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Original article

## Integrating Condom Skills Into Family-Centered Prevention: Efficacy of the Strong African American Families–Teen Program

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### A B S T R A C T

**Purpose:** The Strong African American Families–Teen (SAAF–T) program, a family-centered preventive intervention that included an optional condom skills unit, was evaluated to determine whether it prevented unprotected intercourse and increased condom efficacy among rural African American adolescents. Ancillary analyses were conducted to identify factors that predicted youth attendance of the condom skills unit.

**Methods:** Sixteen-year-old African American youths (N = 502) and their primary caregivers were randomly assigned to SAAF–T (n = 252) or an attention control (n = 250) intervention. SAAF–T families participated in a 5-week family skills training program that included an optional condom skills unit. All families completed in-home pretest, posttest, and long-term follow-up interviews during which adolescents reported on their sexual behavior, condom use, and condom efficacy. Because condom use was addressed only in an optional unit that required caregiver consent, we analyzed efficacy using complier average causal effect analyses.

**Results:** Attendance in both SAAF–T and the attention control intervention averaged 4 of 5 sessions; 70% of SAAF–T youth attended the condom skills unit. Complier average causal effect models indicated that SAAF–T was efficacious in reducing unprotected intercourse and increasing condom efficacy among rural African American high school students. Exploratory analyses indicated that religious caregivers were more likely than nonreligious caregivers to have their youth attend the condom skills unit.

**Conclusions:** Results suggest that brief condom skills educational modules in the context of a family-centered program are feasible and reduce risk for sexually transmitted infections and unplanned pregnancies.

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### IMPLICATIONS AND CONTRIBUTION

The SAAF–T program, a family-centered intervention with an optional condom skills training session, was evaluated. Results indicate that SAAF–T reduced African American high school students' frequency of unprotected intercourse and increased their condom efficacy during the 22 months separating the baseline and long-term follow-up assessments.

Surveillance efforts indicate that African American adolescents are disproportionately affected by sexually transmitted infections (STIs), including HIV [1]. High STI rates are particularly evident in

small towns and rural communities in the South [2]. For example, the southern region accounts for more than one-third of all AIDS cases in the United States, and infection among residents of rural areas is more likely to occur in the southern region than in other areas of the country [3]. These data underscore the importance of developing programs that target sexual risk reduction among African American adolescents in general and rural youth in particular.

Powerful factors protecting rural African American adolescents from risky sexual activity originate in the family, particu-

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larly from caregivers' parenting behavior [4,5]. Studies have demonstrated that family-centered interventions are effective in reducing adolescents' risky sexual behavior [6,7]. Most programs, however, do not involve family members [8] and were not developed for or evaluated with rural African American youth. Furthermore, extant family programs do not incorporate condom skills training, a critical component in STI risk reduction [9].

The Strong African American Families–Teen (SAAF–T) program addresses these limitations. SAAF–T consists of five weekly meetings held at community facilities. Each meeting includes separate concurrent training sessions for caregivers and youth, followed by a conjoint session during which families practice the skills they learned in their separate sessions. SAAF–T targets a cluster of adolescent problem behaviors including risky sex, substance use, and conduct problems. It is unique in its focus on rural African American high school students and its integration of condom skills training into a family-centered program. The present study focuses on SAAF–T's efficacy in preventing unprotected sexual intercourse and promoting a key cognitive mediator of condom use, condom efficacy.

The integration of condom use skills into family-centered programming is a challenge. Although most caregivers express interest in their youths' learning about condoms [10], many hesitate to provide youth with this information or to encourage them to attend available condom use education programs [11]. In SAAF–T, we approached this issue by developing an optional condom skills module. Session 4, which took place after caregivers had developed considerable trust in the facilitators and investment in the program, addressed sexual health issues. The youth session included general sexual health information and skills for abstaining from sexual activity; no condom skills information or practice was included. The caregiver session addressed communication about risk behavior and common caregiver misgivings regarding condom education, including the concern that teaching condom skills may encourage sexual activity. After session 4, caregivers were invited to give permission for their youth to attend a 20-minute condom education unit that included condom use instructions and practice with a penis model. This unit was offered in gender-segregated meetings.

SAAF–T's optional condom skills unit permitted us to explore predictors of attendance in such a unit, an important prevention issue. Although studies have addressed parental attitudes toward condom skills education [12], we are aware of no studies that address parents' actual choices when presented with the opportunity to have their youth attend condom skills training. Several predictors were considered. We hypothesized that caregiver religiosity would be linked negatively to participation. Past studies link religiosity to attitudes favoring abstinence-only programming [13,14]. Supportive family relationships were hypothesized to predict attendance, as such relationships have been linked previously with condom use [4,5]. We hypothesized that caregiver reports of youths' poor self-control would predict greater participation, because caregivers who observe poor self-control in their youth may be more concerned about their youths' involvement in risk behavior. Finally, we examined socioeconomic risk as a predictor. Past studies have linked the accumulation of socioeconomic stressors with greater risk behavior among youth and obstacles to participation in prevention programs [15].

## Methodology

Families (N = 502) were recruited from six rural counties in Georgia. In terms of socioeconomic and demographic indicators, the counties were representative of the Southern "Black Belt" [16], a geographic concentration of rural poverty that coincides with the nation's worst economic and health disparities by race. Public high schools provided lists of 10th-grade students, whose families were contacted by phone in random order to discuss participation. Eligibility requirements included the presence of a youth 15 or 16 years of age at pretest who self-identified as African American.

### Procedures

Data collection began in October 2007 and concluded in February 2010. Research staff initially contacted families with a letter introducing the study. Follow-up phone calls to and in-person contacts with families were made by local community liaisons who were in charge of screening and recruitment. African American field researchers made home visits to collect data using audio computer-assisted self-interviews on laptop computers. Informed consent/assent was obtained at all data collection points. Caregivers were paid \$100 and youth were paid \$50 at each assessment. All study protocols were approved by the university institutional review board.

After pretest, families were randomly assigned to SAAF–T or an attention control intervention. Project staff informed them of their assignments, and their group leaders called to schedule a program information visit at each family's home; these visits were completed with 94.4% of the families. Posttest data were collected 5 months after pretest, which was approximately 2 months after the intervention programs ended. Participants were assessed again at 22 months after pretest.

### Experimental conditions

SAAF–T was informed by our experience in developing and testing the efficacious Strong African American Families (SAAF) program for preadolescents [17,18]. Both are family skills training programs, an approach that integrates guidance related to individual youth skills, parenting, and family interactions. Sessions were organized using DVDs on which narrators addressed specific content and actors presented family scenarios depicting program-targeted interactions and behaviors. Group leaders presented the prevention curriculum, organized role-playing activities, guided discussions among participants, and answered participants' questions. SAAF–T was designed to be shorter than SAAF (5 sessions vs. 7) based on feedback from families regarding time commitments among older adolescents. The SAAF–T curriculum also addressed unique risk factors that African American adolescents encounter [19]. The curriculum included a focus on optimal parenting for high school-age adolescents (vs. the preadolescents who took part in SAAF), preparation for life after high school, and content on sexual health that was not included in SAAF. The sexual health curriculum and condom skills unit were based on materials adapted from the efficacious Sisters Informing Healing Living and Empowering program for African American adolescent women [20]. The unit included a video-based demonstration of condom skills and opportunities for youth to practice placing a condom on a penis model. It was offered to youth in gender-segregated groups. Caregiver ap-

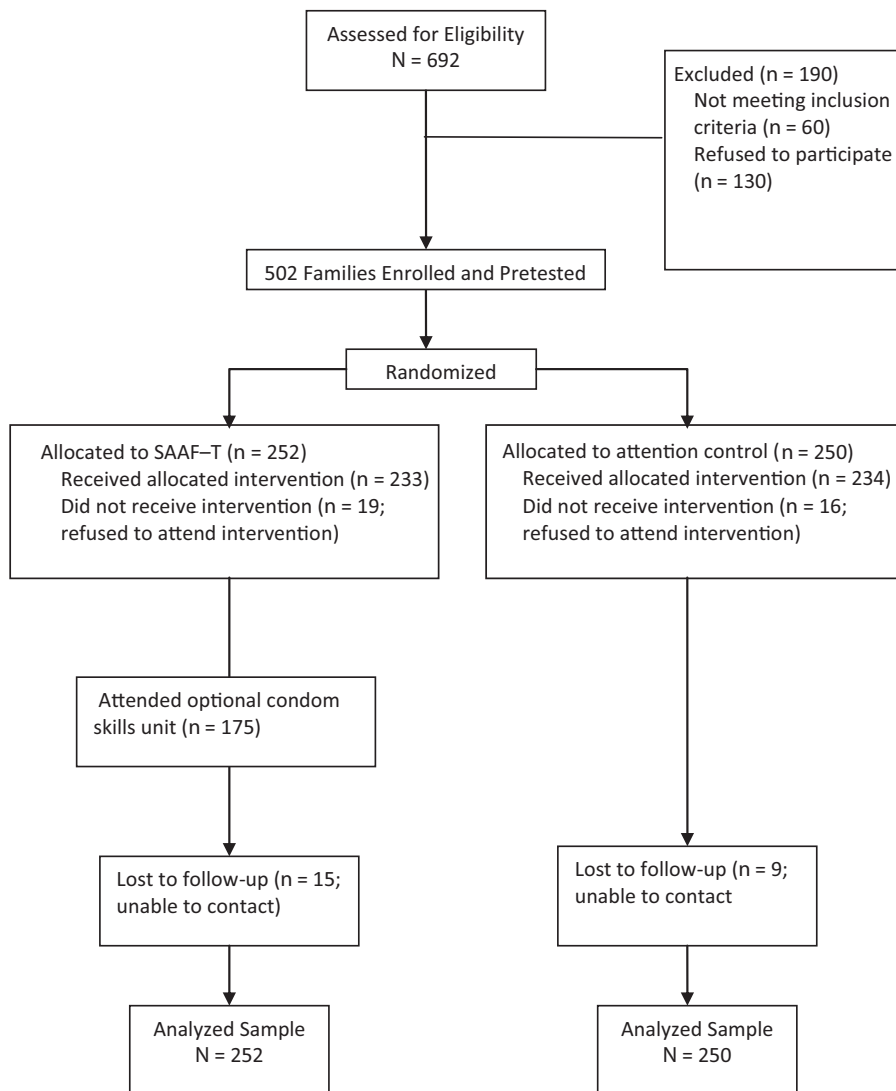


Figure 1. Participant flow through the Strong African American Families–Teen trial.

proval was required for youth to attend this session. Approximately 70% of families assigned to SAAF-T attended the condom skills session.

Youth assigned to the control condition attended a family-centered intervention designed to promote healthful behaviors among adolescents by encouraging good nutrition, exercise, and informed consumer behavior. This program was based on the FUEL™ program distributed by the Comprehensive Health Education Foundation. Our team adapted materials from FUEL™ and created new activities to fit into the family skills format that SAAF-T used. This process produced a program that was structurally similar to SAAF-T, which we called Fuel for Families (FF). FF was designed to avoid overlap in intervention-targeted content and included no curriculum materials addressing risk behavior reduction.

*Intervention implementation and fidelity*

African American group leaders with good interpersonal and group facilitation skills were selected to deliver the SAAF-T and FF interventions. These leaders took part in training that ad-

ressed content delivery in a structured group process format, implementation of specific curriculum activities, guided practice in delivering and pacing curriculum segments, and leader self-care. Before conducting any intervention sessions, group leaders demonstrated their mastery of the prevention curriculum and the prescribed method of presenting it. Leaders of SAAF-T groups received 20 hours of training, and leaders of FF groups received 12 hours of training, before conducting any intervention sessions.

Teams of three leaders directed 20 SAAF-T and 20 FF groups. Prevention supervisors were assigned to each team of group leaders to support implementation fidelity and competence. All sessions were videorecorded. Prevention supervisors reviewed videos of each week’s sessions and then provided constructive feedback to group leaders by telephone or in person on a weekly basis. For each group, two caregiver, two youth, and two family sessions were selected randomly and scored for adherence to and coverage of the prevention curriculum. Coverage of the curriculum components exceeded 80% for both SAAF-T and FF sessions. Reliability checks were conducted on 20% of the fidelity assessments; the intraclass correlation between judges was .95.

**Table 1**

Pretest equivalence of experimental conditions for complier youth, Strong African American Families–Teen (SAAF–T) Intervention program and attention control program

Variables at pretest	Experimental condition				T
	SAAF–T		Attention control		
	M	SD	M	SD	
Unprotected intercourse model					
Socioeconomic risk	2.66	1.60	2.48	1.58	1.03
Adolescent gender (male)	.45	.50	.41	.49	.91
Doses	4.78	.55	4.79	.50	–.17
Unprotected intercourse, baseline	n	%	n	%	
0	152	86.9	157	92.4	
1	10	5.7	3	1.8	
2	2	1.1	2	1.2	
3 or more	11	6.3	8	4.7	
				$\chi^2(3) = 4.25,$	
				$p = .23$	
Condom efficacy model					
Socioeconomic risk	2.66	1.60	2.45	1.57	1.26
Adolescent gender (male)	.45	.50	.42	.50	.57
Dose	4.78	.55	4.82	.39	–.91
Condom efficacy	3.54	1.12	3.57	1.14	–.30

SAAF–T = Strong African American Families–Teen (SAAF–T) program; M = mean; SD = standard deviation.

## Measures

### Outcomes

The primary outcomes in the present study were episodes of unprotected intercourse during the previous 3 months and condom efficacy. Youth reported the number of times they had sexual intercourse during the past 3 months and the number of times condoms were used. Subtracting protected episodes from total episodes yielded a count of unprotected episodes. Condom efficacy was assessed using a 6-item scale; [20] an example item is as follows: “How much of a problem would it be for you to unroll a condom down correctly on the first try?” Youth responded on a scale ranging from 1 (not a problem) to 5 (a big problem). Items were reverse coded so that higher scores on the scale indicated greater condom efficacy. Cronbach  $\alpha$  for the scale ranged from .87 to .90 across waves.

### Predictors of participation in the condom skills unit

Socioeconomic risk, gender, family relationship quality, caregiver religiosity, and youths' poor self-control were examined as predictors of participation in the condom skills unit. The socioeconomic risk index was based on the observation that the presence or absence of various risk factors functions in a cumulative fashion [21]. Such indices aggregate risk factors that may not be strongly correlated; thus, reliability usually is not calculated. This approach has been used elsewhere [22]. Seven dichotomous variables formed the socioeconomic risk index. A score of 1 was assigned to each of the following variables: primary caregiver < 17 years of age at the first child's birth, family poverty based on federal guidelines, caregiver unemployment, receipt of Temporary Assistance for Needy Families, unmarried caregiver, caregiver education level less than high school graduation, and caregiver-reported income inadequacy. The scores were summed to form the index, which ranged from 0 to 7 stressors.

Family relationship quality was assessed from caregivers' and youths' perspectives using a 4-item scale focused on behavior in the past 3 months. Example items include “How often did you let your teen know you really care about him/her?” and “How often did your caregiver help you do something that was important to you?” Cronbach  $\alpha$  for the scale exceeded .75. Caregiver religiosity was added to the measurement battery at wave 3. Although it would have been ideal to measure this variable at every wave of data collection, our past research with similar samples found stability coefficients for caregiver religiosity to exceed .65 during a 2-year period. Thus, caregiver religiosity was quite stable over time. The caregiver religiosity measure included five items ( $\alpha = .73$ ). Example items include “In the past year, how often did you usually attend religious services?” and “In general, how important is your faith or spiritual beliefs as a source of strength in your day-to-day life?” Youths' poor self-control was assessed from caregivers' perspectives on a subscale of the Humphrey self-control measure [23]. Caregivers rated their youth on a scale ranging from 1 (never) to 5 (almost always). Example items include “How often does your teen get into arguments or fights with other teens?” and “How often does your teen fail to complete work?” Cronbach  $\alpha$  at baseline was .71.

### Plan of analysis

Because our analysis focuses on outcomes that were addressed in the optional unit, intent-to-treat analyses are problematic. Youth who took part in the overall program but not the condom skills unit would not be likely to demonstrate intervention-targeted changes in condom efficacy or reductions in unprotected intercourse. “As-treated” analyses, however, are also problematic because self-selection processes bias the composition of the groups being compared. Complier average causal effect (CACE) models are a recent innovation uniquely suited to trials with optional components [24]. They provide unbiased estimates of causal effects for a full dose of an intervention while accounting for self-selection factors that would bias “as-treated” analyses [25]. CACE models form latent complier classes that allow a comparison between those receiving a complete dose of SAAF–T (specified as attendance at three or more regular sessions and the condom skills unit) and an equivalent group from the attention control condition.

SAAF–T's efficacy was tested using Mplus to evaluate separate CACE models for each outcome [26]. In each model, intervention dose was included as a covariate to increase the precision of

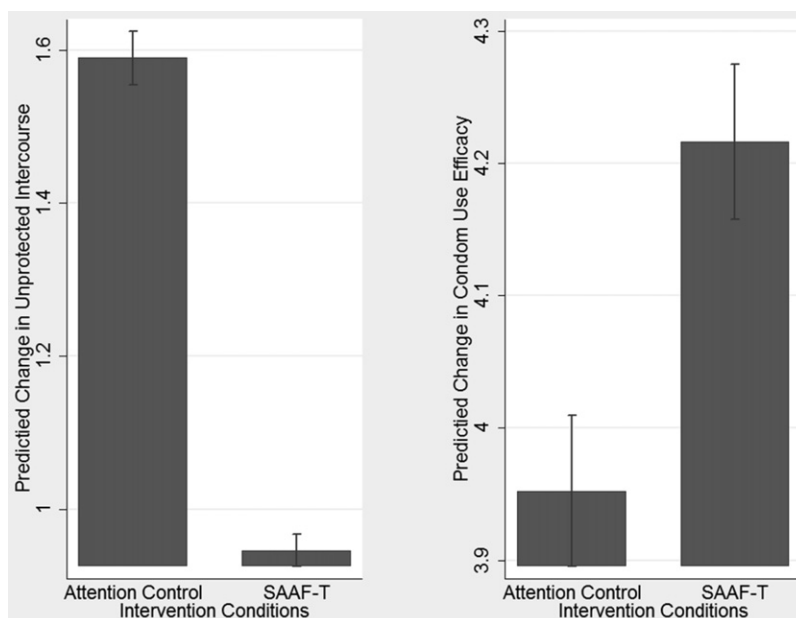
**Table 2**

Efficacy of the Strong African American Families–Teen Intervention program on unprotected intercourse and condom efficacy at long-term follow-up

Predictors	Unprotected intercourse				Condom efficacy	
	Binary		Frequency		OLS regression	
	Estimate	SE	Estimate	SE	Estimate	SE
Compliers						
Pretest measure	–.372**	.13	.005	.02	.289***	.05
Gender (male)	.687*	.33	.137	.17	.168**	.06
Intervention	–.375	.32	–.451**	.15	.125*	.05
Noncompliers						
Pretest measure	–.322	.20	.189***	.04	.468***	.09
Gender (male)	–.530	.42	–.178	.34	.201*	.09
Intervention	–	–	–	–	–	–

SE = standard error. OLS = ordinary least squares.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .



**Figure 2.** Estimated changes in the frequency of each outcome for compliant adolescents in the attention control group and the Strong African American Families–Teen intervention group.

model estimates. Gender and baseline levels of the outcome were controlled. Because of the high number of zeroes in the unprotected intercourse variable, a zero-inflated Poisson (ZIP) CACE model was estimated for that outcome. The ZIP regression estimated intervention effects on two components of the unprotected intercourse count: (a) a binary yes or no report indicating that unprotected intercourse did or did not occur, and (b) the frequency with which unprotected intercourse occurred. An ordinary least squares regression CACE model was used to examine intervention effects on condom efficacy. A logarithmic transformation was performed on this variable to correct a modest positive skew. All models used full information likelihood estimation, testing models against all available data. Hypotheses regarding predictors of condom skills unit participation were tested with logistic regression on the completer sample (three or more regular sessions attended) of families assigned to SAAF-T ( $n = 222$  of 252 total).

## Results

### Sample characteristics and attrition

Youths' mean age at baseline was 16 years (standard deviation [SD] = .57); 51% were female. Most (60.5%) youth lived with a single mother, 33.3% lived with married parents, and 6.2% lived with a mother and her cohabiting partner. Among the primary caregivers, 24.6% had completed high school or earned a GED, 25.4% did not complete high school, and the remaining 50% had completed some college education. Median family income was \$1,482.50 per month. Approximately 71.3% of study families lived within 150% of the poverty threshold; they had an average of 2.5 children. Overall, 11.8% of participants reported at least one episode of unprotected intercourse in the past 3 months at pretest, and 25.3% reported unprotected intercourse in the past 3 months at wave 3. Mean prevalence rates for the outcomes were as follows: for unprotected intercourse—Mean ( $M$ ) = .43 (SD =

1.89) at pretest,  $M = 1.84$  (SD = 6.90) at wave 3; for condom efficacy— $M = 3.50$  (SD = 1.16) at pretest,  $M = 4.00$  (SD = 1.07) at wave 3.

The flow of participants through the trial is depicted in Figure 1. Of the 252 SAAF-T families, 175 (69.4%) participated in the optional condom skills unit. The long-term follow-up was completed by 478 families (95%); no differences emerged between attrition rates for SAAF-T and FF on demographic or outcome variables. The mean intervention attendance for the trial was approximately four of five sessions ( $M = 3.96$ , SD = 1.6); 32 families (6.3%) did not attend any intervention sessions. Most families attended four or more sessions (76%); 65% attended all five sessions of the program to which they were assigned. No differences emerged in overall intervention attendance between the SAAF-T and FF intervention conditions.

### Efficacy analyses

We estimated separate CACE models with dose as a covariate for unprotected intercourse and condom efficacy. Typical fit statistics are not available for mixture models. The entropy value, which indexes the models' classification accuracy, exceeded .72 for each model, an acceptable value as per Nagin [27]. The model for each outcome created a group of compliers in the SAAF-T condition and an equivalent group of compliers in the attention control condition. Table 1 presents the statistical equivalence of the compliance groups for each model based on youth gender, socioeconomic risk, and intervention dose. As expected, the CACE models created compliance groups that were equivalent across experimental conditions. These data support the validity of the CACE model in creating an unbiased comparison between SAAF-T and FF compliers for each outcome.

Table 2 presents the causal effects of SAAF-T on unprotected intercourse and condom efficacy, with gender and pretest levels of each outcome controlled. The column on the left presents SAAF-T effects on the first part of the ZIP regression: dichoto-

**Table 3**  
Logistic regression predicting attendance at the condom skills unit<sup>a</sup>

Variables	Logit	SE	t	Odds ratio	p
Gender	.215	.35	.61	1.24	.54
Socioeconomic risk	-.035	.11	-.32	.97	.75
Family relationship quality (caregiver reported)	.098	.06	1.51	1.10	.13
Family relationship quality (youth reported)	.001	.05	.02	1.00	.98
Low self-control	.004	.04	.09	1.00	.93
Caregiver religiosity	.137	.05	2.67	1.15	.01

<sup>a</sup> A positive coefficient indicates a greater likelihood of attending and a negative coefficient indicates a greater likelihood of not attending the condom skills unit.

mously assessed engagement in unprotected intercourse (yes/no). No effect emerged. The middle column presents SAAF-T effects on the second component of the ZIP model: reductions in the frequency of unprotected intercourse. Assignment to SAAF-T was a significant negative predictor of frequency of unprotected intercourse among compliers; it was associated with a 54% reduction in the frequency of unprotected episodes. The third column of Table 2 presents SAAF-T effects on condom efficacy. SAAF-T was a significant positive predictor of condom efficacy. Figure 2 presents the effect sizes for changes in frequency of unprotected intercourse and condom efficacy. Ancillary analyses examined possible gender moderation of the effects of SAAF-T on unprotected intercourse or condom efficacy in the complier samples. No gender interactions emerged, suggesting that the intervention worked equally well for male and female youth.

#### Ancillary analyses

Table 3 presents logistic regression analyses of the potential predictors of attendance at the condom skills unit. Only caregiver religiosity was significant. In contrast to our expectations, caregivers who were more religious were more likely to have their youth attend the condom skills unit than were those who were less religious.

#### Discussion

The results of this study indicate that the SAAF-T intervention with its optional condom skills unit was efficacious in reducing the frequency of unprotected intercourse and increasing condom efficacy among rural African American high school students. SAAF-T is the first program of which we are aware that integrates condom skills training into a family-centered curriculum. Caregivers were invited to allow their youth to participate in a 20-minute add-on unit after session 4 of the five-session program. Notably, most caregivers assigned to SAAF-T (~70%) agreed to their youths' participation in condom skills training. These results suggest that integrating condom skills education into family-centered prevention programs is feasible when the context is supportive and caregivers' decisions on the issue are respected. The SAAF-T program is one of a limited number of risk reduction programs in general [8] and family-centered programs in particular [6,7], with durable (22 months or longer) effects on risky sex.

The SAAF-T trial allowed us to explore several potential predictors of caregivers' decisions regarding their youths' atten-

dance at the condom skills unit. Counterintuitively, only religiosity predicted participation, in a positive direction. Reasons for this finding are unclear. Rural churches may be concerned about the HIV epidemic in African American communities, which may lead them to communicate a less stringent "abstinence only" view on sexual education. Because of the small samples used in these ancillary analyses, these results should be considered preliminary, and replication is required.

Although participation in SAAF-T decreased the frequency of unprotected intercourse, it did not completely prevent unprotected intercourse among youths who were not engaging in this behavior at baseline. Encouraging consistent safer sexual behavior remains a challenge for the HIV/STI prevention field [28]. Studies indicate that youths view steady relationships perceived as monogamous to be "safe" [29] and are less likely to use condoms in these relationships as compared with more casual ones. Future efficacy studies may benefit from examining this behavior for casual versus steady partners, data that were not available in the present study.

Several limitations apply to this research. First, we used self-reports of sexual behavior, which may be biased. Second, the extent to which these results generalize to nonrural populations is unknown. Third, the trial was not designed to demonstrate whether a condom skills unit confers protection against risk beyond that provided by other aspects of the curriculum. Finally, analyses of condom skills attendance were based on a small sample and did not account for nonattendance based on reasons other than objecting to the sexual content of the session that day. These cautions notwithstanding, the present research was conducted in the context of a randomized prevention trial, with excellent attendance and low attrition. The use of CACE models allowed unbiased analyses of an optional element in the prevention design that has strong potential to affect adolescent health.

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