

# Prime Time: Long-Term Sexual Health Outcomes Of a Clinic-Linked Intervention

**CONTEXT:** Evidence about long-term effects of preventive health services for youth with complex needs is lacking. *Prime Time*, a youth development intervention, aims to reduce pregnancy risk among vulnerable adolescent females seeking clinic services.

**METHODS:** In a randomized trial, 253 sexually active females aged 13–17 who were at high risk for pregnancy were assigned to the *Prime Time* intervention or usual clinic services. The 18-month intervention, initiated in 2007–2008, comprised regular meetings with case managers and participation in youth leadership groups. Trial participants completed surveys at baseline and 30 months. Regression analyses were used to evaluate differences between groups in sexual and psychosocial outcomes at follow-up.

**RESULTS:** At 30 months, the intervention group reported more months of consistent condom use (adjusted means, 1.8 vs. 1.1) and dual contraceptive use (0.9 vs. 0.3) in the past seven months than did controls. The intervention was most effective in promoting consistent use among participants with relatively high levels of connectedness to family or school. Fifteen percent of intervention participants, but only 6% of controls, reported having abstained from sex in the past six months (adjusted odds ratio, 2.9). Moreover, among high school graduates, those in the intervention group were more likely than those in the control group to have enrolled in college or technical school (72% vs. 37%; odds ratio, 4.5).

**CONCLUSION:** Health services grounded in a youth development framework can lead to reductions in sexual risk among vulnerable youth that are evident one year following conclusion of services.

*Perspectives on Sexual and Reproductive Health*, 2014, 46(2):91–100, doi: 10.1363/46e0914

Despite reaching historic lows, the rates of adolescent pregnancy and childbearing in the United States continue to be among the highest in industrialized nations.<sup>1</sup> Rates have declined among all racial and ethnic groups, but they remain disproportionately high among adolescents of color; black and Hispanic females aged 15–19 have twice the rates of pregnancy and birth of their white counterparts.<sup>1,2</sup>

Teenage childbearing is associated with a range of adverse health and social outcomes, including reduced educational attainment among mothers, lower well-being among children and increased poverty among young families.<sup>3</sup> As overall birthrates decline, the link between early childbearing and negative outcomes appears to be growing stronger.<sup>4</sup> Teenage childbearing also results in substantial economic costs to society: The estimated costs to U.S. taxpayers were \$10.9 billion in 2008 alone. Most of these costs are related to the elevated rates of negative outcomes (e.g., foster care, incarceration) among children of teenage mothers, or to lost tax revenue (e.g., compared with the children of older women, those of teenage mothers earn less during adulthood and hence pay less in taxes).<sup>5</sup>

Preventive interventions whose effects are sustained over time are needed to change risky behaviors among youth who have a high risk of early pregnancy.<sup>6</sup> A particularly promising approach is the use of interventions grounded

in a positive youth development framework. Such interventions, which incorporate both prevention and health promotion strategies, build on young people's strengths, enhancing protective factors at both the individual level (e.g., socioemotional skills) and the social contextual level (e.g., prosocial involvement).<sup>7</sup> Because they emphasize internal assets and external supports,\* rather than focusing on risks, positive youth development approaches may be particularly appealing to communities that have experienced profound health and social disadvantage.<sup>8</sup> A 2009 report from the National Research Council and the Institute of Medicine concluded that a greater emphasis on youth development is fundamental to improving adolescent preventive services, particularly for vulnerable populations.<sup>9</sup>

The Affordable Care Act will dramatically increase the number of young people in the United States with access to preventive services.<sup>10</sup> Thus, there is an urgent need to expand quality preventive care for adolescents, especially for those youth most vulnerable to negative health and social outcomes (including early pregnancy). At present, a dearth of evidence exists concerning the long-term effects

\*Internal assets are protective factors that reside within the individual (e.g., skills, self-efficacy); external supports are protective factors external to the individual (e.g., family support, adult mentoring).

By Renee E. Sieving, Annie-Laurie McRee, Molly Secor-Turner, Ann W. Garwick, Linda H. Bearinger, Kara J. Beckman, Barbara J. McMorris and Michael D. Resnick

Renee E. Sieving and Barbara J. McMorris are associate professors, and Ann W. Garwick and Linda H. Bearinger are professors, School of Nursing, University of Minnesota, Minneapolis. Annie-Laurie McRee is assistant professor, College of Public Health, Ohio State University, Columbus. Molly Secor-Turner is assistant professor, Department of Nursing, North Dakota State University, Fargo. Kara J. Beckman is study coordinator, and Michael D. Resnick is professor, Department of Pediatrics, University of Minnesota Medical School, Minneapolis.

of preventive services designed for youth with complex, multisystem needs.<sup>9</sup> Such evidence is critical for guiding changes in the organization and delivery of adolescent health services, especially in this era of health care reform, and will also advance the field of prevention science.<sup>7</sup> This article, which examines long-term outcomes associated with Prime Time, a youth development intervention for adolescent females at high risk for pregnancy, contributes to this evidence base. Designed for primary care clinics, Prime Time is a multicomponent, 18-month intervention that aims to reduce levels of the precursors of adolescent pregnancy, including sexual risk behaviors, involvement in violence and disconnection from school.

We conducted a randomized controlled trial of the Prime Time intervention at four school- and community-based clinics in Minneapolis and St. Paul. Prior analyses of study data revealed that 12 months after baseline, adolescents in the intervention group were more likely than those in the control group to report consistent use of condoms, hormonal contraceptives and dual methods.<sup>11</sup> At the end of the 18-month intervention, participants reported more consistent hormonal contraceptive use than did controls.<sup>12</sup> Moreover, compared with members of the control group, young women in the intervention group were more likely to have enrolled in postsecondary education, had lower levels of relational aggression<sup>13</sup> and (among participants with strong family connections) were less likely to have been a victim of interpersonal violence.<sup>14</sup> Six months after the conclusion of the intervention, youth in the Prime Time group reported more consistent use of condoms, hormonal methods and dual methods than did their counterparts in the control group.<sup>12</sup>

In this article, we examine sexual health and other outcomes—including patterns of contraceptive use, number of sex partners and psychosocial variables—at the trial's final data collection point, 12 months following the conclusion of the intervention. We also examine whether strong prosocial connections—a key form of external support, according to the positive youth development framework<sup>15</sup>—moderated any long-term effects of the intervention on sexual and contraceptive behaviors. Finally, using process data collected during the intervention, we present qualitative case exemplars illustrating some of the social and contextual factors that may have contributed to differences in longitudinal patterns of sexual and contraceptive behavior among participants.

## METHODS

### Participants

Our sample consisted of sexually active females aged 13–17 who had attended a school- or community-based clinic and were considered at high risk for early pregnancy. All participants met one or more of the following criteria: They had had a negative pregnancy test<sup>16</sup> or received treatment for an STD at one of study clinics;<sup>17</sup> they were aged 13–14;<sup>6</sup> or they had engaged in aggressive or violent behavior (e.g., they had used a weapon in the past six months),

high-risk sexual behavior (e.g., they had had multiple partners in the past six months) or behavior indicating disconnection from school (e.g., they were not enrolled or had changed schools at least twice in the past year).<sup>6</sup> Recent sexual activity, age and the three behavioral criteria were assessed using a self-report screening tool; information on the remaining criteria were obtained from clinic records.<sup>11</sup> Individuals were excluded if they did not understand the consent materials, were married or pregnant, or had given birth. All study procedures were approved by the institutional review boards of the University of Minnesota and participating clinics.

From April 2007 through October 2008, trained study staff invited 571 eligible females to participate. To minimize attrition, which is particularly common in studies of high-risk, highly mobile youth,<sup>18</sup> enrollment required two clinic visits. At the first visit, research staff screened youth for eligibility and invited those who met the specified criteria to return within two weeks. At the second visit, youth provided written informed consent, completed a baseline survey and were randomized into the intervention group or a control group, which received usual clinic services. A total of 253 adolescents enrolled in the study.

The demographic characteristics and risk behaviors of women who enrolled (as measured by the screening tool completed at the first visit) were generally similar to those of eligible women who did not enroll.<sup>19</sup> However, participants were more likely than nonparticipants to be living with one parent (64% vs. 52%).

### Intervention Components

The design of this positive youth development intervention was guided by the resilience paradigm,<sup>15</sup> social cognitive theory<sup>20</sup> and findings from a Prime Time pilot study.<sup>21</sup> The intervention explicitly sought change in selected external supports and internal assets linked to adolescent females' sexual and contraceptive behaviors and other targeted risk behaviors.<sup>6</sup>

To achieve this goal, Prime Time used two interrelated components—one-on-one case management and youth leadership groups—that engaged participants for an 18-month period. All aspects of these components, which are summarized below and described more fully elsewhere,<sup>11</sup> were led by case managers experienced working with urban teenagers from diverse cultural backgrounds; the training and supervision have been previously detailed as well.<sup>22</sup>

•**Case management.** The primary goal of case management was to establish a trusting, consistent relationship between an adolescent and her case manager that allowed them to work together to address target attributes.<sup>23,24</sup> Case managers attempted monthly visits with each participant, in locations convenient for the youth, for the duration of the intervention. The core topics addressed during each six-month period were social and emotional skills, healthy relationships, responsible sexual behaviors, and positive involvement with family, school and community. Case

managers explored participants' academic and career interests following high school through activities such as accompanying them on local college tours. To determine the topics covered during specific visits, the case manager used a client-centered approach that took into account the adolescent's capacities, interests and needs. Participants received \$10 for each monthly visit. Eighty-eight percent of adolescents completed four or more case management visits; among those who reached this threshold, the median number of visits was 13.<sup>12</sup>

•**Youth leadership groups.** To complement one-on-one case management, Prime Time used two types of youth leadership groups: peer educator and service learning groups.<sup>25</sup>

The goal of the peer educator component, Just in Time, was to provide opportunities for positive family, school and community involvement by engaging participants as peer educators. Just in Time training consisted of a standard 15-session curriculum that addresses expectations and skills for healthy relationships, social influences on sexual behaviors, sexual decision making and contraceptive use skills. The curriculum employs an empowerment health education approach that makes learners' interests central to the process and engages youth as active participants.<sup>26</sup> Weekly homework assignments give adolescents opportunities to discuss Just in Time topics with adult family members.

Starting with their first training session, adolescents were instructed to practice their peer educator skills by teaching others outside of their peer educator group. Participants received \$5 for each documented peer educator contact, for up to 50 contacts. After completing the Just in Time curriculum, participants engaged in a seven-session teaching practicum, during which groups selected a topic, developed a lesson plan, taught a session to another group of youth, adjusted the lesson plan and taught a second group session. Sixty-seven percent of participants attended four or more peer educator group sessions; among those who reached this threshold, the median number of sessions attended was 18.<sup>12</sup>

The service learning group intervention, It's Our Time, was offered following the peer educator groups and focused on expanding participants' social and emotional skills and their real-world experience in youth leadership. Groups use a standard curriculum that features core elements of service learning: applying knowledge and skills to challenging tasks that meet genuine community needs and systematically reflecting on service.<sup>27</sup> An initial unit emphasizes building group cohesion and identifying participants' leadership skills; in a second unit, groups explore community needs, assets and potential service projects. In a third unit, groups implement a service project over 5–6 sessions (e.g., a coat drive for homeless youth, a health fair in a local high school). Each implementation session includes a group reflection activity examining the impact of service on both recipients and participants themselves. In a final session, groups celebrate their accomplishments. In contrast

to the high levels of participation in case management and peer educator groups, the level of involvement in service learning was low; only 31% of participants attended four or more sessions.<sup>12</sup> Process data indicated that barriers arose because participants took on part-time jobs, started post-secondary education or were otherwise unable to commit to ongoing group involvement.<sup>13</sup>

### Evaluation

Data were collected via audio computer-assisted self-interview (audio-CASI) surveys administered at baseline and six, 12, 18, 24 and 30 months following enrollment. Research staff trained in audio-CASI administration conducted evaluation visits that oriented young women to the computer survey using several nonsensitive practice items. Participants were paid \$25 for completing each survey round.

Of the 253 participants who completed baseline surveys, 237 (94%) completed the 30-month survey. Of the 16 participants lost to follow-up, 12 were in the intervention condition. No significant differences in baseline indicators were apparent between intervention and control participants completing the 30-month survey. An attrition analysis yielded no significant differences in baseline characteristics between participants lost to follow-up and those completing the 30-month survey.

### Measures

•**Primary behavioral outcomes.** Our outcomes of interest were consistent use of contraceptives with one's most recent male sex partner, number of male sex partners in the past six months and sexual abstinence in the past six months, all of which were measured at the 30-month survey. Previous research has established the reliability of these measures among sexually active adolescent females.<sup>28</sup>

To create measures of consistent contraceptive use, we tallied the number of months out of the past seven (including the current month) in which participants had used a hormonal method (pill, injectable, patch or ring), dual methods (hormonal method plus condoms) or condoms most of the time or every time they had had sex with their most recent male partner. We created separate measures for each category (hormonal methods, dual methods and condoms), yielding three variables with possible scores ranging from 0 to 7. Number of male partners in the past six months was a continuous variable measured by asking participants the number of males with whom they had had vaginal sex during that period; responses were also used to create a dichotomous variable that identified participants who had been abstinent in the past six months.

•**Psychosocial outcomes.** We also examined a variety of measures of external supports and internal attributes targeted for change through the intervention. All of these measures have been used in our prior research with adolescents and have excellent psychometric properties;<sup>21,29–31</sup> unless otherwise noted, all scale items had four response options.

Family connectedness was measured using a scale consisting of five items (Cronbach's alpha=0.91) that assessed participants' attachment to family (e.g., "My family cares about me"), and school connectedness using nine items (Cronbach's alpha=0.91) that measured participants' attachment to school (e.g., "I feel like I belong at my school"). A single dichotomous item assessed whether participants were currently enrolled in college or technical school. Two scales measured respondents' stress management and interpersonal skills; the first used eight items (Cronbach's alpha=0.87) to assess participants' abilities to cope positively with stress and control their emotions (e.g., "I can stay calm when I'm upset"), while the second used six items (Cronbach's alpha=0.79) to assess participants' ability to recognize, express and regulate their emotions (e.g., "I can easily describe my feelings").

Several measures concerned perceptions and desires related to contraceptive use. Peer contraceptive use was measured using a single item that asked respondents to estimate the proportion of their sexually active friends who used contraceptives (on a scale from 0=none to 3=almost all). Participants also reported their most recent partner's wishes concerning frequency of contraceptive use; from their responses, we created a dichotomous variable that categorized respondents according to whether they perceived that their partner had "always" wanted to use contraceptives. A similar dichotomous variable indicated whether respondents themselves had "always" wanted to use contraceptives with their most recent partner. A five-item scale (Cronbach's alpha=0.77) assessed participants' efficacy to use condoms with their most recent partner; items included "It would be easy to tell my partner that I wanted to use a condom."

Two measures focused on young women's motivations for sex. The first used two items ( $r=0.79$ ) to assess the degree to which respondents perceived that they had had sex with their most recent partner for material reasons (e.g., "How important was it to have sex with your partner because he buys you stuff?"); we created a dichotomous variable that indicated whether participants had answered "not at all important" to both questions. To assess young women's perceived importance of having sex for relationship reasons, we used a four-item scale (Cronbach's alpha=0.74) based on responses to questions such as "How important was it to have sex with your partner to strengthen your relationship?"

Perceived consequences of pregnancy were measured using a six-item scale (Cronbach's alpha=0.86) based on responses to statements such as "Getting pregnant would force me to grow up too fast." Participants' efficacy to refuse sex was assessed using a four-item scale that presented scenarios involving sexual negotiation in new and long-term relationships (Cronbach's alpha=0.90). For example, one scenario stated: "Imagine that you met someone at a party who wants to have sex with you. Even though you are very attracted to each other, you don't think you are ready to have sex. How sure are you that you could keep from

having sex?" Finally, sexual risk communication with one's partner was measured using seven items that asked participants when they had talked to their most recent partner about various aspects of sexual risk, including using contraceptives, preventing pregnancy, and avoiding STDs and HIV (Cronbach's alpha=0.85). Response options for all items were 0="We never talked about it," 1="We talked about it after we had sex" and 2="We talked about it before we had sex."

**•Social and demographic characteristics.** We assessed social and demographic characteristics commonly associated with adolescent sexual risk.<sup>6</sup> These were age, number of parents or guardians in the home, number of places the respondent had lived in the past six months (1, 2, or 3 or more), whether the respondent's family had received public assistance in the past year, whether the respondent was enrolled in school, whether she had ever been suspended from school, and race and ethnicity. We classified race and ethnicity as Native American, Asian or Pacific Islander, black, white, Hispanic or mixed (if the participant provided multiple responses).

**•Process measures.** To identify contextual factors and intervention processes associated with changes in study outcomes, case managers completed a standardized intervention summary for every participant after six months and updated it at the 12- and 18-month intervention points. The summary included results of a psychosocial assessment (which used a universally accepted adolescent clinical screening tool known as *HEADSSS*<sup>32</sup>), observations regarding changes in the adolescent's sexual and contraceptive behaviors, and the case manager's perceptions regarding intervention strategies that supported positive behavior change.

## Analyses

**•Quantitative.** We compared baseline characteristics of the intervention and control groups using *t* tests for continuous variables and chi-square tests for categorical variables, adjusting for clustering of participants within clinics. We used traditional endpoint analyses to evaluate effects of the Prime Time intervention on study outcomes at 30 months. All analyses used an intent-to-treat approach, whereby we analyzed participants on the basis of their baseline assignment, regardless of their level of participation in intervention activities. This type of analysis provides an estimate of an intervention's effects under real-world conditions, rather than its potential benefit under ideal circumstances.<sup>33</sup>

Regression analyses compared 30-month outcomes in the intervention group with those in the control group. The analyses for most outcomes controlled for the baseline level of the outcome; the exception was the analysis of college and technical school attendance, which was not assessed at baseline. To adjust for variation in the length of time participants were at risk, the models for consistent use of condoms, hormonal contraceptives and dual methods controlled for the number of months a participant had been

sexually active with her most recent partner. Models of partner-specific outcomes (e.g., condom use self-efficacy) also included a variable indicating whether the participant's most recent partner at 30 months was the same partner reported at baseline.

Regression models were estimated in Stata version 10 using generalized estimating equations to allow for modeling of normally and nonnormally distributed variables and to adjust for intercorrelations between participants recruited from the same clinic.<sup>34,35</sup> Results are presented as adjusted odds ratios for dichotomous outcomes, adjusted incidence risk ratios for categorical outcomes and adjusted mean differences for continuous outcomes. Because generalized estimating equation models are "population-averaged" models,<sup>36</sup> estimates are interpreted as applicable to an average participant in this population of high-risk adolescents.

We examined whether family and school connectedness moderated any intervention effects on primary behavioral outcomes. These variables were selected as potential moderators on the basis of the resilience paradigm, which posits that these constructs are key external supports in young peoples' lives.<sup>19</sup> We created composite measures of family and school connectedness using the mean of each measure during the 18-month intervention period (the means and standard deviation were 2.0 and 0.7, respectively, for family connectedness and 2.2 and 0.5 for school connectedness).<sup>14</sup> We then created interaction terms and entered them into main effects models for each sexual behavior outcome described above.

•**Qualitative.** To identify key intervention components and contextual factors that contributed to sexual and contraceptive behavior outcomes, we used a descriptive content analysis approach. Two intervention summaries were randomly selected from each of the four participating clinics, and these summaries were independently reviewed by two researchers to generate an initial list of codes; the researchers coded eight additional summaries to verify the initial coding. This systematic open coding process yielded a list of key protective factors and barriers related to the study's behavioral outcomes.

Next, quantitative data from participant surveys were used to categorize intervention participants into two groups: those who reported decreasing or persistently low levels of condom or hormonal contraceptive use during the intervention period, and those who reported increasing use of condoms or hormonal contraceptives. Cases were then reviewed for congruence between quantitative survey data on contraceptive use and patterns of use described by case managers in the intervention summaries. Only congruent cases were used in the remainder of the analysis.

In the final step, the two researchers independently read summaries from congruent cases, and each chose an exemplar reflective of each group. To select the final exemplars, they consulted a third qualitative expert, and the three of them reached a consensus. For the exemplar of increasing

contraceptive use, they selected a case that reflected key protective factors that contributed to improved sexual and contraceptive behaviors. Likewise, for the group with persistently low levels of use, an exemplar was selected that highlighted barriers to improvements in sexual and contraceptive behaviors.

## RESULTS

### Sample Characteristics

At baseline, participants had a mean age of 15.6, and the sample was racially and ethnically diverse (Table 1). Indicative of the high levels of social risk in the study population, only two in five participants lived with two parents or guardians, a similar proportion had moved at least once in the past six months and more than two-thirds had been suspended from school at some point. Levels of sexual risk behaviors were higher than those seen in national and statewide samples of sexually active females of similar age (e.g., 2007 Youth Risk Behavior Survey,<sup>37</sup> 2007 Minnesota Student Survey<sup>38</sup>). For example, while 47% of sexually active ninth- and 12th-grade females in Minnesota reported always using condoms,<sup>38</sup> only 31% of our sample reported consistent condom use during the past six months. The demographic characteristics and sexual behaviors of the intervention group did not differ from those of the control group.

### Intervention Effects

At the 30-month survey, sexual behaviors differed between the two groups (Table 2). Compared with their counterparts in the control group, young women assigned to the intervention group reported a greater number of months of consistent condom use (adjusted means, 1.8 vs. 1.1; risk ratio, 1.7) and dual method use (0.9 vs. 0.3 months; risk ratio, 2.3) with their most recent partner. In addition, young women in the intervention group were more likely than controls to have abstained from sex in the past six months (15% vs. 6%; odds ratio, 2.9).

Intervention effects on psychosocial outcomes were also apparent. Among participants who had completed high school or received a GED, the adjusted proportion who were attending college or technical school was higher in the intervention group than in the control group (72% vs. 37%; odds ratio, 4.5). Intervention participants also had higher scores on the intrapersonal skills scale than did controls (adjusted means, 1.6 vs. 1.4).

### Moderation of Intervention Effects

Family and school connectedness moderated Prime Time's effects on sexual behavior outcomes (Table 3). Intervention participants with higher mean levels of family or school connectedness during the intervention period reported more consistent condom use at 30 months than did those with lower levels of connectedness (risk ratios, 2.1 and 2.5, respectively). Similarly, intervention participants with higher levels of school connectedness reported more consistent dual method use than did those with lower levels

**TABLE 1. Selected baseline characteristics of Prime Time trial participants, by group assignment, 2007–2008**

Characteristic	All (N=253)	Intervention (N=126)	Control (N=127)
<b>PERCENTAGE DISTRIBUTIONS</b>			
<b>Age</b>			
13	2	1	2
14	18	14	22
15	26	29	24
16	28	27	28
17	26	29	24
<b>Race/ethnicity</b>			
Native American	3	3	2
Asian/Pacific Islander	12	10	13
Black	41	45	38
Hispanic	12	17	8
White	11	6	16
Mixed	21	19	23
<b>No. of parents/guardians in home†</b>			
0	3	4	2
1	45	46	44
2	42	38	46
≥3	10	12	8
<b>No. of places lived in past six months</b>			
1	59	58	61
2	25	25	23
≥3	16	17	16
<b>Family received public assistance in past year</b>			
No	47	43	51
Yes	32	33	32
Unsure	21	24	17
<b>Currently enrolled in school</b>			
Yes	95	94	96
No	5	6	4
<b>Ever suspended from school</b>			
Yes	70	65	75
No	30	35	25
<b>No. of male partners in past six months</b>			
1	66	65	57
2	20	26	24
≥3	14	9	19
<b>Condom use with most recent partner‡</b>			
Never	12	14	9
≤half of the time	33	32	33
>half of the time	24	23	26
Every time	31	31	32
Total	100	100	100
<b>MEANS</b>			
<b>No. of male partners in past six months (range, 1–13)</b>	1.67 (0.07)	1.54 (0.21)	1.76 (0.07)
<b>No. of months used hormonal contraceptives with most recent partner (range, 0–7)‡</b>	2.08 (0.38)	2.06 (0.29)	2.10 (0.50)
<b>Proportion of months used dual methods with most recent partner‡</b>	0.15 (0.02)	0.15 (0.01)	0.15 (0.04)
†Includes biological or adoptive parents, stepparents, foster parents, grandparents or other guardians. ‡In past seven months. Notes: Figures in parentheses are standard errors. Intervention and control groups did not differ at baseline in any specified characteristic. A small number of responses (12 or fewer) were missing for some variables.			

(2.5); however, family connectedness did not moderate the effect of the intervention on dual method use. Neither family connectedness nor school connectedness moderated the relationships between intervention group assignment and the other sexual outcomes.

**Qualitative Exemplars**

The following exemplars, which use pseudonyms, illustrate typical psychosocial contexts of participants’ lives and the factors that, according to case managers, influenced contraceptive use among members of the intervention group.

•**Persistent low-level contraceptive use.** Lucee, who was 17 years old when she enrolled in Prime Time, had grown up in an environment of violence and sexual abuse. After immigrating to the United States from Africa, she lived with her grandparents, who had strong traditional African cultural ties and religious beliefs. Shortly after arriving, Lucee discovered that she was pregnant; she was pressured to have an abortion and to leave her grandparents’ home because they considered her “dirty and unclean.” She subsequently moved in with her partner.

Throughout the intervention period, Lucee remained disconnected from her grandparents and had no contact with other family members. She struggled to make ends meet, frequently missed school and was occasionally suspended because of her poor attitude and failure to follow school rules. Her case manager reported that Lucee had substantial mental health issues, which persisted throughout the intervention period.

Although her case manager provided information about condoms and hormonal contraceptives and encouraged her to use them, Lucee did not use any form of contraception. She described to her case manager her “constant fear of getting pregnant” and her desire to take birth control pills; however, she said that her partner did not want to use condoms and she did not feel comfortable talking with him about contraception. The case manager reported that Lucee’s beliefs regarding gender roles in sexual relationships and her financial reliance on her partner kept her from communicating about contraception. On several occasions, the case manager helped Lucee set up clinic appointments to obtain contraceptives, but Lucee missed her appointments. When she finally obtained and filled a prescription for oral contraceptives, she never took the pills. At the close of the intervention period, Lucee was pregnant.

During the intervention, the case manager met with Lucee 16 times. She encouraged her to participate in the group sessions, but Lucee refused. Developing a working relationship with Lucee was difficult, as she often scheduled appointments with her case manager but failed to show up.

•**Increased contraceptive use.** When Denisha enrolled in Prime Time, she was 17 years old and living with her mother and several siblings in a relatively safe neighborhood. She had a strong relationship with her father and was emotionally very close to her extended family. At the start of the intervention, Denisha reported frequently skipping school and getting into trouble for being disruptive in class and disrespectful to teachers. Although she had a large group of friends, many of them were also involved in trouble at school. Despite these behavior problems, Denisha was on track to graduate on time and determined to be the first member of her family to graduate from high school.

**TABLE 2. Sexual and psychosocial outcomes at 30 months in Prime Time trial, by group assignment, and results of regression analyses assessing differences between groups**

Measure	N	% or mean		Risk ratio	Odds ratio	Difference in means
		Intervention	Control			
<b>SEXUAL</b>						
<b>No. of months of consistent use (range, 0–7)†,‡,§</b>						
Condoms	199	1.77	1.06	1.67 (1.39–2.00)***	na	na
Hormonal methods	198	3.21	2.08	1.52 (0.85–2.71)	na	na
Dual methods	198	0.85	0.33	2.28 (1.31–3.97)**	na	na
<b>No. of male sex partners (range, 0–12)†</b>	234	1.13	1.37	0.83 (0.63–1.10)	na	na
<b>% abstinent†,††</b>	235	15.2	5.6	na	2.88 (1.12–7.40)*	na
<b>PSYCHOSOCIAL</b>						
External supports: social connectedness						
<b>Family connectedness (range, 0–3)</b>	235	2.16	2.08	na	na	0.08 (–0.05 to 0.21)
<b>School connectedness (range, 0–3)‡‡</b>	129	2.13	2.07	na	na	0.06 (–0.08 to 0.20)
<b>% attending college/technical school§§</b>	107	72.1	36.5	na	4.50 (2.64–7.66)***	na
External supports: perceived norms about contraception						
<b>Perceived peer contraceptive use (range, 0–3)</b>	209	1.69	1.79	na	na	–0.10 (–0.28 to 0.08)
<b>% perceiving partner always desired to use contraceptives‡‡</b>	195	29.0	30.4	na	0.84 (0.46–1.54)	na
Internal attributes: socioemotional skills						
<b>Stress management skills (range, 0–3)</b>	230	1.98	1.71	na	na	0.27 (–0.01 to 0.41)
<b>Intrapersonal skills (range, 0–3)</b>	232	1.64	1.45	na	na	0.19 (0.03 to 0.35)***
Internal attributes: sexual attitudes and beliefs						
<b>% always desired to use contraceptives with partner</b>	196	46.0	43.2	na	1.09 (0.89–1.34)	na
<b>% reported material reasons for having sex‡‡</b>	204	7.2	5.9	na	1.19 (0.56–2.53)	na
<b>Relationship reasons for having sex (range, 0–3)‡‡</b>	201	0.43	0.45	na	na	–0.02 (–0.16 to 0.12)
<b>Perceived pregnancy consequences (range, 0–3)</b>	209	1.65	1.79	na	na	–0.14 (–0.37 to 0.09)
Internal attributes: sexual self-efficacy and skills						
<b>Sex refusal self-efficacy (range, 0–3)‡‡</b>	209	2.51	2.53	na	na	–0.02 (–0.19 to 0.15)
<b>Condom use self-efficacy (range, 0–3)‡‡</b>	198	2.02	2.08	na	na	–0.06 (–0.22 to 0.10)
<b>Sexual risk communication with partner (range, 0–2)‡‡</b>	199	1.20	1.10	na	na	0.10 (–0.08 to 0.28)

\*p<.05. \*\*p<.01. \*\*\*p<.001. †In past seven months (contraceptive measures) or six months (other measures); contraceptive measures refer only to most recent partner. ‡Model adjusts for having the same partner at the baseline and 30-month assessments. §Model adjusts for number of months in which participant had sex with most recent partner. ††Model adjusts for number of sex partners at baseline. ‡‡Model excludes participants who had completed high school or obtained a GED by the 30-month assessment. §§Model includes only participants who had graduated from high school or received a GED. Notes: Unless otherwise indicated, all models control for outcome at baseline and are adjusted for within-clinic similarities. Differences in sample size for individual outcomes primarily reflect missing data because of survey skip patterns. Figures in parentheses are 95% confidence intervals. na=not applicable.

Six months into the intervention, Denisha reported that she had only casual sex partners and was “sometimes” using condoms. She was not using hormonal contraceptives and was afraid that her mother would be angry if she were. She told her case manager that she was not interested in a monogamous relationship and wanted to have the freedom to “fool around like guys do.” Twelve months into the intervention, she said that her mother had taken her to obtain a prescription for contraceptives. By the end of the intervention, Denisha was consistently using hormonal

contraceptives. She had been approved to graduate, gotten a job and completed applications for several colleges. Denisha was proud to be the first member of her family to graduate from high school. She expressed appreciation for the opportunity to participate in Prime Time because the program had “helped her focus on her future and realize how much she wanted to go to college.”

Reflecting on intervention elements that helped Denisha reduce her sexual risk behaviors, her case manager reported that Denisha’s active participation provided opportunities to develop important leadership and goal-setting skills that, in turn, helped her engage in positive and healthy behaviors. Following Denisha’s participation in Just in Time, her case manager wrote that Denisha had “progressed from being disruptive in class and unwilling to participate to being one of the most active students with excellent contributions to group discussion.” She became known as a leader, and her peers looked up to her.

## DISCUSSION

Our findings indicate that at the final follow-up, Prime Time participants had better sexual and psychosocial outcomes than did a control group that received usual clinical

**TABLE 3. Adjusted risk ratios (and 95% confidence intervals) from regression analyses examining associations of interactions between intervention group assignment and connectedness measures with selected outcomes**

Outcome and interaction	Risk ratio
<b>Consistent condom use</b>	
Intervention x family connectedness	2.10 (1.32–3.36)**
Intervention x school connectedness	2.51 (1.07–5.86)*
<b>Consistent dual method use</b>	
Intervention x school connectedness	2.45 (1.82–3.30)***

\*p<.05. \*\*p<.01. \*\*\*p<.001. Note: Risk ratios are from separate models of interactions between the intervention group and connectedness measures.

**Interventions  
must attend to  
the develop-  
ment and  
functioning  
of supportive  
social  
attachment  
systems.**

services. These results add to a growing evidence base supporting the use of positive youth development approaches to reduce sexual risk among adolescent females at high risk for early pregnancy.

Involvement in Prime Time led to improvements in consistency of condom and dual method use that were still apparent a full year after the intervention's conclusion. These intervention effects had been observed first at a 12-month interim assessment and again six months following the end of the intervention.<sup>12</sup> However, while the magnitude of the odds ratio for hormonal contraceptive use was very similar to the odds ratios at previous assessment points,<sup>12</sup> the relationship was no longer statistically significant. Nonetheless, prior research has shown that improvements in adolescents' contraceptive use have been a driving force behind recent declines in adolescent pregnancy and childbearing,<sup>39</sup> and interventions such as Prime Time that aim to promote consistent contraceptive use among sexually active youth may be key to achieving further reductions in adolescent pregnancy rates.

Findings from the moderation analyses showed that high levels of prosocial connectedness augmented the intervention's effects on condom and dual method use. The resilience paradigm characterizes high levels of connectedness to family and school as indicative of a supportive, functional social attachment system,<sup>40</sup> which in turn plays a critical role in positive development among youth exposed to high levels of risk. These findings affirm the theoretical notion that preventive interventions emphasizing both external supports and individual skills will be most powerful among young people with functional social attachment systems.<sup>40,41</sup> As Lucee's experiences illustrate, a young person's likelihood of engaging in healthy behaviors is compromised when supportive attachments to family and school are absent. Thus, interventions must attend to the development and functioning of supportive social attachment systems.

At the time of the final study survey, intervention participants were nearly three times as likely as controls to report having had no male sex partners in the past six months, and a substantially greater proportion of intervention participants reported recent abstinence (15%) than had done so at previous follow-up points (4–6%). Intervention participants also reported higher levels of intrapersonal skills at this survey than did controls. By definition, adolescents with high levels of intrapersonal skills are self-confident, understand their own feelings and are able to express their opinions.<sup>29</sup> In previous research with this sample, greater intrapersonal skills were negatively associated with number of recent male sex partners.<sup>42</sup> Self-worth and emotional self-awareness may underlie this association: Young women may be more inclined to limit the number of sex partners they have if they understand that they have worth, power and control in sexual situations and sexual relationships.<sup>43</sup>

In addition to influencing sexual behavior, Prime Time had a substantial impact on enrollment in college or technical school; such enrollment suggests a positive transition into early adulthood. Among participants who

had completed high school by the final follow-up point, almost three-quarters of young women in the intervention group—but only one-third of those in the control group—were attending college or technical school. Differences between the intervention and control groups in enrollment in postsecondary education were first noted at the close of the intervention, although the number of study participants who had completed high school at that point was small (60).<sup>13</sup> Perhaps the combination of case managers' explicit focus on exploring adolescents' school and career interests and participants' involvement in youth leadership group activities that examined career options and educational pathways gave these young women the support they needed to translate educational aspirations into reality. Involvement in postsecondary education (an indicator of prosocial engagement during emerging adulthood) may be a driving force behind the intervention's long-term reductions in sexual risk behaviors. Social ecological models of health behavior (e.g., the theory of triadic influence) suggest that access to higher education—along with the exposures and opportunities that accompany such access—shapes distal influences on contraceptive use and sexual behaviors (e.g., opportunities to pursue career goals, expectations to delay childbearing) that, in turn, increase the likelihood of lasting behavior change.<sup>41</sup> Like Denisha, a substantial number of other Prime Time participants lived in disadvantaged environments and may have lacked the social and institutional supports available to adolescents from other backgrounds. For these youth, expanding prosocial opportunities and supports may be critical to sustaining healthy sexual behaviors, including contraceptive use.<sup>25</sup>

### Limitations and Strengths

This study has methodological limitations. Data were collected using self-report surveys, which are subject to response bias. Using self-reports is standard practice for intervention studies addressing sexual risk behaviors,<sup>44</sup> and research supports the reliability of youths' reports of sexual and contraceptive behaviors,<sup>28</sup> particularly when provided using audio-CASI methods.<sup>45</sup> However, including biological measures, such as urine pregnancy tests, could have enhanced this study.<sup>46</sup> Moreover, the findings may not be generalizable to high-risk adolescent females who do not access clinic services. These limitations are balanced by notable methodological strengths. First, because participants were similar to eligible nonparticipants on a range of indicators, findings are likely to be generalizable to a broader population of high-risk adolescent females who use clinic services. Moreover, the minimal loss to follow-up at the 30-month survey and the similarity between participants in the 30-month sample and those lost to follow-up increase our confidence in the validity of findings.<sup>47</sup>

### Conclusions

Previous follow-up assessments of the Prime Time trial found reductions in sexual risk behaviors,<sup>12,19</sup> relational aggression<sup>13</sup> and violence victimization.<sup>14</sup> Those findings,

together with the results of the current study, suggest that involvement in a youth development intervention that combines individualized case management with youth leadership components is a promising approach for preventing multiple risk behaviors among youth vulnerable to poor health outcomes, including early pregnancy. Furthermore, the increases in postsecondary school enrollment and intrapersonal skills evident at this follow-up point suggest that interventions such as Prime Time may foster external supports and internal assets needed to sustain healthy behaviors.

In a time of resource scarcity, brief, inexpensive interventions may seem more desirable than those that effectively address the complex health and social needs of high-risk individuals but require substantial up-front investment. For adolescents at high risk for early pregnancy and parenting, the most effective prevention programs address a comprehensive array of social and behavioral issues over a sustained period of time.<sup>6</sup> If these young women are unable to avoid early pregnancy and parenting, they and their children will require substantially more health and social services, at higher costs, than they will if the young women become pregnant at later ages.<sup>5</sup> A formal dose-response analysis is needed to understand the relative contributions of each of Prime Time's components to the intervention's overall effects. Additionally, future cost-effectiveness and cost-benefit analyses are necessary to determine whether the up-front costs of interventions such as Prime Time can result in long-term economic benefits to society.

Implementation of the Affordable Care Act will result in substantial increases in the number of young people in the United States who have access to preventive services, including reproductive health services.<sup>9</sup> This expanded access provides a unique opportunity to improve health and developmental outcomes for youth who are vulnerable to negative outcomes (including early pregnancy). As our research shows, multipronged services, which augment traditional primary care, can be delivered within the existing structure of primary care clinics with interdisciplinary teams (e.g., social workers, community health educators and youth workers) that serve youth;<sup>13</sup> they can also be delivered through collaborations between primary care clinics and community organizations with expertise in implementing youth leadership groups. Moreover, youth development services link young people with opportunities and support outside of the health care sector, including those related to education, employment and housing—all of which profoundly affect health.<sup>48</sup> Thus, our findings have direct implications for improving the organization and delivery of health and social services provided through primary care clinics for those young people who are most vulnerable to negative health outcomes.

## REFERENCES

- Hamilton BE, Mathews TJ and Ventura SJ, Declines in state teen birth rates by race and Hispanic origin, *NCHS Data Brief*, Hyattsville, MD: National Center for Health Statistics, 2013, No. 123.
- National Campaign to Prevent Teen and Unplanned Pregnancy, *Fast Facts: Teen Pregnancy in the United States*, Washington, DC: National Campaign to Prevent Teen and Unplanned Pregnancy, 2013.
- Maynard R and Hoffman S, The costs of adolescent childbearing, in: Maynard R and Hoffman S, eds., *Kids Having Kids: Economic Costs and Social Consequences of Teen Pregnancy*, Washington, DC: Urban Institute Press, 2008.
- Kearney MS and Levine PB, Why is the teen birth rate in the United States so high and why does it matter? *Journal of Economic Perspectives*, 2012, 26(2):141–166.
- Hoffman S, *Counting It Up: The Public Costs of Teen Childbearing*, Washington, DC: National Campaign to Prevent Teen and Unplanned Pregnancy, 2011.
- Kirby D, *Emerging Answers 2007: Research Findings on Programs to Reduce Teen Pregnancy and Sexually Transmitted Diseases*, Washington, DC: National Campaign to Prevent Teen and Unplanned Pregnancy, 2007.
- Catalano RF et al., Worldwide application of prevention science in adolescent health, *Lancet*, 2012, 379(9826):1653–1664.
- Rew L and Horner SD, Youth resilience framework for reducing health-risk behaviors in adolescents, *Journal of Pediatric Nursing*, 2003, 18(6):379–388.
- National Research Council and Institute of Medicine, *Adolescent Health Services: Missing Opportunities*, Washington, DC: National Academies Press, 2009.
- English A and Park MJ, *The Supreme Court ACA Decision: What Happens Now for Adolescents and Young Adults?* Chapel Hill, NC: Center for Adolescent Health and the Law, and National Adolescent and Young Adult Health Information Center, 2012.
- Sieving RE et al., Prime Time: 12-month sexual health outcomes of a clinic-based intervention to prevent pregnancy risk behaviors, *Journal of Adolescent Health*, 2011, 49(2):172–179.
- Sieving RE et al., Prime Time: sexual health outcomes at 24 months for a clinic-linked intervention to prevent pregnancy risk behaviors, *JAMA Pediatrics*, 2013, 167(4):333–340.
- Sieving RE et al., Prime Time: 18-month violence outcomes of a clinic-linked intervention, *Prevention Science*, 2013, doi: 10.1007/s11121-013-0387-5, accessed Dec. 13, 2013.
- Shlafer RJ et al., The impact of family and peer protective factors on girls' violence perpetration and victimization, *Journal of Adolescent Health*, 2013, 52(3):365–371.
- Resnick MD, Protective factors, resiliency and healthy youth development, *Adolescent Medicine*, 2000, 11(1):157–165.
- Zabin LS, Sedivy V and Emerson MR, Subsequent risk of childbearing among adolescents with a negative pregnancy test, *Family Planning Perspectives*, 1994, 26(5):212–217.
- Orr DP et al., Subsequent sexually transmitted infection in urban adolescents and young adults, *Archives of Pediatrics & Adolescent Medicine*, 2001, 155(8):947–953.
- Sussman S, Dent CW and Stacy AW, Project Towards No Drug Abuse: a review of the findings and future directions, *American Journal of Health Behavior*, 2002, 26(5):354–365.
- Sieving RE et al., A clinic-based, youth development approach to teen pregnancy prevention, *American Journal of Health Behavior*, 2011, 35(3):346–358.
- Bandura A, *Social Foundations of Thought and Action: A Social Cognitive Theory*, Englewood Cliffs, NJ: Prentice-Hall, 1986.
- Sieving RE et al., A clinic-based youth development program to reduce sexual risk behaviors among adolescent girls: Prime Time pilot study, *Health Promotion Practice*, 2012, 13(4):462–471.

22. Tanner AE et al., Engaging vulnerable adolescents in a pregnancy prevention program: perspectives of Prime Time staff, *Journal of Pediatric Health Care*, 2012, 26(4):254–265.
23. Beyene T et al., Mentoring and relational mutuality: protégés' perspectives, *Journal of Humanistic Counseling, Education and Development*, 2002, 41(1):87–102.
24. Paterson BL and Panessa C, Engagement as an ethical imperative in harm reduction involving at-risk youth, *International Journal on Drug Policy*, 2008, 19(1):24–32.
25. Pittman KJ et al., *Preventing Problems, Promoting Development, Encouraging Engagement: Competing Priorities or Inseparable Goals?* Washington, DC: Forum for Youth Investment, 2003.
26. Airhihenbuwa CO, Health promotion and the discourse on culture: implications for empowerment, *Health Education Quarterly*, 1994, 21(3):345–353.
27. National Youth Leadership Council, *K–12 Service-Learning Standards and Indicators for Quality Practice*, St. Paul: National Youth Leadership Council, 2008.
28. Sieving R et al., Reliability of self-reported contraceptive use and sexual behaviors among adolescent girls, *Journal of Sex Research*, 2005, 42(2):159–166.
29. Bar-On R and Parker JD, *BarOn Emotional Quotient Inventory: Youth Version (BarOn EQ-i:YV) Technical Manual*, North Tonawanda, NY: Multi-Health Systems, 2000.
30. Sieving RE et al., Development of adolescent self-report measures from the National Longitudinal Study of Adolescent Health, *Journal of Adolescent Health*, 2001, 28(1):73–81.
31. Kenyon DB et al., Individual, interpersonal, and relationship factors predicting hormonal and condom use consistency among adolescent girls, *Journal of Pediatric Health Care*, 2010, 24(4):241–249.
32. Goldenring JM and Rosen DS, Getting into adolescent heads: an essential update, *Contemporary Pediatrics*, 2004, Vol. 21, pp. 64–90.
33. Hollis S and Campbell F, What is meant by intention to treat analysis? Survey of published randomized controlled trials, *BMJ*, 1999, 319(7211):670–674.
34. Liang KY and Zeger SL, Longitudinal data analysis using generalized linear models, *Biometrika*, 1986, 73(1):13–22.
35. Zeger SL and Liang KY, Longitudinal data analysis for discrete and continuous outcomes, *Biometrics*, 1986, 42(1):121–130.
36. Hubbard AE et al., To GEE or not to GEE: comparing population average and mixed models for estimating the associations between neighborhood risk factors and health, *Epidemiology*, 2010, 21(4):467–474.
37. Centers for Disease Control and Prevention, Youth risk behavior surveillance—United States, 2007, *Morbidity and Mortality Weekly Report*, 2008, Vol. 57, No. SS-4.
38. Minnesota Department of Health, Minnesota Student Survey statewide tables for educational settings and racial/ethnic groups, no date, <<http://www.health.state.mn.us/divs/chs/mss/statewidetables/>>, accessed Jan. 21, 2013.
39. Santelli JS and Melnikas AJ, Teen fertility in transition: recent and historic trends in the United States, *Annual Review of Public Health*, 2010, Vol. 31, pp. 371–383.
40. Masten AS and Obradovic J, Competence and resilience in development, *Annals of the New York Academy of Sciences*, 2006, Vol. 1094, pp. 13–27.
41. Flay B, Snyder F and Petraitis J, The theory of triadic influence, in: DiClemente RJ, Kegler MC and Crosby RA, eds., *Emerging Theories in Health Promotion Practice and Research*, second ed., New York: Jossey-Bass, 2009.
42. Lando-King E et al., Associations between social emotional intelligence and adolescent girls' sexual risk behaviors, *Journal of Adolescent Health*, 2010, 46(2 Suppl. 1):S7.
43. Gutiérrez L, Oh HJ and Gillmore MR, Toward an understanding of (em)power(ment) for HIV/AIDS prevention with adolescent women, *Sex Roles*, 2000, 42(7/8):581–611.
44. Mathematica Policy Research and Child Trends, *Identifying Programs That Impact Teen Pregnancy, Sexually Transmitted Infections, and Associated Sexual Risk Behaviors: Review Protocol, Version 2.0*, Washington, DC: Office of Adolescent Health, U.S. Department of Health and Human Services, 2012.
45. Turner CF et al., Adolescent sexual behavior, drug use, and violence: increased reporting with computer survey technology, *Science*, 1998, 280(5365):867–873.
46. Oliphant J et al., Pregnancy testing for high-risk adolescents in nontraditional locations, paper presented at the 140th annual meeting of the American Public Health Association, San Francisco, Oct. 29–31, 2012.
47. Davis LL, Broome ME and Cox RP, Maximizing retention in community-based clinical trials, *Journal of Nursing Scholarship*, 2002, 34(1):47–53.
48. Jones CP et al., Addressing the social determinants of children's health: a cliff analogy, *Journal of Health Care for the Poor and Underserved*, 2009, 20(4 Suppl.):1–12.

### Acknowledgments

This project was supported by grants from the National Institute of Nursing Research (5R01-NR008778), the Centers for Disease Control and Prevention (U48-DP001939) and the Bureau of Health Professions, Health Resources and Services Administration (T32HP22239). The contents of this article are the responsibility solely of the authors and do not necessarily represent the views of the funders. The authors thank Sandra Pettingell, Shari Plowman, Jennifer Oliphant and Ann Seppelt for their contributions to this manuscript, and Jenna Baumgartner for her excellent editorial assistance.

**Author contact:** sievi001@umn.edu