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Effective Approaches to Reducing Adolescent Unprotected Sex, Pregnancy, and Childbearing

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In the United States, there exist a multitude of different approaches to reducing adolescent sexual risk-taking, unintended pregnancy, childbearing, and sexually transmitted disease, including HIV. While many of these approaches have some positive effects upon some outcomes (such as greater knowledge), only some of these programs actually delay the initiation of sex, increase condom or contraceptive use, and reduce unprotected sex among youth. This article summarizes a review of 73 studies and their respective programs, and describes four groups of programs which have reasonably strong evidence that they delay sex, increase condom or contraceptive use, or reduce teen pregnancy or childbearing. These four groups of programs include (a) sex and HIV education curricula with specified characteristics, (b) one-on-one clinician-patient protocols in health settings with some common qualities, (c) service learning programs, and (d) a particular intensive youth development program with multiple components.

Although teenage pregnancy and birth rates have declined in the United States every year since 1991, the United States still has one of the highest pregnancy rates in the developed world (Singh & Darroch, 2000); about 40% of all young women become pregnant before they turn 20 (National Campaign to Prevent Teen Pregnancy, 1997), and about one fourth of sexually experienced teenagers contracts an STD every year (Alan Guttmacher Institute, 1994). These alarming statistics have motivated efforts to delay teenagers' initiation of sex and to increase their use of condoms and contraception more generally if they do have sex. For example, communities concerned with the reproductive health of youth have implemented curriculum-based sexuality and HIV education programs in both school and community settings, sex and HIV education programs for parents and their families, family planning services for teenagers, clinic instructional programs with one-on-one consultation with a medical provider, school-based and school-linked clinics, school condom-availability programs, community-wide pregnancy or HIV prevention initiatives with many components, early childhood programs, and youth development programs for adolescents (e.g., service-learning programs, vocational education and employment programs, and other youth development programs).

This paper summarizes a review of 73 studies meeting specified criteria (Kirby, 2001). The six primary criteria include (a) the study was published in 1980 or later, (b) the study was conducted in the United States or Canada, (c) the program targeted adolescents of middle school or high

school age (roughly 12 to 18), (d) the study used an appropriate experimental or quasi-experimental design, (e) the sample size was at least 100 in the combined treatment and control group, and (f) the study measured impact on sexual or contraceptive behavior or pregnancy or childbearing. This review identified four groups of programs with strong evidence of success.

SEX AND STD/HIV EDUCATION PROGRAMS COVERING BOTH ABSTINENCE AND CONDOMS OR CONTRACEPTION

The first group of effective programs are comprehensive sex and HIV education programs. These programs typically emphasize that abstinence is the safest method for preventing STDs and pregnancy, and that condoms and other methods of contraception provide protection against STDs and pregnancy and accordingly are safer than unprotected sex. In this review, *sex education programs* will refer to programs that cover protection against both pregnancy and STDs (and possibly other, broader, sexuality topics), while *HIV education programs* will refer to programs that focus primarily upon HIV (and sometimes other STDs). Both groups include a wide variety of programs, ranging from programs taught during regular school classes, to those taught on school campuses after school, and to programs taught in homeless shelters and detention centers.

Evaluations of these programs strongly support the conclusion that sexuality and HIV education curricula do not increase sexual intercourse, either by hastening the onset of intercourse, increasing the frequency of intercourse, or increasing the number of sexual partners. Twenty-eight studies meeting the criteria discussed above have examined the impact of middle school-, high school-, or community-based sexuality or HIV education programs on the initiation of intercourse. Nine of them (or about one-third) found that the programs delayed the initiation of sex (Aarons et al., 2000; Blake et al., 2000; Coyle, Kirby, Marin, Gomez, &

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Gregorich, 2000; Ekstrand et al., 1996; Howard & McCabe, 1990; Hubbard, Giese, & Rainey, 1998; Jemmott, Jemmott, & Fong, 1998; Kirby, Barth, Leland, & Fetro, 1991; Klaus et al., 1987; St. Lawrence et al., 1995). Eighteen found no significant impact (Coyle et al., 1999; Eisen, Zellman, & McAlister, 1990; Gottsegen & Philliber, 2000; Jemmott, Jemmott, & Fong, 1992, 1998; Kirby, 1985; Kirby, Korpi, Adiri, & Weissman, 1997; Levy et al., 1995; Lieberman, Gray, Wier, Fiorentino, & Maloney, 2000; Little & Rankin, 2001; Main et al., 1994; Nicholson & Postrado, 1991; Thomas et al., 1992; Walter & Vaughn, 1993; Warren & King, 1994). Only 1 study out of 28 found that a sex or HIV education program hastened the initiation of sex (Moberg & Piper, 1998). It should be noted that this particular program did not focus primarily upon sexual behavior, but was a comprehensive program that addressed tobacco, alcohol, marijuana, and nutrition, as well as sexual behavior. Overall, these studies provide very strong evidence that sex and HIV education programs do not hasten sex and that some of them actually delay sex.

Nineteen studies examined the impact of sexuality and HIV education programs on the frequency of intercourse. Five studies found that they reduced the frequency of sex (Coyle et al., 2001; Howard & McCabe, 1990; Jemmott et al., 1992, 1998; St. Lawrence et al., 1995). Thirteen found no significant impact (Blake et al., 2000; Coyle et al., 1999; Jemmott et al., 1998; Kirby, 1985; Kirby et al., 1991; Kirby, Korpi, Adiri, & Weissman, 1997; Levy et al., 1995; Little & Rankin, 2001; Main et al., 1994; Moberg & Piper, 1990; Rotheram-Borus, Koopman, Haigners, & Davies, 1991). Only 1 of 19 studies found a significant increase in frequency (Moberg & Piper, 1998). Again, this is strong evidence that sex and HIV education programs do not increase the frequency of sex and that some of them reduce the frequency.

Finally, of the 10 studies that examined impact on number of sexual partners, 3 found a significant decrease in partners (Jemmott et al., 1992; Main et al., 1994; St. Lawrence et al., 1995), 7 found no impact (Coyle et al., 1999; Gillmore et al., 1997; Kirby et al., 1991; Kirby, Korpi, Adiri, & Weissman, 1997; Levy et al., 1995; Little & Rankin, 2001; Magura, Kang, & Shapiro, 1994), and none found a significant increase. Once more, this is strong evidence that these programs do not increase the number of sexual partners.

In sum, these data strongly indicate that sex and HIV education programs do not significantly increase any measure of sexual activity, as some people have feared, and that to the contrary, may delay or reduce sexual intercourse among teens. These results are also consistent with reviews of programs evaluated in other countries that have also found that sex and HIV education programs do not increase any measure of sexual activity (Grunseit, Kippax, Aggleton, Baldo, & Slutkin, 1997).

These studies also demonstrate that some programs increased condom use or contraceptive use more generally. Of the 18 programs for which impact on condom use

was evaluated, 10 programs (or more than half) significantly increased some measure of condom use (Coyle et al., 1999; Hubbard et al., 1998; Jemmott et al., 1992, 1998; Magura et al., 1994; Main et al., 1994; Rotheram-Borus et al., 1991; St. Lawrence et al., 1995; Walter & Vaughn, 1993). Similarly, 4 of 11 programs that measured contraceptive use more generally significantly increased its use (Aarons et al., 2000; Coyle et al., 1999; Gottsegen & Philliber, 2000; Kirby et al., 1991). None of the programs reduced either condom or contraceptive use. Taken together, these results are quite positive.

A disproportionate number of the programs that significantly increased either condom or contraceptive use more generally were HIV education programs that increased condom use. Eight out of 11 HIV education programs found significant effects on condom use, while two out of seven sex education programs found significant effects on condom use and 4 out of 11 sex education programs found significant effects on contraceptive use more generally. It cannot yet be determined whether HIV education programs are inherently more effective than more general sex education programs that cover pregnancy, STDs, HIV, and other topics, or whether HIV education programs have simply been better funded, provided better training, had studies with larger sample sizes, or had some other advantage that might improve effectiveness. The special effectiveness of HIV education programs may also reflect the fact that AIDS is undoubtedly a more salient threat than pregnancy for high-risk males in some, but not all, communities.

The data also suggest that these sex and HIV education programs may be more effective with higher risk youth than with lower risk youth. This may be partly due to the behavioral characteristics of high-risk youth—that is, when youth engage in a large amount of unprotected sex, there is greater room for improvement than if they engage in little unprotected sex to begin with. In addition, these findings may be due, in part, to methodological and statistical factors. A program that reduces the proportion of lower risk youth who initiate sex from 6% to 4% is more difficult to measure than a program that reduces the proportion of higher risk youth who initiate sex from 12% to 8%, even though the proportional reductions are the same.

The strength of the evidence for the effectiveness of some sex and HIV education programs has improved considerably during recent years. In 1997, *No Easy Answers* raised serious concerns about the methodological rigor of some of the studies evaluating these programs (Kirby, 1997). It noted that (a) many studies did not include random assignment, large sample sizes, long-term follow-up, measurement of behavior, and proper statistical analyses, and (b) the few studies that did include all these methodological strengths failed to find positive and significant effects on behavior (Kirby, Korpi, Adiri, & Weissman, 1997; Kirby, Korpi, Barth, & Cagampang, 1997; Thomas et al., 1992). However, there are now three studies with random assignment, large sample sizes, long-term follow-up, measurement of behavior, and proper statistical analy-

ses that have shown statistically significant and programatically important reductions in adolescent sexual risk-taking (Coyle et al., 1999; Jemmott et al., 1998; St. Lawrence et al., 1995). These three studies clearly indicate that certain school-based and community-based sex and HIV education programs can delay sex, decrease the frequency of sex, increase condom or contraceptive use, or decrease unprotected sex. In previous years, few studies measured or found long-term effects. However, that too has changed. Several recent studies have found lasting effects for 1 year, some have found effects for about 18 months, and one study found effects that lasted at least 31 months after the intervention (Coyle et al., 2001).

In years past, there were also few replications of studies. When they did occur, the second study usually failed to find the positive behavioral effects that the first study found. For example, the initial positive results for the *Postponing Sexual Involvement* program in Atlanta, Georgia, were not replicated in California (Howard & McCabe, 1990; Kirby, Korpi, Barth, & Cagampang, 1997). However, there is now evidence of one successful replication. Two separate research teams in California and Arkansas trained people to implement *Reducing the Risk*, implemented it in multiple schools in each study, and evaluated the impact of the curriculum on adolescent sexual behavior. Both found that it delayed the onset of sexual intercourse and increased the use of condoms or contraception more generally among some groups of youth (Hubbard et al., 1998; Kirby et al., 1991). In addition, preliminary unpublished reports indicate that *Reducing the Risk* has reduced sexual risk-taking in other states as well. Such confirmation of positive behavioral findings is most encouraging, providing greater evidence that programs found effective in one study and one group of communities can be effective in subsequent communities.

Only one study has estimated the cost-effectiveness and cost-benefit of a sex education program; that study found that for every dollar invested in the *Safer Choices* program, \$2.65 in total medical and social costs were saved (Wang et al., 2000). The savings were produced by preventing pregnancy and STDs, including HIV.

When curricula that are effective at reducing unprotected sex are compared with curricula that are not effective, the effective curricula have 10 distinguishing characteristics. These characteristics reflect different aspects of effective pedagogy. In addition, they are similar to the characteristics of educational programs found to be effective at reducing substance abuse (Dusenbury & Falco, 1995). Effective curricula (a) focused on reducing one or more sexual behaviors that lead to unintended pregnancy or HIV/STD infection; (b) were based on theoretical approaches that have been demonstrated to be effective in influencing other health-related risk-taking behavior, and upon research which identified the important determinants of selected sexual and condom or contraceptive behaviors; (c) gave a clear message about sexual activity and condom or contraceptive use and continually reinforced that mes-

sage; (d) provided basic, accurate information about the risks of teen sexual activity and about methods of avoiding intercourse or using protection against pregnancy and STDs; (e) included activities that address social pressures that influence sexual behavior; (f) provided modeling and practice of communication, negotiation, and refusal skills; (g) employed a variety of teaching methods designed to involve the participants and have them personalize the information; (h) incorporated behavioral goals, teaching methods, and materials that were appropriate to the age, sexual experience, and culture of the students; (i) lasted a sufficient length of time to complete important activities adequately; and (j) selected teachers or peers who believed in the program they were implementing and then provided them with training.

Currently, there is considerable debate in this country about whether communities and schools should implement abstinence-only programs or comprehensive sex education programs. Abstinence-only programs emphasize that abstinence is the only appropriate choice for young people. Typically, these programs either do not discuss contraception at all or briefly discuss contraceptive failure to provide complete protection against pregnancy and STD.

Despite their common emphasis upon abstinence from sex, abstinence-only programs are a very diverse group of programs. For example, some encourage youth to postpone sex until a later age, while others emphasize that no one should have sex prior to marriage. A few are very religious and begin with a prayer for God's guidance, while most are far more secular. Some are curriculum-based, while others include a wide variety of youth development activities. Some last only 1 or 2 sessions, while others last for 15 to 20 sessions. Some are very didactic, while others engage the participants in group activities and use role playing and other active-learning strategies to change group norms and teach assertiveness skills.

To date, only three studies of abstinence-only curricula meet the criteria of this review and two of them have important methodological limitations (Kirby, Korpi, Barth, & Cagampang, 1997; St. Pierre, Mark, Kaltreider, & Aikin, 1995; Weed, Olson, DeGaston, & Prigmore, 1992). Although none of these three studies found significant effects upon behavior, the primary conclusion reached is that the evidence is not conclusive about the impact of abstinence-only programs. Given this small number of studies, their methodological limitations, and the great diversity of abstinence-only programs that have not been evaluated, one should be careful about making any generalizations about all abstinence-only programs. In particular, one should not conclude that all abstinence-only programs either do or do not delay sex (or do or do not affect contraceptive use). This is particularly true given that there is some evidence that making a pledge to remain abstinent may help prevent some youth from initiating sex (Bearman & Bruckner, 2001), and that community-wide abstinence campaigns may delay sex and reduce teen pregnancy (Doniger, Riley, Utter, & Adams, 2001).

It may be the case that, in some respects, abstinence-only programs are like sexuality and HIV education programs—that is, some abstinence-only programs may be effective at changing behavior and some may not, and particular programmatic characteristics may distinguish effective programs from ineffective ones. If this is true, then communities wishing to put abstinence-only programs in place may increase their chances of selecting effective ones if they choose programs with the common characteristics of effective sex and HIV education programs described above.

PROTOCOLS FOR HEALTH CLINIC APPOINTMENTS AND SUPPORTIVE ACTIVITIES

The second group of effective programs involves clinic protocols. Six studies have examined what happens during a clinic visit—the counseling and instruction that takes place between a medical provider and a teen patient and the other materials and activities that can support and reinforce that counseling. Four found positive effects on condom or contraceptive behavior.

The first of the four studies evaluated a very modest intervention for female patients with chlamydia (Orr, Langefeld, Katz, & Caine, 1996). A nurse spent about 10 to 20 minutes discussing chlamydia with the aid of a pamphlet, demonstrated how to put a condom on a banana (and got the patient to practice), and engaged the patient in a brief role-play involving a woman getting her partner to use a condom. An experimental design was used to measure the impact at 6 months and found that those youth who received the special instruction were substantially more likely to use condoms than those youth who received the standard intervention.

The second study evaluated a program for males that included two parts: (a) a slide-tape program that focused on anatomy, STDs, contraception, couple communication, and access to health services; and (b) a visit with a health care practitioner who focused on contraception, reproductive health goals, health risks, and the patient's related interests. Both parts emphasized abstinence and the use of contraception if sexually active. A strong experimental design and questionnaire data collected a year later indicated that the program did not significantly affect sexual activity but did increase use of contraception, especially by the males' partners and by program participants who were not sexually experienced at baseline (Danielson, Marcy, Plunkett, Wiese, & Greenlick, 1990).

The third effective program focused on HIV/STD prevention and served equal percentages of males and females (Boekeloo et al., 1999). It included a 15-minute audio-taped risk assessment and education program, a discussion ice-breaker, two brochures on skills and ways to avoid unprotected sex, a brochure on community resources, and parent brochures. On a one-to-one basis, the patient's physician then reviewed the risk assessment with the patient and discussed concerns and methods of avoiding unprotected sex. An experimental design indicated that the

program increased use of condoms during the 3 months after the intervention.

In the fourth study, a family planning clinic substantially improved its clinic protocol for adolescents by placing greater focus upon nonmedical problems, providing more information and more counseling, delaying the medical examination until the second visit, and giving more attention to partner and parent involvement (Winter & Breckenmaker, 1991). It also designated one staff person as a teen counselor. The study did not have a strong evaluation design, but its results indicate that it did increase contraceptive use.

The fact that four of these six studies found positive effects on behavior with such brief, modest interventions is quite encouraging. It should be noted that all four of the effective interventions focused on sexual and contraceptive behavior, gave clear messages about appropriate sexual and contraceptive behavior, and included one-on-one consultation about the client's own behavior. At the very least, these studies suggest that such approaches should be further developed and rigorously evaluated. These results should also encourage medical providers to review their instructional protocols with youth and to spend more time talking with individual adolescent patients about their sexual and contraceptive activity.

SERVICE LEARNING PROGRAMS

The third group of effective programs includes service learning programs. By definition, service learning programs include (a) voluntary or unpaid service in the community (e.g., tutoring, working as a teacher's aide, working in nursing or retirement homes, helping out in day care centers, or helping fix up parks and recreation areas) and (b) structured time for preparation and reflection before, during, and after service (e.g., group discussions, journal writing, or papers). Often the service is voluntary, but sometimes it is prearranged as part of a class. And often, but not always, the service is linked to academic instruction in the classroom.

Service learning programs may have stronger evidence that they reduce actual teen pregnancy rates while youth are in the programs than any other type of intervention. Four different studies, three of which evaluated programs in multiple locations, have consistently indicated that service learning reduces either sexual activity or teen pregnancy (Allen, Philliber, Herrling, & Kuperminc, 1997; Melchior, 1998; O'Donnell et al., 1999; O'Donnell et al., 2000; Philliber & Allen, 1992).

The first study of a service learning program evaluated multiple sites using the Teen Outreach Program (TOP) (Philliber & Allen, 1992). It found that youth were less likely to report becoming pregnant during the school year in which they participated in TOP. Because the comparison group consisted of youth identified by participants as similar to themselves, there was the potential for self-selection effects. Consequently, a second study was completed, this time with an experimental design, including random

assignment of youth to participate in TOP or not to participate (Allen et al., 1997). Again, this study evaluated the impact of TOP in multiple sites around the country. On the average, these TOP participants spent about 46 hours doing service. TOP participants again reported lower pregnancy rates during the school year in which they participated in TOP than did the control group. It should also be noted that TOP participants also had lower rates of school failure than the control group.

A third study measured the impact of exemplary Learn and Serve programs throughout the country (Melchior, 1998). Students in these programs spent an average of 77 hours providing service. This study did not employ an experimental design with random assignment, but it did identify similar students in other school classes or other schools as a comparison group. Its results tended to confirm the TOP results in that participants in the Learn and Serve programs reported lower pregnancy rates during the school year in which they participated. However, the result was not quite significant ($p = .10$). Notably, this study also evaluated the longer term impact of participation in *Learn and Serve* and found that the impact on pregnancy (and also on most other outcomes) did not last through the school year following the year of participation. This suggests that participation in service learning programs may reduce teen pregnancy rates only during the semesters in which youth actually participate.

Finally, a pair of studies measured the impact of a health education curriculum alone and the combined impact of the same health education curriculum and service learning (O'Donnell et al., 1999, 2000). Results indicated that the health education curriculum alone did not significantly decrease recent sexual activity, but the addition of service learning did significantly reduce sexual activity. In the short term it delayed the onset of sex, while in the long term (more than 3 years later) it both delayed the onset of sex and reduced the percentage of students who had sex the previous month. These studies suggest that service learning may reduce teen pregnancy rates in part by reducing sexual activity.

It is not known for sure why service learning has positive effects on pregnancy, but several explanations have been suggested—participants developed on-going relationships with caring program facilitators, some may have developed greater autonomy and felt more competent in their relationships with peers and adults, some may have been heartened by the realization that they could make a difference in the lives of others—all of which might have increased motivation to avoid pregnancy. The volunteer experiences also encouraged youths to think more about their futures. It may also be that both supervision and alternative activities simply reduced the opportunity for participants to engage in problem behaviors, including unprotected sex. After all, these programs were time intensive—the average number of hours that youth spent in TOP and Learn and Serve programs during the academic year were 46 hours and 77 hours respectively. The study of TOP

found that the kinds of volunteer service varied considerably from site to site, but TOP appeared to be most effective when young people had some control over where they volunteered (Allen et al., 1997). The effectiveness of TOP was not dependent upon the fidelity of the implementation of the TOP curriculum (Allen, Philliber, & Hoggson, 1990), which suggests that the service itself is the most important component of the programs.

THE CHILDREN'S AID SOCIETY-CARRERA PROGRAM

The final group of effective programs includes the Children's Aid Society-Carrera programs (CAS-Carrera Program) (Philliber, Kaye, Herring, & West, 2000). The evaluated programs were long-term and intensive programs that recruited youth when they were about 13- to 15-years-old and encouraged them to participate throughout high school. During those school years, the programs operated 5 days a week. Some programs had regularly scheduled special events, education programs, and entrepreneurial activities. During the summer months paid employment, including entrepreneurial activities, were emphasized, along with evening maintenance programs. Participants spent an average of 16 hours per month in the program during the first 3 years; many spent more time in the program. The CAS-Carrera programs used a holistic approach, providing multiple services: (a) family life and sex education; (b) an education component that included individual academic assessment, tutoring, help with homework, preparation for standardized exams, and assistance with college entrance; (c) a work-related intervention that included a job club, stipends, individual bank accounts, employment, and career awareness; (d) self-expression through the arts; and (e) individual sports. In addition, the programs provided mental health care and comprehensive medical care, including reproductive health and contraception when needed. In all these areas, staff tried to create close, caring relationships with the participants. Although the programs focused on youth, they also provided services for the participants' parents and other adults in the community.

The study of the CAS-Carrera programs was a very rigorous one. It included multiple sites, random assignment, a large sample size, long-term measurement, measurement of behavior, and proper statistical analyses. The study found that, after 3 years and among girls, the program significantly delayed the onset of sexual intercourse, increased the use of condoms as a secondary method with another highly effective methods of contraception, reduced pregnancy rates, and reduced birth rates. Among males, the program did not have significant positive behavioral effects, but the study did have one unexpected finding—males in the programs were significantly less likely to report using both condoms and another highly effective contraception method at last sex than boys in the control group. This was found among males who had initiated sexual activity prior to the onset of the program. Notably, these findings are reported for all the members of the treatment and control groups, even though some mem-

bers of the treatment group (especially the boys) did not participate extensively in the program, and some members of the control group received a few services from the same organization or other organizations in the community.

This study of the CAS-Carrera programs is the first and only evaluation to date using random assignment, multiple sites, and a large sample size that found a positive impact on sexual and contraceptive behavior and pregnancy and birth rates among girls for as long as 3 years. In fact, the pregnancy rate among girls in the intervention group was less than half the rate among the control group (10% vs. 22%). These are strong, very important results. It should also be recognized that this is a complex program to implement, requiring significant financial and staff resources, and sites that do not implement all the components or that do not fully engage young people over time cannot expect to achieve these positive results.

DISCUSSION AND CONCLUSIONS

Sex and HIV education programs, clinic protocols, and service learning programs are complementary: The first two groups of programs focus upon the sexual antecedents of sexual risk-taking (e.g., the sexual beliefs, attitudes, norms, and self-efficacy related to sexual behaviors) in different settings and in different formats (group sessions vs. one-on-one), while service learning programs address nonsexual antecedents (such as connections to adults or belief in the future). The CAS-Carrera programs combined multiple components, addressed both sexual and nonsexual antecedents, and had a greater impact. Thus, it seems likely that programs that address both sexual and nonsexual antecedents effectively will be more effective than those programs that address only one group of antecedents.

This does not mean, however, that all youth should participate in intensive programs that address both groups of antecedents. After all, some youth may have all the needed knowledge and skills regarding contraception but may simply lack the motivation to avoid pregnancy, while others may lack the knowledge, attitudes, or skills but have connections with adults, a belief in the future, and the motivation to avoid pregnancy. Thus, for different groups of youth, it is important to determine the reasons for their sexual risk-taking and to then select the proper program.

In sum, it is very encouraging that there are now four different and somewhat complimentary types of programs for adolescents with rather strong evidence that they effectively reduce either unprotected sex that place youth at risk of pregnancy or STD/HIV, or that they reduce actual pregnancy.

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