

An Evaluation of California's Adolescent Sibling Pregnancy Prevention Program

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CONTEXT: The siblings of adolescents who have been pregnant or are parents have disproportionately high rates of teenage pregnancies and births. California's Adolescent Sibling Pregnancy Prevention Program is targeted at these high-risk youths.

METHODS: An evaluation of the program was conducted in 1997–1999 with 1,176 predominantly Hispanic 11–17-year-olds who had at least one sibling who was an adolescent parent or had been pregnant—731 youths who were program clients and 445 youths who received no systematic services. All evaluation participants completed an interview and questionnaire at enrollment and again nine months later.

RESULTS: Female program clients had a significantly lower pregnancy rate than comparison females over the evaluation period (4% vs. 7%), as well as a lower rate of sexual initiation (7% vs. 16%). They also significantly decreased their frequency of school truancy, whereas this outcome increased among comparison females; program females had significantly more definite intentions of remaining abstinent at posttest than comparison females. Consistency of contraceptive use increased over time among males in the program and decreased among comparison males. Delivery of group services was correlated with delayed onset of intercourse among males, and the receipt of services related to psychosocial skills was correlated with greater contraceptive use at last sex among all sexually experienced youth.

CONCLUSIONS: This new program, which serves a population known to be at very high risk for early pregnancy, appears to be effective at reducing rates of pregnancy and improving several pregnancy-related risk behaviors.

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Much evidence has documented the disproportionately high rates of adolescent pregnancy and childbearing and early sexual activity among the siblings of pregnant and parenting teenagers.¹ Concern over this problem led to the creation of the California Adolescent Sibling Pregnancy Prevention Program (ASPPP) in 1996. The program is delivered to the brothers and sisters of pregnant and parenting teenagers at 44 nonprofit social service agencies, community-based organizations, school districts and county health departments across California.* Each program site provides a unique combination of services, including individual case management, academic guidance, training in decision-making skills, job placement, self-esteem enhancement, and contraceptive and sexuality education. To date, the program has served approximately 6,000 youths.²

This article presents the results of an evaluation that had two goals. First, we sought to determine whether program participants showed more favorable outcomes than comparison youths at the conclusion of the nine-month evaluation. We assessed many outcomes, including the incidence of problem behaviors known to be risk factors for teenage pregnancy; adolescents' perceived likelihood that they would engage in pregnancy-related behaviors; and rates of first intercourse, contraceptive use and pregnancy. Second, we examined whether positive outcomes were related to the content area of services received, their mode of delivery and

the dosage of the intervention. The findings from these analyses will highlight which services were most effective at preventing pregnancy in this high-risk population.

METHODS

Study Design

At the initiation of the evaluation, in May 1997, approximately 3,300 youths were participating in ASPPP.³ Because of logistic and time constraints, only a subset of active program sites were included in the evaluation. The 16 ASPPP program sites selected to participate in the evaluation[†] were serving 1,011 clients at the time, or 31% of all clients statewide.

In our selection of program sites to be included in the evaluation, we targeted those sites that would be most representative in terms of geographic region of California, area of residence (urban or rural), and clients' age and race or ethnicity. This effort was partially successful. Although the client gender composition at the selected sites was identical to that of clients served statewide (60% female and 40%

*Program sites are contracted through the Maternal and Child Health Branch of California's Department of Health Services on a noncompeting basis.

†A 17th program site was originally selected to participate in the evaluation, but that agency had to temporarily discontinue service provision (because its administrative offices were relocating at the time), so it was excluded from the study.

male), the 16 evaluation sites were more likely than ASPPP sites overall to be located in an urban area and to serve Hispanics and clients who were younger than the average. Finally, we could not base our selection of evaluation sites on their record of services delivered, because most program sites were still developing their service profiles at the time.

The evaluation involved a group of current participants in ASPPP and a comparison group of youths not in the program. Eligibility criteria for participation in the evaluation (as either a program client or a member of the comparison group) were being aged 11–17 years and three months; having never been pregnant or caused a pregnancy; and having a biological teenage sibling (full or half) who was pregnant or parenting and enrolled in California's Adolescent Family Life Program or Cal-Learn Program.* The adolescents in the program group needed to be currently enrolled in ASPPP. Youths eligible for ASPPP were often identified through providers' existing caseloads, since most service providers were familiar with the families and siblings of the teenagers already enrolled in their programs.

Youths who participated in the evaluation as part of the comparison group could never have been enrolled in ASPPP, and neither could any of their siblings. Comparison youths were recruited from the waiting lists at the 16 evaluation sites or by outreach, often conducted through a satellite agency of the main ASPPP office.

We expected to enroll equivalent numbers of program clients and comparison youths at each site. (The average number of clients served per site was 63; the range, 20–195.) However, some sites could not meet this expectation because of financial and personnel constraints. For example, two sites did not enroll any comparison youths, and two enrolled only a negligible number (i.e., two or three individuals).

The Sample

Overall, 1,594 youths were enrolled in the evaluation: 1,011 program clients and 583 comparison youths. Enrollment for the evaluation took approximately 20 months (May 1997 to December 1998). Posttest data were collected nine months after enrollment. Usable posttest information was obtained for 1,271 adolescents, or 80% of those originally enrolled.

Similar proportions of program clients and comparison youths completed a posttest questionnaire (81% and 77%, respectively; $\chi^2=3.7$, $p<.06$). The proportion successfully followed up was comparable for females (81%) and males (77%), and for youths of different races or ethnicities (Hispanics, 81%; blacks, 73%; whites, 76%; and other, 79%). Moreover, the likelihood of completing the posttest questionnaire was not related to several background characteristics, including age, receipt of financial assistance and family size.

The evaluation data reflect only those youths who provided complete pretest and posttest information. Contrasting the background characteristics of program and comparison youths indicated significant differences by several demographic factors, including age and race or ethnicity. We

TABLE 1. Percentage distributions and means reflecting selected background characteristics at enrollment of participants in the Adolescent Sibling Pregnancy Prevention Program and comparison youths, California, 1997–1998

Characteristic	Program (N=731)	Comparison (N=735)
% DISTRIBUTIONS		
Race/ethnicity		
Hispanic	77.0	71.4*
Black	9.5	11.3
White	8.1	8.6
Other	5.4	8.6
Speaks Spanish at home		
Yes	59.0	46.0***
No	41.0	54.0
Family currently receives aid†		
Yes	66.2	75.1*
No	20.4	18.2
No response	13.4	6.7
Area of residence		
Urban	71.0	66.9
Suburban	12.0	15.0
Rural	17.0	18.1
Gender		
Female	59.0	59.0
Male	41.0	41.0
Mother currently married		
Yes	52.0	48.0
No	48.0	52.0
Two-parent household		
Yes	52.9	51.0
No	47.1	49.0
Total	100.0	100.0
MEANS		
Current grade‡	8.1	8.3*
Age	13.5	13.6
Mother's last grade completed	9.3	9.8**
Mother's age at first birth	19.1	19.2

*Groups differ significantly at $p<.05$. **Groups differ significantly at $p<.01$. ***Groups differ significantly at $p<.001$. †Denotes any kind of government assistance. ‡For the 1% of adolescents who were no longer in school, the last grade attended was considered in the calculation of the mean. Note: Comparison group N is weighted. (Unweighted N was 445.)

used two procedures to make the two groups more comparable in terms of both their characteristics and sample size. First, we eliminated all participants from the four sites that provided only three or fewer comparison youths (N=95); thus, the total unweighted sample for analysis from the remaining 12 sites was 1,176, or 731 program clients and 445 comparison youths. Second, we weighted the comparison group data within four sites that provided fewer comparison youths than program youths, but left the data unweighted from the remaining eight evaluation sites; weighting brought the final sample of comparison youths to 735.

*The Adolescent Family Life Program, which is operated through California's Department of Health Services, is designed to enhance the health and social and economic well-being of pregnant and parenting adolescents and their children. Cal-Learn, which is run by the state's Department of Social Services, uses incentives and disincentives to help pregnant and parenting teenagers attend high school and earn a high school diploma (or its equivalent).

In both the program and the comparison groups, the majority of youths were Hispanic, from economically disadvantaged families and urban residents; they were, on average, nearly 14 years old (Table 1, page 63). Program clients differed significantly from comparison youths on several background variables, however. For example, a significantly higher proportion of program than comparison youths were Hispanic (77% vs. 71%) and spoke Spanish at home (59% vs. 46%). The proportion of youths whose family was receiving aid at the time was significantly higher among comparison youths (75% vs. 66%), as was the mean grade completed by the youths' mother (9.8 vs. 9.3) and the adolescents' current grade (8.3 vs. 8.1).

Program participants and comparison youths had equivalent numbers of brothers (mean, 1.9—not shown) and sisters (2.8). Moreover, youths from both the program and the comparison groups had an equivalent number of sisters who had been pregnant during adolescence (mean, 1.3) and of brothers who had fathered a child as a teenager (mean, 0.2). (Overall, 73% of the full evaluation sample had one sister who had been pregnant or given birth, 16% had two such sisters and 6% had three or more; 11% overall had one brother who had fathered a child during adolescence and 5% had two or more.)

Forty-nine percent of evaluation participants lived in the Central Valley region of California, 27% in Los Angeles County and the surrounding coastal counties, 13% in Southern California, 6% in the San Francisco Bay area and 5% in Northern California. These proportions roughly correspond to the geographic distribution of all clients served by the program.

Survey Procedures and Measures

At enrollment, all participants were interviewed about their family background and completed a 59-item self-administered questionnaire, at their home or the program agency office. The survey instrument was expanded slightly and administered nine months later as a posttest. Program and comparison adolescents completed identical forms at pretest and posttest. Five percent completed their interview and questionnaire in Spanish; these adolescents did not differ on any indicator from those who responded in English. Although program clients were not paid for taking part in the evaluation, comparison youths received a \$5 gift certificate for filling out the pretest questionnaire and a \$10 gift certificate for completing the posttest form. All respondents (and their parents or guardians) provided written informed consent to participate.

The questionnaire assessed several outcomes relevant to the program, including the incidence of pregnancy, measures of sexual and contraceptive behavior, and variables thought to mediate adolescent sexual and fertility-related behavior.⁴ The survey had a grade-2.5 reading level and an ease of readability score of 87 (out of 100). The mean alpha

*Six scales had low internal reliabilities (alpha less than .59) and are not included in the analyses.

TABLE 2. Means and percentage distributions reflecting evaluation outcomes assessed at pretest among program and comparison youths, by gender

Outcome	Females		Males	
	Program (N=432)	Comparison (N=430)	Program (N=299)	Comparison (N=305)
MEANS				
Parent-youth communication (scale, 1–4)†	2.0	2.0	1.8	1.7
Perceived likelihood of having sex (scale, 1–5)‡	2.0	2.0	2.5	2.8*
Perceived likelihood of early parenting (scale, 1–5)‡	1.6	1.6	1.8	1.8
Perceived likelihood of contraceptive use (scale, 1–5)‡	4.5	4.7*	4.4	4.4
Truancy (scale, 0–4)§	0.8	0.7	0.8	0.6*
Drug/alcohol use (scale, 0–4)§	0.5	0.5	0.5	0.5
Gang activities (scale, 0–4)§	0.1	0.2	0.2	0.2
No. of times had sex in last 3 mos. (range, 1–35)††	3.1	3.0	2.6	2.8
Lifetime no. of partners (range, 1–20)††	1.9	2.2	3.5	3.0
Consistency of contraceptive use in last 3 mos. (scale, 1–5)††,‡‡	4.0	3.7	3.4	4.1*
% DISTRIBUTIONS				
Ever had sex				
No	82.6	84.2	84.0	82.6
Yes	13.9	15.6	12.7	14.8
No response	3.5	0.2	3.3	2.6
Used contraceptive at last sex††				
No	15.0	11.6	18.0	20.0
Yes	71.7	55.1	56.4	62.2
No response	13.3	33.3	25.6	17.8
Ever had an STD††				
No	90.0	72.5	94.9	100.0
Yes	10.0	11.6	0.0	0.0
No response	0.0	15.9	5.1	0.0
Total	100.0	100.0	100.0	100.0

*Within gender, program group differs significantly from comparison group at p<.05. None of the differences retained significance, however, after grade level was controlled for. †Score of frequency of parent-youth communication in last three months, where 1=never, 2=once, 3=2–3 times and 4=more than three times. ‡Higher scores on the scale indicate increasing certainty that event asked about will occur, where 1=sure it will not happen, 2=probably will not happen, 3=not sure, 4=probably will happen and 5=sure it will happen. §Score of frequency of outcome in the last three months, where 0=never, 1=once, 2=2–3 times, 3=4–10 times and 4=more than 10 times. When outcomes were assessed through more than one item, score is the average across all items. ††Based on sexually experienced respondents only. ‡‡Consistency score, where 1=never, 2=rarely, 3=sometimes, 4=most of the time and 5=always. Note: All scores and contrasts included weighted data for the comparison group.

coefficient of scales assessed at both points in time was .78, and all scales had an alpha greater than .68, indicating acceptable internal consistency.* For items yielding response scores, increasing scores mean higher frequency, greater perceived likelihood and more consistency. For measures that combined more than one item, the resulting score represents an average of the items.

The 30 questionnaire items considered in the evaluation fell into the following categories:

• *Parent-youth communication (two)*. These items measured how frequently adolescents talked in the last three months with a parent or other adult relative about contraception and pressures to have sex (scale, 1–4).

• *Perceived likelihood of having sex (four)*. These items assessed youths' likelihood that they would have sex during the next year, while still in high school, while still a teenager and before marriage (scale, 1–5).

• *Perceived likelihood of remaining abstinent (two)*. At posttest only, adolescents were asked how sure they were that they would remain abstinent during the next year and how likely they were to wait until they were older to have sex (scale, 1–5). All participants were asked these questions, regardless of their sexual experience. The responses thus indicate intentions of secondary abstinence among sexually experienced youths.

• *Perceived likelihood of early parenting (four)*. These gauged participants' likelihood of becoming a parent during the next year, while still in high school, while still a teenager and before marriage (scale, 1–5).

• *Perceived likelihood of contraceptive use (two)*. These asked about the likelihood that a respondent and his or her partner would use any contraceptive and, specifically, a condom, if they were to have sexual intercourse (scale, 1–5).

• *Truancy (two)*. Respondents were questioned on how frequently in the last three months they had cut a class and had cut a whole day of school (scale, 0–4).

• *Drug or alcohol use (four)*. Participants were asked how many times during the last three months they had smoked cigarettes; drunk beer, wine or liquor; smoked marijuana; and used drugs other than marijuana, such as crack cocaine (scale, 0–4).

• *Gang activity (one)*. This item asked how often during the last three months the adolescent had been part of a gang or gang activity (scale, 0–4).

• *Sexual behavior (three)*. Youths were asked whether they had ever had voluntary vaginal intercourse (0=no, 1=yes). (The questionnaire specified voluntary intercourse to distinguish between willful and coerced pregnancy risk behavior.) Sexually experienced respondents also indicated how often they had had intercourse in the last three months and their total number of sexual partners.

• *Contraceptive behavior (three)*. Sexually experienced youths were asked how consistently they had practiced contraception (scale, 1–5); what method they had used most often; and whether they had used a method at last intercourse (0=no, 1=yes).

• *Pregnancy and sexually transmitted disease (STD) history (three)*. All respondents were asked whether they had ever been pregnant or impregnated anyone (0=no and 1=yes); their age at that time; and whether they had ever had an STD.

At pretest, young women in the program and comparison groups were similar on all indicators except the perceived likelihood of contraceptive use (Table 2). Males in the comparison group were significantly more certain than male program clients that they would have sex in the near

TABLE 3. Mean number of hours (and standard deviations) of services received, by service domain and mode

Service domain and mode	Mean
DOMAIN	
Psychosocial	6.5 (7.3)
Dealing with peer pressure	1.1 (1.7)
Decision-making skills	0.9 (1.1)
Life skills	0.7 (1.8)
Stress/anger management	0.7 (1.0)
Gang prevention	0.6 (1.0)
Self-esteem	1.5 (2.4)
Relationship with parents	1.0 (1.4)
Sexuality/health	4.5 (5.0)
Sexuality education	0.9 (1.1)
HIV/AIDS education	0.8 (1.1)
STD (non-HIV) education	0.9 (1.2)
Contraceptive education and services	0.9 (1.1)
Abstinence education	1.0 (1.1)
Activities	3.8 (4.1)
Community service	0.3 (0.9)
Recreation	3.5 (3.9)
School/job	3.5 (4.0)
School issues	2.7 (3.3)
Job skills	0.9 (1.1)
MODE	
One-on-one	10.6 (11.5)
Group	7.4 (10.1)

Note: The 16 service domains were grouped into four overarching service categories for ease of analysis.

future and had recently been truant significantly less often; those who were sexually experienced had used contraceptives more consistently. Once we entered controls for the youths' grade level, however, all of these differences—among females as well as males—lost statistical significance.

Description of Services

No specific program services were required of providers, other than at least one face-to-face contact with every client every month. Program personnel were expected to implement a variety of services to prevent pregnancy and related risk behaviors.* Two sample programs, which are profiled in the appendix (page 70), provide a sense of what services may be involved.

The evaluation involved monitoring the services that program clients received at all of the sites. Providers were required to note the following at every client encounter: duration of service (dosage); service mode, or how it was delivered (i.e., case management, group activity, one-on-one mentoring, individual counseling, formal therapy, video or other means); and service domain, or broad content area (i.e., community service or recreational activity, psychosocial skills, job skills or school issues, and sexuality and health issues).

On average, program clients received 18.4 hours of services over the evaluation period (range, 45 minutes to more than 95 hours), or approximately two hours per month.

*A copy of the program standards can be obtained from the California Department of Health Services, Maternal and Child Health Branch, at <<http://www.mch.dhs.ca.gov/programs/asppp/asppp.htm>>.

TABLE 4. Changes in scores from pretest to posttest, percentages of youths engaging in selected behaviors during the evaluation period and outcomes assessed at posttest only, by group and gender

Outcome	Females		Males	
	Program	Comparison	Program	Comparison
Changes in scores				
Parent-youth communication	.07	.28	.08	.13
Perceived likelihood of having sex	.12	.22	.26	-.04
Perceived likelihood of early parenting	.06	.15	.06	-.07
Perceived likelihood of contraceptive use	.09	-.04	.07	.17
Truancy	-.12	-.18**	-.04	.02
Drug/alcohol use	-.09	-.08	-.08	-.04
Gang activities	-.09	-.09	-.06	-.18
Consistency of contraceptive use†	-.39	.14	.38	-.18**
Percentages over evaluation period				
Had first sex	7.4	16.0**	11.7	11.5
Became pregnant/caused a pregnancy	3.7	6.5*	0.7	1.3
Posttest measures				
Perceived likelihood of abstaining from sex (scale, 1–5)	4.3	4.0*	3.8	3.9
No. of times had sex in last 3 mos.†	6.5	3.9	4.2	3.7
Consistency of contraceptive use in last 9 mos. (scale, 1–5)†	3.5	3.7	4.0	4.0
% used contraceptive at last sex†	77.4	55.8	59.2	53.3
No. of partners in last 9 mos.†	1.5	1.7	2.0	2.0
% had an STD in last 9 mos.†	6.8	9.3	1.4	0.0

*Within gender, program youths differed significantly from comparison youths at $p < .05$. **Within gender, program youths differed significantly from comparison youths at $p < .01$. †Based on sexually experienced respondents only. Notes: Analyses of covariance (ANCOVA) included weighted data for the comparison group and controlled for cumulative receipt of nonprogram services and background characteristics that differed significantly at intake. Among females, ANCOVA produced F values of 7.09 (df=1 and 639) for significant difference between program and comparison youths in change in truancy, and 4.68 (df=1 and 662) for significant difference in perceived likelihood of abstaining at posttest. Among males, F value was 7.18 (df=1 and 57) for significant difference between program and comparison youths in change in consistency of contraceptive use from pretest to posttest.

To simplify our analysis of service impact, we reduced the 16 possible service domain categories to four on the basis of services that are related or typically delivered together. Thus, over the nine-month evaluation, clients received an average of seven hours of services devoted to improving their psychosocial skills, five hours of sexuality and health education, and four hours each of community service or recreational activities and help with school and job issues (Table 3, page 65).

Clients received, on average, 11 hours of individual services and seven hours of group activities over the evaluation period. (We excluded from the analysis services that included showing videos and “other” modes of delivery, because of the small number of service hours involved.) The number of group service hours correlated minimally with the number of one-on-one hours ($r = .12$); thus, these measures appear to be assessing separate aspects of service delivery.

Compared with males, females received significantly more total service hours (20.1 vs. 15, $p < .001$) and participated in significantly more hours of one-on-one services (12.4 vs. 7.9); however, the number of hours of group activities did not differ by gender. The mode of service delivery did not vary by clients’ race or ethnicity, but one-on-one services were positively correlated with age ($r = .15$), whereas group activities were negatively associated with age ($r = -.11$). Thus, older clients were likely to receive many hours of individual services, whereas younger clients were likely to receive services within a group.

Receipt of Nonprogram Services

At the posttest interview, we asked all evaluation participants if, in the past nine months, they had received any non-program services, such as through school, church or synagogue; organizations such as the Girl Scouts or Boy Scouts; or a community center or agency (e.g., Boys’ and Girls’ Clubs). We also asked that respondents specify which of the following seven domains best described those services: sexuality education, drug and alcohol use prevention, contraception, violence prevention and gang activity, communication with parents, STDs (including HIV and AIDS) and how to handle peer pressure.

A significantly higher proportion of comparison adolescents than of program youths received any nonprogram services (63% vs. 50%; $\chi^2 = 24.61$, $p < .001$). Relative to program clients, comparison youths also received other services in a higher average number of topic areas (2.9 vs. 2.2; $t = 4.56$, $p < .001$). Because these services address key pregnancy prevention issues, we used the receipt of supplemental services (summed across the seven topic domains) as a statistical control in the analyses comparing clients and nonprogram youths, and as an independent variable in interaction with group status (program or comparison) in other analyses.

Analytic Procedures

To contrast the program and comparison groups, we calculated change scores for the outcome variables from pretest to posttest—that is, the measure’s value assessed at posttest, minus the value assessed at pretest. A positive change score indicates an increase in that variable from pretest to posttest, and a negative change score indicates a decrease.

We then contrasted these change scores by group, using analysis of covariance tests when the dependent variables were continuous and we needed to statistically control for a variety of factors (e.g., extent of nonprogram services and differences in the adolescents’ background characteristics at pretest). We used logistic regressions when the outcome variables were categorical rather than scales or scores (such as the proportions who first had sex during the evaluation period, who experienced or caused a pregnancy, who used contraceptives at last sex and who had an STD). When change scores were unavailable because data were collected at only one point (e.g., abstinence intentions were assessed at posttest only), we compared the posttest scores of program clients and comparison youths, using analysis of covariance or logistic regression, depending on the coding of the variable. All the analyses controlled for the cumulative number of domains of nonprogram services received and for background characteristics that differed significantly by group at intake (i.e., grade level, ethnicity, language spoken at home, family’s receipt of financial assistance and mother’s educational level). We conducted separate analyses for males and females, both to discern gender-specific program effects and because male and female program participants received different levels and types of services. We present F values and odds ratios only for

variables that were significant.

We next ran additional analyses of covariance and logistic regressions that tested for interactions between group status (comparison vs. program) and additional services received (many vs. few or none). We based our categorization on the median number of domains in which males and females received additional services. Thus, for young women, “few or no outside services” was defined as having received nonprogram services in two or fewer topic areas, whereas “many” corresponded to three or more. Among young men, those who received no outside services were categorized as having received “few or no outside services,” whereas the receipt of outside services in one or more areas corresponded to “many.” These analyses controlled for the same background variables as the original analyses.

To examine whether positive outcomes were related to the receipt of specific services, we computed Pearson-listwise correlations between the hours of service received in the four service domains and the two service modes and the program outcomes. Correlations were computed first for all program clients (statistically controlling for youths’ gender and age) and then separately for each gender (statistically controlling for age). The correlations by gender highlight which services may be particularly effective for males and for females.

RESULTS

Group Contrasts

Overall, participation in the sibling pregnancy prevention program appears to have been associated with positive outcomes, especially among females. For example, program females’ truancy frequency score declined from pretest to posttest, while it rose among nonprogram females (Table 4); program participants scored significantly higher than comparison females on their abstinence intentions score at posttest. Moreover, a significantly lower proportion of program than of comparison females first had sex over the nine-month period (7% vs. 16%) and experienced a pregnancy in that interval (4% vs. 7%). Results of the logistic regressions performed with these data (not shown) show that the odds of initiating sexual activity over the evaluation period were significantly elevated among comparison females relative to program females (odds ratio, 1.5; 95% confidence interval, 1.09–1.94), and the odds of becoming pregnant were significantly higher among comparison than program females (odds ratio, 1.6; 95% confidence interval, 1.07–2.52).

Only one significant difference emerged between program and comparison males at posttest: Males enrolled in the program increased their consistency of contraceptive use from pretest to posttest, while comparison males used contraceptives less consistently over time.

Effects of Nonprogram Services

When we tested for interactions between group status (program or comparison) and the receipt of nonprogram services, two significant interaction effects emerged for each

TABLE 5. Means for selected outcomes, by number of non-program services received, according to gender and group

Outcome	Many†	Few or none‡
MALES		
Posttest likelihood of abstinence		
Program**	4.02	3.64
Comparison	3.94	3.91
<i>F=8.55 (df=1 and 426)</i>		
Change in frequency of gang activities		
Program	-.01	-.11
Comparison**	-.20	-.12
<i>F=7.21 (df=1 and 426)</i>		
FEMALES		
Change in perceived likelihood of sex		
Program	.09	.14
Comparison*	.12	.36
<i>F=3.93 (df=1 and 666)</i>		
Change in frequency of drug/alcohol use		
Program	-.09	-.09
Comparison***	-.27	.05
<i>F=10.40 (df=1 and 637)</i>		

*Within gender and group, difference by receipt of nonprogram services is significant at $p < .05$. **Within gender and group, difference by receipt of nonprogram services is significant at $p < .01$. ***Within gender and group, difference by receipt of nonprogram services is significant at $p < .001$. †Defined as receipt of nonprogram services in one or more topic areas for males and in three or more for females. ‡Defined as receipt of no nonprogram services for males and of nonprogram services in two or fewer topic areas for females. Note: The F values are for the group by nonprogram services interaction.

gender (Table 5). Among program males, those who received nonprogram services in one domain or more had more definite intentions of abstaining from sex than those who received no outside services at all. All other interactions centered on the comparison group. Comparison group males who received many outside services experienced greater declines in their frequency of gang activities from pretest to posttest than did those who received no supplemental services. Similarly, among comparison females, those who received many outside services perceived sex in the near future to be significantly less likely to occur, and used drugs and alcohol less frequently, than females who received relatively few nonprogram services.

Effects of Type and Mode of Services

Our assessment of whether the receipt of services in specific domains was associated with changes in program outcomes revealed many significant correlations, both among program clients overall and among male and female participants separately. Because of the relatively large sample size and the large number of correlations computed, we focus on those that were highly significant.

At $p < .01$ or higher, the receipt of an increasing number of hours of school and job-related services was correlated with reductions in the frequency of skipped classes over time among males and with more consistent contraceptive use over time among females (Table 6, page 68). More hours of sexuality or health education were related to declines from pretest to posttest in the perceived likelihood of early parenting among all program clients (and among males

TABLE 6. Significant correlation coefficients from analyses assessing the relationship between service domain and mode of delivery and evaluation outcomes, by gender

Gender and outcome	Domain				Mode of delivery	
	School/job	Sexuality/health	Psycho-social	Activities	One-on-one	Group
All						
Likelihood of early parenting	ns	-.11***	ns	ns	-.12***	ns
Likelihood of contraceptive use	ns	ns	ns	ns	ns	.10**
Gang activities	ns	ns	ns	ns	-.09**	ns
Frequency of sex in last 3 mos.†	-.11*	-.09*	ns	ns	ns	ns
Used contraceptive at last sex†,‡	ns	ns	.20**	ns	.16*	ns
Males						
Likelihood of abstaining‡	ns	-.16**	ns	.25***	ns	.14**
Likelihood of early parenting	ns	-.16**	ns	ns	-.14**	ns
Truancy	-.21***	-.12*	-.18**	ns	-.22***	-.12*
Had first sex since pretest	ns	ns	ns	ns	ns	-.17**
Females						
Likelihood of early parenting	ns	-.11*	-.15**	ns	-.14**	ns
Likelihood of contraceptive use	.11*	.10*	ns	ns	ns	.14**
Truancy	ns	ns	.13**	ns	ns	ns
Had first sex since pretest	ns	.12*	ns	ns	ns	ns
Consistency of contraceptive use since pretest†,‡	.28**	ns	ns	ns	ns	ns
Used contraceptive at last sex†,‡	ns	.23*	.23*	ns	ns	ns

*p<.05. **p<.01. ***p<.001. †Based on sexually experienced respondents only. ‡Assessed at posttest only (not a change score). Notes: Outcomes are change scores unless otherwise noted. Tests for correlations among all clients statistically controlled for youths' age and gender, and those conducted for males and females separately statistically controlled for age. ns=not significant.

separately), but also to decreases in males' perceived likelihood of remaining abstinent.

The receipt of psychosocial services was positively related to contraceptive use at most recent sex among all program clients. Psychosocial services were also correlated with reduced truancy among males but with increased truancy among females, and with a reduced perceived likelihood of early parenting among females. The number of hours of community and recreational activities was associated only with males' more definite intentions to be abstinent.

Services delivered in a one-on-one context were related to reductions in adolescents' perceived likelihood of early parenting among all program clients (and males and females separately), as well as to declines in gang activity among all program clients and in truancy among males. Finally, services delivered in a group setting were related to greater certainty of contraceptive use among all program clients (and among females separately), and to a greater certainty among males that they would remain abstinent. The receipt of group services also was correlated with a delay in sexual debut among males.

Even at p<.05, negative associations emerged between content area and delivery modes and measures of sexual activity (for all clients), measures of truancy (for males) and measures of intentions of early parenting (for females). We found positive correlations at p<.05 between content area and contraceptive use at last sex (for females) and between content area and contraceptive intentions and sexual initiation (for females), as well as a positive correlation between one-on-one service delivery and contraceptive use at last sex (for all clients).

DISCUSSION AND CONCLUSIONS

Our results suggest that participation in ASPPP was associated with several favorable outcomes, particularly among female clients. Most notable was the significantly lower pregnancy rate among program females than comparison females (4% vs. 7%). This difference translates to a 43% reduction in pregnancy. Applying such a potential decrease to all 3,600 young women who have been served by ASPPP to date⁵ could have a meaningful impact on rates of teenage pregnancies and births in California, and mean far lower costs for services for pregnant and parenting teenagers throughout the state. Certainly, ASPPP and other special programs that systematically focus prevention efforts on high-risk individuals hold great promise for continuing the trend toward lower teenage birthrates in the country; such programs should be considered an integral component of any national pregnancy prevention policy.

Very few males overall reported impregnating a partner over the evaluation period, so there were no differences in these rates by group. These negligible rates of causing a pregnancy may reflect a variety of factors, such as the low overall rates of fatherhood among young men in this age-group. For example, the Youth Risk Behavior Surveillance Survey found that only 4% of males in grades 9–12 had caused a pregnancy.⁶ Additionally, the presumably young female partners of these males (who averaged 14 years of age) may be less likely than older women to have informed their partner of a pregnancy. Moreover, these young men may be less likely than older men to admit to themselves that they had gotten someone pregnant and thus be less likely to report it.

Significantly lower proportions of program than of comparison females first had sex during the evaluation period. This difference is a key indicator of success. Young age at sexual onset is a known risk factor for teenage pregnancy; thus, if program services can delay sexual initiation, pregnancy will be avoided or at least delayed.

When contrasted with females in the comparison group, program females were more certain, at posttest, that they would remain abstinent. Further, program females cut classes less frequently from pretest to posttest, whereas females in the comparison group increased their frequency of truant behavior over this period. Among males, only one significant difference emerged between program clients and comparison youths: ASPPP males used contraceptives more consistently from pretest to posttest, whereas those in the comparison group used contraceptives less consistently over that period. All of these differences were in the desired direction and are key measures of program success.

The effects of the receipt of nonprogram services were only nominal among program participants, but were more important among comparison youths. These findings illustrate that benefits accrue for youths who are not part of an organized state program, but who receive many services in diverse community settings. In these cases, a "saturation" of services across multiple contexts likely reinforces the prevention message and helps forge social norms that shun

risky and unhealthy behaviors.⁷ Thus, although comparison youths did not necessarily fare better overall than program youths, those who received many community services fared better than those who received minimal or no community services in terms of females' reductions in frequency of drug and alcohol use and perceived likelihood of sex, and in males' reductions in gang activity.

Our study also identified types of services that were especially effective in enhancing positive outcomes. The receipt of group services was correlated with delayed sexual debut among males, and services that strengthen psychosocial skills were correlated with increased contraceptive use among sexually active youths.

A few unexpected findings emerged in which program services were correlated with an unfavorable outcome. For example, the receipt of sexuality or health education was correlated with less certainty of remaining abstinent among males and with recent sexual debut among females (at $p < .05$). The most plausible interpretation may be that males with little intention of being abstinent and females who had only recently started having sex were specifically targeted to receive many hours of sexuality or health education. The finding of a positive correlation between training in psychosocial skills and females' frequency of truancy most likely reflects the same kind of tailoring of service to need (i.e., females who often cut classes were targeted to receive many hours of psychosocial services).

That the correlation between psychosocial services and truancy was in the opposite direction among males is puzzling. One possible explanation is that service providers were more reactive (and less proactive) with female clients than with male clients.* Alternatively, these results may reveal that different services work differently for each gender. In any case, repeated assessments of measures throughout the evaluation period would have been useful to verify these conjectures.

The variability in the number of service hours that clients received is also noteworthy. Although the total amount of services received averaged 18 hours over the evaluation period, it ranged from 45 minutes to 95 hours. Moreover, the number of hours received in each service domain and mode varied by clients' gender and age. These findings of variations by client characteristics suggest that providers did not deliver services in a vacuum, but focused on the needs and characteristics of each client. An approach based on individual needs can be a sound and successful pregnancy prevention strategy, particularly because different factors likely influence the pregnancy-related risk behaviors of older and younger adolescents and of male and female adolescents.⁸ The different levels of service offered and the individually tailored nature of service delivery are important components of this program and should be considered in its replication.

Several potential limitations of this study should be mentioned. First, the evaluation period—nine months—was relatively short. Most clients participate in the program for a longer period (sometimes a year or more), so the changes

captured here likely underestimate what most clients ultimately experience. A longer study period may uncover long-term effects that are not yet evident among these fairly young adolescents (i.e., 14 years old, on average). Unrealized benefits may include impacts on rates of high school graduation and college attendance, and reductions in pregnancy rates in the middle and later teenage years, when most adolescent pregnancies occur.⁹ Of course, program effects may also decay over time.

Second, individuals were not randomly assigned to program and comparison groups, so the adolescents who were recruited into the program might have had a different pregnancy risk than those who made up the comparison group. To avoid this potential bias, randomization would have been preferable. Third, the evaluation sample was predominantly Hispanic. Different outcomes might have resulted if the program had served a different population; thus, caution should be exercised when generalizing beyond the evaluation sample.

A definite strength of the evaluation, however, is that all participants had siblings who had been pregnant or had been a parent. (Since program and comparison youths had equivalent numbers of these siblings, the known higher risk associated with having many such siblings was not an issue.¹⁰) Thus, all participants were at very high risk of early sexual activity and pregnancy, and of problem behaviors such as alcohol and drug use.¹¹ The risks for this population likely derive from the adolescent's family background (e.g., having permissive parents) and environment (e.g., neighborhood conditions of poverty, lack of job opportunities and community norms that accept early and unwed parenting). A sibling's pregnancy and parenthood may also affect these youths. For example, an adolescent may model the behavior of a sister who gave birth, the adolescent's mother may be less available to monitor her children, and family stress and financial hardship may increase when a teenager has become pregnant or given birth.¹² Any changes in attitudes and behaviors that occurred from pretest to posttest among these sibling clients should, therefore, be considered within this context.

In summary, California's special sibling program was effective at reducing the pregnancy rate and several pregnancy-related risk behaviors in this high-risk sample. Targeting intervention efforts at high-risk youths has been a recommended approach to teenage pregnancy prevention.¹³ Although such specially targeted programs are certainly a challenge to implement, they hold great promise for significantly lowering rates of teenage pregnancy and births.

*This explanation is supported by the correlation coefficients between receipt of psychosocial services and truancy at pretest, which were .15 for males but -.01 for females, and thus suggest that truant males were targeted to receive more psychosocial services, but that receipt of psychosocial services was unrelated to females' truancy levels at pretest. The correlations between psychosocial services and truancy at posttest (statistically controlling for pretest levels), however, were -.15 for males and .21 for females, which suggests that an increasing number of hours of psychosocial services over the evaluation was associated with declines in truancy among males, but with increased truancy among females. These pretest and posttest correlations by gender are roughly what would be expected if providers were less proactive with females than with males.

The different levels of service offered and the individually tailored nature of service delivery are important components of this program and should be considered in its replication.

**Appendix—Description of Two Sample ASPPP Programs
Stand Tall and Achieve Responsibility (STAR)**

- *Site.* County of Santa Cruz Health Services Agency.
- *Stated goals.* To support teenagers in delaying childbearing; help youths do well in school; and help youths be physically healthy.
- *Underlying objectives.* That youths see themselves as important and valued persons; have a positive, optimistic life outlook; have healthy and positive goals and expectations; develop trusted, positive relationships with caring adults; and enjoy themselves and have fun. Utilizes a youth development approach.
- *Strategies.* In areas of sex and contraception—counsel about abstinence and contraception; provide access to quality reproductive health care; take clients to a health or medical clinic, if needed; provide rewards for not having sex or for being responsible about using contraceptives; and incorporate goal-setting concepts. In schooling and job skills—connect clients with tutors and help with homework; help with writing and typing school reports; take clients to the library to do research; help students deal with teachers and connect with school counselor; help clients prepare a résumé; advocate at expulsion and court hearings; and meet with teachers and principal. In the areas of health and general well-being—make appointments and take youths to doctor, dentist, optometrist, sports exams and vaccine updates; sign up clients for medical insurance; provide access to sports teams, games and swimming program at local high school; help teenagers recognize media pressure for fashion and thinness; educate clients about healthy eating and exercise; and go on field trips and engage in group activities to strengthen social skills and competence in new situations.
- *Program structure.* Throughout the first year of operation, one full-time program staff person for a 35-client caseload.
- *Program successes after one year of operation.* No pregnancies; no STDs; extremely low program dropout rate; and more than 50% attendance on field trips and outings.

San Bernardino County Siblings Program

- *Site.* County of San Bernardino Department of Public Health.
- *Stated goals.* To prevent pregnancy; promote healthy lifestyles; and inspire and empower young people and their families toward self-discovery, positive personal growth, goal attainment and self-sufficiency.
- *Strategies.* Sibling groups meet bimonthly to participate in sports, visit museums and historical places, visit colleges or vocational schools, and participate in sociocultural events and volunteer activities. Each event is structured and developed with specific goals and objectives to build youths' self-esteem and internal strengths by exposing them to opportunities that increase their skills in decision-making, problem-solving, goal-setting and communication. Program staff identify and build on existing strengths and accomplishments, provide a sense of belonging, and advocate, educate and counsel when needed.
- *Program structure.* In the first year of operation, three social workers and two public health nurses provided case management for approximately 200 youths.
- *Program successes after the first year of operation.* Program attendance has resulted in reductions in rates of teenage pregnancies and truancy. Eighty-seven percent of program participants are enrolled in school and attend regularly.

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