

**Committee on Oversight and Government Reform
Hearing on Abstinence-Only Programs
April 23, 2008**

**Testimony of Dr. John Santelli
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Chairman Waxman, ranking member Davis, distinguished members of the Committee and guests, thank you for the opportunity to speak with you today about the needs of today's adolescents and my professional findings about abstinence-only education. My name is John Santelli and I am the Chairman of the Department of Population and Family Health at the Mailman School of Public Health at Columbia University. I am also a Senior Fellow at the Guttmacher Institute. I am a pediatrician, a father, and have served in leadership positions in medical and public health organizations including the Society for Adolescent Medicine and the American Public Health Association. I also directed the Applied Science Branch of the Division of Reproductive Health at the U.S. Centers for Disease Control and worked for the CDC for 13 years. I have worked extensively in research ethics for 15 years and chaired an Institutional Review Board at CDC for five years.

I have conducted research in the past few years that seeks to understand trends in adolescent sexual behavior and the reasons for recent declines in teen pregnancy rates. I have also actively monitored the scientific literature on adolescent development, trends in sexual behavior, and effective programs to help teens avoid unplanned pregnancy and sexually transmitted diseases.

Summary of Concerns About Abstinence-Only Education

Numerous scientific and ethical critiques have been raised about abstinence-only education for young people. These concerns are articulated in the reports from the Society for Adolescent Medicine, the American Public Health Association, and others. The Society for Adolescent Medicine's position paper on abstinence-only education and policies is attached to my testimony. Key critiques include:

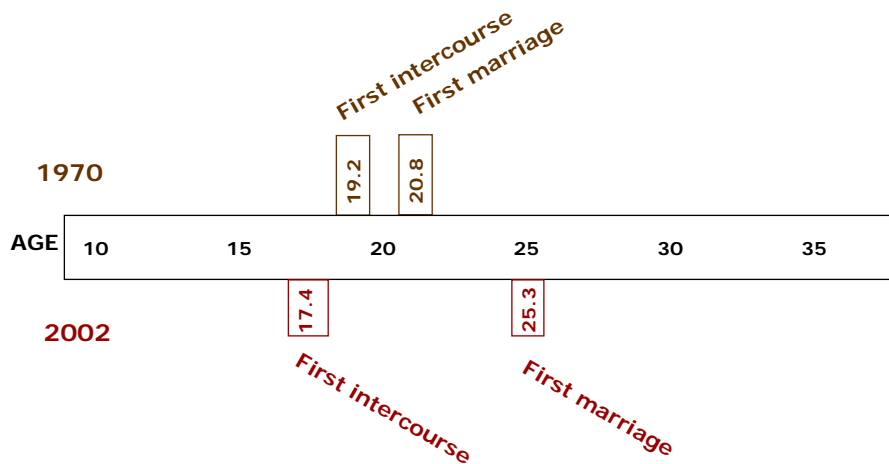
- Abstinence-only-until-marriage as a program goal is out of touch with broad demographic trends toward both an earlier age at first sex and a later age at marriage. Indeed, 95 percent of Americans have intercourse prior to marriage (Finer, 2007).
- Recent declines in adolescent sexual activity precede widespread federal funding of abstinence-only education in the U.S.; as such, federal abstinence-only programs are not responsible for reductions in adolescent sexual experience and teen pregnancy in the U.S. Rather, most of the decline in teen pregnancy rates in the U.S. can be attributed to better contraceptive use among adolescents.

- Evaluations of comprehensive sexuality education programs show that many programs help young people to delay intercourse. In addition these programs help young people use contraception and condoms when they do have intercourse. In contrast, abstinence-only programs that have been carefully evaluated have failed to demonstrate behavioral results.
- Many abstinence-only programs withhold critical information or include misinformation, particularly about important health topics such as contraception and condoms. This puts young people at risk. Such programs are contrary to the medical ethical principle of informed consent and are a violation of human rights principles.

Demographic Trends

Evidence from the past several decades indicates that establishing abstinence until marriage as normative behavior is a highly challenging policy goal. In 1970, [See Figure 1] there is a gap of only one and a half years between first sex and marriage; by 2002 this gap was a full eight years. Research has shown that over the past 40 years, the median age at first intercourse has dropped (and stabilized) at around age 17 in most developed countries (Teitler, 2002). At the same time, the median age at marriage has risen dramatically. Thus, expecting people to wait until marriage to engage in sexual intercourse is increasingly unrealistic. Almost all Americans initiate sexual intercourse before marriage (Finer, 2007). By the time they reach age 44, 99 percent of Americans have had sex, and 95 percent have done so before marriage.

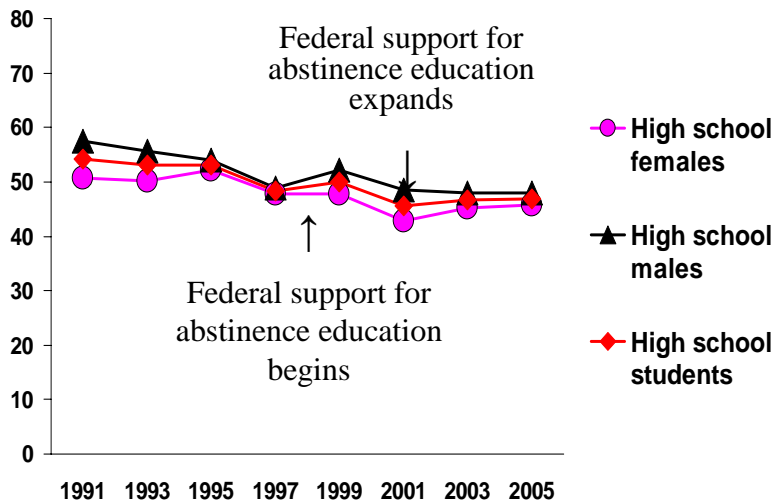
Figure 1. Declining Age of First Intercourse & Increasing Age of First Marriage in Women



Trends in Adolescent Sexual Activity and Teen Pregnancy

Recent declines in teen sexual activity appear to be unrelated to federal abstinence programs [See Figure 2]. According to the Centers for Disease Control and Prevention, rates of sexual experience declined from 54 percent in 1991 to 46 percent in 2001 and have been unchanged since 2001. Note that much of the reduction in rates of adolescent sex occurred before the federal government began widespread funding of abstinence-only education in FY1998.

Figure 2. Ever had Sexual Intercourse, Grades 9-12, National YRBS



Teen birth and pregnancy rates declined impressively between 1991 and 2005. Two behaviors contribute directly to teen pregnancy: engaging in sexual intercourse and contraceptive use. From the 1960s through 1990, *increasing* involvement in sexual activity by teenagers in Western Europe and the United States was accompanied by sharply *lower* teen birth and pregnancy rates in most countries, due to greatly improved contraceptive use. Today, better use of contraceptives is the major behavioral difference between European and U.S. teenagers (Santelli, Sandfort, and Orr, 2008). Rates of sexual activity are similar, but European teens have much higher use of oral contraceptives and use of the “double Dutch” method - simultaneous use of condoms and hormonal methods.

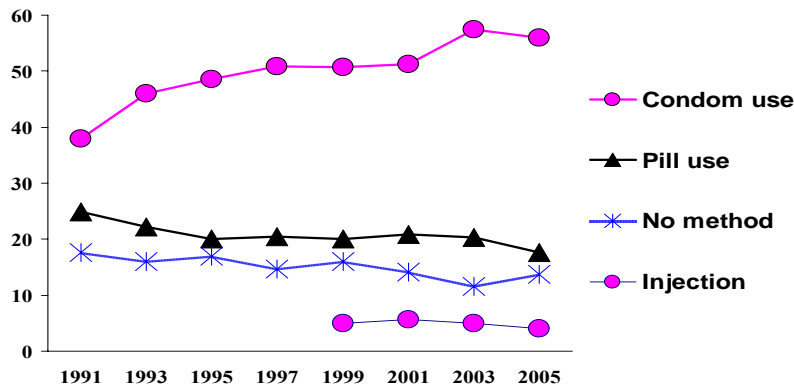
Throughout the 1990s, teen sexual activity in the U.S. decreased and contraceptive use improved. Much of the improvement in contraceptive use was related to increasing condom use: between 1991 and 2001 condom use at last intercourse by young women

rose from 38 percent to 51 percent (Santelli et al., 2004). Increases in teen condom use in the 1980s were even more dramatic.

My own research suggests that 86 percent of the decline in teen pregnancy rates among 15-19 year olds between 1995 and 2002 was the result of improved contraceptive use. Among younger teens (15-17 years old), three-quarters of the decline was the result of improved contraceptive use. I have attached my paper entitled “Explaining Recent Declines in Adolescent Pregnancy in the United States: The Contribution of Abstinence and Improved Contraceptive Use” to this testimony. My colleagues and I have recently repeated this calculation for 1991 to 2003 using data from the Youth Risk Behavior Survey which is conducted nationwide with high schools students and found similar results. Improvements in contraceptive use between 1991 and 2003 were responsible for 70 percent of the decline in teen pregnancy.

Thus, while an increase in abstinence (i.e., fewer teens having sexual intercourse) explains some of the decline in teen pregnancy rates in the 1990s, more recently there appears to be little impact of abstinence on teen birth or pregnancy rates.

Figure 3. Contraceptive Use at Last Sex, Women in Grades 9-12, National YRBS



Unfortunately these positive trends in contraceptive use reversed in 2005. Both no use of contraception and decreases in condom use occur in the most recent data (Santelli, Orr, and Lindberg, in preparation). These reversals coincide with increases in teen birth rates in 2006 – after steady declines over the previous 14 years.

Evaluations of Comprehensive Sexuality Education and Abstinence-Only Programs

There is now an extensive body of research that demonstrates that comprehensive sexuality education programs that include information about both abstinence and contraception and share several other key characteristics, are effective in helping young

people to delay the onset of sexual intercourse and to use contraception and/or condoms when they do have intercourse (Kirby, 2007). Dr. Douglas Kirby conducted an analysis for the National Campaign to Prevent Teen and Unintended Pregnancy that examined well-designed studies and evaluated whether or not programs designed to reduce teen pregnancy and sexually transmitted infections, including HIV, actually worked in changing behavior. That meta-analysis shows compelling evidence that programs that include information on both abstinence and contraception and display a number of other characteristics are effective in helping young people to abstain or protect themselves from pregnancy and STDs. In fact, his review carefully examined 48 comprehensive programs and found that nearly half of them delayed the initiation of sex, nearly half increased condom use and 63 percent reduced sexual risk through changes in multiple behaviors (Kirby, 2007; Kirby, 2008).

In contrast, rigorous evaluations of abstinence-only programs find little evidence of efficacy for abstinence-only education. None of the well-designed evaluations of abstinence-only programs has presented strong evidence of an impact on behaviors.

The Mathematica evaluation of the Title V program (Trenholm et al., 2007), released in April 2007, found no measurable impact on increasing abstinence or delaying sexual initiation among participating youth or on other important health behaviors such as condom use. This well funded and well conducted evaluation examined four abstinence-only programs, tracking youth over four years. One of the few measurable impacts of the programs was a decrease in adolescent confidence regarding the ability of condoms to prevent HIV and other sexually transmitted diseases. Similar results on program efficacy were found by Underhill, who conducted a systematic review of abstinence-only programs (Underhill, 2007). In other words, comprehensive sexuality education programs are actually better than abstinence-only programs at helping young people to abstain from sex.

Virginity Pledges

Virginity pledging, one which is one approach to encouraging abstinence until marriage among youth, appears to have little long-term benefit in preventing outcomes such as sexually transmitted infections. A longitudinal study by Bruckner and Bearman found that teens who signed abstinence pledges, when compared to non-pledgers, experienced similar rates of sexually transmitted infection (Bruckner and Bearman, 2005). Pledgers did delay sexual intercourse for a limited period, but when they did start having sex, they were less likely to use condoms. They were also less likely to seek reproductive health care compared to non-pledgers leaving them at increased risk for unintended pregnancy and sexually transmitted infections.

Medical Accuracy and Complete Information for Youth

A December 2004 Congressional report on federal abstinence programs from the U.S. House of Representatives' Committee on Government Reform - Minority Staff found that 11 of the 13 most frequently used curricula contained false, misleading or distorted

information about reproductive health — including inaccurate information about contraceptive effectiveness, purported health risks of abortion, and other scientific errors (Waxman Report, 2004). Concerns about the accuracy of information included in abstinence-only programs have also been raised by many different professional organizations. Over the past several years, my colleagues and I at Columbia University have explored this issue. Our recent review of abstinence-only curricula found similar inaccuracies, particularly misinformation about the efficacy of condoms and contraception. A copy of my analysis entitled, “The Accuracy of Condom Information in Three Selected Abstinence-Only Education Curricula,” is attached to this testimony (Santelli, 2008). In addition, I have developed an overview article entitled, “Medical Accuracy in Sexuality Education: Ideology and the Scientific Process,” which explores the concept of medical accuracy in sexuality education and is attached to this testimony for your review (Santelli, in press). That article includes information about the 21 states that require medical or scientific accuracy in the provision of sexuality or HIV/AIDS education and an overview of the systems that are in place to determine scientific consensus.

Ethical and Human Rights Concerns

As a physician, I am expected to provide information this is both accurate and complete to my patients. The premise of federal abstinence-only programs are antithetical to this basic principle of medical ethics. Abstinence-only programs require teachers and health educators to conceal information about risk reduction measures such as condoms and contraception – or risk loss of federal funding. Misinformation about condoms is of particular concern given the high rates of sexually transmitted diseases among young people in the United States.

For all of these reasons and more, the leading medical and health organizations in this country have taken the position that abstinence-only education is inappropriate for young people. On this panel you are hearing from two of the key organizations with concerns about abstinence-only approaches, the American Public Health Association and the American Academy of Pediatrics. Abstinence-only education is also opposed by the American Medical Association, the Society for Adolescent Medicine, the Institute of Medicine, and the American Foundation for AIDS Research.

Recommendations:

As someone who is deeply committed to the well-being of young people, I urge the committee to encourage policies that will better serve the needs of America’s youth.

- Congress should develop policies to improve adolescent reproductive health based on sound scientific evidence and the realities of adolescents’ lives. Policies should support what we know works in helping young people to stay healthy.
- Congress should require medical accuracy in all federally-supported health education activities.

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- Congress should end federal support for abstinence-only programs that require withholding potentially life-saving information. Teachers should be allowed to teach. Indeed, policy makers have an ethical obligation to ensure that young people have the critical information they need to protect their health.
- Congress should help ensure that every American adolescent has access to age-appropriate, comprehensive sexuality education and comprehensive health care services to help young people to avoid HIV, other STDs and unplanned pregnancy. This approach is consistent with the scientific evidence about what works and echoes the overwhelming support of America's parents and physicians.

Thank you.

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Position paper

Abstinence-only education policies and programs: A position paper of the Society for Adolescent Medicine

Summary

Abstinence from sexual intercourse represents a healthy choice for teenagers, as teenagers face considerable risk to their reproductive health from unintended pregnancy and sexually transmitted infections (STIs) including infection with the human immunodeficiency virus (HIV). Remaining abstinent, at least through high school, is strongly supported by parents and even by adolescents themselves. However, few Americans remain abstinent until marriage, many do not or cannot marry, and most initiate sexual intercourse and other sexual behaviors as adolescents. Abstinence as a behavioral goal is not the same as abstinence-only education programs. Abstinence from sexual intercourse, while theoretically fully protective, often fails to protect against pregnancy and disease in actual practice because abstinence is not maintained.

Providing “abstinence only” or “abstinence until marriage” messages as a sole option for teenagers is flawed from scientific and medical ethics viewpoints. Efforts to promote abstinence should be based on sound science. Although federal support of abstinence-only programs has grown rapidly since 1996, the evaluations of such programs find little evidence of efficacy in delaying initiation of sexual intercourse. Conversely, efforts to promote abstinence, when offered as part of comprehensive reproductive health promotion programs that provide information about contraceptive options and protection from STIs have successfully delayed initiation of sexual intercourse. Moreover, abstinence-only programs are ethically problematic, being inherently coercive and often providing misinformation and withholding information needed to make informed choices. In many communities, abstinence-only education (AOE) has been replacing comprehensive sexuality education. In some communities, AOE has become the basis for suppression of free speech in schools. Abstinence-only education programs provide incomplete and/or misleading information about contraceptives, or none at all, and are often insensitive to sexually active teenagers. Federally funded abstinence-until-marriage programs discriminate against gay, lesbian, bisexual, transgender and questioning youth,

as federal law limits the definition of marriage to heterosexual couples.

Schools and health care providers should encourage abstinence as an important option for teenagers. “Abstinence-only” as a basis for health policy and programs should be abandoned.

Background

Abstinence from sexual intercourse is an important behavioral strategy for preventing STIs and unwanted pregnancy among adolescents and adults. Sexually active teenagers face considerable risk to their reproductive health from unintended pregnancy and STIs including infection with HIV. Although health professionals often are primarily concerned with the potentially serious consequences of adolescent sexual behavior, we also recognize that sexuality is integral to human nature and has many positive mental health consequences.

Abstinence, as the term is used by program planners and policymakers, is often not clearly defined in behavioral terms, nor is the term used consistently. Abstinence may be defined in behavioral terms, such as “postponing sex” or “never had vaginal sex,” or refraining from further sexual intercourse if sexually experienced. Programmatically, abstinence is also frequently defined in moral terms, using language such as “chaste” or “virgin,” and framing abstinence as an attitude or a commitment in addition to a behavior [1]. Federal regulations for state abstinence education funding adopt a moral definition of abstinence, requiring that abstinence education “teaches that a mutually faithful monogamous relationship in the context of marriage is the expected standard of human sexual activity” [2].

Although abstinence until marriage is the goal of many abstinence policies and programs, few Americans wait until marriage to initiate sexual intercourse. Recent data indicate that the median age at first intercourse for women was 17.4 years, whereas the median age at first marriage was 25.3 years [3,4]. For men, the corresponding median age at first intercourse was 17.7 years, whereas the age at first marriage was 27.1 years [3,4].

Although advocates of abstinence-only government policy have suggested that psychological harm is a consequence of sexual behavior during adolescence, there are no scientific data suggesting that consensual sex between adolescents is harmful. Mental health problems are associated with early sexual activity, but these studies suggest that sexual activity is a consequence not a cause of these mental health problems [5–8]. We know little about how the decision to remain abstinent until marriage may promote personal resilience or sexual function/dysfunction in adulthood.

Opinion polls suggest considerable support for abstinence as a public health goal, but also indicate strong support for education about contraception and for access to contraception for sexually active teenagers [9]. Most teens (94%) and adults (91%) think it is somewhat or very important for society to give teens a strong message that they should not have sex until they are at least out of high school [9]. However, most adults (75%) and teens (81%) want young people to receive more information about both abstinence and contraception [9].

Current federal policy and programs

The federal government has greatly expanded support for abstinence-only programs since 1996. This support includes funding to states provided under Section 510 of the Social Security Act, originally enacted in 1996, and under Community-Based Abstinence Education projects, funded through the Special Projects of Regional and National Significance (SPRANS) program established in 2000. These programs focus on a restricted vision of abstinence promotion and prohibit disseminating information on contraceptive services, sexual orientation and gender identity, and other aspects of human sexuality [10]. Federal funding language promotes a specific moral viewpoint, not a public health approach. These federal programs present questionable and inaccurate opinions as fact, and specifically prohibit information about healthy alternatives to abstinence such as condom and other contraceptive use.

Section 510 programs must have as their “exclusive purpose” the promotion of abstinence outside of marriage for people of any age and may not in any way advocate contraceptive use or discuss contraceptive methods except to emphasize their failure rates [10]. Section 510 provides an eight-point definition of abstinence-only education. Under Section 510, abstinence education is defined as *an educational or motivational program which:*

1. has as its exclusive purpose, teaching the social, psychological, and health gains to be realized by abstaining from sexual activity;
2. teaches abstinence from sexual activity outside marriage as the expected standard for all school-age children;

3. 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;
4. teaches that a mutually faithful monogamous relationship in the context of marriage is the expected standard of human sexual activity;
5. teaches that sexual activity outside of the context of marriage is likely to have harmful psychological and physical effects;
6. teaches that bearing children out-of-wedlock is likely to have harmful consequences for the child, the child’s parents, and society;
7. teaches young people how to reject sexual advances and how alcohol and drug use increases vulnerability to sexual advances; and
8. teaches the importance of attaining self-sufficiency before engaging in sexual activity.

The initial implementation of Section 510 has allowed funded programs to emphasize different aspects of these eight points as long as the program did not contradict any of them. The intent of the SPRANS program has been more rigid: to create “authentic” abstinence-only programs, in response to concerns that states were using funds for “soft” activities such as media campaigns instead of direct classroom instruction and were targeting younger adolescents. Programs funded under SPRANS must teach all eight components of the federal definition, they must target 12–18-year-olds, and, except in limited circumstances, they cannot provide young people they serve with information about contraception or safer-sex practices, even with their own nonfederal funds. Funding for this program also bypasses the 510 program’s state approval processes and makes grants directly to community-based organizations, including faith-based organizations. Virtually all the growth in funding since FY2001 has come in the SPRANS program.

Evaluations of abstinence-only education and comprehensive sexuality education programs in promoting abstinence

To demonstrate efficacy, evaluations of specific abstinence promotion programs must address a variety of methodological issues including clear definitions of abstinence, appropriate research design, measurement issues including social desirability bias, the use of behavioral changes and not just attitudes as outcomes, and biological outcomes such as STIs [11]. Two recent reviews [12,13] have evaluated the evidence supporting abstinence-only programs and comprehensive sexuality education programs designed to promote abstinence. Neither review found scientific evidence that abstinence-only programs demonstrate efficacy in delaying initiation of sexual intercourse. Likewise, research on adolescents taking virginity pledges suggest that failure rates

for the pledge are very high, especially when biological outcomes such as STIs are considered [14]. Although it has been suggested that abstinence-only education is 100% effective, these studies suggest that, in actual practice, efficacy may approach zero.

A recent Congressional committee report [15] found evidence of major errors and distortions of public health information in common abstinence-only curricula. Eleven of the 13 curricula contained false, misleading, or distorted information about reproductive health, including inaccurate information about contraceptive effectiveness and risks of abortion. The report found that several of the curricula handle stereotypes about girls and boys as scientific fact (e.g., portraying girls as weak or dependent or men as sexually aggressive and lacking emotional depth) or blur religious and scientific viewpoints.

A rigorous national evaluation of abstinence-only education is currently being conducted with support from the Department of Health and Human Service's Office of the Assistant Secretary for Planning and Evaluation [16].

Adverse impact of abstinence-only policies on sexuality education and other public programs

Although health professionals have broadly supported comprehensive sexuality education [17–20], increasingly abstinence-only education is replacing more comprehensive forms of sex education in the nation's schools. Recent reports describe teachers and students being censured for responding to questions or discussing sexuality topics that are not approved by the school administrators [21]. Data from the School Health Policies and Programs Study in 2000 found that 92% of middle and junior high schools and 96% of high schools taught abstinence as the best way to avoid pregnancy, HIV, and STIs; only 21% of middle schools and 55% of high schools taught how to correctly use a condom [22]. Between 1988 and 1999, there was a sharp decline in the percentage of teachers who supported teaching about birth control, abortion, and sexual orientation and in the percentages who actually taught these subjects [23]. In 1999, 23% of secondary school sexuality education teachers taught abstinence as the only way to prevent pregnancy and STIs, compared with only 2% who had done so in 1988. In 1999, one-quarter of sex education teachers said they were prohibited from teaching about contraception. Similar declines in school-based sexuality education are reported by teens [3]. In 2002, about one-third of teens 15–19-year-olds reported not having received any formal instruction about methods of birth control before turning 18.

Likewise, federal funding requirements in the Title X program and for HIV/AIDS prevention programs have increasingly focused on abstinence promotion [24]. Such requirements have redirected efforts from other important objectives.

Abstinence-only policies by the U.S. government have

also influenced global HIV prevention efforts. The President's Emergency Plan for AIDS Relief (PEPFAR), focusing on 15 HIV-afflicted countries in sub-Saharan Africa, the Caribbean and Asia, requires grantees to devote at least 33% of prevention spending to abstinence-until-marriage programs. The U.S. government policy has become a source for misinformation and censorship in these countries and also may have reduced condom availability and access to accurate HIV/AIDS information [25].

Abstinence-only sex education and sexually active and GLBTQ youth

Programs geared to adolescents who have not yet engaged in coitus systematically ignore sexually experienced adolescents, a group with different reproductive health needs who likely require a different approach to abstinence education [26]. Sexually experienced teens need access to complete and accurate information about contraception, legal rights to health care, and ways to access reproductive health services, none of which are provided in abstinence-only programs.

Likewise, federally funded abstinence-until-marriage programs discriminate against gay, lesbian, bisexual, transgender and questioning (GLBTQ) youth because federal law limits the definition of marriage to heterosexual couples. Approximately 2.5% of high school youth self-identify as gay, lesbian or bisexual [27] and as many as one in 10 teenagers struggle with issues regarding sexual orientation [28]. GLBTQ adolescents often are fearful of rejection or discrimination due to their orientation; they are frequently subjected to harassment, discrimination, and violence. Homophobia may contribute to health problems such as suicide, feelings of isolation and loneliness, HIV infection, substance abuse and violence among GLBTQ youth [29]. Abstinence-only sex education classes are unlikely to meet the health needs of GLBTQ youth, as they largely ignore issues surrounding homosexuality (except when discussing transmission of HIV/AIDS), and often stigmatize homosexuality as deviant and unnatural behavior [30].

The human right to sexual health information

Although abstinence is often presented as the moral choice for teenagers, the current federal approach to abstinence-only funding raises serious ethical and human rights concerns. Abstinence-only education policies have implications at a public and individual level. Access to complete and accurate HIV/AIDS and sexual health information is a basic human right and is essential to realizing the human right to the highest attainable standard of health. Governments have an obligation to provide accurate information to their citizens and eschew the provision of misinformation; such obligations extend to state-supported health education and health care services [31]. These legal guar-

antees are found in a number of international treaties, which provide that all people have the right to “seek, receive and impart information and ideas of all kinds,” including information about their health [32–34]. Access to accurate health information is a basic human right that has also been described in international statements on reproductive rights such as the Programme of Action of the International Conference on Population and Development—Cairo, 1994 [35]. These international treaties and statements clearly define the important responsibility of governments to provide accurate and complete information on sexual health to their citizens.

Ethical obligations of health care providers and health educators

Health care providers and health educators have ethical obligations to provide accurate health information. Patients and students have rights to accurate and complete information from health professionals. Health care providers may not withhold information from a patient in order to influence their health care choices. It is unethical to provide misinformation or withhold information about sexual health that teens need in order to protect themselves from STIs and unintended pregnancy. Withholding information on contraception to influence adolescents to become abstinent is inherently coercive and may cause teenagers to use ineffective (or no) protection against pregnancy and STIs. Current federal abstinence-only legislation is ethically problematic, as it excludes accurate information about contraception, misinforms by overemphasizing or misstating the risks of contraception, and fails to require the use of scientifically accurate information while promoting approaches of questionable value. Additionally, “abstinence until marriage” curricula are commonly provided to those teens who are already sexually experienced and to GLBTQ youth, ignoring their pressing needs for accurate information to protect their health. These ethical obligations to provide complete and accurate information also are the basis for the strong support among medical professionals for comprehensive sexuality education in schools [17–19] and recent state legislative attempts to require that these sexuality education programs provide medically accurate information {e.g., Cal. Education Code § 51933}.

Positions of the Society for Adolescent Medicine (SAM)

- Abstinence is a healthy choice for adolescents. The choice for abstinence should not be coerced. SAM supports a comprehensive approach to sexual risk reduction including abstinence as well as correct and consistent use of condoms and contraception among teens who choose to be sexually active.

- Efforts to promote abstinence should be provided within health education programs that provide adolescents with complete and accurate information about sexual health, including information about concepts of healthy sexuality, sexual orientation and tolerance, personal responsibility, risks of HIV and other STIs and unwanted pregnancy, access to reproductive health care, and benefits and risks of condoms and other contraceptive methods.
- Individualized counseling about abstinence and sexual risk reduction are important components of clinical care for teenagers.
- Health educators and clinicians caring for adolescents should promote social and cultural sensitivity to sexually active youth and gay, lesbian, bisexual, transgendered and questioning youth. Health education curricula should also reflect such sensitivity.
- Governments and schools should eliminate censorship of information related to human sexual health.
- Government policy regarding sexual and reproductive health education should be science-based. Governments should increase support for evaluation of programs to promote abstinence and reduce sexual risk, including school-based interventions, media efforts and clinic-based interventions. Such evaluations should utilize rigorous research methods and should assess the behavioral impact as well as STIs and pregnancy outcomes. The results of such evaluations should be made available to the public in an expeditious manner.
- Current U.S. federal law and guidelines regarding abstinence-only funding are ethically flawed and interfere with fundamental human rights. Current federal funding requirements as outlined in Subsections A–H of Section 510 of the Social Security Act should be repealed. Current funding for abstinence-only programs should be replaced with funding for programs that offer comprehensive, medically accurate sexuality education.

Endorsement

This position paper has been endorsed by the American College Health Association.

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Explaining Recent Declines in Adolescent Pregnancy in the United States: The Contribution of Abstinence and Improved Contraceptive Use

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In recent years, the United States has had the highest rate of adolescent pregnancy of any of the world's developed nations.^{1,2} However, since 1991 these rates have declined dramatically. Pregnancy rates among 15- to 19-year-olds declined 27% from 1991 to 2000,³ and birth rates (for which more recent published data are available) dropped 33% between 1991 and 2003.⁴

The pattern of decline in US birth rates among adolescents is considerably different from the pattern in non-English-speaking European countries, where adolescent pregnancy rates peaked between 1965 and 1980 and then dropped dramatically.¹ Little of the decline in Europe seems attributable to delay in initiation of sexual intercourse, given that the median age at initiation has fallen since 1965, indicating that more teens were having sex.^{1,5} In fact, the age at which young people initiate sexual activity has become increasingly similar across developed countries.^{1,5} A mid-1990s analysis of 5 developed countries showed that adolescents in the United States initiated sexual activity at an age similar to that of adolescents in Sweden, France, Canada, and Great Britain but that they used contraceptives less frequently.⁶

Reductions in adolescent pregnancy rates are the result of shifts in 2 key underlying behaviors: sexual activity and contraceptive use. Between 1971 and 1988, age at sexual initiation among US teenagers became increasingly younger, as demonstrated by increases in the proportion of adolescents who had ever experienced coitus.⁷⁻⁹ At the beginning of the 1990s this trend reversed, and declines in early sexual experience have since been documented in both school-based and household surveys.¹⁰⁻¹²

Social conservatives in the United States have ascribed much of the recent decline in adolescent pregnancy rates to increased

Objectives. We explored the relative contributions of declining sexual activity and improved contraceptive use to the recent decline in adolescent pregnancy rates in the United States.

Methods. We used data from 1995 and 2002 for women 15 to 19 years of age to develop 2 indexes: the contraceptive risk index, summarizing the overall effectiveness of contraceptive use among sexually active adolescents (including nonuse), and the overall pregnancy risk index, calculated according to the contraceptive risk index score and the percentage of individuals reporting sexual activity.

Results. The contraceptive risk index declined 34% overall and 46% among adolescents aged 15 to 17 years. Improvements in contraceptive use included increases in the use of condoms, birth control pills, withdrawal, and multiple methods and a decline in nonuse. The overall pregnancy risk index declined 38%, with 86% of the decline attributable to improved contraceptive use. Among adolescents aged 15 to 17 years, 77% of the decline in pregnancy risk was attributable to improved contraceptive use.

Conclusions. The decline in US adolescent pregnancy rates appears to be following the patterns observed in other developed countries, where improved contraceptive use has been the primary determinant of declining rates. (*Am J Public Health*. 2007;97:150-156. doi:10.2105/AJPH.2006.089169)

abstinence from sexual intercourse.¹³ Consequently, the US government now promotes abstinence until marriage ("abstinence only") as its primary prevention message for teenagers.¹⁴ Federal government requirements for abstinence-only programs specify that these programs must have as their "exclusive purpose" the promotion of abstinence outside of marriage and that they must not, in any way, advocate contraceptive use or discuss contraceptive methods other than to emphasize their failure rates.¹⁵

Federal government funding for abstinence-only education in the United States has grown rapidly since 1998, despite a lack of scientific evidence in support of these programs and concerns about their informational content and ethical acceptability.^{13,14} In addition, the federal government, through its foreign aid programs, has vigorously promoted abstinence as a means of preventing HIV infection among adolescents.¹⁵

In a previous analysis, we examined nationally representative data derived from samples

of US high-school students in an attempt to understand declining adolescent pregnancy rates.¹⁶ We found significant increases in use of contraception among 15- to 17-year-olds between 1991 and 2001 and estimated that improved contraceptive use and delay in initiation of intercourse made equal contributions to declining pregnancy rates.

In an effort to update that study, we conducted a more comprehensive analysis of the roles of increased contraceptive use and delayed initiation of sexual activity in explaining changes in pregnancy risk over the period 1995 to 2002 among young people aged 15 to 19 years. We used data from the 1995 and 2002 versions of the National Survey of Family Growth (NSFG), a nationally representative household survey that provides more complete coverage of female adolescents (particularly older adolescents and those who are out of school) than high-school surveys. The NSFG also provides detailed information about contraceptive use, allowing assessment of trends in dual- and

multiple-method use, which can greatly reduce pregnancy risk.

METHODS

Data

The NSFG is a periodic (every 7 years) national probability survey conducted among noninstitutionalized adult (15–44 years of age) residents of the United States.¹⁷ Our analyses were limited to young women who were aged 15 to 19 years at the time they were interviewed in 1995 (n=1396) or 2002 (n=1150). Further information about the design of the NSFG is available elsewhere (<http://www.cdc.gov/nchs/nsfg.htm>).

Measures

Sexual activity and contraceptive use. We recoded the publicly available NSFG data to increase the comparability of the relevant measures in the 2 waves of data collection. Our analyses were based on 2 central measures: recent sexual activity and contraceptive use at most recent intercourse. Young women who had engaged in vaginal intercourse at any point during the 3 months before the interview were defined as having been recently sexually active. For comparison purposes, we also examined the percentage of young women in each group who were sexually experienced (i.e., had ever engaged in vaginal intercourse).

We assessed contraceptive use at most recent sexual intercourse only among women who had been sexually active in the preceding 3 months, reducing measurement issues related to recall. Women could report use of up to 4 contraceptive methods in combination at their most recent sexual intercourse or no contraceptive use. Young women who were pregnant at the time of the interview (55 in 1995, 32 in 2002) were coded as having used the contraceptive method they were using when they became pregnant (most were using no method); these data were collected in a separate section of the interview in which detailed histories were obtained.

Contraceptive failure rates. In addition to the sexual activity and contraceptive use measures, our calculations required measures of method-specific contraceptive failure rates (CFRs). A “typical-use” CFR is the number of

pregnancies occurring among 100 women using a specific contraceptive method over a 12-month period. We used published CFRs for women’s first year of typical use based on the 1988 and 1995 versions of the NSFG, adjusted for underreporting of abortion.¹⁸ Failure rates from the 2002 NSFG were not available at the time this article was written.

The failure rate for nonuse of contraception was based on widely accepted data provided by Trussell.¹⁹ We estimated failure rates for combined method use at most recent intercourse by multiplying the method-specific failure rates calculated for the 2 methods. Although women could report simultaneous use of up to 4 contraceptive methods, we limited our failure rate calculations to the 2 most effective methods.

Risk indices. We created 2 related indexes for this study: (1) the contraceptive risk index, a weighted-average contraceptive use/nonuse pregnancy risk index (the same as our previously labeled weighted-average contraceptive failure rate index¹⁶), and (2) the overall pregnancy risk index. The contraceptive risk index summarizes the overall effectiveness of a group’s contraceptive use and essentially represents pregnancy risk for the sexually active proportion of that population by summing the product of each method-specific failure rate and the proportion of those who are sexually active using that method at their most recent sexual intercourse.^{18,19} In these calculations, nonuse of contraception was considered a “method” involving a specific risk of pregnancy. Thus, here the contraceptive risk index can be represented as follows: $\sum(\text{percentage of sexually active women using method } x \times \text{CFR for method } x)$, where x =each specific method or method combination. (The CFR for each method is reported in Table 2.)

The overall pregnancy risk index summarizes the risk of pregnancy among all adolescents (including those who are not currently sexually active), incorporating information about both the level of recent sexual activity and the level of contraceptive risk among those who were sexually active at the time of the study. Thus, the overall pregnancy risk can be defined as follows: percentage of women who were sexually active multiplied by contraceptive risk index.

Data on pregnancies. We used data on 1991 to 2000 pregnancy and birth rates obtained from the National Center for Health Statistics to compare our measure of overall pregnancy risk with actual pregnancy rates.³ The pregnancy rates for 2001 were computed using the same method employed by the National Center for Health Statistics. To estimate pregnancy rates for 2002, we calculated a linear extrapolation based on changes from 1995 to 2001.

Analysis

We initially estimated, for both 1995 and 2002, the percentages of female adolescents who were sexually active. We then tested for changes in percentage over time overall and by age and race/ethnicity. Next, we measured the specific contraceptive methods these young women had used at their most recent sexual intercourse, as well as the number of methods they had used and common method combinations. Each sexually active woman was assigned an individual contraceptive risk score on the basis of the 2 most effective contraceptive methods she had used at her most recent sexual intercourse. We used this information to calculate the mean and variance of the contraceptive risk index and test for changes in the index between 1995 and 2002, both overall and separately according to age and race/ethnicity.

In the next part of our analysis, we calculated age- and race/ethnicity-specific changes over time in overall pregnancy risk index values. We computed standard errors and tests of statistical significance using the *svy* series of commands in Stata 8.2 (Stata Corp, College Station, Tex) to account for the stratified survey designs.²⁰ To calculate the mean and variance for the overall pregnancy risk index, we assigned sexually active teenagers a value equal to this contraceptive risk score and assigned those not sexually active a score of zero. Implicit in this index is the fact that adolescents who were not sexually active at the time of the study, even if they had previously been sexually active, did not face a current risk of pregnancy.

Finally, we decomposed the overall pregnancy risk index into its component parts to ascribe the decline in pregnancy risk from 1995 to 2002 to changes in sexual activity and changes in contraceptive use. The percentage

of the decline in pregnancy rate because of the decline in sexual activity was calculated as

$$(1) \frac{\log(SA_{2002}/SA_{1995})}{\log(SA_{2002}/SA_{1995}) + \log[(CRI_{2002})/(CRI_{1995})]} \times 100,$$

where SA represents the percentage of sexually active young women and CRI represents the contraceptive risk index. Similarly, the percentage of the decline in pregnancy rate because of improved contraceptive use was calculated as

$$(2) \frac{\log[(CRI_{2002})/(CRI_{1995})]}{\log(SA_{2002}/SA_{1995}) + \log[(CRI_{2002})/(CRI_{1995})]} \times 100.$$

This method produced results that were nearly identical to those obtained with an alternative approach suggested by Preston et al.²¹ We used a bootstrapping procedure with 500 iterations to calculate confidence intervals (CIs) for percentage changes because of sexual activity and percentage changes because of contraceptive use.

RESULTS

Between 1995 and 2002, the number of young women aged 15 to 19 years who had

ever engaged in sexual intercourse declined 10% (52% to 47%; *P*=.035; Table 1). There was a 22% decline in the 15- to 17-year-old group (*P*=.003), and there was no change among 18- and 19-year-olds (71% at both time points). The number of young Hispanic women who had ever engaged in sexual intercourse declined (*P*=.003), but there was no significant change among young non-Hispanic White (*P*=.156) or Black (*P*=.415) women.

More relevant to this analysis, rates of sexual activity (i.e., sexual intercourse during the preceding 3 months) did not decline significantly among either 15- to 19-year-olds (41% to 38%; *P*=.244) or 18- and 19-year-olds. Among 15- to 17-year-olds, the decline in sexual activity (28% to 23%) was of borderline statistical significance (*P*=.065). Hispanic 15- to 19-year-olds exhibited a decline from 46% to 35% (*P*=.032). Again, no significant change was found for non-Hispanic Whites or Blacks in that age group. In general, we found smaller changes in recent sexual intercourse than in history of ever having sexual intercourse, as a result of small, nonsignificant

increases in sexual activity among sexually experienced teenagers.

Dramatic improvements in contraceptive use occurred between 1995 and 2002, including increases in the use of individual methods, increases in the use of multiple methods, and declines in nonuse (Table 2). Improvements associated with individual methods included increases in the use of condoms (36% to 53%), birth control pills (24% to 33%), injection methods (8% to 10%), and withdrawal (7% to 12%). Use of Norplant ceased after its removal from the US market. The rate of nonuse declined from 34% to 18%. Use of 2 or more methods increased from 11% to 26%. The most common combinations of contraceptive methods used in 2002 included pills and condoms, condoms and withdrawal, pills and withdrawal, and injection and condoms. Overall, the contraceptive risk index declined 34% (*P*<.001).

Improvements in contraceptive use among 15- to 17-year-olds were even larger than changes among 15- to 19-year-olds. The rate of condom use increased from 38% to 58%, whereas pill use increased from 19% to 39%. Nonuse declined from 35% to 14%. Use of 2 or more methods rose from 12% to 33%, the most common combination being use of the pill and condom simultaneously (22%). The contraceptive risk index declined 46% (*P*<.001). Although the increase in contraceptive use was not as dramatic among 18- and 19-year-olds, the decline in the contraceptive risk index (27%) was still considerable (*P*=.004), and the percentage in which 2 or more methods were used rose from 11% to 22%.

Large changes in contraceptive use were observed among non-Hispanic White women, with considerable increases in the use of individual methods and a dramatic decline in nonuse. The rate of condom use increased from 38% to 58%, and use of birth control pills increased from 29% to 40%. Use of 2 or more methods rose from 13% to 31%, and simultaneous pill and condom use rose from 9% to 17%. The contraceptive risk index declined 44% (*P*<.001). The data for non-Hispanic Blacks and Hispanics shown in Table 2 should be considered with caution given the small sample sizes for these groups in both years.

TABLE 1—Percentages of Young Women Aged 15–19 Years Engaging in Sexual Intercourse: National Survey of Family Growth, 1995 and 2002

	1995, No. (%)	2002, No. (%)	Change, 1995-2002, %	<i>P</i>
History of sexual intercourse				
Age group, y				
Overall	1396 (51.7)	1150 (46.8)	-9.5	.035
15-17	815 (38.6)	674 (30.3)	-21.5	.003
18-19	581 (71.1)	476 (70.5)	-0.8	.853
Race/ethnicity				
White non-Hispanic	842 (50.9)	613 (46.4)	-8.7	.156
Black non-Hispanic	289 (60.4)	242 (57.0)	-5.8	.415
Hispanic	210 (56.4)	231 (40.4)	-28.4	.003
Recent sexual intercourse^a				
Age group, y				
Overall	1387 (40.5)	1149 (37.9)	-6.4	.244
15-17	808 (28.2)	673 (23.4)	-17.0	.065
18-19	579 (58.9)	476 (58.9)	0.0	.999
Race/ethnicity				
White non-Hispanic	837 (40.1)	613 (38.4)	-4.2	.543
Black non-Hispanic	288 (46.9)	241 (41.3)	-12.0	.240
Hispanic	207 (45.7)	231 (34.5)	-24.5	.032

^aDefined as within the past 3 months.

TABLE 2—Percentages of Sexually Active Young Women Aged 15–19 Years Who Used Selected Contraceptive Methods at Most Recent Sexual Intercourse and Contraceptive Failure Rates Risk Scores: National Survey of Family Growth, 1995 and 2002

	Contraceptive Failure Rate	15–19 Years		15–17 Years		18–19 Years		White Non-Hispanic		Black Non-Hispanic		Hispanic	
		1995	2002	1995	2002	1995	2002	1995	2002	1995	2002	1995	2002
Method, %													
Condom	13.7	35.7	53.0	38.4	58.3	33.7	50.0	38.4	58.0	37.9	52.7	19.6	30.6
Birth control pill	7.5	23.7	32.5	19.3	38.7	26.8	28.8	28.9	39.7	14.5	24.1	14.1	18.3
Injection	3.5	7.6	9.9	9.2	9.4	6.4	10.2	5.5	7.9	14.7	19.9	8.4	7.8
Norplant	3.5	2.2	0.0	1.8	0.0	2.4	0.0	1.4	0.0	3.2	0.0	4.6	0.0
Withdrawal	24.5	6.7	12.2	6.6	11.5	6.9	12.7	7.7	13.9	2.5	3.6	6.0	8.4
Rhythm	22.9	0.7	0.9	0.0	0.7	1.2	1.0	0.2	1.3	1.7	0.0	1.3	0.0
Vasectomy	0.2	0.2	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0
Patch	8.0 ^a	0.0	0.4	0.0	0.0	0.0	0.6	0.0	0.3	0.0	1.0	0.0	0.0
Intrauterine device	3.5	0.0	0.6	0.0	0.6	0.0	0.6	0.0	0.0	0.0	0.0	0.0	1.5
Diaphragm	13.1	0.0	0.2	0.0	0.6	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Spermicide	27.6	1.0	0.8	0.0	0.2	0.7	1.1	1.1	1.1	1.0	0.0	0.0	0.0
No method	85.0 ^a	33.9	18.3	35.4	14.3	32.8	20.7	30.7	12.2	33.3	24.8	50.2	39.6
Sexually active, no.		560	444	228	156	332	288	327	240	135	98	89	84
Common method combinations, %													
Pill + condom	1.0	7.0	14.2	6.1	21.9	7.6	9.7	8.9	17.4	4.8	14.3	0.7	3.0
Pill + withdrawal	1.8	1.3	2.6	1.1	3.6	1.3	2.0	1.7	4.0	0.0	0.0	1.2	0.0
Withdrawal + condom	3.4	1.7	3.6	2.0	3.0	1.5	3.9	2.0	4.2	0.0	2.0	2.4	1.4
Injection + condom	0.5	0.5	3.3	1.1	2.6	0.1	3.7	0.0	2.5	2.6	8.8	0.0	0.7
Patch + condom	1.1	0.0	0.4	0.0	0.0	0.0	0.6	0.0	0.3	0.0	1.0	0.0	0.0
No. of methods used, %													
0		33.9	18.3	35.4	14.3	32.8	20.7	30.7	12.2	33.3	24.8	50.2	39.6
≥1		66.1	81.7	64.6	85.7	67.2	79.3	69.3	87.8	66.7	75.2	49.8	60.4
≥2		11.2	26.1	11.5	32.7	10.9	22.2	13.4	30.9	8.8	26.2	4.3	5.0
≥3		0.5	2.3	0.5	1.5	0.6	2.7	0.8	3.3	0.0	0.0	0.0	1.1
4		0.0	0.4	0.0	0.0	0.0	0.6	0.0	0.6	0.0	0.0	0.0	0.0
Contraceptive risk index ^b		33.8	22.3	34.4	18.6	33.3	24.4	31.1	17.3	34.0	26.5	45.6	39.5
Change, 1995–2002, %			-34.0		-45.9		-26.8		-44.3		-22.1		-13.4
t test			4.74		4.47		2.87		5.05		1.42		0.82
P			<.001		<.001		.004		<.001		.158		.413

Note. Typical-use first-year contraceptive failure rates are from Ranjit et al.¹⁸ unless otherwise noted.

^aFrom Trussell.¹⁹

^bWeighted-average contraceptive use or nonuse risk score, abbreviated as contraceptive risk index.

As described in the “Methods” section, the overall pregnancy risk index combined the impact of changes in sexual activity and contraceptive use (Table 3). Overall, pregnancy risk declined 38% (95% CI=23%, 54%), from 13.7 to 8.4. The decline was larger among 15- to 17-year-olds (55%, from 9.7 to 4.4) than among 18- and 19-year-olds (27%, from 19.6 to 14.4). The change in the overall pregnancy risk index observed among non-Hispanic Whites was significant; however, given the small numbers of non-Hispanic

Blacks and Hispanics, changes were of borderline statistical significance for both groups. (Note that, in each case, the decline in actual birth and pregnancy rates fell within the confidence intervals for the change in pregnancy risk. This represents one way to validate the calculation of our overall pregnancy risk index.)

Table 4 summarizes changes between 1995 and 2002 in key components of pregnancy risk and also displays the overall percentages of change that could be attributed to

changes in the 2 key components: sexual activity and contraceptive use. As Table 4 demonstrates, the largest changes in behaviors and pregnancy risks were observed among 15- to 17-year-olds. This finding is consistent with the largest changes in actual pregnancy rates occurring among younger teenagers.

We estimated that 14% of the change observed among 15- to 19-year-olds was attributable to a decrease in the percentage of sexually active young women (95% CI=-18%, 34%) and that 86% was attributable to

TABLE 3—Changes in Pregnancy Risk, by Age and Race/Ethnicity: National Survey of Family Growth, 1995 and 2002

	15-19 Years	15-17 Years	18-19 Years	White, Non-Hispanic	Black, Non-Hispanic	Hispanic
Change, 1995-2002, % (95% confidence interval)	-38.3 (-22.7, -53.9)	-55.2 (-33.1, -77.2)	-26.7 (-6.5, -46.8)	-46.7 (-27.4, -65.9)	-31.5 (-0.1, -63.0)	-34.2 (4.0, -72.4)
<i>t</i> test	4.81	4.90	2.60	4.74	1.97	1.75
<i>P</i>	<.001	<.001	.010	<.001	.05	.08
Change in birth rate, %	-23.2	-34.6	-17.0	-27.5	-29.7	-16.0
Change in pregnancy rate, % ^a	-23.5	-35.5	-17.3

^aData for 2002 not available; change extrapolated from trend between 1995 and 2001.

TABLE 4—Summary of Changes in Sexual Activity and Risk Index Values and Overall Changes Attributable to Sexual Activity and Contraceptive Use: National Survey of Family Growth, 1995 and 2002

	15-19 Years, Change, %	15-17 Years, Change, %	18-19 Years, Change, %	White, Non-Hispanic, Change, %	Black, Non-Hispanic, Change, %	Hispanic, Change, %
Sexual activity	-6.4	-16.9	0.0	-4.2	-12.0	-24.5
Contraceptive risk index	-34.0	-45.9	-26.8	-44.3	-22.1	-13.4
Overall pregnancy risk index	-38.3	-55.2	-26.7	-46.7	-31.5	-34.2
Overall change attributable to sexual activity (95% CI)	14 (-18, 34)	23 (-6, 45)	0 (-99, 37)	7 (-28, 26)	34 (-125, 172)	66 (-110, 236)
Overall change attributable to contraceptive use (95% CI)	86 (66, 118)	77 (55, 106)	100 (63, 199)	93 (74, 128)	66 (-72, 225)	34 (-136, 210)

Note. CI = confidence interval.

changes in contraceptive method use (95% CI=66%, 118%); the corresponding percentages among 15- to 17-year-olds were 23% (95% CI=-6%, 45%) and 77% (95% CI=55%, 106%). (Confidence intervals for attributions [and the attributions themselves] may in theory be below 0% or above 100% because one of the 2 changes may have actually been in the opposite direction of the overall change. For example, if sexual activity actually increased in one group but contraceptive use and the overall pregnancy risk declined, sexual activity would have made a “negative” contribution to the decline in pregnancy risk, and contraceptive use would have been responsible for “more than” 100% of the change.) All of the change in pregnancy risk among 18- and 19-year-olds was the result of increased contraceptive use (95% CI=63%, 199%).

Among non-Hispanic Whites, we estimated that 7% of the change was attributable to a decrease in the percentage of sexually active young women (95% CI=-28%, 26%) and that 93% was attributable to changes in contraceptive method use (95%

CI=74%, 128%). As noted earlier, attributions for non-Hispanic Blacks and Hispanics (Table 4) should be interpreted with caution given the limited sample sizes and large confidence intervals.

DISCUSSION

Our data suggest that declining adolescent pregnancy rates in the United States between 1995 and 2002 were primarily attributable to improved contraceptive use. The decline in pregnancy risk among 18- and 19-year-olds was entirely attributable to increased contraceptive use. Decreased sexual activity was responsible for about one quarter (23%) of the decline among 15- to 17-year-olds, and increased contraceptive use was responsible for the remainder (77%). Improved contraceptive use included increases in the use of many individual methods, increases in the use of multiple methods, and substantial declines in nonuse.

These data suggest that the United States appears to be following patterns seen in other developed countries where increased

availability and increased use of modern contraceptives have been primarily responsible for declines in adolescent pregnancy rates.¹ Our findings raise questions about current US government policies that promote abstinence from sexual activity as the primary strategy to prevent adolescent pregnancy.

Other scientific data also challenge the federal government’s efforts to promote abstinence-only strategies. The limited evaluations of abstinence-only sex education programs provide no evidence that they are successful in delaying initiation of sexual intercourse.²² Although abstinence is theoretically highly effective in preventing unintended pregnancies and sexually transmitted infections (STIs), in actual practice abstinence intentions often fail.^{14,23} Abstinence programs may undermine the promotion of other prevention behaviors. For example, a longitudinal examination of the virginity pledge movement showed that pledgers did delay initiation of sexual intercourse; however, they were less likely to use contraception when they initiated sexual activity and were less likely to seek STI screenings.²⁴

Identifying changes in the behaviors that result in adolescent pregnancy can provide some insight into the social forces that influence these behaviors. Increases in the use of multiple methods of contraception suggest an increased motivation to avoid pregnancy and STIs, which in turn suggest declines in the social acceptability of adolescent childbearing and increases in educational and employment opportunities. Increasing rates of condom use in the United States reflect continuing concerns about HIV infection and other STIs among adolescents.²⁵

Socially disadvantaged young people and their communities may increasingly see adolescent pregnancy as a barrier to improvements in life circumstances.²⁶ Adolescents who are also parents have become less socially acceptable.²⁷ Delays in initiation of sexual activity are traceable to many factors, including broad public support for delaying initiation of sexual intercourse at least until graduation from high school.²⁷ Ironically, the trend toward later initiation of sexual intercourse and declines in adolescent pregnancy appears to have preceded recent intensive efforts on the part of the US government to promote abstinence-only policies.¹⁴

This study provides new and more comprehensive information on the factors underlying recent declines in US rates of adolescent pregnancy. Earlier studies involving NSFG data^{28,29,30} focused on the years 1988 to 1995, a period in which there were relatively small changes in rates of adolescent pregnancy. Data available from the 2002 NSFG allow exploration of behavioral changes during the period 1995 through 2002, when larger declines in rates occurred.

Our previous study involving 1991 to 2001 data on high-school students showed that both increased abstinence and increased contraceptive use contributed to the decline in pregnancy rates among 15- to 17-year-olds.¹⁶ Relative to school surveys, the NSFG includes more data on older teenagers and those who have left school and collects more detailed information about contraceptive use. In comparison with our school-based study, this analysis of the NSFG showed a larger contribution of contraceptive use to declines in adolescent pregnancy rates. We believe that these differences in attribution are the

result of differences in age groups and time periods, inclusion of young people who are not in school, and more complete measurement of contraceptive use.

Limitations

Our study had several limitations. When self-reported information is used, one must always consider the potential for over- and under-reporting. Adolescents are generally reliable reporters of information on sexual health.³¹ However, given increasing social pressure to delay sexual initiation and avoid pregnancy, adolescents may be more likely today than in the past to underreport sexual activity or overreport contraceptive use.

Although the overall NSFG sample size is adequate, sample sizes become problematically small in analyses of subgroups. This was particularly true for the Black and Hispanic subgroups, in which the numbers of sexually active young women fell below 100. Moreover, variance around changes in percentages or around attribution was much larger than variance around estimates for a single point in time. As such, care should be taken in interpreting our estimates for these smaller subgroups.

There appears to be a specific problem with instability in the NSFG data for Hispanic adolescents. In our analyses, the decline in sexual experience among Hispanic teenagers (from 56% to 40% in 7 years) was much larger than the changes observed in other groups. Likewise, a comparison of the 1988, 1995, and 2002 versions of the NSFG¹⁰ revealed wide differences over time in sexual experience estimates among young Hispanic women aged 15 to 17 years (35%, 49%, and 25%, respectively). These differences seem implausible and may have resulted from the limited sample size or other problems involved in sampling an ethnic group that is heterogeneous with respect to national origin and sexual mores.

We assumed that there were no changes in whether contraceptives were used correctly or in biological fecundity. Correct use of contraception can be assessed via measuring changes in typical-use CFRs. We used the most recent available failure rates (for 1995). Ranjit et al. found no changes between 1988 and 1995 in typical-use CFRs (note that

questions about contraception use at most recent intercourse did assess consistency of use).¹⁸ No data are available to measure changes in biological fecundity among teenagers (or adults).

Implications

What policy recommendations arise from our results? Although more adolescents in the United States are delaying initiation of sexual intercourse, the impact of this change on pregnancy risk is small and confined to younger teenagers (i.e., 15- to 17-year-olds). Overall, increasing rates of contraceptive use appear to be the primary determinant of declining pregnancy rates between 1995 and 2002, and this assessment appears to be consistent with the pattern in other developed countries. Public policies and programs in the United States and elsewhere should vigorously promote provision of accurate information on contraception and on sexual behavior and relationships, support increased availability and accessibility of contraceptive services and supplies for adolescents, and promote the value of responsible and protective behaviors, including condom and contraceptive use and pregnancy planning.

Abstinence promotion is a worthwhile goal, particularly among younger teenagers; however, the scientific evidence shows that, in itself, it is insufficient to help adolescents prevent unintended pregnancies. The current emphasis of US domestic and global policies, which stress abstinence-only sex education to the exclusion of accurate information on contraception, is misguided. Similar approaches should not be adopted by other nations. ■

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Contributors

J.S. Santelli originated the study and assumed primary responsibility for the writing of the article. L. Duberstein Lindberg was the primary data analyst and was involved in the origination of the study. L.B. Finer

provided expertise on advanced statistical methods. S. Singh provided expertise on research methods and policy implications.

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The institutional review board at Columbia University declared this study exempt from protocol approval because the data were anonymous.

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The Accuracy of Condom Information in Three Selected Abstinence-Only Education
Curricula

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Abstract: While previous reports identified inaccuracies in abstinence-only education, many do not detail the specific informational problems. Based on a review of three purposively-selected curricula used in federally-funded programs, we identified the types of scientific errors about condoms in abstinence-only education. These curricula explicitly and implicitly convey the message that condoms fail to provide protection against HIV. References were commonly out of date. In addition the curricula often misrepresented studies, for example only reporting the highest condom failure rates reported within a study. The curricula did not explain differences between typical use and perfect use contraceptive failure associated with condom use and often incorrectly compared HIV transmission risk and pregnancy risk. Finally, these curricula use faulty reasoning in explaining risk and promote misinformation about condoms (such as condom permeability) that have been repudiated by scientific consensus bodies. The information about condoms presented in these curricula does not represent complete, current, or accurate medical knowledge about the effectiveness of condoms in preventing sexually transmitted infections, including HIV.

Key words: sexuality education; abstinence education; adolescent health; medical accuracy, HIV, pregnancy

Condom promotion has been a central public health strategy in preventing HIV and other sexually transmitted infections (STIs). Research in the last decade has greatly advanced understanding of condom effectiveness in protecting against infection from HIV and other STIs. In 2000, the Public Health Service convened a group of scientists and policymakers to review scientific evidence for condom efficacy. This review, referred hereafter as the NIH Condom Report, found that when used correctly and consistently, condoms offer protection against HIV/AIDS, pregnancy, gonorrhea in men, and perhaps diseases caused by human papillomavirus (National Institute of Allergy and Infectious Diseases, 2001). The report also identified the paucity of data on the efficacy of condoms for many other STIs. Since that time additional peer-reviewed evidence has accumulated that suggests condoms provide protection against chlamydia, gonorrhea, syphilis and Herpes Simplex Virus type 2 (Casper & Wald, 2002; Holmes, Levine, & Weaver, 2004; Winer et al., 2006). Recent research also suggests that condoms may provide newly sexually active young women protection from HPV (Winer et al., 2006).

Beginning in 1998, the federal government greatly expanded its support for abstinence-only education (AOE) programs. Federally supported programs must have as their exclusive purpose the promotion of abstinence from sexual intercourse outside of marriage and may not in any way advocate contraceptive use or discuss contraceptive methods or condoms. The only exception to this restriction on contraceptive information is a provision that allows AOE programs to discuss failure rates for condoms and contraception (Administration for Children and Families, 2007; Dailard 2002; Haskins & Bevan, 1997).

In 2004, the minority staff from the Committee on Government Reform of the U.S. House of Representatives, published *The Content of Federally Funded Abstinence Education Programs*, often referenced as The Waxman Report. This was the first report to identify inaccuracies in AOE curricula supported by the federal government. This report found that eleven of the thirteen most commonly used AOE curricula contained misleading and incorrect scientific information about reproductive health including information about condoms and contraceptive efficacy and presented stereotypes of gender roles as facts (United States House of Representatives Committee on Government Reform, 2004). In 2006, the U.S. Government Accountability Office (GAO) issued two reports relating to scientific accuracy in federally funded AOE programs. The first report stated that the Department of Health and Human Services had not put in place a mechanism to review the medical accuracy of AOE programs (U.S. Government Accountability Office, 2006b). The second review suggested that AOE programs were legally required to provide accurate information about condoms under section 317p of Public Health Service Act, enacted in 2000 (U.S. Government Accountability Office, 2006a). While the federal government has neither required nor defined medical accuracy, over 20 states have recently instituted requirements for medical accuracy in regards to sexuality and HIV/AIDS education (Santelli, 2008 in press). Among these, seven states have specifically defined medical accuracy. Key elements of these state definitions include consideration of the weight of scientific evidence and the importance of scientific theory, peer review, and recognition by mainstream scientific and health organizations such as the American Academy of Pediatrics and the U.S. Centers for Disease Control and Prevention (Santelli, 2008 in press).

A recent federally sponsored, longitudinal evaluation of four exemplary AOE programs found no evidence of program efficacy in changing health behaviors but did find that youth in AOE programs, compared to those receiving usual sex education, had less confidence in condoms' abilities to protect from STIs, although no decline in actual condom use (Trenholm et al., 2007). This finding may reflect program restrictions on condom information or inaccuracies within the curricula about condoms.

In light of the continued federal funding for AOE programs and given concern about the scientific accuracy of information in these curricula, we reviewed three federally funded AOE curricula previously identified as containing problems with accurate information. We wished to explore the specifics of medical inaccuracies about condoms. An analysis of purposely-selected curricula, our findings cannot be generalized to all AOE programs; rather our finding should be considered illustrative of the types of inaccuracies that may be found in other AOE curricula.

Method

Three federally funded AOE curricula—*Me, My World, My Future* (published in 1998 by Teen-Aid Inc. for use by middle-school students); *Sexuality, Commitment and Family* (also published in 1998 by Teen-Aid Inc. for use by high school students); and *Why kNOw* (published in 2002 by AAA Women's Services for use by sixth grade through high school students)—were reviewed for medical accuracy with a focus on condom information (Frainie, 2002; Potter & Roach, 1998; Roach & Benn, 1998). *Me, My World, My Future* and *Sexuality, Commitment and Family* are collectively referred to as the Teen-Aid curricula in this article. Teachers' manuals which included the student portions and notes to instructors were used for this study. According to the Waxman Report, eight

Community Based Abstinence Education (CBAE) recipients were using the Teen Aid Curriculum, *Me, My World, My Future*, and seven were using *Why knOw*. These two curricula were part of the 13 most popular curricula funded by CBAE in 2001, out of 69 different curricula that were funded that year (United States House of Representatives Committee on Government Reform, 2004).

These three curricula were purposely selected, i.e., we were asked to review these curricula by the American Civil Liberties Union for medical inaccuracies. Findings from this original review were then presented by John Santelli's as a communication in the form of a legal Declaration from the ACLU to the Department of Health and Human Services (Santelli, 2007). These curricula were chosen because they were previously identified as containing medically inaccurate information and continued to receive federal funding. Thus, the purpose of this paper is to explore the nature of these inaccuracies and not to determine the prevalence of them.

We reviewed specific statements about condoms along with scientific references provided by the curricula. In addition, we conducted searches on Web of Science and Medline for peer-reviewed references on condom efficacy to identify both current medical understanding on this topic and understanding at the time each specific curriculum was published. Each statement involving condoms was placed into a matrix and assessed by both authors for accuracy. We inductively developed a typology to describe the types of inaccuracies we found, including information that was *out of date*, *selectively reported* from study, and *not peer reviewed* (Huberman & Miles, 2002). We also include an *other* category for less common errors that were not classifiable into the first three categories. *Out of date* represented statements whose source of information

were eclipsed by better research and improved understanding in the research literature. *Selectively reported* included instances where a single statistic or finding was taken out of the study context and was therefore not representative of the authors' overall conclusions. Statements based on references which were not peer reviewed were identified as *not peer reviewed*. The *other* category encompassed statements that were inaccurate for other reasons, such as nonparallel comparisons of statistics or concepts. Each inaccurate statement was categorized using this typology.

In addition, we sorted the statements about condoms into themes related to various aspects of condom use, including slippage and breakage, contraceptive efficacy of condoms, condom efficacy in preventing HIV transmission, youth as condom users, and condom availability and distribution programs. The section on condom slippage and breakage included statements relating to how often condoms break or slip off in a variety of clinical trials and population based studies. Statements about condom efficacy as a contraceptive were placed in the section about condoms and pregnancy, while those relating to the efficacy of condoms in reducing HIV transmission were put into the section on condoms and HIV transmission risk. Statements regarding youth's ability to use condoms and the usefulness of condom distribution programs are found respectively in the sections about youth as condom users and on condom availability and distribution programs. In the results section, we review examples of statements about condoms by these themes. We summarize and provide textual examples of the main medical inaccuracies relating to condoms and critique these statements. Finally, we provide two in-depth examples which illustrate multiple inaccuracies.

Findings

Condom Breakage and Slippage

All three curricula address condom breakage and slippage. In the scientific literature, a range of rates for condom slippage and breakage are reported. The NIH Condom Report reports:

Estimates of condom breakage from these [prospective] studies range from 0.4–2.3%. Slippage rates from these three studies ranged from 0.6% to 1.3%. Slippage rates include both slippage during intercourse and slippage during withdrawal. The combined method failure (slippage plus breakage) is estimated at 1.6% – 3.6%. (National Institute of Allergy and Infectious Diseases, 2001, p. 9)

Similar rates are provided by more recent publications such as *Contraceptive Technology* (Trussell, 2004).

These rates are much lower and in a narrower range than those found in the Teen-Aid curricula. Rates of condom breakage and slippage reported in the Teen-Aid curricula ranged from 0.6% to 44.5%. The rate of 0.6% is qualified by stating that this was for female prostitutes. Rates ranging from 1.3% to 15.1% are presented as rates for “experienced and/or mutually monogamous adults.” Finally the rate of 44.5% is not qualified but, in context, appears to be data about the percent of time condoms break or slip over a year for unmarried Hispanic women (Roach & Benn, 1998, p. 257). In general, the curricula did not differentiate user and method failure in reporting condom breakage and slippage. By listing this wide range of slippage and breakage rates, the curricula seem to imply that condoms are not reliable.

Contraceptive Efficacy of Condoms

When used consistently and correctly, condoms are an effective method of contraception with a perfect use failure rate of 2% and typical use failure rate of 15% as reported across multiple studies (Trussell, 2004, National Institute of Allergy and Infectious Diseases, 2001). Contraceptive failure rates represent the number of women out of 100 who get pregnant within one year of use. Clarifying between perfect use failure rate and typical use failure rate are important when providing information about contraceptives. *Perfect use* rates represent failure rates when a method is used consistently and correctly; *typical use* failure rates reflects the failure of users to do so. Typical use rates generally are calculated for first year of use among new users and among those who are new to the method or are restarting a method. In general, failure rates are lower in subsequent years and among experienced users. Importantly, typical use failures include pregnancies occurring after a user forgot to take the pill as prescribed or when a couple intends to use condoms but fails to do so consistently.

The two Teen-Aid curricula often report the highest failure rates from cited studies, or confuse efficacy in preventing HIV and pregnancy. For instance, the teacher manual for Teen-Aid suggests that “*Contracting HIV is easier than getting pregnant because you can only get pregnant several days a month*” (Roach & Benn, 1998, p. 254). It is important to note that efficacy in HIV transmission and pregnancy prevention are not comparably calculated. In another place, Teen-Aid reports an average rate but also the two highest rates of contraceptive failure from a study: “*Condoms fail 15.7 percent of the time over the course of a year. This is a standardized failure rate—among some groups of women it has gone as high as 36.3 percent and 44.5 percent*” (Roach & Benn, 1998, p. 257).

The Why kNOw curriculum does not differentiate typical use from perfect use condom failure rates and selectively reports higher condom failure rates in stating that “*The condom has a 22.5 % failure rate in preventing pregnancy in unmarried women under the age of 20 during the first 12 months of use. (Fu, Darroch et al. 1999)*” (Frainie, 2002, p. 96). The user failure rate for women in the same age range and time period whose income was above 200% of poverty was 13.3% (Fu, Darroch et al., 1999). This lower rate is not reported.

These three curricula do not report perfect use, nor do they explain the difference between perfect use and typical use. Likewise, they do not explain that correct and consistent use of condoms will result in much lower contraceptive failure.

Condoms and HIV Transmission Risk

Evaluation of condom efficacy in preventing sexually transmitted infection is often methodologically difficult as is well described in the NIH Condom Report (National Institute of Allergy and Infectious Diseases, 2001). However, the best studies for calculating condom efficacy use HIV infection as an outcome. These estimates come from a series of longitudinal studies of HIV serodiscordant couples, where one member of a couple is infected with HIV and the other is not. These studies suggest that correct and consistent use of condoms substantially reduces the risk of HIV infection.

These studies have been systematically reviewed by Weller and Davis in three published meta-analyses (Weller, 1993; Davis and Weller, 1999; and Weller and Davis, 2002). The 1993 meta-analysis found that consistent use of condoms help prevent the transmission of HIV by 69% (Weller, 1993). The two more recent meta-analyses found that condoms afford greater protection. The 1999 analysis found that condoms reduce the

rate of HIV infection by 87% (0.9 per 100 person-years with a confidence interval of 0.4–1.8 for always-users and 6.8% per 100 person-years with a confidence interval of 4.4–10.1 for male to female transmission for never-users) and the 2002 analysis found an 80% reduction rate (1.14 per 100 person-years with a confidence interval of 0.56–2.04 for always-users and 5.75% per 100 person-years with a confidence interval of 3.16–9.66 for never-users) (Davis & Weller, 1999; Weller & Davis, 2002). The 2001 NIH Condom Report relied on the second of these meta-analyses (Davis and Weller, 1999). Their 2002 review for The Cochrane Collaboration is an update of the 1999 analysis which used stricter guidelines for study inclusion.

Despite the more recent estimates, *Why kNOw*, published in 2002 still references the 1993 meta analysis. The Teen-Aid curricula (published in 1998) also references the 1993 meta-analysis and it is unclear to us why Teen Aid has not revised their curricula given the scientific advances in understanding HIV and other STIs. In addition, Teen-Aid curricula report a 1987 study by Fischl et al. (Fischl et al., 1987), “*In one study of heterosexual couples where one partner is HIV infected, over an average of two years sexual exposure [sic] if latex condoms were relied upon, there was still a 10 to 23% risk of transmission of [HIV] infection even with training and proper useage*” (Potter & Roach, 1998, p.19; Roach & Benn, 1998, p. 256). In the Fischl study that the previous quote references, only 1 out of 10 couples who were using barrier protection seroconverted within the 2-year study period (Fischl et al., 1987). Importantly, the estimate of HIV transmission in this study is much higher than the estimate from the most recent meta-analysis by Weller and Davis: 1.14 per 100 person-years (Weller and Davis,

2002). Finally, these curricula do not address HIV transmission when the HIV status of a partner is unknown.

Even more ominous than this confusion about condom efficacy in preventing HIV infection, both Teen-Aid and *Why kNOW* curricula subtly suggest that condoms allow the transmission of HIV. This is addressed below in the teaching examples section.

Youth as Condom Users

Our review of contraceptive efficacy suggests that method-specific contraceptive failure rates for teenagers are similar to women in their twenties. For example, Ranjit, Bankole, Darroch, and Singh (2001) report that condom failure rates over the first two years of use, based on data from the 1988 and 1995 National Surveys for Family Growth, were 25.8% for those under 18 years, 27.5% for 18- to 19-year-olds, 28.2% for 20- to 24-year-olds, 21.8% for 25- to 29-year-olds, and 13.6% for 30- to 44-year-olds. (One reason for the reduced failure rates over age 30 may relate to reduced fecundability.) Thus, evidence shows that teens may be effective condom users. In addition, research shows that high quality sex education classes may facilitate the use of condoms by teaching and demonstrating correct condom use (Kirby et al., 2007).

However, many of the statements in the Teen-Aid curricula contain statistics that suggest that teens are less able to use condoms to prevent pregnancy when compared to adults. Other statements and figures cite rates of condom failure dependent on experience or cohabitation. In one figure, Teen-Aid presents the following statistics without any elaboration: “Pregnancy Rates during the first year of contraceptive use. Condom: method failure 4%, married adult 14.1%, unmarried adolescent 18.4%” (Roach & Benn, 1998, p. 215). As noted above, without explanation, method failure (i.e., perfect use) is

not comparable to the typical use failure rates that are reported for married adults and unmarried youth. Yet Teen-Aid presents them in sequence and thereby implies that unmarried teens are not effective condom users. Many factors influence an individual's success with condoms and age does not preclude correct and consistent condom use.

Condom Availability and Distribution Programs

Leading organizations of health professionals support condom availability programs for youth. The American College of Obstetricians and Gynecologists, the American Academy of Pediatrics, and the American Medical Association support adolescent access to condoms through comprehensive school health programs (American Academy of Pediatrics, 2001; American Medical Association, 2004; Bethards, 2003). Evaluations of school-based condom availability programs have shown mixed results in increasing condom use but these programs have not reported negative impact on other sexual behaviors (Blake et al., 2003; Furstenberg, Getz, Teitler, & Weiss, 1997; Kirby et al., 1999). Likewise leading STI researchers have supported condom availability. For example, Holmes and colleagues suggest: "Condom promotion represents an important element in approaches to and programs about comprehensive HIV-prevention" (Holmes et al., 2004).

The three AOE curricula do not support these ideas about condom availability to teens. The Teen-Aid curriculum takes a contrary view citing the following opinion: "*Condoms don't hack it. Passing them out is futile*—Robert Noble M.D." (Potter & Roach, 1998, p. 20; Roach & Benn, 1998, p. 215).

Teaching Examples

The *Why kNOW* and Teen-Aid curricula use a variety of illustrative examples to impart the authors' understanding of condoms and risk for HIV, STIs, and pregnancy. The next two sections illustrate this use of such examples. In each case, we identify informational problems.

Condom Use and Russian Roulette

The Teen-Aid curricula draw an analogy between condom use and playing Russian roulette:

“If condoms and condom usage are not reliable, wouldn't relying on them be like playing the insane “game” of Russian roulette? A cartridge is loaded into one of the six chambers of a revolver. The first “player” spins the cylinder, points the gun to his/her head, and pulls the trigger. He/she has only one in six chances of being killed. But if one continues to perform this act, the chamber with the bullet will ultimately fall into position under the hammer, and the game ends as one of the players dies. Condoms are like Russian roulette. Condoms do not prevent pregnancy, STDs or AIDS; they only delay them. Theoretically, the longer one relies on them, they will fail and the “game” is over.” (Roach & Benn, 1998, p. 215)

This analogy, which is found under the heading “Are Condoms Effective and Reliable?” in which condoms and HIV risk are discussed, is problematic on several levels. First, it implies that HIV transmission is synonymous with a serious bullet wound and therefore causes imminent death. Second, the analogy implies a 1 in 6 chance of death, much higher than either per coital act or per annum HIV transmission rates among serodiscordant couples who do not use condoms (Weller & Davis, 2002). Third, the

example ignores the fact that most sexual partners among teenagers are not HIV infected.

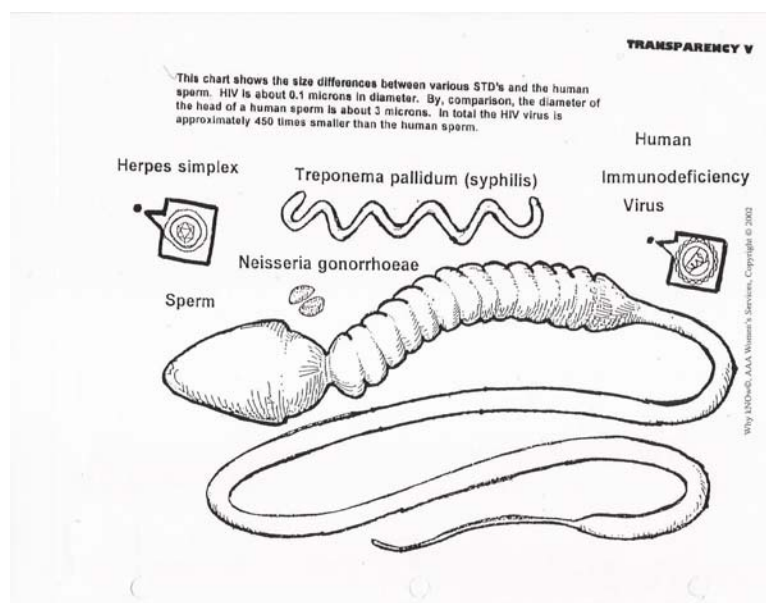
The HIV prevalence in the U.S. teenage population is relatively low, between 0.16% and 0.75% of 15 to 24 years olds (Joint United Nations Programme on HIV/AIDS, 2000).

Fourth, this analogy assumes that condoms do not reduce HIV transmission risk.

Condom Permeability and the “Speedy Sperm” activity

The *Why kNOW* Speedy the Sperm lesson attempts to explain HIV and pregnancy risk by focusing on the size of the virus and human sperm and implies that viral particles may be able to pass through the condom. First, the Speedy the Sperm lesson states that “The condom has a 14% failure rate in preventing pregnancy (1998 Contraceptive Technology, p 216) i.e. keeping sperm from entering the woman’s body” (Frainie, 2002, p. 96). This implies that pregnancy risk is the same each time sperm enter a woman’s body and ignores other factors relating to the fertility.

The Speedy the Sperm lesson uses a cartoon depiction of sperm, HIV, Treponema pallidum, syphilis, and Herpes simplex to illustrate size differentials and suggest transmission risk:



“This chart shows the difference between various STDs and the human sperm. HIV is about 0.1 microns in diameter. By comparison the diameter of the head of a human sperm is about 3 microns. In total the HIV virus is approximately 450 times smaller than the human sperm.” (Frainie, 2002, Transparency 5)

This explanation is problematic. The source of information about this size comparison is a letter to the editor from 1992 in *The Washington Post*. The 2001 NIH Condom Report explicitly states that latex condoms are impermeable to sperm and viruses, such as HIV, regardless of biological size (National Institute of Allergy and Infectious Diseases, 2001). By emphasizing this biological size difference, the curriculum implicitly builds on myths that condoms have holes in them or may be porous.

The Speedy the Sperm lesson also compares pregnancy and HIV infection risk: *“Since the HIV virus is smaller than a sperm and can infect you any day of the month, the failure rate of the condom to prevent AIDS is logically much worse than its failure rate to prevent pregnancy”* (Frainie, 2002, p. 96). This statement is confusing as failure rates for pregnancy and HIV are not calculated in the same ways. The risk of acquiring HIV is dependent on the prevalence in a population and the consistency and correctness of condom use. The risk of pregnancy is dependent on both partners’ fertility during intercourse and contraceptive use, which includes condom use. Thus, statistics for condom failure leading to pregnancy or HIV are not comparable.

Finally, the curriculum asks the instructor to further explain condom failure rates and the size differential between sperm and HIV: *“If the condom has a failure rate of 14% in preventing ‘Speedy’ from getting through to create a new life, what happens if this guy (the penny) [which is used to represent HIV] gets through? You have a death:*

your own” (Frainie, 2002, p. 96). As elaborated previously in the section on the Russian roulette analogy, HIV transmission is dependent on a multitude of factors, such as having sexual intercourse with an HIV infected partner. Even with an infected partner, the risk of HIV transmission per coital act is low.

In 2006 after we had completed our initial review, *Why kNOW* released an updated version of their curriculum which corrected and removed some of the curriculum content from their 2002 edition (Frannie & Ritterbush, 2006). When we requested a copy of the 2006 curriculum through the Department of Health and Human Services, it appeared that the pages of the teacher notebook which included The Speedy the Sperm lesson had been redacted after publication. A letter from the executive director of *Why kNOW* following Santelli’s Declaration stated that “Why Know is in the process of removing this activity from our curriculum. All users of our curriculum will be notified of its removal” (Scarce, 2007)

Discussion and Implications

We found evidence of misinformation about condoms and their ability to prevent HIV and pregnancy in three AOE curricula that are commonly used in federally supported programs. These three curricula explicitly and implicitly convey the message that condoms fail to provide protection against HIV, STIs, and pregnancy. References used to support these assertions in the curricula often were out of date or from non-peer reviewed sources. The curricula often misrepresented studies, for example, only reporting the highest condom failure rates reported within a study. In other instances, the curricula drew conclusions that go beyond the findings from the study cited. The curricula did not explain differences between typical and perfect use contraceptive failure rates associated

with condom use. Curricula often compared statistics for HIV transmission risk and pregnancy risk, even though these are not calculated in the same way. Finally, these curricula use faulty reasoning in explaining risk and promote misinformation about condoms (such as condom permeability) that have been repudiated by scientific consensus bodies. The information about condoms presented in these curricula does not represent complete, current, and accurate medical knowledge about the effectiveness of condoms in preventing sexually transmitted infections, including HIV.

Our findings are consistent with previous reports that document scientific inaccuracies in publications that examined a broader range of AOE curricula. The Waxman report examined a larger group of curricula and identified errors in the content across a range of topics (United States House of Representatives Committee on Government Reform, 2004).

Our study aimed to illuminate the specific reasons that particular statements are incorrect. The inaccuracies identified here presumably reflect legislative restrictions that prohibit AOE programs from teaching about the efficacy of contraceptives in preventing pregnancy, HIV and other STIs except to describe their failure rates (Administration for Children and Families, 2007). Our findings suggest a strong hostility to condoms in all three curricula. Perhaps, the authors of these curricula believe that undermining confidence in condom efficacy will induce students to remain abstinent or stop being sexually active, however, we are not aware of scientific evidence that such misinformation strategies are effective in promoting abstinence. Rather, such strategies may ultimately cause students to reject condom use.

Limitations

The findings from this analysis may not be representative of all AOE curricula nor does it detail the experiences of youth who were taught from these curricula. In this study, we chose to elucidate the types of errors rather than their frequency. The paper offers in depth analysis of selected medical inaccuracies, to detail how they are inaccurate.

Policy Implications

These findings and other research raise serious questions about the efficacy and ethics of AOE promotion (Kantor et al 2008; Kirby, 2008; Miller and Schleifer 2008 in the special issue). One third of ninth graders are sexually active and two thirds of high students are sexually active before graduation (Eaton et al., 2006) and virtually all Americans initiate sexual intercourse outside of marriage (Finer, 2007). Thus, students need access to medically accurate information on condoms and other ways to prevent HIV and other STIs. Comprehensive sexuality education programs which include information about condoms do not increase sexual activity among youth, in fact, many comprehensive programs both increase condom use and help teens delay initiation of sexual intercourse (Kirby, Laris, Roller, 2007; Kirby 2008 in this special issue; Smoak et al 2006). AOE curricula do not equip youth with information or skills necessary to use condoms to protect themselves from HIV, other STIs, or unintended pregnancies. Rather, these curricula teach that condoms are not reliable protection against HIV and pregnancy and that teens often fail at using condoms. Such messages may undermine the correct and consistent use of condoms.

Programs that promote abstinence should provide medically accurate information about condoms and other aspects of human sexuality. Federal requirements that restrict

information on contraception and condoms should be repealed and oversight of AOE curricula for scientific accuracy should be provided. The recent movement among states to require medical accuracy in sex education is an important policy development (Santelli, 2008 in press) however the federal government should also require that all federally supported sexuality education programs are medically accurate.

Ultimately the policy debate about abstinence education reduces to how can we best prepare youth for a healthy lifetime and how we best promote sexual and reproductive health in our society. At a minimum, all youth must be given the information they need to protect their health and their lives.

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Appendix: Quotations from Selected Curricula concerning Condoms

Quotations by Theme ¹	Specific Quotations from <i>Me, my world, my future</i> (MMWMF), <i>Sexuality, Commitment and Family</i> (SCF) and <i>Why kNOw</i> (WK) ²
Condom slippage and breakage	
Condom slippage and breakage	The failure rates for condoms (breakage or slippage rate) is higher than most people think. During vaginal intercourse condoms have been reported to break or slip off 14.6 % of the time, and a large family planning clinic found that 52% of respondents had experienced condoms bursting or slipping off in the previous three months. Between male homosexuals, condoms have been shown to fail 7.3%, 8% and 25.5% of the time. (MMWMF p 214; SCF p 19)
Condom slippage and breakage Youth as condom users	Condoms fail to protect when they break or slip off. Failure most often occurs when used by couples who are young, less experienced, or in those who are not cohabitating. <ul style="list-style-type: none"> • Reported failure rates with female prostitutes are 0.6% to 5%. • Failure rates for adults who are experienced and/or mutually monogamous are 1.3%, 1.9%, 6.7%, 7.4%, 8%, 10.1%, 11.7%, 12.9% and 15.1%. • When one partner had limited experience, condoms failed 6.9% and 14.8% of the time. • At the time of publication, only one study was found in non-cohabitating couples ages 13 to 17. Condoms failed 11.5% of the time. (MMWMF p 257)
Condom slippage and breakage	The condom has a 14% failure rate in preventing pregnancy (1998 Contraceptive Technology, page 216) i.e. keeping sperm from entering the woman's body. (WK p 96)
Contraceptive Efficacy of Condoms	
Contraceptive Efficacy and Condoms Youth as condom users	Basically two factors influence the overall effectiveness of a birth control method; (1) method failures and (2) patient failures. Mature married couples experience low failure rates, while single adolescents consistently prove to have higher failure rates, even after extensive training and follow-up (see below). Perhaps there is fundamental difference between post marital family planning and pre-martial birth control. (MMWMF p 215; SCF p 20)
Contraceptive Efficacy of Condoms	<i>Do condoms ever break or slip?</i> Condoms fail 15.7 percent of the time over the course of a year. This is a

¹ The possible themes are Condom breakage and slippage, Contraceptive Efficacy of Condoms, Youth as condom users, Condom availability and distribution programs, Condoms and HIV transmission risk, Teaching Examples (Condom use and Russian roulette, Condom Permeability in Speedy the Sperm) and Other.

² Roach, N., & Benn, L. (1998). *Me, my world, my future: Teacher's manual*. Spokane, WA: Teen-Aid.
Potter, S., & Roach, N. (1998). *Sexuality, commitment & family: Teacher's manual*. Spokane, WA: Teen-Aid.
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Condoms and HIV transmission risk	standardized failure rate—among some groups of women it has gone as high as 36.3 percent and 44.5 percent. This means that at the least, the chances of getting pregnant with a condom are 1 out of 6. (Contracting HIV is easier than getting pregnant because you can only get pregnant several days a month). (MMWFMF p 257; SCF p 37)
Contraceptive Efficacy of Condoms Youth as condom users	The condom has a 22.5% failure rate in preventing pregnancy in unmarried women under the age of 20 during the first 12 months of use. (<i>Family Planning Perspectives</i> , March/April 1999). (WK p 90)
Contraceptive Efficacy of Condoms	The typical failure rate for the male condom is 14% in preventing pregnancy (1998 <i>Contraceptive Technology</i> p 216). (WK p 90)
Contraceptive Efficacy of Condoms Other	In view of these “comforting” statistics , consider these additional facts: <ul style="list-style-type: none"> • The human sperm is 450 times larger than the HIV virus • A woman can become pregnant approximately 6 days each cycle (The ovum actually lasts less than one day, but sperm has been known to survive up to five says inside the female genital tract.) • You can acquire an STD any day of the month. (WK p 90)
Condoms and HIV transmission risk	
Condoms and HIV transmission risk	In one study of heterosexual couples where one partner is HIV infected, over an average of two years of sexual exposure if latex condoms were relied upon there was still a 10 to 23% risk of transmission of HIV infection even with training and proper use. (MMWFMF p 214 p 256; SCF 19 &36)
Condoms and HIV transmission risk	A meticulous review of condom effectiveness was reported by Dr. Susan Weller in 1993. She found that condoms were even less likely to protect people from HIV infections. Condoms appear to reduce the risk of heterosexual HIV infection by only 69%. (MMWFMF p 214; SCF p 19 & p 36-37)
Condoms and HIV transmission risk	The CDC has highly touted a study from Europe by Dr. de Vincenzi. This was a study of 256 heterosexual relationships where one partner was known to be HIV positive, and continued to have vaginal and anal intercourse. These adults were carefully instructed to use condoms correctly and consistently. Over an average time of 20 months, none became infected in the consistent condom users, while 4.8% of the inconsistent users seroconverted annually. This study has been criticized by three different university groups as being seriously flawed in at least six areas, and therefore the results are questionable and not statistically significant. (MMWFMF p 257)
Condoms and HIV transmission risk	In the CDC’s highly touted study Dr. de Vincenzi, 256 heterosexual couples were followed when one partner was known to be HIV positive. Each partner was counseled about HIV infection and about “safe sex.” Only 48% of the adult couples used condoms consistently. (MMWFMF p 258)
Condoms and HIV transmission risk	Do HIV positive men and women tell their sexual partners of their infection? In one study, 40% of HIV infected people did <u>not</u> . Of those who did not disclose, 57% did not use condoms consistently. Only 42% of individuals with multiple partners were honest about their HIV status.

	Surprisingly, 21% people did not tell their one and only sexual partner. (MMWMF p 257)
Condoms and HIV transmission risk	In a study performed in Canada, freshman college students knew more about HIV/AIDS than other STD's. In spite of this knowledge, only 25% of the men and 16% of the women always used a condom during sexual intercourse. Incredibly, among those students with ten or more sexual partners , regular condom use was reported by only 21% of the men and 7.5% of all the women! (MMWMF p 216, 258; SCF p 38)
Condoms and HIV transmission risk	The use of latex condoms has been promoted, by some, as a means to reduce the risk of sexual transmission of HIV. Experts from the Centers for Disease Control recommend abstinence and faithful monogamy as the only totally effective prevention strategies for sexually transmitted diseases. They also note that proper use of condoms for each sexual exposure can reduce, but not eliminate , the risk of infection. (MMWMF p 259; SCF p 36)
Condoms and HIV transmission risk	In mid-1988, the National Institute of Health canceled a two-year research project on condom effectiveness in Los Angeles. Officials felt that the study had too much risk and was therefore "unethical." The project was designed to determine how effective condoms are while people are involved in "high-risk" sex. They estimated that 40% of the control group would have become infected with HIV, and if condoms even reduced the risk ten-fold, four percent of condom users would become infected. (SCF p 38)
Condoms and HIV transmission risk	XVI. About Condoms A. The use of condoms does not necessarily prevent infection, but could just _____ it. (SCF p 44).
Condoms and HIV transmission risk	HIV Crossword Puzzle Down 16 Best protection- abstinence and mutually faithful monogamy; less than best protection - _____. [condoms is correct crossword answer]. (SCF p 45)
Condoms and HIV transmission risk	In heterosexual sex, condoms fail to prevent HIV approximately 31% of the time (Dr. Susan Weller, "A meta-analysis of Condom effectiveness in Reducing sexually transmitted HIV," <i>Social Science and Medicine</i> , June 1993). (WK p 90)
Youth as condom users	
Youth as condom users Contraceptive Efficacy and Condoms	Pregnancy Rates during the first year of contraceptive use. <i>Studies show that unmarried adolescents consistently experience higher contraceptive failure rates for pregnancy.</i> Condom: method failure 4%, married adult 14.1%, unmarried adolescent 18.4% (MMWMF p 215; SCF p 20)
Youth as condom users	Cohabiting women under the age of 20 had condom failure rate of 53.4 percent in preventing pregnancy during the first 12 months of use. (<i>Family</i>

Contraceptive Efficacy of Condoms	<i>Planning Perspectives</i> , March/April 1999). (WK p 90)
Youth as Condom users	<p>Studies have been done on sexually active adolescents and condom usage. One was completed in October 1986 in San Francisco. The authors noted:</p> <p>In San Francisco, information about AIDS prevention (including use of condoms) via television, newspapers, billboards, and on buses, some aimed specifically at teenagers, has increased in past years. The San Francisco Unified School District (SFUSD) began teaching a one-class segment on AIDS in the middle and high schools in academic year 1985-86 with teachers free to discuss AIDS in the lesson plans as they chose.</p> <p>After one year of intensive promotion, they notes that only 2.1% of teen girls and 8.2% of teen boys reported that they used condoms every time they had intercourse during the year. Also, paradoxically they learned that, in spite of the knowledge that condoms, “prevent” AIDS and other STD’s, the boys had less intention to use them one year later! (MMWMF p 215; SCF p 20)</p>
Youth as condom users	Is the goal of “correct and consistent” condom use attainable for the majority of teens, or even for the majority of adults? (MMWMF p 259)
Condom availability and distribution programs	
Condom availability and distribution programs	“Condoms don’t hack it. Passing them out is futile.” – Robert Noble, M.D. (MMWMF p 215; SCF p 20)
Teaching Examples	
	Condom use and Russian roulette
Condom slippage and breakage	If condoms and condom usage are not reliable, wouldn’t relying on them be like playing the insane “game” of Russian roulette? A cartridge is loaded into one of the six chambers of a revolver. The first “player” spins the cylinder, points the gun to his/her head, and pulls the trigger. He/she has only one in six chances of being killed. But if one continues to perform this act, the chamber with the bullet will ultimately fall into position under the hammer, and the games ends as one of the players dies. (MMWMF p 215 & 258; SCF 19)
Condom slippage and breakage Contraceptive Efficacy of Condoms Condoms and HIV transmission risk	Condoms are like Russian roulette. Condoms do not prevent pregnancy, STD’s, or AIDS; they only delay them. Theoretically, the longer one relies on them, they will fail and the “game” is over. (MMWMF p 215; SCF p 19)
Condom slippage and breakage Contraceptive Efficacy of Condoms	Relying on condoms is like playing Russian roulette. Condoms do not prevent pregnancy, STD’s, or AIDS. The longer one relied on them, the greater the chance of failure. Even if the method had a 90% chance of success the first time, repeated acts compound the failure rate and a person’s risk. The longer one relies on them, the probability increases that a

Condoms and HIV transmission risk	condom will fail and that the “game” is over. (MMWFM p 258)
	Speedy the Sperm
Condom Permeability in Speedy the Sperm lesson Condoms and HIV transmission risk Contraceptive Efficacy of Condoms	<p>The purpose of this illustration is to show the dangers of trusting your life to a piece of latex (condom). The condom has a 14% failure rate in preventing pregnancy, (1998 Contraceptive Technology, page 216) i.e. keeping sperm from entering the woman’s body. Studies show that the HIV virus is 450 times smaller than a human sperm. (Michael Roland of the Rubber Chemistry and Technology Company, (1992), Letter to the Editor—<i>The Washington Post</i>.) Recent research shows that the actual fertile time for women can last for about 6 days each cycle. Sperm has been known to live up to 5 days inside the female genital tract; the egg lives less than 1 day. Since the HIV virus is smaller than a sperm and can infect you any day of the month, the failure rate of the condom to prevent AIDS is logically much worse than its failure rate to prevent pregnancy.</p> <p>Explain to students the condom failure rate (see page 90) and the size difference between the HIV virus and the human sperm. The HIV virus is so small that it is impossible to see with the naked eye. In fact, you would have to magnify it greatly just to see it under a microscope! So for the sake of illustration, you are going to magnify it to the size of the penny, which is much easier to see. Now the sperm has to be magnified 450x the size of the penny.</p> <p>Hold up the penny and ask them how large we would have to make the sperm if we make the HIV virus the size of the penny. Using their brains, paper, and pencils, or calculators tell them to multiply $450 \times .5$ (size of penny’s diameter) = 225 inches. Since there are 12 inches in a foot, divide by 12=18.75 ft. That’s a big sperm!</p> <p>Tell them you just happen to have a sperm of that size with you and ask for two volunteers. Introduce “Speedy” and have students stretch him out to his full length. You stand in the middle and hold the penny up for them to see. If the condom has a failure rate of 14% in preventing “Speedy” from getting through to create new life, what happens if this guy (the penny) gets through? You have a death: your own.</p> <p>(WK p 96)</p>
Condom Permeability in Speedy the Sperm lesson Condoms and HIV transmission risk	<p>This chart shows the size differences between various STD’s and the human sperm, HIV is about 0.1, microns in diameter. By comparison, the diameter of the head of a human sperm is about 3 microns. In total the HIV virus is approximately 450 times smaller than the human sperm. (WK Transparency V)</p>
	Safer Than Nothing (activity supplement Sexually Transmitted Diseases)
Condoms and HIV transmission risk Contraceptive Efficacy of Condoms	<p>After a discussion about the failure rate of the condom ask the class, “Since the condom is not 100% safe, it cannot be called “safe sex”; so what could we call it?” After the class has had a few moments to answer, you suggest that “safer than nothing” may be a better name. Ask them if they want to be 100% safe, or just “safer than nothing.” Since there are some people who are satisfied with being “just safer,” we have a little scenario that will help us</p>

	<p>understand exactly what they are settling for when they settle for “just safer.” <i>Invite a student to come to the front of the class to play the part of “Teen.” You plan the part of “Narrator” and “Tempter.”</i></p> <p>[sic] From the plane we are watching this happening. We can’t jump because we are not married and don’t have a parachute. If we jump without being married, we are going to go “splat,” so all we can do is watch and learn. We watch those who are doing it right and making their marriage work. [sic]</p> <p><i>Ask the students what will happen when they jump [the unmarried couple who is using a baby blanket as a parachute]. They will say that they are going to crash. Yes, they are going to crash, because, although they are doing the same thing that married people are doing, they are not married. A blanket cannot take the place of a parachute, and condom cannot take the place of the protection of a faithful, loving, monogamous relationship. (WK p 98-99)</i></p>
Other	
Other	<p><i>How effective is Teen Contraceptive Use?</i> Encouraging the use of condoms and other contraceptives may even be harmful if it gives a false sense of security. (emphasis added [by Teen Aid]) (MMWMF p 214)</p>
Other	<p><i>Are Condoms Effective and Reliable?</i> [sic] Would you trust a condom, when condoms have been shown to be ineffective in preventing pregnancy or disease, to break, and even with proper usage to allow the transmission of HIV? (MMWMF p 214)</p>
Other	<p>A Rutgers University study found that barrier contraceptives apparently do not afford adequate protection against chlamydia. Infection rates were similar regardless of the contraceptive used. User infection rates were diaphragm -44%, condom-36%, oral contraceptives- 37% and no contraception- 44%. (MMWMF p 214; SCF p 19)</p>
Other	<p>Prevention ...He [former US Surgeon General Dr. C. Everett Koop] advocates condoms only for those who would not be abstinent or monogamous. (MMWF p 256)</p>
Other	<p>In spite of high level of AIDS-specific knowledge among sexually active young people (mean age 16.3 years), more than 66% engaged in sex without correct condom usage, with partners whose sexual history was unknown. These authorities concluded that AIDS knowledge alone is unlikely to reduce sex risk behavior in adolescents. (MMWMF p 257)</p>
Other	<p>A questionnaire of 108 men found that 49% reported removing condoms after beginning intercourse. (MMWMF p 258; SCF p 19)</p>
Other	<p>About Condoms What if condoms were 100% effective in preventing HIV infection, if used “correctly and consistently”? Should we then abandon moral values and advocate that all our children be indoctrinated that they must use condoms</p>

	with every sex act, and be taught how to correctly use them? If so, at what age do we begin instruction? (MMWMF p 258)
Other	Should physical safety from HIV, other STDs, or pregnancy be our paramount concern? Or are there other very important long-term considerations? What effect does condom instruction have on young people spiritually, emotionally, and socially? Does condom instruction result in positive or negative effects on future family stability and economic success? Could it not actually be harmful to young people, or to the rest of us, to follow this course? (MMWMF p 259)
Other	If you knew that someone was infected with the AIDS virus (HIV) would you have sex with that person? Would you recommend that your son or your daughter or your students place their trust in condoms? Would you trust a condom when condoms have been shown to be ineffective in preventing pregnancy or disease, to break, and even with proper usage, to allow the transmission of HIV? (MMWMF p 259; SCF p 19 & 36)
Other	Risky Behavior If abstinence is 100% effective and there is virtually no risk in a mutually faithful, monogamous (marriage) relationship, what level of risk are you willing to take? Condoms use has a risk factor. Are you worth the best? What is the best choice with the least risk? What choice can you live (die) with? (MMWMF p260; SCF p39).
Other	Teens Can Abstain [sic] Medical authorities see a continuing toll of sickness and death by HIV/AIDS, and they are calling for changes in sexual behavior. A popular “solution” one frequently hears is the cry that people must be given more condoms, and condom/AIDS education, an effort that has proven to fall short of expectations. (SCF p 22)
Other	It appears that a condom should reduce one’s risk of infection in a single sex act. The more often that the act is repeated, the more opportunity there is for condom failure. The longer people engage in risky behavior and rely on condoms for protection, the greater the risk of becoming infected. (Those married couples who are mutually faithful and don’t do IV drugs have no risk of HIV infection, with or without a condom.) (SCF p 38)
Other	Think about the following statistics and consider: “Could condoms be just another stupid idea?” (WK p 90)
Other	Currently there is not a condom made that can protect a person’s emotions. (WK p 90)

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Medical Accuracy in Sexuality Education: Ideology and the Scientific Process
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“If medicine is to fulfill her great task, then she must enter the political and social life.” Virchow, founder of modern pathology

Abstract

Recently, many states have implemented requirements for scientific or medical accuracy in sexuality education and HIV prevention programs. While seemingly uncontroversial, these requirements respond to the increasing injection of ideology into sexuality education, as represented by abstinence-only programs. This commentary describes the process by which health professionals and government advisory groups within the United States reach scientific consensus and reviews the legal requirements and definitions for medical accuracy. Key elements of this scientific process include the weight of scientific evidence, the importance of scientific theory, peer review, and recognition by mainstream scientific and health organizations. A concise definition of medical accuracy is proposed which may be useful to policy makers, health educators, and other health practitioners.

Introduction

Despite the overwhelming success of science as the foundation for medicine and public health, increasingly science itself is being manipulated or ignored in the debates surrounding public policy. While health professionals implicitly accept this scientific foundation for their work, we have seen political intrusions into scientific policy making normally based on scientific considerations in areas as diverse as FDA approval of emergency contraception, stem cell research, and new vaccines for the Human papillomavirus (HPV). (This interference also reaches into public schools with the teaching of evolution and abstinence education.¹⁻⁴) Tampering with scientific decision-making has included the suppression of data collection and

analysis, the muzzling of federal scientists, the packing of scientific advisory committees, the equating of fringe science with mainstream science, and the manipulation of scientific uncertainty.^{1, 2, 5} While political interference in public health is not new, many have suggested the Bush administration has politicized science to an unprecedented degree.^{6, 7} In this commentary, I explore the collision of science and ideology in recent federal policy designed to promote abstinence to improve adolescent reproductive health, and the recent introduction of federal and state legal requirements for *medical accuracy* as a legislative solution to these ideological debates. [Clearly distinctions can be made between *medical accuracy* and *scientific accuracy*, however, for purposes of this commentary I have generally considered *medical accuracy* to be the application of *scientific accuracy* to health matters. *Scientific accuracy* is the preferable term but *medical accuracy* is more commonly use.] {Note to the editor- this sentence could go into a footnote.}

Since enacting “welfare reform” in 1996, the federal government has spent more than 1 billion dollars on assistance to states, and to community-based, and faith-based organizations for abstinence-only educational programs.^{8, 9} These programs are restricted from providing information about condoms and contraception, except to discuss their failure rates.¹⁰ A variety of critiques, based upon scientific and ethical considerations, have been directed toward US government policies that promote abstinence exclusively.^{7, 11-20} These critiques of commonly used abstinence education curricula, from leading health professional and human rights organizations, have addressed multiple issues including scientific accuracy, withholding of life-saving information about the Human Immunodeficiency Virus (HIV), failure to delay initiation of sexual intercourse, promotion of gender stereotypes, insensitivity and unresponsiveness to sexually active youth and non-heterosexual youth, harm to comprehensive sexuality education and other domestic public health programs, damage to US foreign aid programs, and inconsistency with ethical imperatives of medicine and public health.^{7-9, 11, 17, 19-21} Underlying ideological assumptions of abstinence-only programs, based on moral and religious beliefs of their authors, are often at odds with current scientific consensus; these beliefs are a critical feature of the “scientific” basis for abstinence-only policies.²²

Medical Accuracy in Abstinence Only Education Programs

A number of analyses have specifically examined the scientific or medical accuracy of commonly-used abstinence programs. In 2004, the minority staff of the Committee on Government Reform of the U.S. House of Representatives reviewed 13 commonly-used, abstinence-only curricula for evidence of scientific accuracy.²³ Their report, commonly referred to as the Waxman report, found that 11 of the 13 curricula contained false, misleading or distorted information about reproductive health including inaccurate information about contraceptive effectiveness and the risks of abortion, as well as other scientific errors. These curricula treat stereotypes about girls and boys as scientific fact and blur religious and scientific viewpoints.²³ Two recent reviews of several abstinence-only curricula found similar problems.^{24, 25} In the fall of 2006, the Government Accountability Office (GAO) issued two reports on the federal programs that promote abstinence, both of which faulted the programs on the issue of scientific accuracy.^{26, 27} In the first report, the GAO found that the Agency for Children and Families (ACF), which dispenses most of the federal funding for abstinence education through the Community Based Abstinence Education (CBAE) or Title V programs, does not review grantees’ educational materials for scientific accuracy and does not require either CBAE or Title V recipient programs to review their own materials for scientific accuracy.²⁶ The second report

concluded that the federal statutory requirement (section 317P(c)(2) of the Public Health Service Act) to include scientifically accurate information on condom effectiveness would apply to abstinence education materials prepared and used by federal grant recipients.²⁷ The Department of Health and Human Services (DHHS), a parent agency of the ACF, responded that 317P does not apply to abstinence education,²⁷ although the 2007 program guidelines for the CBAE program created a new requirement specifically pertaining to medical accuracy.²⁸

What is meant by “*medical or scientific accuracy?*” Importantly, how do health professions determine medical and scientific accuracy? In answering these questions, it is useful to review the way medical and public health organizations review scientific studies to formulate policy guidance.

Scientific Consensus in Setting Health Policy

The community of scholars within a scientific discipline provides opportunities for vetting and critiquing new ideas: via professional meetings and conferences, peer-reviewed publications, advisory boards, university education, and mentoring of junior scientists. This scientific community operates through a variety of professional organizations - associations of scientists, public health workers, and medical professionals which promote scientific consensus by offering scientific opinions on key policy and practice issues. These professional organizations include the American Medical Association (AMA), the American Public Health Association (APHA), the American Academy of Pediatrics (AAP), and other specialty and subspecialty groups. These opinions are created and reviewed by a series of scientific committees to insure both the scientific accuracy and the clarity of specific recommendations. Likewise, federal government advisory committees such as the Advisory Committee on Immunization Practices (ACIP), the US Preventive Services Task Force, (USPSTF), the Task Force on Community Preventive Services (TFCPS), and the Institute of Medicine (IOM), as well as federal agencies such as the Centers for Disease Control and Prevention (CDC), the National Institutes of Health (NIH), and the Food and Drug Administration (FDA) offer scientific opinions on a broad variety of health matters. Taking a hard-nose approach, these bodies separate scientific fact from fallacy to assure policy based on the current scientific understanding.

These consensus statements are authoritative recommendations informed by scientific research. Membership within these advisory groups is based on scientific accomplishment and recognition by members of one’s own profession. Such groups use a variety of methods to reach consensus on scientific matters, including literature reviews, formal meta-analyses, and clinical experience. All scientific disciplines have standards for scholarship that are used to judge the quality of specific studies, although such standards differ among professions and disciplines. The methods for reviewing scientific findings, rating the strength of scientific evidence, and reaching recommendations are often explicitly defined in written documents.^{29,30} These review processes favor research published in peer-reviewed journals, particularly those journals that are held in high regard within the medical and scientific communities. Scientific panels weigh not only the predominance of evidence, but also consistency of specific studies with scientific theory within a particular discipline. These reviews examine key issues of scientific validity, such as the strength of research design, sample size, the generalizability of findings, etc. Policy makers and practitioners alike utilize these consensus statements in their decision making. While this scientific consensus process does not guarantee consensus in policy making, particularly where

strong cultural beliefs or economic forces are at work, this consensus process is often essential in determining scientific accuracy.

The licensure of the first vaccine to prevent HPV infection and cervical cancer is an example of this scientific consensus process at work - particularly when this scientific process is confronted with social and cultural concerns.³¹ Based on research findings provided by the drug company (Merck), FDA advisory committees recommended licensure and the FDA subsequently approved the vaccine for sale in 2006. Following licensure, the ACIP endorsed the vaccine's use among females 9-26 years of age and provided specific recommendations for its use. Medical associations such as the Society for Adolescent Medicine and American College of Obstetricians and Gynecologists (ACOG) have endorsed its widespread use. Despite concerns among social conservatives that the vaccine would lead to increased sexual risk taking among teens and despite conservative political leadership in the White House, the scientific review and consensus process functioned properly and led to approval of a vaccine that appears to be very safe and potentially highly efficacious.³² More than 20 states are currently considering legislation to mandate vaccine coverage. Despite considerable evidence that school mandates improve vaccine coverage for children and adolescents,³⁰ opposition to these mandates has been strong. Opposition from conservatives have been joined by opposition from those who generally oppose childhood vaccinations, those worried about drug company tactics, and physicians who are concerned about costs, long term efficacy, and side effects.^{31,33}

Similar review and consensus processes have been used in determining the efficacy of sexuality education, including AOE.^{19,20,34} Most recently, scientific review has been extended to the content of sexuality education curricula.^{23,24} This extension has often used the term "medical accuracy."

State and Federal Requirements for Medical Accuracy

State governments and the federal government have begun requiring medical accuracy in public health programs such as sexuality education, HIV prevention programs, and condom distribution.³⁵ For example, section 317P(c)(2) of the federal Public Health Service Act (42 U.S.C. § 247b-17(c)(2)), enacted in 2000, (also known as "the federal condom statute") requires medical accuracy when educational materials about sexually transmitted diseases (STDs) are created and distributed by HHS and HHS grantees. Such materials must contain "*medically accurate information regarding the effectiveness or lack of effectiveness of condoms in preventing the STD.*" Notably, the federal statute does not define "medical accuracy."

Based on a WestLaw search of all 50 state statutes, twenty-one states (AZ, CA, CO, IA, IL, IN, LA, ME, MD, MI, MN, MO, NV, NY, NC, OK, OR, RI, UT, WA, WV) have in some way required medical or scientific accuracy (using a variety of terms) in the provision of sexuality and/or HIV/AIDS education, although often without defining the term.³⁵

Among these 21 states, seven states have definitions of medical accuracy in some area of health law; four of these definitions appear in state sexuality education requirements (Table 1). Some states, such as New Mexico, have undertaken specific reviews of abstinence curricula, while other states, such as New Jersey, have rejected the curricula outright and declared they are unable to review each individual curriculum.³⁶

California requires that information presented in "sexual health education" courses "shall be medically accurate and objective" (Cal. Education Code § 51933(b)(2)). Similarly, Utah law requires the state board of education to approve instructional materials used in school health courses (Utah Code § 53A-13-101(1)(c)(i)) and an additional educational regulation mandates

that the board may “approve only medically accurate human sexuality instruction programs” (Utah Administrative Code r. 277-474.4.(D)). Colorado requires and defines medical accuracy with respect to HIV and AIDS prevention and education programs. (Colo. Rev. Stat. § 25-4-1413(5); 6 Colo. Code Regs. § 1009-10(1.1)(G)). A new Colorado statute also requires school human sexuality courses to be “medically accurate according to published authorities upon which medical professionals generally rely” (H.B. 07-1292, 66th Gen. Assem., Reg. Sess. (Colo. 2007) (amending Colo. Rev. Stat. § 22-1-110.5)). Finally, new state laws in Iowa and Washington require sexuality education to be “research-based” and “medically and scientifically accurate,” respectively. New Mexico and New Jersey require (and define) medical accuracy with respect to written and oral information provided to sexual assault survivors (N.M. Code R. §§ 7.7.2.7(KK), 7.7.2.38(B)(6); N.J. Stat. §§ 26:2H-12.6b, 26:2H-12.6c).

The medical accuracy definitions found in the California, Iowa, New Jersey, and Washington statutes and the Utah, New Mexico, and Colorado regulations are nearly identical. In these cases, medical accuracy is defined by three interrelated features:

- verification or support of research conducted under accepted scientific methods;
- publication in peer-reviewed journals; and
- recognition as accurate and objective by mainstream professional organizations such as the AAP, ACOG, APHA, and government agencies such as the CDC.

New Mexico, New Jersey, and Iowa add an important qualifier to peer-reviewed publication:

- supported by the weight of scientific evidence, i.e., “weight of research.” (This weighing of the predominance of evidence is intrinsic in the review by professional organizations and government agencies.)

The Colorado definition includes two additional components:

- linkage to social, behavioral, and biomedical theories; and
- adaptation of programs that are evidence-based.

Iowa adds the important notion of “complete” information.

Are these state definitions of medical accuracy adequate? The short answer is “Yes,” particularly if one considers the features identified by New Mexico, New Jersey, Iowa, and Colorado - which add critical dimensions. These state definitions clearly recognize the process which health professionals and scientists themselves understand and reflect the practical realities by which scientific consensus is produced.

The social/political context for requirements for “medical accuracy” is important to understand. Since the 2004 report of the Waxman Congressional staff, conservative organizations that support abstinence-only programs have attempted to define medical accuracy themselves.^{37, 38} For example, the Medical Institute for Sexual Health, a physicians group based in Texas which promotes sexual abstinence and the National Abstinence Leadership Council, has issued statements on medical accuracy. Such statements provide some insight into the scientific process, e.g., by identifying the importance of correctly quoting scientific research and the importance of peer review and publication in a medical journal. Such statements also undermine the scientific consensus process, for example, by suggesting that “*not all government agency recommendations meet this standard [of medical accuracy].*”³⁷ Moreover, these definitions are incomplete in key respects. Critical missing elements include the failure to acknowledge the positive importance of scientific consensus, the predominance of scientific evidence, and the use of theory in guiding scientific discovery and producing consensus. Theory is critical to the scientific process and in distinguishing science from ideology.

Scientific Theory

“Stand on the shoulders of giants.” From the home page of Google Scholar

An unfortunate feature of many current public debates is the manipulation of scientific uncertainty and confusion about scientific theory.⁶ Discovery and debate within the scientific community are critical to the scientific process and scientists are generally acutely aware of the limits to their own understanding. Does this suggest that scientific theories are merely unproven hypothetical constructs? If science is not definitive, is any *scientific fact* as good as any other? This confusion (or perhaps obfuscation) goes to the heart of the processes by which science reviews and reaches consensus on health issues.

Scientific discovery builds theories or paradigms, i.e., all encompassing theoretical constructs that attempt to explain a body of scientific findings.³⁹ In its classic formulation by Kuhn, a paradigm is expected to be consistent with all of the scientific findings within a specific area of scientific investigation and not inconsistent with other theories. Theoretical paradigms are not static, but substantial alternative findings are required to incite a paradigm shift or scientific revolution. An example is Darwin’s discovery of natural selection that became the foundation for a new theory of evolution and essential to modern biology and medicine. In contrast to natural selection, some have developed an alternate “theory” so-called *intelligent design* that is not science at all; this “theory” fails to follow the rules of science discovery and collapses under the accumulated body of scientific evidence. It makes little attempt to be encompassing and is rejected by mainstream organizations of biologists.

In the behavioral sciences and health education we are seeing the emergence of consensus theories of behavior change based on several decades of research, particularly AIDS prevention research (Fishbein Report). This emerging paradigm emphasizes key psychosocial factors such as self efficacy and peer norms and stages of behavior change. These factors have become key building blocks in developing comprehensive, effective sexuality curricula, such as Safer Choices.⁴⁰ Likewise, Kirby and others have identified key characteristics of effective programs.⁴¹ These psychosocial factors and characteristics do not appear to have influenced the creation of AOE curricula.

If Information is Incomplete, is it Medically Accurate?

A final issue in debates over medical accuracy involves the withholding of information about the benefits of condoms and contraception in abstinence-only curricula. Federal abstinence programs must have as their “exclusive purpose” the promotion of abstinence outside of marriage and may not in any way advocate contraceptive use or discuss contraceptive methods except to emphasize their failure rates.^{10, 42} As such, programs may discuss the risks and failures of contraception but not their benefits or successes in preventing pregnancy or HIV and other STDs. This specific program restriction clearly *requires* programs to provide *biased* information, by withholding positive information about contraception. Thus, it is not surprising that the Waxman report found that commonly-used abstinence programs contained inaccurate information about condom and other contraceptive effectiveness.²³

Withholding potentially life-saving information from sexually active teenagers is ethically troubling.^{15, 16, 34} The principle of informed consent suggests that persons should be given all the information they need to make informed choices.⁴³ Patients with cancer or other serious illness expect that they will receive complete and accurate information about treatment options from their physicians. Likewise, teenagers at risk of HIV and other STDs and unintended pregnancy need information on ways to prevent these. The American Medical

Association and other medical societies have endorsed annual behavioral screening and counseling for teenagers about sexual health.⁴⁴ Similarly, key medical and public health groups have endorsed comprehensive sexuality education.^{11, 12, 20, 34} If teenagers are sexually active, they need information to protect their health and lives. In school-based health education programs where a significant proportion of students are sexually active or will be shortly, students need access to education that provides accurate information about condoms and contraception. Where there is a need to know, medically incomplete is medically inaccurate.

Conclusions and Implications

Koplan and McPheeters have suggested that science should inform public health which in turn should drive public policy.⁴⁵ Unfortunately, they find that often the reverse is true, with politics driving public health decision-making and then seeking scientific justification using faulty science. Such manipulations of public policy-making must be stopped.

In this context, the requirement for *medical accuracy* is a welcome and generally helpful development for sexuality education and potentially useful in other areas of health. Requiring medical accuracy can help in clarifying debates between mainstream scientists and ideologically driven groups who claim the mantle of science in supporting specific social policies. Understanding the scientific consensus process can prevent the manipulation of scientific uncertainty. Health professionals and scientists need to become active in speaking out on the importance of scientific integrity in public policy. This can be done personally via letter writing and community advocacy or more broadly through energizing professional organizations around these issues.

Likewise, a definition of medical accuracy, based upon current practices for developing scientific consensus, would be helpful to state and federal policy-makers and local practitioners. Such a definition of *medical accuracy* should incorporate a comprehensive understanding of the scientific process. As such, medical accuracy should be defined as:

information relevant to informed decision-making based on the weight of scientific evidence, consistent with generally recognized scientific theory, conducted under accepted scientific methods, published in peer-reviewed journals, and recognized as accurate, objective, and complete by mainstream professional organizations such as AMA, ACOG, APHA and AAP, government agencies such as the CDC, FDA and NIH, and scientific advisory groups such as the Institute of Medicine and the Advisory Committee on Immunization Practices. The deliberate withholding of information that is needed to protect life and health (and therefore relevant to informed decision-making) should be considered medically inaccurate.

All states and the federal government should adopt requirements for medical accuracy in health education. At a national level, DHHS should create an independent review process to ensure the accuracy of commonly-used health education curricula supported by the federal government. Likewise, states should convene advisory bodies of knowledgeable medical professionals and public health officials to review local curricula.

Requirements for medical accuracy will not end attempts to manipulate health policy-making. However, such a requirement provides a clear standard in refuting such attempts. Even in the absence of a specific public health mandate or definition, appeals for medical accuracy may be a useful approach in promoting scientifically-grounded health policies.

Table 1. State Definitions of Medical Accuracy

State	Statute (enacted)	Scope	State Definition
California	Cal. Educ. Code § 51931(f) (2003)	Sexuality education	Verified or supported by research conducted in compliance with scientific methods and published in peer-reviewed journals, where appropriate, and recognized as accurate and objective by professional organizations and agencies with expertise in the relevant field, such as the federal Centers for Disease Control and Prevention, the American Public Health Association, the American Academy of Pediatrics, and the American College of Obstetricians and Gynecologists.
Utah	Utah Admin. Code r. 277.474.1(G) (2001)	School health education	Verified or supported by a body of research conducted in compliance with scientific methods and published in journals that have received peer review, where appropriate, and recognized as accurate and objective by professional organizations and agencies with expertise in the relevant field, such as the American Medical Association.
New Mexico	N.M. Code R. § 7.7.2.7(KK) (2004)	Sexual assault survivors, information about emergency contraception	Verified or supported by the weight of research conducted in compliance with accepted scientific methods and standards; published in peer-reviewed journals; and recognized as accurate and objective by leading professional organizations and agencies with relevant expertise in the field of obstetrics and gynecology, such as the American College Of Obstetricians And Gynecologists.
New Jersey	N.J. Stat. § 26:2H-12.6b (2005)	Sexual assault survivors, information about emergency contraception and STDs	Verified or supported by the weight of research conducted in compliance with accepted scientific methods and standards, published in peer-reviewed journals, and recognized as accurate and objective by leading professional organizations and agencies with relevant expertise in the field of obstetrics and gynecology.

Colorado	6 Colo. Code Regs. § 1009-10(1.1)(G) (2006)	HIV/AIDS prevention and education programs	<i>Consistent with one or more of the following:</i> 1. Verified or supported by research conducted in compliance with scientific methods;2. Recognized as accurate and objective by professional organizations and agencies with expertise in the relevant field, such as the American Public Health Association, American Social Health Association, the American Academy of Pediatrics, the American Academy of Family Physicians, the American College of Obstetricians and Gynecologists, the Infectious Disease Society of America, and the American Psychological Association;3.A study published in a peer-reviewed journal;4. Clearly identified link to social, behavioral, and biomedical science theories; or5. A local adaptation of an evidence-based model.
Iowa	H.F. 611, 82nd Leg., 2007 Sess. amending Iowa Code § 279.50 (2007)	Instruction in human growth and development, human sexuality, STDs, and HIV/AIDS	Complete information that is verified or supported by the weight of research conducted in compliance with accepted scientific methods; recognized as medically accurate and objective by leading professional organizations and agencies with relevant expertise in the field, such as the American College of Obstetricians and Gynecologists, the American Public Health Association, the American Academy of Pediatrics, and the National Association of School Nurses; and published in peer-reviewed journals where appropriate.
Washington	S.B. 5297, 60th Leg., 2007 Reg. Sess. (2007)	Sexual health education	Information that is verified or supported by research in compliance with scientific methods, is published in peer-review journals, where appropriate, and is recognized as accurate and objective by professional organizations and agencies with expertise in the field of sexual health including but not limited to the American College of Obstetricians and Gynecologists, the Washington State Department of Health, and the federal Centers for Disease Control and Prevention.

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