Association between Religious Characteristics and Condom Use at Coital Debut

Characteristic	Condom Use at First Intercourse			Wald Test F-Statistic	p-value	OR	95% CI
	Total n (weighted %)	No n (weighted %)	Yes n (weighted %)				
Religion				0.76	0.5197		
None	123 (25.30)	19 (14.45)	104 (85.55)			Referent	
Catholic	157 (26.39)	28 (20.21)	129 (79.79)			0.67	[0.25 – 1.76]
Protestant	239 (43.82)	49 (18.95)	190 (81.05)			0.72	[0.32 – 1.65]

Other	27 (4.48)	3 (9.45)	24 (90.55)			1.62	[0.35 – 7.50]
Frequency of Service Attendance				0.66	0.4200		
Less than weekly	423 (79.57)	74 (18.46)	349 (81.54)			Referent	
Weekly or more	122 (20.43)	24 (14.76)	98 (85.24)			1.31	[0.68 – 2.52]
Importance of Religion in Daily Life				2.87	0.0423		
Not	54 (9.84)	6 (8.86)	48 (91.14)			Referent	
Somewhat	222 (39.31)	36 (14.17)	186 (85.83)			0.59	[0.19 – 1.82]
Very	145 (25.52)	36 (29.42)	109 (70.58)			0.23	[0.08 – 0.72]
No Religion	123 (25.33)	19 (14.45)	104 (85.55)			0.58	[0.15 – 2.24]

Univariate analyses: parental discussion and condom use

In contrast to the relationships of parental discussion of abstinence and birth control methods and reliable contraceptive use, none of the sex education topics discussed between the respondent and his parents were significantly related to condom use (see Table 18).

Table 18. Association between Parental Discussion and Condom Use at Coital Debut

Characteristic	Total	Condom Use		Wald test F-statistic	p-value	OR	95% CI
		No	Yes				
	n (weighted %)	n (weighted %)	n (weighted %)				
Parental Discussion				0.06	0.8060		
No	125 (20.74)	27 (16.78)	98 (83.22)			Referent	
Yes	421 (79.26)	72 (17.97)	349 (82.03)			0.92	[0.47 – 1.79]
Topics Discussed							
Abstinence				0.89	0.3474		
No	340 (58.62)	73 (19.72)	267 (80.28)			Referent	
Yes	206 (41.38)	26 (14.89)	180 (85.11)			1.40	[0.69 – 2.87]
Methods of Birth Control				0.32	0.5735		
No	338 (57.89)	59 (16.66)	279 (83.34)			Referent	
Yes	208 (42.11)	40 (19.19)	168 (80.81)			0.84	[0.46 – 1.55]
Where to get birth control				0.01	0.9080		
No	397 (70.64)	76 (17.91)	321 (82.09)			Referent	
Yes	149 (29.36)	23 (17.26)	126 (82.74)			1.05	[0.48 – 2.28]
STDs				0.88	0.3510		
No	211 (36.33)	47 (20.59)	164 (79.41)			Referent	
Yes	335 (63.67)	52 (16.09)	283 (83.91)			1.35	{0.71 – 2.57}
How to Prevent HIV/AIDS				0.11	0.7449		
No	261 (50.88)	53 (18.57)	208 (81.43)			Referent	
Yes	285 (49.12)	46 (16.85)	239 (83.15)			1.13	[0.55 – 2.31]
How to use a Condom				1.46	0.2311		
No	269 (47.15)	58 (20.78)	211 (79.22)			Referent	
Yes	277 (52.85)	41 (14.99)	236 (85.01)			1.49	[0.77 – 2.86]

Univariate Analyses: substance use and condom use

We again examined substance use characteristics of the sample for their association with condom use (see Table 19). However, unlike with reliable contraceptive use, marijuana use was not associated with condom use ($p=0.9399$). None of the substance use categories were associated below the .20 level; none were included in backward selection.

Table 19. Association between Substance Use Characteristics and Condom Use at Coital Debut

Characteristic	Total	Condom Use		Wald test F-statistic	p-value	OR	95% CI
	n (weighted %)	No n (weighted %)	Yes n (weighted %)				
Total	546 (100)						
Alcohol consumption (last 12 months)				0.06	0.9825		
Never	123 (22.98)	20 (17.48)	103 (82.52)			Referent	Referent
Once or twice	108 (16.98)	16 (19.35)	92 (80.65)			0.88	[0.33 – 2.39]
Several times-once a month	186 (35.49)	33 (16.93)	153 (83.07)			1.04	[0.41 – 2.62]
About once a week or about once a day	127 (24.54)	29 (17.83)	98 (82.17)			0.98	[0.37 – 2.61]
Binge drinking (last 12 months)				0.68	0.5663		
Never	227 (38.25)	35 (20.40)	192 (79.60)			Referent	Referent
Once or twice	78 (16.62)	15 (16.09)	63 (83.91)			1.34	[0.51 – 3.51]
Several times-once a month	149 (28.05)	31 (18.41)	118 (81.59)			1.14	[0.57 – 2.28]
About once a week or about once a day	90 (17.08)	17 (11.98)	73 (88.02)			1.88	[0.78 – 4.52]
Marijuana Use (last 12 months)				0.13	0.9399		
Never	289 (51.31)	48 (17.14)	241 (82.86)			Referent	Referent
Once or twice	88 (16.92)	15 (17.10)	73 (82.90)			1.00	[0.37 – 2.72]
Several times-once a month	76 (15.17)	15 (16.16)	61 (83.84)			1.07	[0.37 – 2.72]
About once a week or about once a day	91 (16.60)	20 (21.55)	71 (78.45)			0.75	[0.29 – 1.96]
Cocaine Use (last 12 months)				1.55	0.2200		
Never	506 (92.43)	88 (17.44)	418 (82.56)			Referent	Referent
Once or twice, several times or about once a month	34 (7.10)	8 (18.67)	26 (81.33)			0.92	[0.23 – 3.65]
About once a month or more	6 (0.46)	3 (59.33)	3 (40.67)			0.15	[0.02 – 1.28]
Crack (last 12 months)				1.54	0.2181		
Never	540 (99.24)	96 (17.44)	444 (82.56)			Referent	Referent
Once or twice, several times or about once a month	5 (0.58)	2 (41.66)	3 (58.34)			0.30	[0.04 – 2.09]
About once a month or more	1 (0.17)	1 (100.00)	0 (0.00)				

Meth (last 12 months)				0.58	0.4484		
Never	534 (97.35)	93 (17.44)	441 (82.56)			Referent	Referent
Once or twice, several times or about once a month	11 (2.46)	6 (30.36)	5 (69.64)			0.48	[0.07 – 3.22]
About once a month or more	1 (0.20)	0 (0.00)	1 (100.00)				
IV drug use (last 12 months)				0.61	0.4363		
Never	541 (98.97)	96 (17.55)	445 (82.45)			Referent	Referent
Once or twice, several times or about once a month	5 (1.03)	3 (34.28)	2 (65.72)			0.41	[0.04 – 4.00]
About once a month or more	0 (0.00)	0 (0.00)	0 (0.00)			-	-
Any substance use				0.21	0.6516		
No	107 (19.52)	16 (15.12)	91 (84.88)			Referent	Referent
Yes	437 (80.48)	82 (18.31)	355 (81.69)			0.79	[0.29 – 2.19]
Any Drug Use (not including alcohol)				0.07	0.7975		
No	289 (51.31)	48 (17.14)	241 (82.86)			Referent	Referent
Yes	255 (48.69)	50 (18.32)	205 (81.68)			0.91	[0.49 – 1.73]
Any hard drug use (not including pot)				0.68	0.4135		
No	500 (91.62)	84 (17.09)	416 (82.91)			Referent	Referent
Yes	46 (8.38)	15 (24.65)	31 (75.35)			0.63	[0.21 – 1.93]

Model building began with backward stepwise selection including variables that were associated with condom use at a level of 0.20 or less (age at first coitus, race, current school enrollment, education level, mother’s education level, father’s education level, place of residence, whether the respondent always lived with both parents, whether the respondent ever lived on his own, mother’s age at first birth, and importance of religion). Backward stepwise selection for variables significant at the 0.05 level resulted in current school enrollment, education level, and importance of religion being included in the model. Again, potential confounders were assessed for their influence on the odds of condom use among the different formal sex education groups. As none of the tested confounders were associated with a change of more than 20% in the magnitude of the association, none were added to the model.

Results for the final model are presented in Table 20. After adjustment for age at first coitus, importance of religion and father’s education, men who reported having

received Abstinence education had 5.60 (95% CI: 1.82 – 17.2) times the odds of reporting condom use at first intercourse compared to those who only received HIV and/or STD education. The decreased odds of condom use with Methods education and the increased odds of condom use with Comprehensive education were not significant.

Table 20. Odds of Condom use at Coital Debut by Significant Predictors

Characteristic	Adjusted OR*	95% CI	Wald Stat	p-value
Formal Sex Education Group			4.27	0.0079
HIV/STD only	Referent			
Abstinence (AM)	5.60	[1.82 – 17.2]		
Methods (MM)	0.92	[0.26 – 3.21]		
Comprehensive (CM)	2.25	[1.00 – 5.06]		
Current school enrollment			6.78	0.0112
Yes	Referent			
No	0.38	[0.18 – 0.79]		
Years of schooling			4.71	0.0020
9 th grade or less	Referent			
10 th grade	1.65	[0.57 – 4.74]		
11 th grade	0.61	[0.25 – 1.49]		
12 th grade	2.99	[1.39 – 6.43]		
1-2 years college/grad school	2.39	[0.49 – 11.64]		
Importance of Religion in Daily Life			3.11	0.0317
Not	Referent			
Somewhat	0.70	[0.16 – 3.02]		
Very	0.26	[0.06 – 1.09]		
No religion	1.06	[0.19 – 5.86]		

*Each OR adjusted for the other predictors in the table

Because the variable on the whole was a significant predictor of condom use at first coitus (Wald F-statistic p-value=0.0079), we performed linear combinations to assess the likelihood of condom use between other groups. The results of these analyses are presented in Table 21. Those who received abstinence education had 6.09 times the odds of using condoms at first intercourse compared to those who received Methods education (p=0.004). Those who received abstinence messages had 2.49 times the odds of reporting condom use than those who received comprehensive education (p=0.025). The increased likelihood of condom use with comprehensive as compared to methods education was not significant (p=0.074).

Table 21. Odds of Condom Use at Coital Debut using Different Reference Groups

Comparison	Adjusted OR*	95% CI	p-value
Abstinence vs Methods	6.09	[1.81 – 20.45]	0.004
Comprehensive vs Methods	2.44	[0.92 – 6.50]	0.074
Abstinence vs Comprehensive	2.49	[1.12 – 5.53]	0.025

*OR adjusted for current school enrollment, respondent’s education level, and importance of religion

Overall Results

Overall, whether or not a boy received of formal sex education regarding only HIV/STD, abstinence, methods or all three types was not associated with use of a reliable method at first coitus (see Table 23). However, those who received AM education prior to first coitus had 5.18 times the odds of using a condom the first time they had sex compared to those with neither abstinence nor methods education (NM) prior to adjustment, while those who received comprehensive education had 2.65 times the odds of using a condom. After adjusting for the respondent’s school enrollment, education level and importance of religion the association remained significant. Thus, after accounting for school enrollment, level of education and importance of religion, those with AM education had 5.60 times the odds of reporting condom use at first coitus compared to those with HIV/STD only education. The association between MM and CM compared to NM only were not significant after adjustment.

Table 22. Odds of Contraceptive Use at Coital Debut among Never-married Male Teens by type of Formal Sex Education

Reliable Contraceptive Use				
	Wald Statistic	p-value for Wald	Wald Statistic for Adjusted Model*	p-value for Wald
Formal Sex Education	1.26	0.294	1.69	0.177
	Unadjusted Odds	95% CI	Adjusted Odds	95% CI
Neither (NM)	Referent		Referent	
Abstinence (AM)	1.78	[0.48 – 6.56]	1.19	[0.37 – 3.87]
Methods (MM)	1.59	[0.41 – 6.14]	0.96	[0.29 – 3.12]
Comprehensive (CM)	0.88	[0.35 – 2.20]	0.47	[0.16 – 1.35]
Condom Use				
	Wald Statistic	p-value for Wald	Wald Statistic for Adjusted Model**	p-value for Wald
Formal Sex Education	4.26	0.0080	3.81	0.0136
	Unadjusted Odds	95% CI	Adjusted Odds**	95% CI
Neither (NM)	Referent		Referent	
Abstinence (AM)	5.18	[1.93 – 13.94]	5.60	[1.82 – 17.20]
Methods (MM)	1.11	[0.30 – 4.13]	0.92	[0.26 – 3.21]
Comprehensive (CM)	2.65	[1.22 – 5.77]	2.25	[1.00 – 5.06]

*Adjusted for race, ethnicity, religion, parental discussion of birth control methods, marijuana use, insurance status

**Adjusted for school enrollment, education level and religious importance

CHAPTER FOUR: DISCUSSION

We examined whether receipt of sex education containing abstinence messages (AM), birth control methods messages (MM), or both types (CM) by teen boys was associated with use of reliable contraception or condoms at first intercourse compared to receiving neither type of message (NM). We found that receipt of sex education that included an abstinence message was associated with increased condom use at first intercourse compared to receiving other types of education. Type of sex education was not associated with reliable contraceptive use at first coitus.

Other studies to date have shown inconsistent results regarding the influence of sex education on behaviors at first intercourse. Studies examining abstinence-only education have found either no association with adolescent sexual behaviors or an increase in *risky* behaviors or outcomes with abstinence-only education (55).

Some of the differences in the results of early studies are likely due to different content of various curricula (even among programs promoting abstinence or birth control methods) in place during the early 1990s compared to now. In 1993, Ku examined influences on behaviors at first intercourse among a nationally representative sample of adolescent men (56). They found no association between AIDS or sex education on birth control (which included condoms) or condom use alone, though instruction on methods of birth control or where to get birth control was marginally associated with higher use of both (p values of 0.11 and 0.15 respectively).

One study, using nationally representative data from 2002, found that receipt of any type of sex education was associated with delayed sexual debut and increased birth control use (including condom use) at sexual debut among teen males, but not among

females (37). This study did not differentiate between types of sex education and contrasts with our descriptive analyses of groups with no education compared to any sex education. Another study using the same data set found that comprehensive sex education (that including abstinence and methods messaging) reduced the risk of having had sex and of pregnancy among teens in the survey (36). In this study, the risk of pregnancy was lower among those with comprehensive education than among those with abstinence-only education or no sex education (36). None of the types of sex education were associated with the likelihood of reported STD diagnoses (36). A final study using this data examined only female respondents and found that sex education containing only methods messages (compared to comprehensive education or abstinence-only education) increased the use of reliable birth control use at first coitus (39). The differences evident in the influences on male and female adolescents are not surprising, given that men and women have different roles in contraceptive decision making and the consequences of STDs and unintended pregnancy are different for the man and the woman (57,58).

Many authors have speculated on and investigated what motivates young men to use protection from STDs and pregnancy (56, 59-61). Some have suggested that the use of condoms is lower when young couples are using another method of birth control (56,59,60). This has been observed in teen relationships with “main” partners (60); however, in high-risk samples and in sex with “casual partners” this has not been the case, with young women on oral contraceptives not being any less likely to use condoms or no association between condom and hormonal contraceptive use (60,62). If increased use of hormonal birth control were accounting for the lower percentage of condom use

among those receiving CM or MM in our sample, we would have expected these groups to have more use of reliable methods; this was not the case.

The nature of the relationship between partners has been shown to impact condom use regardless of hormonal contraceptive use, with those in casual relationships being more likely to use condoms (56,60,63). This may have accounted for some of our results if those with abstinence education were more likely to be in casual relationships. Furthermore, if abstinence education presents exaggerated STI risks, those in casual relationships among the abstinence group may be even more likely to protect themselves with condoms.

One potential reason for the increased condom use among those who received abstinence messages, as measured by a yes response to receiving education regarding “how to say no” is that there is a self-efficacy-improving component to these curricula that increases boys’ ability to promote condom use in their first sexual relationships (64). Indeed, evaluations of some specific programs have found that aspects of the programs that “go beyond the classroom” and promote service learning, have a cultural component and span more than one school year were most successful (65). Furthermore, communication between partners has been associated with increased condom use (61,66); if programs promoting “how to say no” encourage communication in general, this could lead to increased contraceptive use in these couples.

Another possibility is that the HIV/STD content of these curricula emphasizes the risk to young men, compelling them to seek to protect themselves through condom use. Concern over risk of STI seems to be very relevant among a group of young men; rates of condom use rose when the young men became more suspicious or sure that their partners

have an STD (60). One factor that could make young men perceive that their partners are “riskier” is age; however, in a recent national survey, young men were less likely than young woman to have an older partner (67).

We were not able to examine whether condom use among our sample was intended to prevent STDs or pregnancy primarily, and there is some indication that the responses of teen boys may differ depending on the intent. In a 1997 study of nationally representative young men asked about condom use specifically as well use of a method “to prevent pregnancy.” In this study, 5% of men who reported using “no method” to prevent pregnancy also reported that they had used a condom, indicating that how the question is asked likely influences the response (68). In our data, subjects were asked whether “you or she use[d] any methods to prevent pregnancy or sexually transmitted disease?” precluding separate analyses of condom use depending on intent of the boy. Being able to stratify based on why the condom was used could provide valuable insight into the differing impact of type of sex education, as others have found different influences on prevention of pregnancy and prevention of STIs (63), although others have suggested that teens often conflate the two and may think they are protecting themselves from STIs with methods of birth control (69).

An especially concerning result is that comprehensive education was associated with less use of condoms. One potential explanation for this is that many abstinence-emphasizing programs include faulty information regarding contraception (70). Furthermore, the content of education regarding “birth control” also likely varies considerable within the sample (71,72). Among young men, qualitative studies have found considerable diversity in knowledge about contraception, even among those who

considered themselves to be knowledgeable (72). While some teenagers report being aware of this, others may simply not believe that contraceptive methods would be effective (71). This may be reflected in the lower percentage of reliable contraceptive use among the ‘comprehensive’ category.

A recent qualitative report of interview with high school students examined sex education curricula regarding methods of birth control (71). In these interviews, students often remarked that, though they received education regarding methods of birth control, these messages were superficial and did not include instruction on how these methods work or how to use them (71). Furthermore, young men may be wary of hormonal birth control due to perceived dangers to their partners, a perception that could be propagated by incomplete or inaccurate sexuality education (73).

We also found several other influences on boys’ choice of method use at first sex consistent with the recent literature. Parental discussion of sex education topics in general was not associated with reliable contraceptive use; however, parental discussions of the specific topics of abstinence and methods of birth control were both associated with increased reliable contraceptive use. This is consistent with several studies that have shown that parental discussion of sex as well as good communication between teens and parents in general increases protective sexual health habits in teens (74,75). In our analysis, however, we could not determine the temporality of these discussions with regard to first sex (as it was not asked), so parental discussions of sex topics may have followed sexual initiation in this sample. Marijuana use, but not other substance use, was associated with decreased reliable contraceptive use. This is consistent with other studies that have shown that risk-taking behavior in other realms of a boy’s life predicts non-use

of contraception (53). Use of other substances (aside from alcohol) was rare, which likely accounts for associations not being observed for these substances.

In contrast to what we found for reliable contraceptive use, parental discussion was not associated with a boy's condom use, no matter the topic. Likewise, no type of substance use was associated with condom use. These findings confirm that difference influences affect boys' use of methods to prevent pregnancy and methods to prevent STDs or HIV. However, they contrast with reports of reduced condom use among teens who report high-risk behavior (such as substance use) (45,53). That our indicator of increased risk behavior was associated with less use of pregnancy prevention methods while it was not associated with condom use, suggests that perhaps pregnancy is viewed a worse consequence.

There are several limitations to this study. As the NSFG is a cross-sectional study, we cannot prove causal inferences between sex education and contraceptive use; an attempt to ascertain temporality is made by using only data on formal sexual education that participants report was received *before* first coitus. Nevertheless, this information is subject to recall bias. Recall bias regarding contraceptive use/condom use at first intercourse may affect those whose first sex was more remote from the interview more than those whose sexual initiation was more recent. Though the effect of recall bias in this instance has not been systematically studied, it has been suggested that asking about specific occasions (such as first intercourse) may improve recall, so that asking about condom use at first intercourse, for example, may be more accurate than asking about condom use in general (63). Information bias is also a potential concern, especially regarding the use of contraceptive methods by the boy's partner. However, assessing

whether the male partner is aware of his female partner's use of reliable contraceptive methods is an important consideration given that this may reflect the male's perception of whether the couple is taking precautions to prevent pregnancy. Thus, this variable can be considered to represent the boy's *perception*. Additionally, given the structure of the question, boys were not asked specifically whether their partner used a hormonal or effective method of birth control. Instead, they chose all methods used from a list. Therefore, boys who knew they used a condom but did not know about their partners use were counted in the "no reliable contraception category," as there was no mechanism to indicate that they did not know about their partner's hormonal use. As there were more boys who used condoms among those with abstinence education, this may have underestimated the number of boys whose partners were using reliable contraception, especially among those in the abstinence group. Social desirability bias is also a concern when asking about sexual behaviors (63). However, the possibility for this is reduced by using ACASI technology for the most sensitive questions (63, 76-79).

As discussed above, our study did not account for some confounders that could affect the relationship between sex education and contraceptive use. Furthermore, male sexual behavior has been shown to be influenced by many and variable factors, making controlling for every possible influence unreasonable. Additionally, we limited our analysis to heterosexually experienced teens who had never been married. Thus, our results should not be used to make inferences about homosexually experienced young men or teens who have been married. We excluded these groups as their contraceptive goals are likely to differ from our group under study; however, this exclusion precludes generalizing our results to these groups.

We did not examine the effect of receiving abstinence messages compared to method messages without the receipt of HIV/AIDS education (i.e. abstinence-only education vs birth-control education or comprehensive), as the later group would have contained only one subject. However, when we compared the group receiving abstinence and HIV/STD messages to that receiving only abstinence messages, there were no differences in the use of any type of birth control methods or condoms, suggesting that the additional receipt of HIV/AIDS education did not account for differences we observed in our sample.

As the NSFG was not designed to evaluate the effectiveness of sex education programs, another concern is that information regarding the specific curriculum of each program are not available and therefore inferences about specifics of formal sex education programs cannot be made. As this survey attempts to capture the types of sex education teens are exposed to nationally, our analysis is limited by the questions included on the survey. However, we feel the benefit of being able to examine a nationally representative sample outweighs this concern. To further refine the examination of this question on a national level, questions about exposure to sex education could be further refined. To capture exposure to abstinence-promoting curricula, teens could be asked about education that encouraged waiting to have sex rather than “how to say no,” as this question leaves some ambiguity. Furthermore, participants should be asked to differentiate between formal sex education received in school and that received in a religious setting as the content of these curricula is likely to diverge. Questions regarding education around condom use and other forms of contraceptives could also be separated, as condom use is much more common and with

the current questions in the survey, it is not possible to identify whether those who answered “yes” to receiving education regarding “methods of birth control” considered condoms as a “method of birth control.”

Despite these limitations, our analysis examined a new question using nationally representative data and suggests that programs containing abstinence messages should be examined for their benefit in motivating male use of condoms. Furthermore, the lack of association between methods messages and reliable contraceptive use raises the concern that the current curricula in use may be ineffective for young men. However, given our inability to examine details of specific curricula, broad conclusions regarding specific curricula are not appropriate and further research is needed.

CHAPTER FIVE: CONCLUSION

Increasing recognition of the role that teenage males play in teen STD rates, and especially teen pregnancy rates is occurring (11,65,72, 80,81). Recent research suggests that teen males themselves are concerned with preventing pregnancy and are interested in methods to accomplish this (11). Several specific programs have shown a benefit in terms of protective sexual behavior and male awareness of and support for reliable method use by their partners (though these programs have not measured whether the partners actually are using a reliable method) (11). It is possible that these programs are not in wide enough use to affect national trends and efforts should continue to promote the use of evidence-based programs or curricula nationally. Our analysis, as well as others, suggests that current sex education messages are lagging behind the concerns of health care providers, educators, policy makers, parents and teens themselves by not providing accurate, appropriate and usable messages that enable teenage boys to be involved in and aware of the contraceptive decisions of their first partners (6). The apparent lack of translation between education about methods of birth control and use of such methods among teenage boys leads to concern over the content and delivery of these programs.

APPENDIX A

Table 23. Size of Formal Sex Education Groups with and without limiting to those who received HIV and/or STD education

Formal Sex Education Group	Sample with HIV/STD education	Regardless of HIV/STD Education status
No methods or abstinence	62	62
Abstinence, no methods	117	139
Methods, no abstinence	54	55
Both Abstinence and Methods	290	290

Table 24. Contraceptive use at Coital Debut among those in the AM group by whether or not they had HIV/STD Education Prior to Coital Debut

Characteristic	Abstinence without Methods			p-value
	Total	No HIV or STD	HIV or STD	
n (%)	139 (100)	20 (16.34%)	117 (83.66%)	
	n (weighted %)	n (weighted %)	n (weighted %)	
Use of a birth control method at coital debut				0.7664
No	18 (6.80)	3 (5.61)	15 (7.03)	
Yes	119 (93.20)	17 (94.39)	102 (92.97)	
Reliable Use				0.9260
No	111 (66.96)	19 (65.25)	92 (67.29)	
Yes	26 (33.04)	1 (34.75)	25 (32.71)	
Dual Use				0.8861
No	113 (67.85)	19 (65.25)	94 (68.36)	
Yes	24 (32.15)	1 (34.75)	23 (31.64)	
Condom Use				0.4875
No	22 (8.70)	3 (5.61)	19 (9.31)	
Yes	115 (91.30)	17 (94.39)	98 (90.60)	

Table 25. Contraceptive Use by Formal Sex Education among those who all had HIV/STD Education

Characteristic	Formal Sex Education Group				p-value
	HIV/STD only	Abstinence + HIV/STD	Methods + HIV/STD	Comprehensive	
Total	62	117	54	290	
	n (weighted %)	n (weighted %)	n (weighted %)	n (weighted %)	
Use of a birth control method at coital debut					0.0802
Yes	51 (77.48)	102 (92.97)	44 (83.76)	258 (89.14)	
No	11 (22.52)	15 (7.03)	10 (16.24)	32 (10.86)	
Reliable Use					0.3105
Yes	14 (21.17)	25 (32.71)	9 (29.02)	51 (19.13)	
No	48 (78.83)	92 (67.29)	45 (70.98)	239 (80.87)	
Dual Use					0.1618
Yes	11 (15.37)	23 (31.64)	6 (16.38)	47 (17.81)	
No	51 (84.63)	94 (68.36)	48 (83.62)	243 (82.19)	
Condom Use					0.0169
Yes	44 (67.47)	98 (90.69)	39 (69.42)	246 (84.61)	
No	18 (32.53)	19 (9.31)	15 (30.58)	44 (15.39)	

Table 26. Odds of Reliable Contraceptive Use at Coital Debut by Significant Predictors including only Subjects who had all Received HIV/STD Education

Characteristic	Adjusted OR*	95% CI	Wald Statistic	p-value
Formal Sex Education			1.67	0.1814
HIV/STD only (HSM)	Referent			
Abstinence + HIV/STD	1.27	[0.38 – 4.18]		
Methods + HIV/STD	1.03	[0.34 – 3.10]		
Comprehensive (CM)	0.57	[0.21 – 1.55]		

Race			3.63	0.0316
Other	Referent			
Black	1.69	[0.49 – 5.77]		
White	3.13	[1.23 – 7.97]		
Hispanic Ethnicity			4.50	0.0373
Hispanic	Referent			
Non-Hispanic	3.73	[1.08 – 12.87]		
Completed years of schooling			0.79	0.5387
9 th grade or less				
10 th grade	1.10	[0.40 – 3.08]		
11 th grade	1.63	[0.57 – 4.64]		
12 th grade	1.96	[0.68 – 5.65]		
1 -2 years of college	1.09	[0.25 – 4.77]		
Religion			3.67	0.0161
No religion	Referent			
Catholic	2.01	[0.68 – 5.92]		
Protestant	1.72	[0.51 – 5.74]		
Other	0.15	[0.02 – 1.12]		
Importance of Religion			3.07	0.0146
Not	Referent			
Somewhat	1.94	[0.64 – 5.90]		
Very	1.36	[0.43 – 4.26]		
No religion	-	-		
Parental Discussion of birth control			3.99	0.0496
No	Referent			
Yes	1.90	[1.00 – 3.60]		
Marijuana Use (last 12 months)			4.13	0.0094
Never	Referent			
Once or twice	1.11	[0.47 – 2.64]		
Several times-once a month	0.79	[0.35 – 1.76]		
About once a week or about once a day	0.20	[0.07 – 0.53]		

* Adjusted for all other predictors in the model

Table 27. Odds of Condom Use at Coital Debut by Significant Predictors including only Subjects who had all Received HIV/STD Education

Characteristic	Adjusted OR*	95% CI	p-value
Formal Sex Education			
No Abstinence or methods	Referent		0.0116
Abstinence, no methods	4.58	[1.45 – 14.45]	
Methods, no abstinence	0.67	[0.18 – 2.62]	
Abstinence and Methods	1.84	[0.77 – 4.37]	
Father's Education			0.1526
Less than HS grad	Referent		
HS grad or GED	2.10	[0.92 – 4.80]	
Some college	2.87	[0.98 – 8.44]	
Bachelor's degree or higher	2.89	[0.93 – 8.96]	
Don't Know/Missing	1.35	[0.46 – 3.96]	
Importance of Religion in Daily Life			0.0793
Not	Referent		
Somewhat	0.59	[0.16 – 2.21]	
Very	0.30	[0.08 – 1.06]	
No Religion	0.86	[0.18 – 4.05]	
Age at First Coitus (per year of age)	1.20	[1.95 – 1.53]	0.131

*Adjusted for formal sex education, age at first coitus, religiosity, father's education

Table 28. Distribution of Abstinence and Methods Messages Prior to Coital Debut among Sexually-experienced, Never-married Teen Males

Type of Sex Education	Total	NM	AM	MM	CM
Total (weighted %)	630	146 (22.22)	139 (22.8)	55 (11.47)	290 (43.52)
	n (weighted %)	n (weighted %)	n (weighted %)	n (weighted %)	n (weighted %)
Either STD or HIV messages**					
Yes	523 (85)	62 (13.39)	117 (21.98)	54 (13.35)	290 (51.28)
No	105 (15)	84 (74.16)	20 (24.90)	1 (0.94)	0 (0)

* Column totals not adding to row totals are due to missing information for types of education

** 3 participants declined to reply or replied “Don’t know” to questions regarding STD, HIV messages

Table 29. Descriptive Characteristics for Total Sample and by Formal Sex Education Status

Characteristic	Any Type of Formal Sex Education			p-value*
	Total	No	Yes	
N (%)	1380 (100)	54 (3.73)	1326 (96.27)	
Average Age in years (weighted average)	16.99 (16.90)	16.68 (16.34)	17.00 (16.92)	0.039**
Average Age at First Coitus in years (weighted average)	15.06 (15.16)	14.11 (14.43)	15.09 (15.18)	0.117**
	n (weighted %)	n (weighted %)	n (weighted %)	
Race				0.153
White	825 (66.32)	29 (46.56)	796 (67.09)	
Black	262 (15.98)	13 (25.42)	249 (15.61)	
Other	293 (17.7)	12 (28.01)	281 (17.30)	
Ethnicity				0.111
Hispanic	345 (17.52)	18 (7.03)	327 (92.97)	
Non-Hispanic	1035 (82.48)	36 (3.03)	999 (96.97)	
Current School Enrollment				0.3627
Yes	1119 (82.86)	39 (75.71)	1080 (83.14)	
No	261 (17.14)	15 (24.29)	246 (16.86)	
Education (completed years of school)				0.0228
9 th grade or less	440 (32.25)	30 (55.08)	410 (31.36)	
10 th grade	280 (22.12)	6 (24.87)	274 (22.02)	
11 th grade	289 (20.86)	7 (8.23)	282 (21.35)	
12 th grade	266 (17.61)	6 (6.58)	260 (18.04)	
1 year college/grad school	93 (6.74)	5 (5.25)	88 (6.79)	
2 years college/grad school	12 (0.42)	0 (0)	12 (0.44)	
Mother’s Education				0.0871
Less than HS grad	226 (11.87)	14 (14.04)	212 (11.78)	
HS grad or GED	436 (34.95)	19 (53.19)	417 (34.24)	
Some college	407 (27.79)	12 (24.16)	395 (27.93)	
Bachelor’s degree or higher	303 (25.4)	8 (8.6)	295 (26.04)	
Father’s Education				0.0051
Less than HS grad	207 (13.13)	16 (40.32)	191 (12.05)	
HS grad or GED	434 (35.08)	11 (23.41)	423 (35.55)	
Some college	265 (21.92)	10 (18.44)	255 (22.06)	
Bachelor’s degree or higher	322 (29.86)	10 (17.83)	312 (30.34)	
Health Insurance Status				0.0588
Private	780 (61.28)	21 (39.35)	759 (62.13)	
Medicaid, CHIP or state-sponsored	334 (21.59)	15 (36.78)	319 (21.00)	
Medicare, military, other govt.	75 (5.72)	7 (9.93)	68 (5.56)	
Single Service, IHS or None	191 (11.41)	11 (13.93)	180 (11.31)	
Place of Residence				0.5225
MSA, central city	499 (30.34)	29 (38.91)	470 (30.01)	
MSA, other	618 (48.67)	18 (47.33)	600 (48.72)	
Not MSA	263 (20.99)	7 (13.76)	256 (21.27)	

*P-value is Pearson’s from cross tab unless otherwise indicated

**P-value from linear regression

Table 30. Religious Characteristics of Sample by Formal Sex Education Status

Characteristic	Any Type of Formal Sex Education			p-value
	Total	No	Yes	
N (%)	1380 (100)	54 (3.73)	1326 (96.27)	
	n (weighted %)	n (weighted %)	n (weighted %)	
Religion				0.2662
Catholic	425 (27.57)	12 (15.02)	413 (28.06)	
Protestant	573 (42.72)	19 (43.93)	554 (42.86)	
Other	113 (8.12)	6 (6.96)	107 (8.17)	
None	269 (21.58)	17 (34.08)	252 (21.1)	
Frequency of Daily Service Attendance				0.9821
Weekly or more	455 (32.95)	19 (33.14)	436 (32.95)	
Less than weekly	924 (67.05)	35 (66.86)	889 (67.05)	
Importance of Religion in Daily Life				0.1267
Not	119 (10.86)	1 (0.24)	118 (11.2)	
Somewhat	559 (48.42)	18 (53.30)	541 (48.26)	
Very	434 (40.72)	18 (46.46)	416 (40.53)	

Table 31. Family Environment Characteristics of Sample by Formal Sex Education Status

Characteristic	Any Type of Formal Sex Education			p-value
	Total	No	Yes	
N (%)	1380 (100)	54 (3.73)	1326 (96.27)	
	n (weighted %)	n (weighted %)	n (weighted %)	
Always lived with both parents from birth to 18				0.6765
Yes	711 (56.66)	27 (51.81)	684 (56.85)	
No	669 (43.34)	27 (48.19)	642 (43.15)	
Ever Lived On Own				0.0824
Yes	144 (10.16)	9 (24.39)	135 (9.6)	
No	1230 (89.84)	45 (75.61)	1185 (90.40)	
Mother's age at her first delivery				0.8423
Less than 18 years	166 (11.57)	7 (8.00)	159 (11.71)	
18-19 years	226 (14.69)	10 (18.11)	216 (14.56)	
20-24 years	458 (33.10)	18 (32.08)	440 (33.14)	
25-29 years	330 (26.25)	13 (23.40)	317 (26.36)	
30 or older	182 (13.60)	4 (16.04)	178 (13.50)	
Mother-figure had no children	18 (0.79)	2 (2.37)	16 (0.73)	

Table 32. Parental Discussion of Sex Ed Topics in Sample by Formal Sex Ed Status

Characteristic	Any Type of Formal Sex Education			p-value
	Total	No	Yes	
n (weighted%)	1380 (100)	54 (3.73)	1326 (96.27)	
	n (weighted %)	n (weighted %)	n (weighted %)	
Parental Discussion				0.4688
Yes	925 (70.15)	30 (62.8)	895 (70.43)	
No	452 (29.85)	22 (37.2)	430 (29.57)	
Topics Discussed				0.4372
Abstinence				
Yes	525 (41.78)	13 (32.97)	512 (42.11)	
No	852 (58.22)	39 (67.03)	813 (57.89)	
Methods of birth control				0.0217
Yes	388 (30.27)	10 (13.64)	378 (30.89)	
No	989 (69.73)	42 (86.36)	947 (69.11)	
Where to get birth control				0.0121
Yes	270 (20.07)	5 (5.99)	265 (29.59)	
No	1107 (79.93)	47 (94.01)	1060 (79.41)	
STDs				0.2822
Yes	663 (49.39)	18 (35.11)	645 (49.93)	

HIV/AIDS	No	714 (50.61)	34 (64.89)	680 (50.07)	0.4101
	Yes	546 (38.49)	13 (28.17)	533 (38.87)	
How to use a Condom	No	831 (61.51)	39 (71.83)	792 (61.13)	0.6378
	Yes	512 (38.03)	17 (32.96)	495 (38.22)	
	No	865 (61.97)	35 (67.04)	830 (61.78)	

Table 33. Substance Use in the Sample and among Those Who Had Sex

Characteristic	Total Sample	Had Sex	p-value
n (weighted %)	1380	631	
	n (weighted %)	n (weighted %)	
Alcohol consumption (last 12 months)	1371	628	<0.0001
Never	574 (44.13)	145 (23.80)	
Once or twice	277 (19.32)	126 (16.95)	
Several times-once a month	337 (22.65)	217 (35.84)	
About once a week or about once a day	183 (13.90)	140 (23.41)	
Binge drinking (last 12 months)			<0.0001
Never	853 (61.49)	261 (38.80)	
Once or twice	167 (12.94)	98 (16.90)	
Several times-once a month	229 (16.57)	168 (27.77)	
About once a week or about once a day	123 (8.99)	101 (16.53)	
Marijuana Use (last 12 months)	1371	627	<0.0001
Never	977 (70.63)	332 (51.29)	
Once or twice	143 (11.26)	98 (16.60)	
Several times-once a month	123 (8.79)	90 (15.12)	
About once a week or about once a day	128 (9.32)	107 (16.99)	
Cocaine Use (last 12 months)			<0.0001
Never	1320 (96.22)	581 (92.03)	
Once or twice, several times or about once a month	48 (3.60)	43 (7.55)	
About once a month or more	6 (0.18)	6 (0.41)	
Crack (last 12 months)			0.0555
Never	1366 (99.6)	623 (99.18)	
Once or twice, several times or about once a month	7 (0.34)	6 (.67)	
About once a month or more	1 (<.10)	1 (.15)	
Meth (last 12 months)			0.0002
Never	1360 (98.90)	617 (97.54)	
Once or twice, several times or about once a month	13 (1.02)	12 (2.28)	
About once a month or more	1 (<.10)	1 (0.18)	
IV drug use (last 12 months)			
Never	1367 (99.35)	624 (99.08)	
Once or twice, several times or about once a month	1 (.65)	6 (0.92)	
About once a month or more	0	0	
Any substance use			<0.0001
No	543 (41.52)	215 (20.31)	
Yes	826 (58.48)	503 (79.69)	
Any Drug Use (not including EtOH)			<0.0001
No	973 (70.26)	331 (51.17)	
Yes	396 (29.74)	296 (48.83)	
Any hard drug use (not including pot)			<0.0001
No	1309 (95.51)	572 (91.06)	
Yes	65 (4.49)	58 (8.94)	

Table 34. Contraceptive Use at Coital Debut in Study Sample

Contraceptive Category	Total
	n (% weighted)
Total N (%)	546 (100%)
Use of any birth control method at coital debut	
Yes	475 (88.06)
No	71 (11.94)
Use of Individual Methods	
Condom	447 (82.28)
Pill	92 (21.54)
Injection	7 (1.92)
Patch	1 (0.44)
Ring	0 (0.00)
IUD/Coil/Loop	1 (0.24)
Female Sterilization	0 (0.00)
Vasectomy	0 (0.00)
Spermicide	1 (0.001)
Withdrawal	54 (11.03)
Rhythm	3 (0.28)
Reliable Use (Pill, Injectable, Patch, IUS)	
Yes	101 (24.14)
No	445 (75.86)
Dual Use	
Yes	89 (20.93)
No	457 (79.93)

Table 35. Contraceptive Outcomes by Formal Sex Education Status

Contraceptive Category	Formal Sex Education		p-value
	No n (weighted %)	Yes n (weighted %)	
Use of any birth control method at coital debut			0.6269
No	4 (17.67)	87 (12.94)	
Yes	14 (82.33)	526 (87.06)	
Reliable Use (Pill, Injectable, Patch, IUD/Coil/Loop)			0.6624
No	15 (82.93)	511 (77.88)	
Yes	3 (17.07)	102 (22.12)	
Dual Use			0.6883
No	16 (85.32)	522 (80.75)	
Yes	2 (14.68)	991 (19.25)	
Condom Use			0.5097
No	6 (25.87)	115 (18.31)	
Yes	12 (74.13)	498 (81.69)	

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