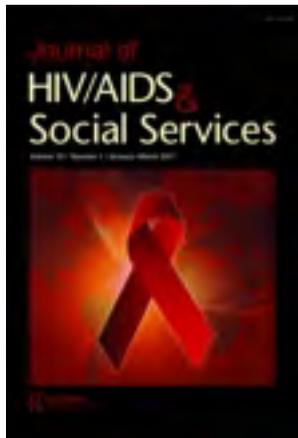


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### Online Activities for Enhancing Sex Education Curricula: Preliminary Evidence on the Effectiveness of the Abstinence and Contraception Education Storehouse

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## **Online Activities for Enhancing Sex Education Curricula: Preliminary Evidence on the Effectiveness of the Abstinence and Contraception Education Storehouse**

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*The purpose of this research was to conduct a preliminary evaluation of the Abstinence and Contraception Education Storehouse (ACES), a digital, classroom-based resource designed to supplement existing sex education curricula with highly interactive materials such as video clips, multimedia polls and quizzes, and audiovisual demonstrations. Three hundred thirty-five students aged 14 to 19 were randomly assigned to an ACES-based (treatment) or a standard (control) sex education curriculum. Data were collected at the onset of the intervention and 3 months after the completion of the intervention. Preliminary results were highly encouraging, with ACES participants who were sexually initiated at baseline reporting (at the 3-month follow-up) significant reductions in the number of times they had sex in the past 4 weeks. Both sexually initiated and non-sexually initiated youth who experienced the ACES curriculum also demonstrated greater intent to abstain from the sex during the follow-up period than did those in the control group.*

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*KEYWORDS* HIV/AIDS prevention, interactive curriculum, multimedia activities, adolescent sex education

## INTRODUCTION

The United States has among the highest rates of teen pregnancy and sexually transmitted infection (STI) in the developed world (National Research Council and Institute of Medicine, 2009). Teen pregnancy, birth, and abortion rates are once again rising in the United States after a decade of decline, and it is estimated that nearly one-third of young women become pregnant at least once by age 20 (Kost, Henshaw, & Carlin, 2010; Sieving et al., 2011). In addition, an estimated half of all new HIV infections in the United States occur in people under age 25 (Kaiser Family Foundation, 2005).

A variety of adolescent sexual behaviors, including unprotected sexual intercourse and multiple sex partners, contribute to teen pregnancy and STI/HIV rates. On the other hand, protective behaviors such as emotional self-awareness, effective communication, and condom use can reduce sexual involvement and risk-taking (Seiving et al., 2011). Over the last two decades, a number of teen sexual health interventions have been developed that have shown efficacy in changing adolescent behaviors leading to pregnancy and STIs/HIV (Card, Niego, Mallari, & Farrell, 1996; Kirby, 2002; Solomon & Card, 2004). Based on Social Cognitive theory, these programs have attempted to promote behavior-specific self-efficacy (i.e., confidence that one can successfully perform specified behaviors in particular contexts), which has been shown to be an important determinant of behavioral change (Bandura, 1986, 1998; Kalichman, Carey, & Johnson, 1996). Many of these interventions focus on behavioral skills training emphasizing partner communication, condom negotiation, problem solving, refusal skills, and resistance to peer pressure (Hansen, 1996; Jemmott, Jemmott, & Fong, 1992). Much of this training is accomplished through interactive learning strategies such as role-plays, group discussions, games, and group exercises and less use of traditional classroom techniques such as lectures, teacher-led demonstrations, and textbook reading (Perlini & Ward, 2000; Wight & Abraham, 2000; Wight, Abraham, & Scott, 1998). Programs reliant on interactive learning strategies have demonstrated greater overall effectiveness in changing behaviors leading to pregnancy and STIs/HIV outcomes than noninteractive programs (Kirby, 2002; Sussman, Rohrbach, Patel, & Holiday, 2003). Structured interaction among teens can lead to behavior change as the material is likely to be more engaging to students. Students are also more likely to identify with situations and scenarios discussed in classroom interactions, leading to a higher retention of the material learned in classrooms (Sussman et al., 2003). Finally, an interactive environment allows students to practice normative social interaction through role-plays, modeling, and feedback (Perlini & Ward, 2000; Wight & Abraham, 2000).

In particular, structured classroom interactions teach youth to resolve conflicts, negotiate, and communicate effectively (Wight & Abraham, 2000).

The purpose of this research was to evaluate a digital library of interactive activities and exercises that could enhance behavioral skills training in adolescent sexual risk reduction interventions. Available both online and on a flash-key, the Abstinence and Contraception Education Storehouse (ACES) is a classroom-based resource that can be used by teachers and health practitioners to supplement and upgrade existing sex education curricula with highly interactive materials that students find engaging, informative, and interactive. Its primary goal is to add interactivity to traditional, didactic sex education curricula. The activities in ACES include audiovisual presentations, video clips, quizzes and polls, role-play exercises for modeling and rehearsal, group discussion activities, and traditional classroom exercises, handouts, and homework assignments, as well as classroom presentation materials for teachers that provide factual information on HIV/AIDS and sexually transmitted disease (STD) awareness (e.g., incidence, prevalence, modes of STI transmission, etc.).

Interactive activities within ACES are in both multimedia and nonmultimedia formats. For example, the library features detailed, authentic role-play scripts and structured scenarios that can be used in classrooms for triggering discussion and guiding and modeling behavior. The scripts and scenarios illustrate behavioral skills such as assertive refusal, resistance to sexual pressure, and effective condom negotiation. The library also includes actual video clips structured around these scripts that can be used at the end of role-play exercises to visually demonstrate refusal and negotiation skills to students. Each video scenario presents a “good practice” ending so that students can observe characters acting competently and effectively in various social settings—such as a party or a date—in which sexual decisions need to be made and specific actions taken. Evidence suggests that such scenario-based exercises have worked well in schools (Perlini & Ward, 2000; Wight & Abraham, 2000). Teachers can also use the video clips to trigger class discussions on how well characters have handled the situation or what they could have done otherwise. Group discussions encompassing analysis and argument can be especially effective in prompting planning and rehearsal of verbal strategies concerning safer sex and in changing attitudes as well as normative beliefs (Bandura, 1998; Perlini & Ward, 2000; Petty & Cacioppo, 1986).

Activities within ACES were drawn and adapted from interventions contained within Sociometrics’ Program Archive for Sexuality, Health and Adolescence (PASHA). PASHA is a collection of 36 teen pregnancy and STI/HIV prevention programs that have been selected by a Scientist Expert Panel for their demonstrated positive impact on fertility- and STI/HIV-related behaviors in one or more subgroups of teens<sup>1</sup> (Solomon & Card, 2007; Card, Lessard, & Benner, 2007). Sociometrics disseminates curriculum and evaluation materials for each of the 36 programs in the form of program replication kits. Contained within each of these replication kits (also referred to as “program

boxes”) are valuable resources for practitioners including role-play scripts, discussion guidelines, and group activities dealing with sexual negotiation, abstinence, and contraception use. After an extensive review of the PASHA programs, 100 activities were selected and digitally transformed for inclusion in ACES. Some examples of this transformation process were as follows:

- (a) A knowledge-based quiz sheet on STI awareness was converted into a “Jeopardy” game that could be played by teams in classrooms.
- (b) A short lesson on body language cues was converted into a multimedia audiovisual slideshow on assertive postures, expressions, and voice tone.
- (c) A conversation between two heterosexual teens on safe sex practices was modified to portray two gay teens, with both the heterosexual and gay scripts being filmed and included as video clips.
- (d) A lesson outlining various scenarios for teen sexual abuse was transformed into a set of short video clips featuring both males and females as potential coercers/abusers.

The selected activities in ACES were then grouped into 40 separate modules, with each module focusing on one of the following topical themes and associated behavioral skills:

- Abstinence/delaying sexual activity
- Assessing risks/safety skills
- Buying contraception
- Condom demonstration
- Coping skills/conflict resolution
- Dating and relationship decisions
- HIV/AIDS/STD awareness
- Negotiation skills/contraception use
- Parent–child communication
- Refusal skills/resisting peer pressure
- Safer sex practices
- Sexual orientation

Activities in each module were placed within “real-life” scenarios following a particular sequence: Setting the Stage, Think About It, Practice It, and Do It. The sequence laid out a cognitive process whereby students were presented with a particular problem (“Setting the Stage”), assessed the situation and its consequences (“Think About It”), practiced skills for resolving the problem (“Practice It”), and viewed a demonstration of how that skill could be applied in real-life settings (“Do It”). For example, the module “Sensing Danger” listed under the theme “Assessing Risks/Safety Skills” deals with the topic of sexual abuse. The module helps children perceive and assess such dangers by first Setting the Stage with a video clip of a man driving up to two

boys walking home from school and offering them a ride. The teacher then guides the class to the next stage Think About It where the class discusses the potential dangers of the situation and how the boys should react to the offer of a ride. Activities in this stage include a computer-based poll, a knowledge quiz, and a group discussion about dangerous situations. Next, the teacher leads students through the Practice It stage where students develop safety skills (e.g., how to refuse offers from strangers and to communicate refusal assertively). Here, teachers use role-play scripts and body language visuals to demonstrate effective refusal and communication. The final section Do It completes the exercise through a video clip that demonstrates how the two boys in the original scenario apply safety skills to protect themselves. This four-stage layout makes ACES particularly useful: each module becomes a self-contained topical unit and can be treated as a session in itself, and teachers and practitioners can build their own interventions by collating a number of individual modules together.

## STUDY DESIGN AND INTERVENTION METHODS

The study used a randomized controlled trial design with data being collected at the onset of the intervention and 3 months after the completion of the intervention. Potential study sites in the San Francisco Bay Area and California's Central Valley were first identified by the project team and then contacted by project staff via e-mail and telephone. Interested sites were then reviewed on site characteristics including type of setting, location, and population. Based on this information, we chose two organizations to participate in the study: a high school in the Gilroy Unified School District (GUSD) in the San Francisco Bay area, and Planned Parenthood Mar Monte, which provides services in Gilroy and neighboring counties in the Central Valley. The sites were chosen to capture a broad sample of sexually active teens in at-risk communities.<sup>2</sup> Gilroy is a city of 49,000 at the edge of California's Silicon Valley in Santa Clara County. Originally a farming community and now a regional retail center as well, Gilroy encompasses both wealth and poverty, with a lower-income Latino east side and wealthier white west side. Like many Latino communities in California and the United States, the city has higher-than-average rates for teen pregnancy and STI.<sup>3</sup>

Eligible participants from Planned Parenthood were drawn from teens aged 14 to 19 years who used their services. Health coordinators explained the study and procedures for participation and obtained parental consent and assent forms. Enrolled participants from Planned Parenthood received a \$5 gift card for completing the pretest survey and \$5 in cash for completing the follow-up survey. Students attending biology classes at the high school were recruited for the study. Science teachers explained the study design and process to parents and students and the procedures for participation and

obtained parental consent and student assent forms. High school students from GUSD were given extra credit for participating in the study, while the school received a stipend that was used to buy new school supplies. A total of 335 students completed assent and parental consent forms and were enrolled in the study.

Prior to recruitment and data collection, Sociometrics' full institutional review board approved the outcome study. On meeting eligibility criteria, high school and Planned Parenthood participants were randomly assigned to either (a) an ACES "treatment condition" or (b) a "control group." Subjects in the GUSD and Planned Parenthood treatment conditions received four of the 40 ACES modules, while the control group received the standard sex education curriculum currently in place at these sites. The four ACES modules covered the following topical areas: HIV/AIDS awareness ("How do you get HIV/AIDS"), condom demonstration ("OPRAH"), negotiation skills ("I want him to wear a condom"), and buying contraception ("A trip to the drug store"). The topics were chosen after careful consideration by program implementers as they most closely fit with the standard sex education curriculum covered by GUSD schools and the local Planned Parenthood organizations. Although the ACES modules covered the same topical themes as the regular sex education curriculum used by the control group, their mode of delivery was highly interactive and combined various media elements such as animations, audio and video clips, games, and multimedia presentations that were absent from the standard sex education curriculum.

The interactive features in the ACES treatment condition was expected to lead to higher student engagement, involvement, knowledge retention, and sharper negotiation skills resulting in reduced risky behaviors leading to unprotected sex. Consequently, the study's main hypothesis is that, relative to the control condition, participants in the ACES treatment would demonstrate significant improvements in HIV/STI awareness and safe sex behavioral practices (i.e., reducing frequency of sexual intercourse, promoting abstinence, and increased use of contraception).

## THE INTERVENTION

The intervention was conducted over an intensive 2-week period. The high school health sessions in both conditions were held in classrooms during the regular health education class (two traditional periods of 55 minutes and four 2-hour long periods) for a total exposure time of 10 hours. The classes that received ACES viewed video clips of male and female condom demonstrations, played "Jeopardy" style quizzes on condom use, used activities and exercises on how and where to purchase condoms, practiced partner negotiation exercises through role-plays, compared video clips demonstrating various responses, and received basic HIV/AIDS awareness

and testing information. The control classes received their “usual” sex education curriculum.

## MEASURES

Data collection occurred at baseline and at a 3-month follow-up via pen and paper. The two instruments were identical and assessed sociodemographic characteristics (i.e., gender, age, race/ethnicity), values and attitudes regarding sexual behavior, contraception and HIV/STI knowledge, HIV/STI prevention-related behaviors (i.e., knowledge of where to buy/obtain condoms and history of purchasing condoms), sexual behavior (i.e., ever had sexual intercourse and number of times had sexual intercourse in last 4 weeks), contraceptive use at most recent intercourse, and negotiation skills (i.e., ability to resist sexual intercourse without condoms and history of suggesting condom use to partners). Unique codes, rather than names, were used on the surveys to protect participant confidentiality.

The instrument includes psychosocial mediators, as well as intentional and behavioral outcomes. These measures were adapted from scales previously developed and validated for high school age students. The sexual behavior values and attitudes scale ( $\alpha = .93$ , baseline) contained five agree/disagree (dichotomous) items. Two examples from the values scale are “Having sex would be a way to keep my boyfriend/girlfriend/partner” and “Having sex is a good way to impress my friends.” Higher scores represent “better” values and attitudes. The HIV knowledge scale ( $\alpha = .81$ , baseline) contained six true/false items. Higher scale scores indicate greater HIV/STD knowledge. Two examples from the knowledge scale are “A person can be infected with more than one STD at a time” and “You can’t get HIV if you are using the birth control pill.” The primary behavioral outcome for non-sexually active youth was the intention to remain abstinent. The primary behavioral outcomes for sexually active youth were frequency of sexual intercourse in the past 4 weeks and contraceptive use at last intercourse.

### Statistical Analyses

At baseline, descriptive statistics were calculated for sociodemographic variables, mediators, and sexual and contraceptive behaviors. Scale reliability (internal consistency) was measured using Cronbach’s  $\alpha$ . Differences were assessed using independent sample t-tests for continuous variables and  $\chi^2$  analyses for categorical variables. Outcomes at 3 months postintervention were examined using paired t-tests for continuous variables and  $\chi^2$  analyses for categorical variables. Analyses were also made on subsamples of girls, boys, and sexually initiated and non-sexually initiated participants.

Of the 335 high school students enrolled in the study, 173 participants (51.6%) were randomly assigned to the computer-delivered HIV

prevention condition (treatment), and 162 (48.3%) were assigned to the general health education condition (control). Of the 173 participants in the treatment arm, 128 (74.0%) completed the 3-month follow-up assessment. Of the 162 participants in the control arm, 122 (75.3%) completed the 3-month follow-up assessment.

At baseline, nearly 80% of the sample reported being of Hispanic/Latino origin, and the most common racial categories reported were "other,"<sup>4</sup> American Indian/Native American (22.9%), white (9.7%), Asian/Pacific Islander (6.5%), and black/African American (4.7%). Also, 58.9% of participants were female and 42.1% were male. At baseline, participants were on average 15.5 years of age, with a range of 12 to 19 years. About half (47.0%) of participants reported ever having had sexual intercourse, and a third (32.0%) reported having had sexual intercourse at least once in the past 4 weeks. For sexually initiated youth, the most common contraceptive methods used during the last sexual intercourse were condoms (38.6%), intrauterine device (10.1%), and Depo-Provera (9.5%), with 13.9% not using any birth control method. Nearly all participants (93.4%) knew where to buy/obtain condoms, a third had bought condoms at some point in their lives, and half had ever suggested condom use to a partner. There were no significant differences at the 95% confidence level between the control and ACES conditions baseline for sociodemographic characteristics, mediators, and sexual and contraceptive behaviors except for (a) ACES participants reporting a slightly higher level of knowledge of where to buy/obtain condoms (96.5% versus 90.1%,  $P = .02$ ) and (b) control group participants reporting a higher level of suggesting condom use to partners (52.3% versus 41.3%,  $P = .01$ ).

## RESULTS

Two key behavioral findings related to (a) intent to be sexually abstinent in following year and (b) frequency of sexual intercourse (see Table 1). Participants in the ACES arm, in comparison to those receiving the control condition, were statistically *significantly more likely* at the 3-month follow-up to report having the intention to *not* be sexually active in the next year (39.00% versus 22.3%,  $P = .01$ ). The findings were in response to the measure on intent regarding future contraceptive use. Among sexually initiated youth who at baseline reported having had sex three or more times in the past 4 weeks, ACES participants reported significant reductions in the number of times they had sex in the past 4 weeks from  $M = 13.3$  at baseline to  $M = 6.81$  at 3-month follow-up,  $t(20) = -2.44$ ,  $P = .02$ , 95% confidence interval (CI)  $-12.11$  to  $-0.94$ ], while there was no significant change for participants in the control condition. Significant increases were also observed for (a) HIV/STI knowledge among female ACES participants [from  $M = 3.69$  at baseline to  $M = 4.04$  at 3-month follow-up,  $t(71) = 2.61$ ,  $P = .01$ , 95% CI  $0.08$  to  $0.62$ ], (b)

**TABLE 1** Outcome Study Data Summary

	ACES					Control group							
	Baseline <i>M</i>	3-mo <i>M</i>	$\Delta$	<i>t</i> ( <i>df</i> ) or $\chi^2$	95% CI	<i>P</i> Value	<i>n</i>	Baseline <i>M</i>	3-mo <i>M</i>	$\Delta$	<i>t</i> ( <i>df</i> ) or $\chi^2$ ( <i>df</i> )	95% CI	<i>P</i> Value
<b>Mediators</b>													
Value scale (out of 5)	4.22	4.31	+0.09 (2.0%)	1.10 (127)	(-0.08, 0.26)	.28	122	4.35	4.50	+0.15 (3.4%)	1.86 (121)	(-0.01, 0.30)	.06
Knowledge scale (out of 6)	3.71	3.87	+0.16 (4.1%)	1.35 (127)	(-0.07, 0.39)	.18	114	3.61	3.80	+0.19 (5.0%)	1.73 (113)	(-0.03, 0.41)	.09
Knowledge scale (out of 6) – female participants	3.69	4.04	+0.35 (8.7%)	2.61 (76)	(0.08, 0.62)	<b>.01</b>	65	3.55	3.69	+0.14 (3.8%)	0.92 (64)	(-0.16, 0.44)	.36
Knowledge scale (out of 6) – $\geq 16$ years old	3.86	4.20	+0.34 (8.1%)	2.31 (55)	(0.05, 0.63)	<b>.03</b>	41	3.85	4.15	+0.30 (7.2%)	1.50 (40)	(-0.10, 0.69)	.14
Values scale (out of 5) – male participants	3.57	4.02	+0.45 (11.2%)	2.83 (50)	(0.13, 0.77)	<b>.01</b>	49	3.94	4.22	+0.28 (6.6%)	1.92 (48)	(-0.01, -0.58)	.06
Values scale (out of 5) – Latino male participants	3.49	3.93	+0.44 (11.2%)	2.45 (42)	(0.08, 0.81)	<b>.02</b>	41	3.98	4.20	+0.22 (5.2%)	1.39 (40)	(-0.10, 0.54)	.17
<b>Intentions</b>													
Intend to not have sex in next 12 months	128 (42.4%)	39.0%	N/A	$X^2 = 7.56$	N/A	<b>.01</b>	122	(30.6%)	22.3%	N/A	$X^2 = 7.56$	N/A	.01
<b>Behaviors</b>													
No. of times had sexual intercourse in past 4 weeks (all sexually initiated)	6.84	4.93	-1.26	-1.33 (43)	(-4.96, 1.14)	.21	47	4.83	2.23	-2.60	-1.17 (46)	(-7.01, 1.89)	.25
No. of times had sexual intercourse in past for weeks (sexually initiated reporting $\geq 3$ times at baseline)	13.33	6.81	-6.52	-2.44 (20)	(-12.11, -0.94)	<b>.02</b>	19	6.17	3.89	-2.28	-1.51 (17)	(-5.46, 0.90)	.18

The bolded values denote significant findings at the  $p < .05$  level.

HIV/STI knowledge among ACES students 16 years of age or older [from  $M=3.86$  at baseline to  $M=4.20$  at 3-month follow-up,  $t(55)=2.31$ ,  $P=.03$ , 95% CI 0.05 to 0.63], (c) favorable sexual values for male ACES participants [from  $M=3.57$  at baseline to  $M=4.02$  at 3-month follow-up,  $t(50)=2.83$ ,  $P=.01$ , 95% CI 0.13 to 0.77], and (d) favorable sexual values for Latino male participants [from  $M=3.49$  at baseline to  $M=3.93$  at 3-month follow-up,  $t(42)=2.45$ ,  $P=.02$ , 95% CI 0.08 to 0.81]. Neither the ACES nor control groups reported significant differences at 3 months postintervention in contraceptive practices and intentions or negotiation skills.

## DISCUSSION

During the past decade, teen sexual risk reduction programs that incorporate interactive learning strategies have demonstrated greater overall effectiveness in changing behaviors leading to pregnancy and STIs/HIV outcomes than noninteractive programs (Kirby, 2002; Sussman et al., 2003). It is believed that such strategies require the participants' active involvement in developing and internalizing the message, thereby increasing the message's personal relevance and promoting knowledge retention and the acquisition of behavioral skills necessary to prevent risky sexual behaviors (Perlini & Ward, 2000; Petty & Cacioppo, 1986; Sussman et al., 2003). It is believed that such strategies require the participants' active involvement in developing and internalizing the message, thereby increasing the message's personal relevance and promoting knowledge retention and the acquisition of behavioral skills necessary to prevent risky sexual behaviors (Perlini & Ward, 2000; Petty & Cacioppo, 1986; Sussman et al., 2003). The goal of the ACES is to promote interactivity in interventions by providing a library of activities in both multimedia and more traditional formats. Our hypothesis was that simply incorporating or substituting relevant ACES elements into an existing traditional sex education curriculum could potentially enhance positive behavioral outcomes in sexual behavior. This study confirmed our hypothesis. Significant differences in behavioral sexual outcomes were found between ACES participants and the control group. These differences were noted among youth who had never engaged in sex, as well as those who were sexually active. Both sexually initiated and non-sexually initiated youth who experienced the ACES curriculum demonstrated greater intent to abstain from sex during the follow-up period than did those in the control group. Likewise, ACES participants who were sexually initiated at baseline reported at follow-up significant reductions in the number of times they had sex in the past 4 weeks. It is notable that these differences were observed in a relatively short span of time interval between the pretest and follow-up (3 months). Longer follow-up studies will have to be undertaken to see if these effects are sustainable.

In the short term, a resource such as ACES also fulfills some of the most immediate needs of schools and organizations implementing sexual risk reduction interventions. The ACES modules offer teachers and practitioners a wide variety of options to reinvigorate their existing prevention programs with fresh content and added interactivity without substantially modifying existing curricula. Many evidence-based programs currently in operation in schools and practitioner settings are almost a decade old and need to be updated. ACES modules on HIV/AIDS awareness provide the most recent information on sexual behavior trends and consequences. These modules can simply replace knowledge-based chapters in a sex education curriculum with the corresponding ACES modules. Alternately, teachers may want to append their curriculum with material that may be more age appropriate or mandated by funding requirements (e.g., a greater abstinence focus). Similarly, practitioners wishing to make their program content more inclusive could search for and select ACES activities directed at both gay and heterosexual adolescents.

## NOTES

1. The positive outcomes include: postponing sexual intercourse, decreasing the frequency of sexual intercourse and number of sexual partners, increasing contraceptive use at first intercourse and at most recent intercourse, increasing consistent contraceptive use among the sexually active at every intercourse, preventing pregnancy and increasing use of effective STD/HIV/AIDS-prophylactic method at first and most recent intercourse.

2. There was no overlap in participants from the Gilroy Unified School District sample (one high school) and the Planned Parenthood sample.

3. The California Department of Public Health 2010 County Health Status Profiles indicate that the age specific birth rate to adolescents age 15 to 19 in Santa Clara County is 25.5 per 1,000 female population, with Latina girls ages 15 to 17 giving birth at a rate of 35 per 1,000, and 102 per 1,000 for ages 18 to 19. In addition, data show that adolescent girls in this same age range have the highest reported number of Chlamydia and gonorrhea cases, compared with other age groups.

4. Sixty percent of respondents of Hispanic/Latino origin listed "other" as the category that best describes their racial background.

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