PREP

The Personal Responsibility Education Program Evaluation

Enhancing a Home Visiting Program to Address Repeat Adolescent Pregnancy: The Early Impacts of Steps to Success

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Overview

Rapid repeat pregnancies can have adverse consequences for young mothers and their children. A small but growing body of evidence suggests that interventions for adolescent mothers can promote healthy birth spacing by providing a combination of individualized support services and improved access to effective contraception. To build on the promising research in this area, the Administration for Children and Families (ACF) within the U.S. Department of Health and Human Services funded Mathematica Policy Research to conduct a rigorous evaluation of Steps to Success, a two-year home visiting program for pregnant and parenting adolescents provided by Healthy Families San Angelo (HFSA) in San Angelo, Texas. Using federal funding from the Personal Responsibility Education Program (PREP) Competitive Grant program, HFSA developed Steps to Success by enhancing a traditional home visiting program. While the traditional home visiting program focused on child development and parenting, the enhanced program included additional program components designed to (1) promote healthy birth spacing, with an emphasis on increasing the use of long-acting reversible contraceptives; (2) encourage father involvement; (3) and support mothers' education and career aspirations. The study is part of a broader national evaluation of PREP that Mathematica is conducting for ACF (Wood et al. 2015).

The study team used a random assignment design to test the efficacy of Steps to Success compared to the traditional home visiting program. HFSA staff recruited pregnant and recently postpartum adolescent mothers, ages 14 to 20, over a three-year period. Mothers were randomly assigned to a program group that received the Steps to Success home visiting program or a control group that received the traditional home visiting program that focused solely on parenting and child development. Mothers in both research groups completed a baseline survey upon enrolling in the study and follow-up surveys one and two years later. Data from the one-year follow-up survey are the focus of this report.

Our analysis provides evidence that, after one year of the two-year program, the Steps to Success enhancements led to some improvements in outcomes related to healthy birth spacing. Specifically, Steps to Success mothers were more likely than mothers enrolled in the traditional home visiting program to report using a long-acting reversible contraceptive method at the one-year follow-up. There is also some evidence that the program reduced the prevalence of unprotected sex around the time of the one-year follow-up survey. Mothers in the two research groups reported similar rates of repeat pregnancy in the year after study enrollment. After one year, there was no evidence that the Steps to Success enhancements improved father involvement, mothers' education and career aspirations, or mothers' parenting behavior relative to the traditional home visiting program.

This report is the second in a series on the implementation and impacts of Steps to Success in San Angelo, Texas. It presents evidence on the program's interim impacts, measured about one year into the two-year program. An earlier process study report described the design and implementation of Steps to Success (Kisker et al. 2016). A future report will present evidence on the program's longer-term impacts, measured after mothers have received the entire two-year home visiting program.

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Introduction

Adolescent pregnancy and birth rates in the United States have declined significantly since 1990. Even so, one in six women becomes a mother before age 20 (Martinez et al. 2011). Compared with those who delay pregnancy, young women who give birth as adolescents are at greater risk of dropping out of school, relying on public assistance, and living in poverty as adults (Hoffman and Maynard 2008; Perper et al. 2010). Their children face increased risk of abuse and neglect and are more likely to experience poor health, behavioral, and educational outcomes than are children born to older mothers (Hoffman and Maynard 2008).

A repeat pregnancy during adolescence compounds the risk of poorer outcomes for both mother and child. Adolescent mothers who experience rapid repeat pregnancies are at significantly greater risk of having a stillbirth or preterm birth than mothers who delay subsequent childbearing (Conde-Agudelo et al. 2006). They are also less likely to stay in or complete high school, work, or maintain economic self-sufficiency, and to have children who exhibit school readiness when older (Klerman 2004). Repeat pregnancy is common among adolescent mothers; about one in four adolescent mothers goes on to have another child as a teenager (Centers for Disease Control and Prevention [CDC] 2013).

A small but growing body of evidence suggests that interventions for adolescent mothers can promote healthy birth spacing by providing a combination of individualized support services and improved access to effective contraception. For example, research has shown that the long-standing Nurse Family Partnership program reduces rates of subsequent pregnancies and births at 24 months postpartum for young, first-time mothers (Olds et al. 2002). More recently, a randomized controlled trial of the Teen Options to Prevent Pregnancy program for low-income adolescent mothers found that the program reduced rates of repeat pregnancy through a combination of one-on-one motivational interviewing sessions and facilitated access to contraceptive services (Rotz et al. 2016).

To build on the promising research in this area, the Administration for Children and Families within the U.S. Department of Health and Human Services funded Mathematica Policy Research to conduct a rigorous evaluation of Steps to Success, a two-year home visiting program for pregnant and parenting adolescents provided by Healthy Families San Angelo (HFSA) in San Angelo, Texas. Using federal funding from the Personal Responsibility Education Program (PREP) Competitive Grant program, HFSA developed Steps to Success by adapting a more traditional home visiting program for parenting adolescents. HFSA's traditional home visiting program is based on the Healthy Families America home visiting model, which focuses on parenting skills and child development and has shown success in improving these outcomes (Harding et al. 2007; LeCroy and Krysik 2011; Caldera et al. 2007; Duggan et al. 2004). HFSA enhanced the traditional approach with additional program components designed to promote healthy birth spacing—with a focus on increasing the use of long-acting reversible contraceptives (LARCs)—encourage father involvement, and support mothers' education and career aspirations.

This report is the second in a series on the implementation and impacts of Steps to Success. An earlier process study report described the design and implementation of both Steps to Success and the traditional home visiting program (Kisker et al. 2016). The present report adds to these

findings by describing the program's early impacts on a variety of outcomes, measured after participants had received program services for about one year. A future report, which is scheduled for release in 2019, will examine the impacts of Steps to Success on healthy birth spacing and other outcomes at the conclusion of the two-year home visiting program.

HFSA's two home visiting programs for adolescent mothers

HFSA, a nonprofit organization founded in 1992, promotes healthy child development and family functioning through home visits to families in need. HFSA designed its services to help expectant and new parents care for their babies and prevent child abuse and neglect. This study contrasts two home visiting programs provided by HFSA: a traditional home visiting program and the enhanced Steps to Success program. These programs differed in both content and format, as summarized in Table 1.

Table 1. Comparison of HFSA's two home visiting programs

	Steps to success	Traditional home visiting
Content of home visits		
Parenting, child health and safety, child development	✓	✓
Healthy birth spacing, contraception, development of a reproductive life plan	✓	
Father involvement and co-parenting	✓	
Education and career planning and other adult preparation subjects	✓	
Format of home visits		
Two years of services, delivered in weekly visits that transition to biweekly visits, and then monthly visits, over time	✓	✓
Extended period of weekly home visits	✓	
Active engagement of fathers during visits	✓	

Home visitors from both programs provide new parents with information on child development and work to improve mothers' parenting skills. At each visit, home visitors assess a baby's progress and discuss mother–baby interactions, how to stimulate the baby's development and growth, and the importance of keeping doctor's appointments and maintaining immunizations. The Steps to Success curriculum supplements this content on parenting and child development with additional program content in three areas: (1) healthy birth spacing; (2) father involvement; and (3) mothers' education and career planning.

Steps to Success home visitors seek to support young mothers in choosing healthy birth spacing. First, home visitors work to develop a comfortable relationship with mothers to facilitate more honest discussion of reproductive health topics. Once they have established rapport, home visitors focus on asking detailed questions to encourage young mothers and their partners to think critically about their contraceptive choices, identify barriers to effective contraceptive use, determine their contraceptive goals, and make informed choices about their reproductive health. Home visitors provide participants with information on different forms of

contraception and work to dispel any misconceptions mothers might have about the methods. They then guide mothers in creating a contraceptive plan to achieve their goals.

In their discussions with families, Steps to Success home visitors placed a particular emphasis on LARCs as reliable, long-term birth control methods. In addition, they counseled families on health insurance coverage of birth control and the importance of being mindful of the expiration of Medicaid benefits that many of the participating mothers faced eight weeks after giving birth. Steps to Success home visitors explained to participants that they could use Medicaid to obtain a LARC method shortly after birth, which would then potentially protect against pregnancy long after they stopped receiving Medicaid benefits. More generally, Steps to Success home visitors encouraged mothers to keep medical appointments and took mothers to appointments if necessary to help them obtain contraception.

To encourage father involvement, Steps to Success home visitors were trained to actively engage fathers during home visits, including fathers who were no longer in romantic relationships with their babies' mothers. Home visitors encouraged fathers to be involved in all parenting decisions, including those related to birth control (if applicable). In addition, Steps to Success incorporated elements of the *Maps for Dads* curriculum, which covers the father's role in child development, father–child relationships, and effective co-parenting.

To promote mothers' education and career planning, the Steps to Success curriculum emphasized goal setting and decision-making skills. Steps to Success home visitors worked to integrate the message that participants should continue to plan for and pursue their education and career goals while parenting their babies, because this would help make them better parents. Steps to Success home visitors also worked with participating families to emphasize the link between career planning and family planning and how another pregnancy in the near term might affect their ability to achieve their goals.

HFSA's traditional home visiting program focused exclusively on parenting and child development topics. HFSA instructed home visitors in the traditional program not to initiate discussions with mothers about healthy birth spacing or the other additional topics covered by Steps to Success. If a mother asked about one of these topics, HFSA trained home visitors to suggest resources on the subject and shift the conversation to topics related to child development or parenting. Similarly, if a father was present during a home visit, home visitors in the traditional program would neither exclude him from the conversation nor actively engage him in the visit through questions or other prompts.

Families in both programs received home visits for up to two years, with the frequency of visits dropping from weekly to biweekly to monthly over this period. However, Steps to Success offered weekly visits with families for a longer period than the traditional program. HFSA planned for Steps to Success families to receive weekly visits for about three to six months; families receiving the traditional home visiting program typically received weekly visits for one month or less. These additional visits with families in their early months in the program enabled the Steps to Success home visitors to cover a wider array of topics while continuing to provide detailed information on parenting and child development.

When the evaluation began, HFSA needed home visitors for both Steps to Success and the traditional home visiting program offered to the control group. The organization maintained separate teams of home visitors for the two programs to reduce the risk that control group families received Steps to Success services. For both programs, some home visitors were staff members who already worked at the organization; HFSA hired others after the evaluation started. HFSA leaders felt strongly that the two programs required home visitors with different strengths. HFSA therefore did not assign home visitors randomly to the two programs. In particular, HFSA leaders wanted Steps to Success staff to be comfortable discussing sexuality, contraception, and reproductive health, and actively sought these characteristics in staff selections and new hires. If a manager did not think a staff member could readily discuss these topics, or staff members themselves indicated they were uncomfortable with these topics, the manager did not select that candidate for Steps to Success.

Because staff members were not assigned randomly to the two programs, there were some differences in the characteristics of the two sets of home visitors. Two differences were particularly notable. First, the organization hired several new home visitors to meet the needs of the evaluation and assigned these staff members to work on Steps to Success. As a result, Steps to Success home visitors had shorter tenures with HFSA, on average, than the traditional home visiting staff. Second, Steps to Success home visitors were more educated, with 63 percent holding a bachelor's degree, compared with 25 percent of the home visitors providing the traditional program (Kisker et al. 2016).

Evaluation design

HFSA staff recruited adolescent mothers, ages 14 to 20, on a rolling basis for the evaluation. To be eligible for the study, mothers could be at any point in their pregnancy or up to three months postpartum. Eligibility did not depend on whether the mother had previously had any other children. The recruitment effort occurred in San Angelo, Texas, and the surrounding communities, from May 2013 to May 2016. Initially, HFSA recruited participants solely through two local hospitals. The effort later expanded to include three local high schools, the Pregnancy Help Center (a local nonprofit), Esperanza clinics (a local health care provider), and offices of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).

The recruitment process involved both informed consent and a baseline survey. For mothers who were at least 18 years old, an intake worker first obtained signed consent for participation in the study and then asked the sample member to complete a self-administered paper-and-pencil baseline survey. For those who were younger than 18, an intake worker first obtained consent from the mother's parent or legal guardian before asking the sample member to complete the baseline survey.

Mothers who applied to the program had an equal chance of being placed into the program group that received the Steps to Success home visiting program or the control group that received the more traditional home visiting program. The evaluation team conducted random assignment separately for two groups of mothers: (1) those who were currently pregnant and (2) those who had recently given birth. This process ensured that the proportion of mothers who entered the study before the birth of their babies was the same in the two study groups. At the end of the three-year enrollment period, 594 young mothers had agreed to participate in the study

and been randomly assigned: 298 to Steps to Success and 296 to the traditional home visiting program.

To measure the impact of Steps to Success relative to traditional home visiting, the evaluation team administered three surveys to women in both study groups: (1) a baseline survey administered when mothers first enrolled in the study, before random assignment; (2) a one-year follow-up survey, administered in the middle of the home visiting programs, about 12 months after enrollment; and (3) a two-year follow-up survey, administered at the conclusion of the home visiting programs, about 24 months after enrollment. The evaluation team designed the baseline survey as a self-administered paper-and-pencil questionnaire, which included a broad range of measures of family background, sociodemographic, and personal characteristics, as well as measures of sexual risk behavior before a woman's current or recent pregnancy. The evaluation team conducted the first follow-up survey by telephone with in-person follow-up to ensure a high response rate. In total, 498 study participants completed the one-year follow-up survey for a total response rate of 84 percent. Response rates were similar for the Steps to Success and traditional home visiting groups (85 and 83 percent, respectively). This report uses data from the baseline and one-year follow-up surveys. The two-year follow-up survey is currently in the field using similar methods. The analysis of the data from the two-year follow-up will appear in the final impact report, scheduled for release in 2019.

The analysis also draws on program data documenting the frequency and content of the services delivered to program participants in both study groups. HFSA home visitors recorded this information after each home visit. We use these data to examine the extent to which Steps to Success actually differed from the traditional home visiting program with respect to the content and frequency of home visits. Understanding the extent to which the programs differed as intended is important for interpreting program impacts.

This report examines the interim effects of the two-year Steps to Success program one year after families began receiving program services. Because the analysis examines the effect of Steps to Success relative to HFSA's traditional home visiting program, we focus on impacts in areas emphasized by Steps to Success, but not the traditional program—specifically, healthy birth spacing, father involvement, and mothers' education and career aspirations. We also examine measures in a fourth area, mothers' parenting behavior. Both Steps to Success and the traditional home visiting program cover parenting topics. However, the additional topics covered during Steps to Success home visits might have led home visitors to spend less time on parenting and child development, potentially making the program less effective in improving mothers' parenting behavior. Alternatively, the additional topics might have enhanced Steps to Success's effects on parenting. Measuring impacts on parenting behavior enables us to examine whether the Steps to Success enhancements made the program more or less effective in this important area.

We have designated whether a mother has had a repeat pregnancy at the end of the two-year follow-up period as the study's sole confirmatory measure—in other words, the main test of Steps to Success's effectiveness in achieving its central goal. We will examine the impact on this confirmatory measure in the final impact report, which will analyze data from the two-year follow-up survey. In this report, we examine the impact on repeat pregnancy after one year to provide an initial look at effects on this important outcome. Since the mothers in our sample had

all given birth relatively recently at the time of the one-year follow-up, rates of repeat pregnancy are likely to be low, limiting the potential scope for impacts at this initial follow-up point. Results based on the two-year follow-up will provide more informative evidence of the program's success in reducing rates of repeat pregnancy among the young mothers served.

Table 2 lists and defines all 11 primary outcomes considered in this report. We also examined impacts on a set of secondary outcomes in exploratory analyses presented in the technical appendix of the report. Details on our analytic approach are also included in the technical appendix.

Table 2. Primary outcome measures

Outcome	Measure
Healthy birth spacing	
Any repeat pregnancy[a]	Binary variable: equals 1 if a woman reports any pregnancy since the birth of the HFSA child and 0 if a woman reports having not become pregnant since the birth of the HFSA child.
Currently using a LARC method	Binary variable: equals 1 if a woman reports currently using an IUD or contraceptive implant and 0 if a woman reports not currently using these methods.
Recently had unprotected sex	Binary variable: equals 1 if a woman reports having had sex without using any effective method of contraception in the three months before the survey and 0 if a woman reports not having done so. Effective methods include condoms, birth control pills, the shot, the patch, the ring, IUDs, and contraceptive implants.
Desire to avoid a repeat pregnancy in the next year	Single-item scale variable indicating how a mother would feel if she became pregnant again in the next year. The variable ranges from 1 (very happy) to 5 (very upset), with higher values indicating more negative feelings about becoming pregnant. Women with a repeat pregnancy since the baseline survey are excluded from the analysis of this outcome because they were not asked the survey question required to construct the measure.
Knowledge of contraception and pregnancy prevention	Count variable: sum of indicators for correct responses to two survey questions. The variable ranges from 0 to 2, with higher values indicating greater knowledge. The knowledge questions were "If condoms are used correctly and consistently, how much can they decrease the risk of pregnancy?" and "If birth control pills are used correctly and consistently, how much can they decrease the risk of pregnancy?" For both items, respondents were asked to choose between the following options: not at all, a little, a lot, completely, and don't know.
Father involvement	
Quality of co-parenting relationship	Multiple-item continuous scale variable: average of mother's responses to seven survey items. The variable ranges from 1 to 5, with higher values indicating a stronger co-parenting relationship (seven items, $\alpha = 0.94$). Each question asked respondents to report their level of agreement with a statement such as "I feel good about child's father's judgement about what is right for child" or "No matter what might happen between child's father and me, when I think of child's future, it includes child's father."
Father's engagement with child	Multiple-item continuous scale variable: average of a mother's responses to eight survey items about her HFSA child's father; variable ranges from 0 to 5, with higher values indicating more frequent interaction with child (eight items, $\alpha = 0.75$). Each question asked the respondent to report the frequency with which the HFSA child's father participated in activities such as singing songs with the child or helping the child to get dressed.

Table 2. (*continued*)

Outcome	Measure
Father regularly spends time with child	Binary variable: equals 1 if a mother reports that the father of her HFSA child spent one or more hours per day with his child every day, almost every day, or a few times per week in the past month and 0 if a mother reports that the father of her HFSA child spent one or more hours per day with his child a few times, once or twice, or never in the past month.
Mothers' education and career aspirations	
Currently enrolled in school	Binary variable: equals 1 if a mother reports being currently enrolled in school and 0 if a mother reports not being currently enrolled in school.
Mother's career goals	Multiple-item continuous scale variable: average of a mother's responses to six survey items. The variable ranges from 1 to 4, with higher values indicating stronger career aspirations (six items, α = 0.78). Each question asked respondents to report their level of agreement with a statement such as "I have specific goals for my future career" and "Going to college is important for getting a good job."
Mothers' parenting behavior	
Mother's engagement with child	Multiple-item continuous scale variable: average of a mother's responses to five survey items. The variable ranges from 0 to 5, with higher values indicating more frequent interaction with child (five items, α = 0.71). Each question asked respondents to report the frequency with which they participated in activities such as singing songs with the child or reading to or looking at books with the child.

[a] Confirmatory outcome when measured using data from the two-year follow-up survey.

IUD = intrauterine device; LARC = long-acting reversible contraceptive.

Program implementation

HFSA staff generally followed through with their initial implementation plans and maintained a strong contrast in the services delivered to the two study groups. In particular, Steps to Success home visitors discussed a wider variety of topics with families than did home visitors for HFSA's traditional program (Figure 1).[1] Steps to Success visits covered contraception, education, employment and career training, and co-parenting and other relationships—topics that were not covered during visits provided to the traditional home visiting group. In addition, Steps to Success's goal of actively engaging fathers increased participation by fathers in home visits; fathers participated in 38 percent of Steps to Success home visits compared with 5 percent of visits in the traditional program (not shown).

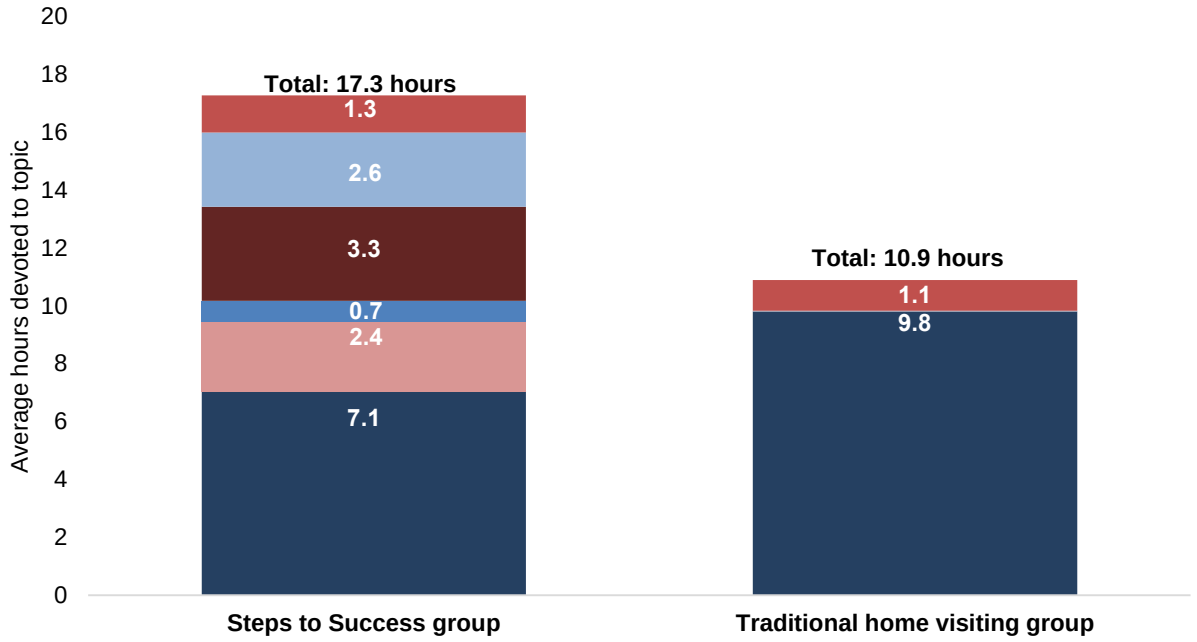
To cover the additional program topics, home visitors delivering Steps to Success visited families more frequently. Steps to Success families averaged about 20 home visits during their first year in the program, compared with about 13 visits for families enrolled in the traditional home visiting program (not shown). In total, Steps to Success families spent 17.3 hours, on average, receiving program services in the year following random assignment, compared with an average of 10.9 hours for families in the traditional home visiting group (Figure 1). However, because of the time devoted to other topics, Steps to Success home visitors spent less time discussing parenting and related topics than did home visitors in the traditional program: an

[1] We analyzed measures of program implementation using data from the entire study sample, including both mothers who responded to the one-year follow-up survey and those who did not respond to the survey. Results are similar if we restrict the sample to survey respondents.

average of 7.1 hours per Steps to Success family compared with 9.8 hours per family in the traditional home visiting program.

According to home visitors, HFSA leaders, evaluation site visitors, and the participants themselves, mothers in both study groups valued the information they received and appreciated the support of their home visitors (Kisker et al. 2016). More generally, focus group respondents reported that they appreciated having the chance to talk to the home visitors. During home visit observations, mothers (and fathers, in the Steps to Success group) actively engaged in the visit activities.

Figure 1. Exposure to key program topics



Source: HFSA administrative data for one year after study enrollment.

Notes: N = 298 for the Steps to Success group and N = 296 for the traditional home visiting group. Estimates are regression-adjusted predicted values. See the technical appendix for details on the estimation procedure.

All differences, except that for time discussing other topics, are statistically significant at the .01 level, two-tailed test.

Characteristics of mothers in the study

The characteristics of the young mothers who enrolled in the study reflect the characteristics of the broader San Angelo community that HFSA serves (Kisker et al. 2016).[2] Across both study groups, 67 percent of participants were Hispanic and 93 percent reported that English was the primary language they spoke at home (Table 3). The young mothers ranged in age from 14 to 20 at study enrollment, with about two-thirds age 18 or older. At the time of study enrollment, about 40 percent lived with their biological mothers and about one-quarter lived with their biological fathers; less than one in five lived with both biological parents. The vast majority (85 percent)

[2] As illustrated in Table A.2 in the technical appendix, the two research groups were very similar at the time of sample enrollment.

had either already earned a high school diploma or GED or were still in school to pursue their diploma. More than three-quarters of mothers reported that they were in a romantic relationship with the baby's father at the time they enrolled in the study. Just over half were living with the baby's father at enrollment, and 14 percent were married to the baby's father. About one in seven mothers lived with both the baby's father and at least one of their biological parents at the time they enrolled in the study.

Table 3. Characteristics of participants at study enrollment

Measure	Percentage
Demographics	
Age	
14	3
15	5
16	10
17	15
18	19
19	23
20	25
Race/ethnicity	
White, non-Hispanic	28
African American, non-Hispanic	3
Hispanic	67
Other	2
Main language spoken at home	
English	93
Spanish	7
Education	
Currently enrolled in high school program	31
Obtained high school diploma or GED certificate	53
Either currently enrolled in school or have a high school diploma or GED certificate[a]	85
Family relationships	
Lives with biological mother and biological father	17
Lives with biological mother but not biological father	26
Lives with biological father but not biological mother	6
Biological parents are married	30
Relationship with baby's father	
Currently married to baby's father	14
Currently living with baby's father	54
Currently in a romantic relationship with baby's father	78
Exposure to information	
Attended classes or sessions in the prior year on:	
Methods of birth control	12
Abstinence	7
Relationships, dating, or marriage	7
Received information on methods of birth control in the prior year from a doctor, nurse, or clinic	53
Pregnancy history and sexual risk behaviors	
Pregnant at study enrollment	40
Been pregnant only once	80
Had child prior to HFSA child	17

Table 3. (*continued*)

Measure	Percentage
Age at first intercourse	
13 or younger	9
14	17
15	25
16	24
17	19
18 or older	6
Ever told have STI by a doctor or nurse	14
Sample size	**594**

Source: HFSA baseline surveys.

STI = sexually transmitted infection.

[a] Due to rounding, the estimate is not equal to the sum of the share of individuals enrolled in a high school program and the share who have received a high school diploma or GED certificate.

Study participants reported little recent exposure to abstinence or contraceptive education at the time of study enrollment. Less than one in five respondents reported having attended classes on abstinence, methods of birth control, or relationship skills in the past year (Table 3). However, about half reported receiving information on birth control methods from a health care provider during the same period.

The study enrolled mothers during pregnancy and immediately after birth. Four in 10 were recruited before their babies were born (Table 3). For 80 percent of sample members, the pregnancy that made them eligible for the study was their first. As seen in other similar studies of adolescent mothers (for example, Rotz et al. 2016; Covington et al. 2017), many of the study participants reported engaging in risky sexual behavior before pregnancy (Table 3). Sexual initiation was often early, with a median age at first intercourse of 15. About one in seven participants had been diagnosed with a sexually transmitted infection (STI). On average, participants reported 3.4 lifetime sexual partners (not shown).

Impacts

Steps to Success includes enhancements to HFSA's traditional home visiting model in three key areas: (1) healthy birth spacing; (2) father involvement; and (3) mothers' education and career aspirations. This section examines the effects of Steps to Success in these three areas relative to the traditional home visiting program offered to mothers in the control group. Both Steps to Success and the traditional program instructed mothers on parenting and child development, but Steps to Success devoted somewhat less time to this topic than did the traditional program. Therefore, this section also examines impacts in a fourth area, mothers' parenting behavior. The technical appendix presents additional analyses of program impacts on secondary outcomes and impacts for key subgroups of mothers.

Steps to Success increased LARC use and decreased the rate of unprotected sex relative to HFSA's traditional program. It did not affect the rate of repeat pregnancy after one year.

Consistent with the program's model and emphasis, Steps to Success increased mothers' use of LARC methods of birth control, measured one year after mothers enrolled in the two-year home visiting programs (Table 4). At this point, 54 percent of Steps to Success mothers reported

that they were currently using a LARC method, compared with 42 percent of mothers who received HFSA's traditional home visiting program, a 12 percentage point difference.[3] Additional exploratory analysis indicates that Steps to Success increased the use of non-barrier, female-initiated methods of birth control more broadly. At the one-year follow-up, 67 percent of Steps to Success mothers and 58 percent of mothers in the traditional home visiting program reported using any hormonal method of birth control or intrauterine device (IUD), a 9 percentage point difference (Table A.6 in the technical appendix). This finding suggests that the increase in LARC use did not simply represent a shift from shorter-term hormonal methods, such as the pill, the patch, or the shot, toward LARC methods.

Table 4. Impacts of Steps to Success on healthy birth spacing

Outcome	Steps to Success mothers	Traditional home visiting mothers	Impact	Effect size
Currently using a LARC method	54	42	12*	0.29
Recently had unprotected sex	18	25	-7+	-0.25
Any repeat pregnancy[a]	14	11	3	0.17
Desire to avoid repeat pregnancy in the next year (range: 1 to 5)[b]	2.10	2.08	0.02	0.02
Knowledge of contraception and pregnancy prevention (range: 0 to 2)	0.88	0.98	-0.10	-0.12
Sample size	**253**	**245**		

Source: Baseline surveys and one-year follow-up surveys conducted by Mathematica Policy Research.

Notes: Estimates are regression-adjusted predicted values. See the technical appendix for details on the estimation procedure.

[a] Confirmatory outcome when measured using data from the two-year follow-up survey.

[b] Measure not available for the 36 Steps to Success mothers (14 percent) and 27 traditional home visiting mothers (11 percent) who responded to the survey and reported a repeat pregnancy.

**/*/+ Differences are statistically significant at the .01/.05/.10 levels, respectively, two-tailed test.

LARC = long-acting reversible contraceptive.

In addition, there is some evidence that Steps to Success reduced the incidence of unprotected sex (Table 4). At the one-year follow-up, 18 percent of Steps to Success mothers reported having had unprotected sex in the past three months, compared with 25 percent of mothers in the traditional home visiting program. This seven percentage-point difference between the two groups is statistically significant at the 0.10 level.

Despite the increases in LARC use and reductions in unprotected sex, Steps to Success had no effect on repeat pregnancy in the year following mothers' enrollment in the study. At the end of this first year, 14 percent of Steps to Success mothers had experienced a repeat pregnancy, compared with 11 percent of mothers in the traditional home visiting group, a difference that is not statistically significant (Table 4). Results based on the two-year follow-up survey, conducted

[3] Although higher among Steps to Success mothers, rates of LARC use were more than 40 percent even for members of the traditional home visiting group. This rate is higher than those typically seen in studies of adolescents but remains within the range of those noted in the literature (CDC 2013; Romero et al. 2015; Rotz et al. 2016).

two years after study enrollment and at the end of the home visiting programs, will provide more summative evidence of Steps to Success's effect on repeat pregnancy.

Mothers in the two study groups also reported similar views on the desirability of avoiding a repeat pregnancy in the short term. Among those who had not experienced a repeat pregnancy, both groups had an average score of 2.1 on a five-point scale measuring the strength of their desire to avoid getting pregnant again in the next year (Table 4). A value of 2 on the scale corresponds to the mother indicating that she would be "a little happy" if she got pregnant in the coming year. Mothers in the Steps to Success and traditional home visiting groups also had similar levels of knowledge about contraception and pregnancy prevention. When asked two questions on the follow-up survey about the effectiveness of condoms and birth control pills in preventing pregnancy, both groups answered just less than one of the two questions right, on average (Table 4).

After one year, the Steps to Success enhancements did not affect father involvement or mothers' education and career aspirations

When asked about the fathers of their babies, mothers in Steps to Success and the traditional home visiting program responded with similarly positive views of the quality of their co-parenting relationship. Both groups had average scores of about 3.9 on the five-point co-parenting quality scale (Table 5). In addition, one year after study enrollment, mothers in the two study groups reported similarly on the degree to which the fathers of their children participated in child care and play activities. On the zero-to-5 scale of a father's engagement with his child, both groups had average scores of 2.6 (Table 5). This value is consistent with fathers engaging with their children in each of the eight activities included in the scale either a few times per week or a few times per month. Similarly, at the one-year follow-up, fathers in both groups were equally likely to spend time with their children at least a few times per week. According to mothers, 72 percent of Steps to Success fathers and 71 percent of traditional home visiting fathers did so.

After one year, Steps to Success did not affect the measures of mothers' education and career aspirations included in the study (Table 5). At the time of the one-year follow-up survey, 38 percent of Steps to Success mothers and 36 percent of traditional home visiting mothers were enrolled in school, a difference that is not statistically significant. In addition, mothers in Steps to Success and the traditional program scored similarly on the four-point scale measuring career goals, with an average score of 3.4 for both groups.

Table 5. Impacts of Steps to Success on father involvement, mothers' education and career aspirations, and mothers' parenting behavior

Outcome	Steps to Success families	Traditional home visiting families	Impact	Effect size
Father involvement				
Quality of co-parenting relationship (range: 1 to 5)	3.90	3.91	-0.01	-0.01
Father's engagement with child (range: 0 to 5)	2.56	2.62	-0.05	-0.03
Father regularly spends time with child	72	71	0	0.03
Mothers' education and career aspirations				
Currently enrolled in school	38	36	2	0.05
Mother's career goals (range: 1 to 4)	3.39	3.37	0.02	0.04
Mothers' parenting behavior				
Mother's engagement with child (range: 0 to 5)	3.92	3.83	0.09	0.11
Sample size	**253**	**245**		

Source: Baseline surveys and one-year follow-up surveys conducted by Mathematica Policy Research.

Notes: Estimates are regression-adjusted predicted values. See the technical appendix for details on the estimation procedure.

**/*/+ Differences are statistically significant at the .01/.05/.10 levels, respectively, two-tailed test.

One year into the two-year home visiting programs, mothers in both programs reported similar levels of engagement with their children

At the one-year follow-up, mothers in the Steps to Success and traditional home visiting groups described their parenting behavior as equally engaged. On a scale ranging from zero to 5, the average index of mothers' self-reported engagement with their children was 3.9 for the Steps to Success group and 3.8 for the traditional home visiting group, a difference that is not statistically significant (Table 5). These average scores are consistent with mothers typically reporting that they engaged with their children almost every day in a variety of play activities, such as singing songs, looking at books, and playing with toys.

Discussion

Repeat adolescent pregnancy can have serious adverse consequences for young mothers and their children (Conde-Agudelo et al. 2006; Klerman 2004). The situation is particularly pressing in Texas, the state with the highest rate of repeat teen births in the nation (CDC 2013). To address this important policy issue, HFSA developed the Steps to Success home visiting program. It did so by supplementing a more traditional home visiting program—which focused only on parenting and child development—with counseling on contraception and adequate birth spacing; instruction on father involvement, co-parenting, and relationship skills; and guidance on education and career planning. For both Steps to Success and the organization's more traditional home visiting program, trained professionals visited mothers' homes regularly for up to two years, with the frequency of visits dropping from weekly to monthly over this period. Steps to Success offered weekly visits for a longer period than the traditional program to allow time for home visitors to cover the additional topics. In addition, unlike HFSA's traditional program, Steps to Success placed a high priority on actively engaging fathers in home visits.

Mathematica partnered with HFSA to test the effects of the Steps to Success enhancements on participating families. The study team randomly assigned young mothers who applied for the program to one of two research groups: (1) a program group that was eligible for Steps to Success or (2) a control group eligible for HFSA's traditional home visiting program. HFSA staff delivered both programs, with separate teams of home visitors dedicated to each. This report provides interim evidence on the relative impacts of the two programs, relying primarily on survey data on almost 500 mothers collected after they had received the first year of the two-year home visiting programs.

As planned, Steps to Success covered a wider variety of topics and provided substantially more home visits. Both programs covered parenting and child development. The traditional home visiting program covered these topics almost exclusively, whereas Steps to Success home visitors devoted more than half their time during visits to other topics, including contraception, relationships, education, and employment. In addition, Steps to Success successfully encouraged fathers' participation in home visits. In the first year after enrollment, 38 percent of Steps to Success visits included fathers, compared with only 5 percent of visits in the traditional program. To support the additional engagement and content, Steps to Success families averaged about 20 home visits during their first year in the program, compared with 13 home visits for families in the traditional program.

Our analysis provides evidence that, after one year, the additional topics covered by Steps to Success led to some improvements in outcomes related to healthy birth spacing. Specifically, Steps to Success mothers were more likely than mothers enrolled in the traditional home visiting program to report using a LARC method at the one-year follow-up: 54 percent versus 42 percent did so. There is also suggestive evidence that the program reduced the prevalence of unprotected sex around the time of the one-year follow-up survey. However, mothers in both groups were equally likely to report a repeat pregnancy in the year after study enrollment. They also reported similar levels of pregnancy prevention knowledge and desires to avoid a repeat pregnancy in the next year. After one year in the program, there was no evidence that Steps to Success improved father involvement or mothers' education and career aspirations.

Both Steps to Success and HFSA's traditional home visiting program included content on parenting and child development. To allow for the coverage of additional program topics, Steps to Success home visitors spent less time on parenting and child development than did home visitors in the traditional program (an average of 7.1 versus 9.8 hours). However, because Steps to Success families received a greater number of home visits and almost all visits involved some mention of parenting topics, mothers in Steps to Success were exposed to parenting topics more often than mothers in the traditional program. Research has demonstrated that more frequent reminders to participate in developmental activities with young children can improve parental engagement, suggesting that more frequent but shorter exposures to these topics might lead to improved outcomes relative to less frequent but longer discussions (Mayer et al. 2015). Nonetheless, mothers in both groups reported similar levels of engagement with their babies at the one-year follow-up, as measured by the self-reported frequency of play activities, such as singing to the baby or looking at books with the baby. This result suggests that, one year into these two-year programs, Steps to Success was no less (or more) successful at improving parental engagement than was the traditional home visiting program.

Steps to Success is a two-year intervention, and about two thirds of Steps to Success mothers were still receiving program services one year after study enrollment (as were more than one third of traditional home visiting mothers). Therefore, a longer follow-up is necessary to adequately assess the full effects of Steps to Success. Although impacts for all measures might vary over time as individuals receive the remainder of the programs, two key factors suggest that impacts on repeat pregnancy, in particular, could change in the future. First, only a relatively small proportion of mothers in the study (11 to 14 percent) had a repeat pregnancy during the one-year follow-up period. Other studies of repeat pregnancy among adolescent mothers suggest that the pregnancy rate is likely to more than double by the end of the study's two-year follow-up period (Katz et al. 2011; Covington et al. 2017). Therefore, Steps to Success might have greater potential to decrease pregnancy rates at the time of the final study follow-up, when these rates could be substantially higher. Second, given that uptake of LARC methods has been associated with substantial decreases in repeat adolescent pregnancy over time (Stevens-Simon et al. 1999; Tocce et al. 2012; Peipert et al. 2012), the positive impact on LARC use at the one-year follow-up suggests the potential for Steps to Success to decrease repeat pregnancy in the longer term. Indeed, although many adolescent mothers begin using contraception after delivery, rates of discontinuation are high for shorter-term methods, including the pill, the patch, and the ring (Peipert et al. 2011). Therefore, the increase in adoption of LARC methods might lead to later impacts on repeat pregnancy. The final report in this series, planned for release in 2019, will use survey data gathered two years after mothers enrolled in the study—around the time they will have completed their program participation—to assess the impacts of Steps to Success on repeat pregnancy and other important outcomes.

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TECHNICAL APPENDIX

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This appendix is a technical supplement to the interim impact report for the evaluation of Steps to Success, conducted as part of the Personal Responsibility Education Program (PREP) Multi-Component Evaluation. It provides additional detail on the evaluation's design, methods, and findings. The first two sections of the appendix describe the methods used to recruit, enroll, and randomly assign adolescent mothers. The third section describes the survey administration procedures and response rates. The fourth and fifth sections of the appendix describe the evaluation's main outcome and implementation measures, respectively. The sixth section describes the methods used to analyze these measures. The final four sections present additional estimates, including impacts estimated in sensitivity analyses, impacts for key subgroups, impacts on secondary outcomes, and differences in secondary implementation measures.

Study recruitment and enrollment

HFSA staff recruited pregnant and postpartum adolescent mothers, ages 14 to 20, on a rolling basis for the evaluation. The recruitment effort occurred in San Angelo, Texas, and the surrounding communities, from May 2013 to May 2016. HFSA staff set a target for enrollment of 20 adolescent mothers per month for 36 months, yielding a total sample size of 700 mothers; the study enrolled 594 young mothers, 85 percent of the target.[4] However, based on a comparison of the number of mothers enrolled in the study and the number of births to women younger than 21 in San Angelo's two hospitals, HFSA staff concluded that the recruitment effort captured nearly all eligible women within San Angelo and the surrounding area.

Initially, recruitment took place in the postpartum units of two local hospitals. HFSA outreach staff worked to develop relationships with the facilities' staff and stay in close contact. During daily visits to the hospitals, HFSA staff consulted nurses before approaching adolescent mothers to initiate study enrollment. If a nurse felt that a mother was not ready to meet with a staff member or discuss the program (because she was tired or distressed, for example), the staff member waited until the nurse felt the mother was ready. Over time, HFSA staff increased their hospital visits to twice daily.

Recruitment also expanded throughout the study period to occur at other locations. In particular, when it became clear that recruitment solely from the two hospitals would not be sufficient to meet study enrollment targets, the outreach team expanded recruitment to three local high schools, offices of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), the Pregnancy Help Center (a local nonprofit), and Esperanza clinics (a local health care provider).

At all locations, the enrollment process involved both informed consent and a baseline survey. Once a mother expressed interest in participating in home visiting services, intake workers followed up within 48 hours to enroll her in the study. For mothers who were at least 18 years old, an intake worker obtained signed consent for participation in the study. For those who were younger than 18, an intake worker first obtained consent from the mother's parent or legal guardian before seeking assent from the mother.

[4] A total of 595 mothers were randomly assigned for the study. However, one mother did not complete the baseline survey and requested to be removed from any further data collection efforts.

Random assignment

As described in the main text of this report, individuals were randomly assigned on a rolling basis to either a treatment group eligible to receive the enhanced Steps to Success home visiting program or a control group eligible to receive a traditional home visiting program. Mothers who applied to the program had an equal chance of being placed into each study group. In total, 298 women were assigned to the Steps to Success group and 296 to the traditional home visiting group.

The study used a stratified random assignment design. The evaluation team conducted random assignment separately for two groups of mothers throughout most of the study enrollment period: (1) those who were currently pregnant and (2) those who had recently given birth. This stratification process, introduced about two months after study enrollment began, ensured that the proportion of mothers who entered the study before the birth of their babies was the same in the two study groups. In the first two months of random assignment, during which 40 mothers enrolled in the study, random assignment was not stratified. Our main analysis treats these mothers as if they were randomly assigned in the same manner as those who enrolled later in the study period; however, our results are robust to treating these women as if they comprised a third random assignment stratum (see Table A.3).

The study team conducted random assignment by generating a random string of characters (C for control and P for program) for each stratum of study participants. The string was created in a manner that ensured the two study groups had a similar number of participants at any point in the study enrollment process.

One group of individuals were deemed exempt from this random assignment process: mothers who had a sister (or other co-residential adolescent mother) already enrolled in the study. There were 21 such study participants and all were assigned to the same study group as their sister who first enrolled in the study. Our results are robust to omitting these mothers from the analysis (see Table A.3).

Survey administration

This study will draw information from three surveys: (1) a baseline survey, administered before random assignment; (2) a one-year follow-up survey, administered about 12 months after random assignment, and (3) a two-year follow-up survey, administered about 24 months after random assignment. This report uses data only from the baseline and one-year follow-up surveys. A future report will also use data from the two-year follow-up survey.

The evaluation team designed the surveys to capture a broad range of demographic and personal characteristics and outcomes across four topic areas: healthy birth spacing, father involvement, mothers' education and career aspirations, and mothers' parenting behavior. The team drew most of the questions from past evaluations, such as the Building Strong Families Evaluation and Evaluation of Adolescent Pregnancy Prevention Approaches, as well as established surveys, such as the National Longitudinal Study of Adolescent Health, the National Survey of Family Growth, and the Youth Risk Behavior Survey.

All enrolled mothers were eligible to complete all of the surveys, regardless of past survey response. The baseline survey was a self-administered paper-and-pencil form, completed as part of the study enrollment process. Both the one- and two-year follow-up surveys were conducted by telephone with in-person follow-up. Study participants received a thank you gift for responding to follow-up surveys, $20 for the one-year follow-up and $25 for the two-year follow-up.

The survey procedures yielded high survey response rates. All 594 mothers in the study sample completed the baseline survey as part of the study enrollment process. In total, 498 individuals completed the one-year follow-up survey for a total response rate of 84 percent. Response rates were similar for the Steps to Success and traditional home visiting groups (85 and 83 percent, respectively).

A comparison of the characteristics of respondents to the one-year follow-up survey and nonrespondents indicates few differences based on response status (Table A.1). Compared with survey respondents, mothers who did not respond to the one-year follow-up survey were of a similar age and racial/ethnic background and were about equally likely to speak English versus Spanish at home. They exhibited similar educational attainment at baseline and had similar living situations and relationships with their babies' fathers. Finally, past sexual risk behavior, pregnancy history, and exposure to information about key reproductive health topics at the time of the baseline survey did not predict whether a mother responded to the one-year follow-up survey. Of the 36 characteristics examined, only one differed between survey respondents and nonrespondents. Ten percent of survey respondents, but only 4 percent of nonrespondents, first had sexual intercourse at the age of 13 or younger. The difference is statistically significant at the 0.10 level.

The evaluation team also examined whether the baseline characteristics of the mothers in the Steps to Success and traditional home visiting groups differed within the sample of one-year follow-up survey respondents used to analyze interim impacts. Although we would expect these characteristics to be similar due to random assignment, chance might have led the two study groups to differ in some way. In addition, if mothers in the different study groups were more or less likely to respond to the one-year follow-up survey, there could be differences within the analytic sample of mothers, even if there were none among all randomly assigned mothers.

Table A.1. Participant characteristics at study enrollment, full sample and survey respondents

Measure (percentage)	Survey respondents	Survey nonrespondents	Difference
Age			
14	3	2	1
15	5	3	2
16	9	13	-3
17	15	13	3
18	19	18	1
19	23	22	1
20	24	30	-6
Race/ethnicity			
White, non-Hispanic	28	29	-2
African American, non-Hispanic	3	4	-1
Hispanic	67	67	0
Other	3	0	3
Main language spoken at home			
English	94	91	3
Spanish	6	9	-3
Education			
Currently enrolled in high school program	31	33	-2
Obtained high school diploma or GED certificate	55	47	8
Either currently enrolled in school or have a high school diploma or GED certificate	86	80	6
Family relationships			
Lives with biological mother and biological father	17	17	0
Lives with biological mother but not biological father	26	29	-3
Lives with biological father but not biological mother	6	6	1
Biological parents are married	30	27	4
Relationship with baby's father			
Currently married to baby's father	13	15	-2
Currently living with baby's father	54	55	-1
Currently in a romantic relationship with baby's father	79	75	4
Exposure to information			
Attended classes or sessions in the prior year on:			
Methods of birth control	12	10	2
Abstinence	7	6	1
Relationships, dating, or marriage	7	10	-4
Received information on methods of birth control in the prior year from a doctor, nurse, or clinic	54	48	6
Pregnancy history and sexual risk behaviors			
Pregnant at study enrollment	41	38	3
Been pregnant only once	81	75	6
HFSA child will not be/is not first child	17	21	-4
Age at first intercourse			
13 or younger	10	4	7+
14	17	15	2
15	23	32	-9
16	23	31	-7
17	19	15	4
18 or older	7	4	3
Ever told have STI by a doctor or nurse	13	21	-8
Sample size	**498**	**96**	

Source: Baseline surveys conducted by Mathematica Policy Research.

**/*/+ Differences are statistically significant at the .01/.05/.10 levels, respectively, two-tailed test.

STI = sexually transmitted infection; GED = General Educational Development.

Within the sample of survey respondents, the average characteristics of the Steps to Success and traditional home visiting groups at baseline were mostly similar (Table A.2). Although more mothers in the traditional home visiting group than the Steps to Success group were 17 years old (19 percent versus 12 percent), the average age within both study groups was 18.1 years (not shown). Mothers in the two study groups were also about equally likely to speak English versus Spanish at home and had similar levels of education, living situations, relationships with their babies' fathers, and exposure to information on key Steps to Success topics at baseline (Table A.2). In addition, baseline measures of past pregnancy, pregnancy at enrollment, and sexual risk behavior were similar across the study groups.

There is one notable difference between the groups: compared with the mothers in the traditional home visiting group, mothers in the Steps to Success group were more likely to be white and non-Hispanic (33 percent versus 23 percent) and less likely to be Hispanic (63 percent versus 72 percent). This difference was also apparent in analyses of the full random assignment sample (the Steps to Success group was 32 percent white, non-Hispanic and 64 percent Hispanic; the traditional home visiting group was 24 percent white, non-Hispanic and 71 percent Hispanic), as well as the sample excluding individuals who enrolled in the study after one of their sisters had already done so. Therefore, the difference is due to chance, rather than differential attrition or the precise nature of the study design. To adjust for this difference, the evaluation team controlled for race and ethnicity when estimating program impacts, as described in detail below.

Outcome measures

In selecting outcome measures, the evaluation team sought to balance two competing demands. To provide a comprehensive assessment of the program, the team sought to identify a relatively broad range of outcomes that would sufficiently capture the breadth of topics covered by Steps to Success. However, such a focus on a very broad range of outcomes can increase the chances of identifying a spurious statistically significant impact (Schochet 2009). As discussed later in this appendix, the evaluation team deemed program impacts statistically significant if the associated p-value of the estimate fell below 5 percent, a common standard. A 5 percent chance of incorrectly identifying an estimated effect as a true impact is a relatively modest risk for a single test. But the more outcomes examined, the more likely at least one of the tests will estimate a spuriously statistically significant impact.

To balance these competing demands, the evaluation team identified a set of four topical areas of interest. Because the analysis focuses on the relative effectiveness of Steps to Success and the traditional home visiting curriculum, the team focused the analysis on measures of healthy birth spacing, which Steps to Success emphasizes but is not part of the curriculum the control group received. In addition, the team examined outcomes related to father involvement and mothers' education and career aspirations, which Steps to Success might have affected but were not targeted by traditional home visiting. Finally, the evaluation team analyzed measures in a fourth area, mothers' parenting behavior, which both programs address. This last analysis enables the evaluation team to examine whether the Steps to Success enhancements influence the effectiveness of the home visits in improving mothers' parenting behavior. Within these four topic areas, the evaluation team identified 11 primary outcomes of interest, described in detail in the remainder of this section.

1. Healthy birth spacing

We consider five primary outcomes related to healthy birth spacing. These capture measures of current LARC use, recent unprotected sex, repeat pregnancy, desire to avoid repeat pregnancy in the next year, and knowledge of contraception and pregnancy prevention.

Current LARC use. To determine whether Steps to Success was successful in increasing the use of the most effective forms of contraception, the evaluation team constructed a binary (yes/no) indicator for whether the study participant currently used a LARC method. In particular, the survey asked mothers to report on whether they had used each of the following methods of birth control at any point since the time of the baseline survey:

- Condoms
- Birth control pills
- The shot, or the Depo-Provera shot
- The patch, or Ortho Evra
- The ring, or NuvaRing
- An IUD—Mirena, Paragard, or Skyla
- An implant—Implanon or Nexplanon
- Emergency contraception, or Plan B
- Any other type of birth control

With the exception of condoms and emergency contraception, respondents were next asked whether they currently used each of the methods they had indicated using since baseline. Survey items were adapted from the Evaluation of Adolescent Pregnancy Prevention Approaches (Smith et al. 2012).

For the last category of methods, the survey instructed respondents to write in the method used. The evaluation team examined all such responses and ensured they should not be categorized as one of the provided methods, taking into account any newly available methods (in particular, the Liletta and Kyleena IUDs that were introduced during the survey fielding period) and other common names for methods (for example, calling the progestin-only birth control pill the “minipill”).

Table A.2. Baseline characteristics of analytic sample

Measure (percentage)	Steps to Success mothers	Traditional home visiting mothers	Difference
Demographics			
Age			
14	4	2	1
15	6	5	1
16	10	9	1
17	12	19	-7*
18	21	16	5
19	24	23	1
20	24	25	-2
Race/ethnicity			
White, non-Hispanic	33	23	10*
African American, non-Hispanic	3	2	1
Hispanic	63	72	-9*
Other	2	3	-2
Main language spoken at home			
English	93	94	-1
Spanish	7	6	1
Education			
Currently enrolled in high school program	33	29	4
Obtained high school diploma or GED certificate	54	55	0
Either currently enrolled in school or have a high school diploma or GED certificate[a]	88	84	4
Family relationships			
Lives with biological mother and biological father	18	16	2
Lives with biological mother but not biological father	28	24	4
Lives with biological father but not biological mother	7	5	2
Biological parents are married	32	29	3
Relationship with baby's father			
Currently married to baby's father	14	13	2
Currently living with baby's father	51	57	-5
Currently in a romantic relationship with baby's father	78	80	-3
Exposure to information			
Attended classes or sessions in the prior year on:			
Methods of birth control	12	12	0
Abstinence	6	7	-1
Relationships, dating, or marriage	7	6	1
Received information on methods of birth control in the prior year from a doctor, nurse, or clinic	53	55	-1
Pregnancy history and sexual risk behaviors			
Pregnant at study enrollment	40	41	-1
Been pregnant only once	81	80	0
HFSA child will not be/is not first child	16	18	-2
Age at first intercourse			
13 or younger	9	11	-2
14	16	19	-3
15	26	21	5
16	27	19	8+
17	16	23	-7+
18 or older	6	7	0
Ever told have STI by a doctor or nurse	12	14	-2
Sample size	**253**	**245**	

Source: Baseline surveys conducted by Mathematica Policy Research.

Table A.2. (*continued*)

[a] Due to rounding, estimates are not always equal to the sum of the share of individuals enrolled in a high school program and the share who have received a high school diploma or GED certificate.

**/*/+ Differences are statistically significant at the .01/.05/.10 levels, respectively, two-tailed test.

GED = General Educational Development; STI = sexually transmitted infection.

The evaluation team coded all respondents who indicated that they currently used either an implant or an IUD as currently using a LARC method. The team coded respondents who indicated they did not currently use these methods, or had not used these methods at any point in time since the baseline survey, as not currently using a LARC method.

Recent unprotected sex. To determine whether Steps to Success was successful in reducing rates of unprotected sex, the evaluation team constructed a binary (yes/no) indicator for whether the study participant reported having had sex without using any effective contraceptive method in the three months before the survey. We constructed this variable using the following series of three survey questions:

1. In the past 3 months, have you had sexual intercourse?
2. In the past 3 months, how many times have you had sexual intercourse without using a condom?
3. Now I want you to think about your use of the following methods of birth control in the past 3 months: Condoms, birth control pills, the Depo shot, the patch, the ring, an IUD like Mirena, Paragard, or Skyla, or an implant such as Implanon or Nexplanon. In the past 3 months, how many times have you had sexual intercourse without using any of these methods of birth control?

These questions were adapted from the National Longitudinal Study of Youth, 1997 cohort (U.S. Bureau of Labor Statistics n.d.).

The evaluation team coded a woman as recently having had unprotected sex if she reported having had sex in the three months before the survey without using any of the above listed methods of birth control. The team coded a woman as not recently having had unprotected sex if she indicated that, in the three months before the survey, she had not had sex, had not had sex without a condom, or had not had sex without any of the above listed methods of birth control.

Although respondents generally answered these questions consistently, the evaluation team found a small number of exceptions. In particular, seven respondents indicated they had sex without a condom zero times but had sex without any method of birth control one or more times. The team coded these respondents as not having had unprotected sex.

Repeat pregnancy. The survey instrument asked mothers whether they had become pregnant at any time since the birth of the child that made them eligible to participate in the study. Using this question, the evaluation team constructed a binary (yes/no) variable indicating whether a woman had a repeat pregnancy.

When measured using data from the two-year follow-up survey, repeat pregnancy will serve as the study's sole confirmatory outcome. In the present report, we use data collected about one-year after study enrollment to provide an initial look at this outcome. We do not consider repeat pregnancy in the year after study enrollment to be a confirmatory outcome for two key reasons: (1) many of the study participants were still pregnant at study enrollment and thus only a short period had elapsed between the birth of their child and the one-year data collection and (2) mothers had only received one year of the two-year home visiting intervention to which they were randomly assigned.

Desire to avoid repeat pregnancy in the next year. To assess mothers' attitudes toward a repeat pregnancy in the next year, the survey instrument asked them, "If you got pregnant again in the next year, how would you feel? Would you say very happy, a little happy, neither happy nor upset, a little upset, or very upset?" This survey item was adapted from the National Survey of Family Growth (CDC n.d.).

The evaluation team used responses to this question to construct a scale variable indicating a woman's attitudes toward repeat pregnancy. The team coded the item so that the measure ranges from 1 to 5, with higher values indicating more negative feelings about becoming pregnant.

Respondents who had already become pregnant again since the birth of the child that made them eligible to participate in the study were not asked to respond to this survey item. Therefore, they are excluded from analyses of this measure. Including mothers who did not respond to the one-year follow-up survey, mothers who did not respond to this particular survey item, and mothers who had experienced a repeat pregnancy in the year since study enrollment, this variable was not available for 29 percent of the Steps to Success group (87 mothers) and 28 percent of the traditional home visiting group (83 mothers).

Knowledge of contraception and pregnancy prevention. The survey contained two items to measure a mother's knowledge of how to prevent pregnancy: "If condoms are used correctly and consistently, how much can they decrease the risk of pregnancy?" and "If birth control pills are used correctly and consistently, how much can they decrease the risk of pregnancy?" For both items, the survey asked respondents to choose between the following options: not at all, a little, a lot, completely, and don't know. These questions were adapted from those used in the Evaluation of Title V Abstinence Education Programs (Trenholm et al. 2007).

The evaluation team combined the answers to these two items to create a scale score ranging from zero to 2 and reflecting the number of these items the mother answered correctly. Answers of "don't know" were counted as incorrect responses. If a mother answered only one of the two questions, the skipped question was treated as if the mother responded "don't know." If a mother skipped both of the questions, the evaluation team excluded her from the analysis of this outcome.

2. Father involvement

We constructed three measures to understand the relative impacts of Steps to Success and the traditional home visiting program on father involvement. These items capture the quality of the parents' co-parenting relationship, fathers' engagement with their children, and whether fathers regularly spend time with their children.

Quality of co-parenting relationship. The evaluation team created a summary measure of the quality of the mother-father co-parenting relationship based on the mother's responses to seven survey items. The first five survey items were items 3, 7, 11, 14, and 18 of the Parenting Alliance Measure (Abidin and Konold 1999). To these, the evaluation team added two items, drawn from the survey used for the Building Strong Families Evaluation (Wood et al. 2010):

- [CHILD] needs [CHILD'S FATHER'S NAME] just as much as he needs me.
- No matter what might happen between [CHILD'S FATHER'S NAME] and me, when I think of [CHILD]'s future, it includes [CHILD'S FATHER'S NAME].

For each statement, the survey asked mothers to report their level of agreement using a five-point scale, ranging from strongly disagree to strongly agree.

To construct a scale from mothers' responses to these statements, the evaluation team first assigned each response category a number ranging from 1 to 5, with higher values indicating a stronger co-parenting relationship. For mothers who responded to at least six of the seven statements, the evaluation team calculated a scale score by taking the average value of the mother's responses across the different statements. The team did not calculate scores for mothers who responded to five or fewer statements. The resulting scale ranged from 1 to 5, with higher values indicating a stronger co-parenting relationship. The scale had high internal consistency within the one-year follow-up data (alpha coefficient = 0.95).

Father's engagement with child. The evaluation team created a summary measure of fathers' engagement with their children based on a series of eight survey items. Each of these survey items asked a mother to assess how many times in the past month the father of her child had participated in the following activities:

- Played a game like "peek-a-boo" or "gotcha" with [CHILD].
- Sung songs with [CHILD].
- Read or looked at books with [CHILD].
- Told stories to [CHILD].
- Played with games or toys with [CHILD].
- Helped [CHILD] to get dressed.
- Changed [CHILD]'s diapers or helped [him/her] use the toilet.
- Given [CHILD] a bottle or something to eat.

The provided response options were more than once a day, every day or almost every day, a few times a week, a few times in the past month, once or twice in the past month, and never. The team drew the statements from the Building Strong Families Evaluation (Wood et al. 2010); researchers from that project had adapted the measures from those used by the National Evaluation of Early Head Start (Love et al. 2002).

To construct a scale from mothers' responses to these statements, the evaluation team first assigned each response category a number ranging from zero to 5, with higher values indicating greater frequency of engagement. For mothers who responded to at least six of the eight statements, the evaluation team calculated a scale score by taking the average value of the mother's responses across the different statements. Mothers who reported that their child had not seen his or her father in the past month or that their child had died (for earlier survey items) were not asked these questions but were treated as if they responded "never" to each. The team did not otherwise calculate scores for mothers who responded to five or fewer statements. The resulting scale ranged from zero to 5, with higher values indicating more frequent engagement. The scale had high internal consistency within the one-year follow-up data (alpha coefficient = 0.97).

Father regularly spends time with child. We used a single survey item to construct a binary (yes/no) variable indicating whether a father regularly spent time with his child. The survey asked mothers, "In the past month, how often has [CHILD'S FATHER'S NAME] spent one or more hours a day with [CHILD]? Was it every day or almost every day, a few times a week, a few times in the past month, once or twice in the past month, or never?" The team adapted the survey item from the Building Strong Families Evaluation (Wood et al. 2010). The evaluation team coded responses of "every day or almost every day," and "a few times a week" as indicating that a father regularly spends time with his child. The team coded all other responses as indicating that a father did not regularly spend time with his child.

3. Mothers' education and career aspirations

We consider two primary outcomes related to mothers' education and career aspirations: an indicator for whether the respondent was currently enrolled in school and a scale variable related to mothers' career goals.

Currently enrolled in school. The survey asked respondents to report whether they were currently enrolled in school, instructing mothers to choose yes if they were "currently on summer break or taking a short break to have a baby but plan to return to school." We created a binary (yes/no) indicator of whether a mother was enrolled in school based on this single survey item.

Mother's career goals. The evaluation team created a summary measure of a mother's career goals based on a series of six survey items. For each of the following items, the survey asked mothers to respond on a four-point scale ranging from strongly disagree to strongly agree:

- I have specific goals for my future career.
- I have a plan for achieving my future career goals.
- Planning for a career is not worth the effort.
- I haven't thought much about my future career.
- If I have a career, I won't be able to enjoy other things in life.
- Going to college is important for getting a good job.

The statements were adapted from the Career Commitment Measure (Carson and Bedeian 1994; Diemer and Blustein 2007), with items added to address adolescent development and educational and career success.

To construct a scale from mothers' responses to these statements, the evaluation team first assigned each response category a number ranging from 1 to 4, with higher values indicating stronger career aspirations (items were reverse coded, as appropriate). For mothers who responded to at least five of the six statements, the evaluation team calculated a scale score for each mother by taking the average value of the mother's responses across the different statements. The team did not calculate scores for mothers who responded to four or fewer statements. The resulting scale ranged from 1 to 4, with higher values indicating greater orientation toward career success. The scale had high internal consistency within the baseline data (alpha coefficient = 0.82).

4. Mothers' parenting behavior

The evaluation team constructed a single primary outcome measuring mothers' parenting behavior. This measure uses data from a series of five survey items similar to the items used to construct the outcome measuring a father's engagement with his child. In particular, mothers were asked to indicate how many times in the past month they had participated in the following activities:

- Played a game like "peek-a-boo" or "gotcha" with [CHILD].
- Sung songs with [CHILD].
- Read or looked at books with [CHILD].
- Told stories to [CHILD].
- Played with games or toys with [CHILD].

The provided response options were more than once a day, every day or almost every day, a few times a week, a few times in the past month, once or twice in the past month, and never. Anticipating that most mothers would serve as their child's primary caregiver, the evaluation team omitted the survey items related to basic child care (dressing, diapering/toileting, and feeding the child) that were used to measure fathers' engagement.

To construct a scale from mothers' responses to these statements, the evaluation team first assigned each response category a number ranging from zero to 5, with higher values indicating greater frequency of engagement. For mothers who responded to at least four of the five statements, the evaluation team calculated a scale score by taking the average value of the mother's responses across the different statements. Mothers who reported that they had not seen their child in the past month or that their child had died (for earlier survey items) were not asked these questions but were treated as if they responded "never" to each. The team did not otherwise calculate scores for mothers who responded to four or fewer statements. The resulting scale ranged from zero to 5, with higher values indicating more active engagement. The scale had high internal consistency within the one-year follow-up data (alpha coefficient = 0.87).

Implementation measures

In addition to the outcome measures described above, the evaluation team constructed nine measures related to the services received by families in the Steps to Success and traditional home visiting groups. The team constructed these implementation measures using administrative data recorded by home visitors after each visit. Because HFSA served members of both study groups, these data provide a full account of the home visits each mother received as part of this study. All measures were constructed using data from only the first year after study enrollment, to match the time horizon used to construct the outcome measures for this report.

The evaluation team created two measures of the number of home visits study participants received:

- Total number of home visits received
- Number of home visits during which the HFSA child's father was present

Both measures are count variables indicating the number of unique home visits recorded by HFSA staff. Additionally, the team used information on the duration of each visit to construct a measure of the number of hours each family spent receiving home visits.

The evaluation team also created six continuous measures capturing the extent to which home visiting exposed families to different topics:

- Number of hours spent discussing parenting with home visitor
- Number of hours spent discussing contraception with home visitor
- Number of hours spent discussing relationships or relationship skills with home visitor
- Number of hours spent discussing employment and career training with home visitor
- Number of hours spent discussing education with home visitor
- Number of hours spent discussing other topics with home visitor

The evaluation team used the total visit duration and number of topics mentioned during a visit to construct these outcomes. For each visit, the team counted the number of topics mentioned by the home visitor and then assumed the home visitor spent the same amount of time discussing each of the mentioned topics. This enabled the evaluation team to estimate the time spent on each of the topics during a visit. The team then created the measures of interest by summing the quantities across all visits received.

Analytic methods

The evaluation team used *RCT-YES*, a statistical software tool developed by Mathematica, to estimate the impacts of Steps to Success in comparison with traditional home visiting (https://www.rct-yes.com/). *RCT-YES* uses estimation methods designed specifically for estimating treatment effects with data from randomized controlled trials, using the design-based methods introduced by Neyman (1923) and expanded upon by Rubin (1974, 1977) and Holland (1986). The study team used the estimation methods for what *RCT-YES* describes as Design 2:

the non-clustered, blocked design (Schochet 2016). These methods account for the study team randomly assigning mothers to the Steps to Success and traditional home visiting groups within separate blocks defined by whether mothers were pregnant or postpartum at the time of random assignment. Impact estimates are calculated as a regression-based weighted average of the difference in outcomes for mothers in the Steps to Success and traditional home visiting groups.

RCT-YES requires users to input certain technical specifications of the model, such as the approach for covariate adjustment and handling of missing data. The study team used data from the baseline survey to include covariates for mothers' age, race and ethnicity, time since birth (or due date, in the case of miscarriage), and the baseline value of the outcome measure or a close proxy (if available). To the extent that these covariates are correlated with mothers' outcomes, they can improve the precision of the impact estimates by reducing the residual variation in the outcome measures (Orr 1999). The study team also used the *RCT-YES* default assumptions to calculate impacts assuming a finite-population model (SUPER_POP = 0) and including block-by-treatment interactions (BLOCK_FE = 0). For missing outcome data, the study team used the default *RCT-YES* option of case deletion—meaning that the impact estimates for a particular outcome exclude mothers with missing data for that outcome. For missing baseline data, the team used dummy variable adjustment. This involves setting any missing baseline values to constants and including missing value flag variables as additional covariates in the regression model. The team deemed the resulting impact estimates as statistically significant if the estimated p-value for the coefficient fell below 5 percent, based on a two tailed hypothesis test. The team deemed any coefficients with estimated p-values between 5 and 10 percent to be statistically significant at the 0.10 level.

To help interpret the magnitude of the reported estimates, the evaluation team also calculated an effect size associated with each impact estimate. For continuous outcomes, the team calculated the standardized effect size as Hedges' g, which equals the impact estimate produced by *RCT-YES* divided by the unadjusted pooled standard deviation of the outcome for mothers in both study groups (Hedges 1981). For binary outcomes, the evaluation team calculated the effect size as the Cox index, which equals the log odds ratio divided by the constant 1.65 (Cox 1970).

Sensitivity analyses

The main impact findings presented in the body of this report are derived from a particular set of analytic decisions. The evaluation team made these decisions in accordance with established research standards and the particular features of the study design. However, sensitivity analyses can help generate further confidence in the study's findings and alleviate concerns that the findings arose due to specific analytic decisions.

To do this, the evaluation team considered four sensitivity tests:

1. Using ordinary least squares (OLS) regression, instead of the RCT-YES design-based approach, to estimate impacts.
2. Not adjusting estimates for differences in baseline covariates.

3. Dividing study participants into three strata instead of two: mothers randomly assigned in the first two months of the study enrollment period (before random assignment was stratified), mothers randomly assigned after this period who were pregnant at assignment, and mothers randomly assigned after this period who were postpartum at assignment.
4. Removing any respondents from the sample who had a sister already enrolled in the study at random assignment (these participants were assigned to the same study groups as their sisters to avoid the sharing of program messages between sisters across study groups).

Comparing the impacts estimated using these alternative methods with those from the evaluation team's primary method reveals the estimates are robust (Table A.3). In no case do the different analytic decisions lead to results that differ based on statistical significance or substantive importance.

Table A.3. Impacts estimated using alternative methods

Outcome	Primary method	OLS	No covariate adjustment	Three strata	Exclude siblings
Healthy birth spacing					
Currently using a LARC method	12*	12**	13**	12*	12**
Recently had unprotected sex	-7+	-7+	-7+	-7+	-6+
Any repeat pregnancy[a]	3	3	3	3	4
Desire to avoid repeat pregnancy in the next year (range: 1 to 5)[b]	0.02	0.02	0.03	0.02	0.06
Knowledge of contraception and pregnancy prevention (range: 0 to 2)	-0.10	-0.10	-0.08	-0.10	-0.10
Father involvement					
Quality of co-parenting relationship (range: 1 to 5)	-0.01	-0.01	-0.05	0.00	0.03
Father's engagement with child (range: 0 to 5)	-0.05	-0.05	-0.11	-0.03	0.02
Father regularly spends time with child	0	1	-2	1	2
Mothers' education and career aspirations					
Currently enrolled in school	2	2	5	2	2
Mother's career goals (range: 1 to 4)	0.02	0.02	0.01	0.02	0.01
Mothers' parenting behavior					
Mother's engagement with child (range: 0 to 5)	0.09	0.09	0.12	0.09	0.12
Sample size	**498**	**498**	**498**	**498**	**481**

Source: Baseline surveys and one-year follow-up surveys conducted by Mathematica Policy Research.

[a] Confirmatory outcome when measured using data from the two-year follow-up survey.

[b] Measure not available for the 36 Steps to Success mothers (14 percent) and 27 traditional home visiting mothers (11 percent) who responded to the survey and reported a repeat pregnancy.

**/*/+ Differences are statistically significant at the .01/.05/.10 levels, respectively, two-tailed test.

LARC = long-acting reversible contraceptive.

Impacts for key subgroups of mothers

As an additional exploratory analysis, the study team examined whether the relative impacts of Steps to Success and traditional home visiting differed for subgroups of mothers defined based on pregnancy status (mothers who were pregnant versus postpartum at study enrollment) and age (mothers ages 19 or 20 versus mothers ages 14 to 18 at study enrollment). The study team conducted these analyses using the optional SUBGROUP input command in the RCT-YES statistical software tool (described earlier). These subgroup analyses are exploratory for two reasons. First, the evaluation team determined the required sample size for the evaluation assuming an analysis of the full sample. Because of the smaller sample sizes, the reported impact estimates for subgroups of mothers might not have sufficient precision. Second, estimating impacts for different subgroups of mothers greatly increases the number of outcomes examined. As discussed earlier, the more outcomes examined, the more likely at least one of the tests will find a spurious statistically significant impact (Schochet 2009).

To alleviate these concerns, before conducting any impact analyses, the study team established a set of reporting rules intended to reduce the chances of emphasizing a false positive impact from the subgroup analyses. In particular, we established that we would not discuss the results of these subgroup analyses in the body of this report unless we found statistically significant impacts of the Steps to Success enhancements compared with the traditional home visiting program for repeat pregnancy or at least 3 of the 10 other primary outcomes within a subgroup. None of the examined subgroups met this bar; therefore, we do not discuss these results in the main report (Tables A.4 and A.5).

Table A.4. Subgroup impacts by pregnancy status at study enrollment

Outcome	Full sample	Pregnant at enrollment	Postpartum at enrollment
Healthy birth spacing			
Currently using a LARC method	12*	8	15*
Recently had unprotected sex	-7+	-6	-7
Any repeat pregnancy[a]	3	2	4
Desire to avoid repeat pregnancy in the next year[b] (range: 1 to 5)	0.02	0.08	-0.02
Knowledge of contraception and pregnancy prevention (range: 0 to 2)	-0.10	-0.06	-0.12
Father involvement			
Quality of co-parenting relationship (range: 1 to 5)	-0.01	-0.13	0.07
Father's engagement with child (range: 0 to 5)	-0.05	-0.15	0.01
Father regularly spends time with child	0	-2	2
Mothers' education and career aspirations			
Currently enrolled in school	2	-3	6
Mother's career goals (range: 1 to 4) †††	0.02	-0.10+	0.10*
Mothers' parenting behavior			
Mother's engagement with child (range: 0 to 5)	0.09	0.16	0.04
Sample size	**498**	**203**	**295**

Source: Baseline surveys and one-year follow-up surveys conducted by Mathematica Policy Research.

[a] Confirmatory outcome when measured using data from the two-year follow-up survey.

[b] Measure not available for the 36 Steps to Success mothers (14 percent) and 27 traditional home visiting mothers (11 percent) who responded to the survey and reported a repeat pregnancy.

**/*/+ Differences are statistically significant at the .01/.05/.10 levels, respectively, two-tailed test.

†††/††/† Difference in impacts between subgroups is statistically significant at the .01/.05/.10 levels, respectively, two-tailed test.

LARC = long-acting reversible contraceptive.

Table A.5. Subgroup impacts by age at study enrollment

Outcome	Full sample	Age at enrollment	
		19 or 20	14 to 18
Healthy birth spacing			
Currently using a LARC method	12*	5	18**
Recently had unprotected sex	-7+	-3	-10*
Any repeat pregnancy[a]	3	8+	-1
Desire to avoid repeat pregnancy in the next year[b] (range: 1 to 5)	0.02	0.05	0.00
Knowledge of contraception and pregnancy prevention (range: 0 to 2)	-0.10	-0.21+	0.01
Father involvement			
Quality of co-parenting relationship (range: 1 to 5)	-0.01	0.00	-0.01
Father's engagement with child (range: 0 to 5)	-0.05	-0.05	-0.06
Father regularly spends time with child	0	1	0
Mothers' education and career aspirations			
Currently enrolled in school	2	0	5
Mother's career goals (range: 1 to 4)	0.02	0.05	-0.01
Mothers' parenting behavior			
Mother's engagement with child (range: 0 to 5)	0.09	0.18+	0.01
Sample size	**498**	**203**	**295**

Source: Baseline surveys and one-year follow-up surveys conducted by Mathematica Policy Research.

[a] Confirmatory outcome when measured using data from the two-year follow-up survey.

[b] Measure not available for the 36 Steps to Success mothers (14 percent) and 27 traditional home visiting mothers (11 percent) who responded to the survey and reported a repeat pregnancy.

**/*/+ Differences are statistically significant at the .01/.05/.10 levels, respectively, two-tailed test.

†††/††/† Difference in impacts between subgroups is statistically significant at the .01/.05/.10 levels, respectively, two-tailed test.

LARC = long-acting reversible contraceptive.

Impacts on secondary outcomes

As another set of exploratory analyses, the study team estimated impacts for several secondary outcomes within each topic area:

- **Healthy birth spacing.** To provide further context for the observed impacts on repeat pregnancy, the evaluation team analyzed outcomes capturing whether a mother had a repeat birth, whether she had a repeat pregnancy outside of marriage, the number of times she had been pregnant since the birth of the child that led her to enroll in the study, and whether she reported that she would like to wait at least two years before having another child. In addition, to further understand the impacts observed for current LARC use, the team analyzed impacts on LARC use at any point in the year since the baseline survey and current use of a hormonal method or IUD (that is, any effective, female-initiated method of birth control) at the time of the one-year follow-up survey. Finally, to determine whether the

emphasis of Steps to Success on LARC methods led to adverse effects on other risky sexual behaviors (see Steiner et al. 2016), the evaluation team examined impacts on whether mothers had sex without a condom in the three months before the one-year follow-up survey and mothers' STI diagnoses.

- **Father involvement.** The evaluation team examined four secondary outcomes related to the mother-father relationship as potential mediating factors for changes in father involvement: (1) whether the mother and father are married, (2) whether the mother and father live together, (3) whether the mother and father are romantically involved, and (4) the share of the baby's life the mother and father lived together with the baby. In addition, the team analyzed an outcome measuring fathers' financial contributions in this topic area, to capture a different aspect of paternal support.
- **Mothers' education and career aspirations.** The evaluation team captured additional estimates of educational achievement and ambitions, including an indicator for whether a mother had obtained her high school diploma or GED certificate; an indicator for whether a mother had either obtained her high school diploma or GED certificate, or was currently enrolled in school; and a four-point scale score capturing the extent to which a mother believes she will eventually graduate from a four-year college.
- **Mothers' parenting behavior.** The evaluation team examined the five individual survey questions used to construct the scale measure of mothers' parenting behavior to further understand the observed impact for the scale as a whole. In addition, the team analyzed an indicator for whether a mother had spanked her child in the past month.

The results from these analyses are detailed in Table A.6. Overall, the results for the secondary outcomes confirm the findings based on the primary outcomes and detailed in the main report.

Table A.6. Impacts on secondary outcomes

Outcome	Steps to Success families	Traditional home visiting families	Impact	Effect size
Healthy birth spacing				
Any repeat birth (%)	5	4	1	0.14
Any repeat pregnancy and not married to baby's father at the time of the survey (%)	12	9	3	0.19
Number of repeat pregnancies	0.16	0.14	0.02	0.05
Used a LARC method in the past 12 months (%)	64	49	14**	0.37
Currently using an IUD or hormonal method of birth control (%)	67	58	9*	0.23
Want to wait two or more years until next birth[a] (%)	70	67	3	0.08
Recently had sex without a condom (%)	53	59	-7	-0.15
Diagnosed with an STI in the past 12 months (%)	10	10	0	0.00
Father involvement				
Baby's parents are married (%)	21	23	-2	-0.07
Baby's parents live together (%)	51	53	-2	-0.05
Baby's parents are romantically involved (%)	68	70	-2	-0.06
Share of time since birth the baby's mother and father have lived together with the baby (%)	61	61	-1	-0.02
Father provides substantial financial support for raising the baby (%)	69	68	1	0.03
Mothers' education and career aspirations				
Obtained high school diploma or GED certificate or currently enrolled in school (%)	84	82	2	0.09
Obtained high school diploma or GED certificate (%)	69	67	2	0.06
Believe will eventually graduate from a four-year college (range: 1 to 4)	2.87	2.76	0.10	0.09
Mothers' parenting behavior				
Frequency mother plays games with child (range: 0 to 5)	4.10	3.97	0.12	0.14
Frequency mother sings songs with child (range: 0 to 5)	3.99	4.02	-0.03	-0.03
Frequency mother reads to or looks at books with child (range: 0 to 5)	3.71	3.57	0.14	0.12
Frequency mother tells stories to child (range: 0 to 5)	3.59	3.40	0.19+	0.14
Frequency mother played with games or toys with child (range: 0 to 5)	4.21	4.17	0.04	0.05

Table A.6. (*continued*)

Outcome	Steps to Success families	Traditional home visiting families	Impact	Effect size
Mother spanked child in past month (%)	34	32	2	0.05
Sample size	**253**	**245**		

Source: Baseline surveys and one-year follow-up surveys conducted by Mathematica Policy Research.

Notes: All estimates account for the random-assignment design and differences across study groups in age of mother at random assignment, mother's race and ethnicity, time since birth (or due date, in the case of miscarriage), and the baseline value of the outcome measure or a close proxy (when available).

[a] Set to zero for women who have had a repeat pregnancy since the time of study enrollment.

**/*/+ Differences are statistically significant at the .01/.05/.10 levels, respectively, two-tailed test.

IUD = intrauterine device; LARC = long-acting reversible contraceptive; STI = sexually transmitted infection.

Differences in secondary implementation measures

In addition to the secondary outcome measures, we also analyzed several secondary measures capturing information on the implementation of Steps to Success and the traditional home visiting program. We constructed these measures using survey data indicating respondents' self-reports of the frequency with which they received information from home visitors, as well as information from other sources in the community.

For each of the constructed measures, we drew data from a single survey item that asked a respondent how many times she received information on a specific topic from a specific source. Response categories included never, 1 to 2 times, 3 to 5 times, 6 to 9 times, and 10 or more times. We constructed eight additional measures of services received using these data. For each, we set the constructed variable to zero if the respondent indicated never, 1.5 if the respondent indicated 1 or 2 times, 4 if the respondent indicated 3 to 5 times, 7.5 if the respondent indicated 6 to 9 times, and 11 if the respondent indicated 10 or more times.

The results of this analysis indicate a strong contrast between the information received during Steps to Success and traditional home visits (Table A.7). Compared with the traditional home visiting group, mothers in the Steps to Success group reported receiving about one more visit during which parenting was discussed, more than two more visits during which methods of birth control were discussed, and between one and two more visits during which each of abstinence and relationships, dating, or marriage were discussed. Although these differences are both strong and significant, they are less stark than those suggested by the administrative data. This could be because survey recall error attenuates the reported differences in visits. It could also be due to the particular way we coded categorical survey responses. Nonetheless, these results confirm our general findings using data from the perspectives of the mothers participating in the study.

In contrast, the survey data indicate few differences between the study groups in information received from health care practitioners or classes and group meetings (Table A.7). For all of these measures, the difference between the two study groups was statistically insignificant. This suggests that, other than the information provided during home visits, there were few differences in the information the two study groups received.

Table A.7. Differences in secondary implementation measures

Outcome	Steps to Success families	Traditional home visiting families	Difference
Number of home visits received from HFSA staff in past 12 months where specific topic was discussed			
Parenting	5.81	4.81	1.01*
Methods of birth control	4.21	1.90	2.31**
Abstinence	2.41	1.15	1.26**
Relationships, dating, or marriage	4.33	2.69	1.65**
Number of times in past 12 months received information on contraception from a doctor, nurse, or clinic	2.88	2.60	0.28
Number of times in past 12 months attended classes or group meetings where specific topic was discussed			
Methods of birth control	0.86	0.66	0.20
Abstinence	0.48	0.35	0.14
Relationships, dating, or marriage	0.78	0.59	0.19
Sample size	**253**	**245**	

Source: Baseline surveys and one-year follow-up surveys conducted by Mathematica Policy Research.

Notes: All estimates account for the random-assignment design and differences across study groups in age of mother at random assignment, mother's race and ethnicity, time since birth (or due date, in the case of miscarriage), and the baseline value of the outcome measure or a close proxy (when available).

**/*/+ Differences are statistically significant at the .01/.05/.10 levels, respectively, two-tailed test.

References

Abidin, Richard R., and Timothy R. Konold. *Parenting Alliance Measure*. Odessa, FL: Psychological Assessment Resources, 1999.

Caldera, D., L. Burrell, K. Rodriguez, S.S. Crowne, C. Rohde, and A. Duggan. "Impact of a Statewide Home Visiting Program on Parenting and on Child Health and Development." *Child Abuse & Neglect*, vol. 31, no. 8, 2007, pp. 829–852.

Carson, Kerry D., and Arthur G. Bedeian. "Career Commitment: Construction of a Measure and Examination of its Psychometric Properties." *Journal of Vocational Behavior*, vol. 44, no. 3, 1994, pp. 237–262.

Centers for Disease Control and Prevention. "Vital Signs: Repeat Births Among Teens-United States, 2007-2010." *Morbidity and Mortality Weekly Report*, vol. 62, no. 13, 2013, p. 249.

Centers for Disease Control and Prevention. "2013-2015 National Survey of Family Growth Female Questionnaire." n.d. Available at https://www.cdc.gov/nchs/data/nsfg/nsfg_2013-2015_femalecapilite_forpuf.pdf. Accessed December 27, 2017.

Conde-Agudelo, A., A. Rosas Bermudez, and A.C. Kafury Goeta. "Birth Spacing and Risk of Adverse Perinatal Outcomes: A Meta-Analysis." *Journal of the American Medical Association*, vol. 295, 2006, pp. 1809–1823.

Covington, Reginald D., Dara Lee Luca, Jennifer Manlove, and Kate Welti. "Final Impacts of AIM 4 Teen Moms." Washington, DC: U.S. Department of Health and Human Services, Office of Adolescent Health, February 2017.

Cox, David R. *Analysis of Binary Data*. New York: Chapman & Hall/CRC, 1970.

Diemer, Matthew A., and David L. Blustein. "Vocational Hope and Vocational Identity: Urban Adolescents' Career Development." *Journal of Career Assessment*, vol. 15, no. 1, 2007, pp. 98–118.

Duggan, Anne, Elizabeth McFarlane, Loretta Fuddy, Lori Burrell, Susan M. Higman, Amy Windham, and Calvin Sia. "Randomized Trial of a Statewide Home Visiting Program: Impact in Preventing Child Abuse and Neglect." *Child Abuse & Neglect*, vol. 28, no. 6, 2004, pp. 597–622.

Harding, Kathryn, Joseph Galano, Joanne Martin, Lee Huntington, and Cynthia J. Schellenbach. "Healthy Families America® Effectiveness: A Comprehensive Review of Outcomes." *Journal of Prevention & Intervention in the Community*, vol. 34, no. 1-2, 2007, pp. 149–179.

Hedges, Larry V. "Distribution Theory for Glass's Estimator of Effect Size and Related Estimators." *Journal of Educational and Behavioral Statistics*, vol. 6, no. 2, 1981, pp. 107–128.

Hoffman, S.D., and R.A. Maynard. *Kids Having Kids: Economic Costs and Social Consequences of Teen Pregnancy*. Washington, DC: The Urban Institute Press, 2008.

Holland, P. W. "Statistics and Causal Inference." *Journal of the American Statistical Association*, vol. 81, no. 396, 1986, pp. 945–960.

Katz, Kathy S., Margaret Rodan, Renee Milligan, Sylvia Tan, Lauren Courtney, Marie Gantz, Susan M. Blake, Lenora McClain, Maurice Davis, Michele Kiely, and Siva Subramanian. "Efficacy of a Randomized Cell Phone-Based Counseling Intervention in Postponing Subsequent Pregnancy Among Teen Mothers." *Maternal and Child Health Journal*, vol. 15, no. 1, 2011, pp. 42–53.

Kisker, Ellen, Jacqueline Berman, Amy Blasberg, and Robert G. Wood. "Preventing Rapid Repeat Births Among Adolescent Mothers: Implementing Steps to Success in San Angelo, Texas." OPRE Report # 2016-80. Washington, DC: U.S. Department of Health and Human Services, Administration for Children and Families, Office of Planning, Research and Evaluation, 2016.

Klerman, L.V. "Another Chance: Preventing Additional Births to Teen Mothers." Washington, DC: National Campaign to Prevent Teen and Unplanned Pregnancy, 2004.

LeCroy, Craig Winston, and Judy Krysik. "Randomized Trial of the Healthy Families Arizona Home Visiting Program." *Children and Youth Services Review*, vol. 33, no. 10, 2011, pp. 1761–1766.

Love, John M., Ellen Eliason Kisker, Christine Ross, Peter Z. Schochet, Jeanne Brooks-Gunn, Diane Paulsell, Kimberly Boller, Jill Constantine, Cheri Vogel, Allison Sidle Fuligni, and Christy Brady-Smith. "Making a Difference in the Lives of Infants and Toddlers and Their Families: The Impacts of Early Head Start. Volume II: Final Technical Report Appendixes." Princeton, NJ: Mathematica Policy Research, 2002.

Martinez, G., C.E. Copen, and J.C. Abma. "Teenagers in the United States: Sexual Activity, Contraceptive Use, and Childbearing, 2006–2010 National Survey of Family Growth, National Center for Health Statistics." *Vital Health Statistics*, vol. 23, no. 31, 2011.

Mayer, Susan E., Ariel Kalil, Philip Oreopoulos, and Sebastian Gallegos. "Using Behavioral Insights to Increase Parental Engagement: The Parents And Children Together (PACT) Intervention." NBER Working Paper No. 21602. Cambridge, MA: National Bureau of Economic Research, 2015.

Neyman, J. "Próba Uzasadnienia Zastosowań Rachunku Prawdopodobieństwa do Doswiadczeń Polowych." *Roczniki Nauk Rolniczych Tom X*, 1923, pp. 1–51. Translated by D.M. Dabrowska and edited by T.P. Speed as "On the Application of Probability Theory to Agricultural Experiments: Essay on Principles." *Statistical Science*, vol. 5, no. 4, 1990, pp. 465–472.

Olds, D.L., J. Robinson, R. O'Brien, D.W. Luckey, L.M. Pettitt, C.R. Henderson Jr., R.K. Ng, K.L. Sheff, J. Korfmacher, S. Hiatt, and A. Talmi. "Home Visiting by Paraprofessionals and by Nurses: A Randomized, Controlled Trial." *Pediatrics*, vol. 110, no. 3, 2002, pp. 486–496.

Orr, Larry L. *Social Experiments: Evaluating Public Programs with Experimental Methods*. Thousand Oaks, CA: Sage, 1999.

Peipert, J.F., T. Madden, J.E. Allsworth, and G.M. Secura. "Preventing Unintended Pregnancies by Providing No-Cost Contraception." *Obstetrics and Gynecology*, vol. 12, no. 6, 2012, pp. 1291–1297.

Peipert, Jeffrey F., Qiuhong Zhao, Jenifer E. Allsworth, Emiko Petrosky, Tessa Madden, David Eisenberg, and Gina Secura. "Continuation and Satisfaction of Reversible Contraception." *Obstetrics and Gynecology*, vol. 117, no. 5, 2011, pp. 1105–1113.

Perper, Kate, Kristen Peterson, and Jennifer Manlove. "Diploma Attainment among Teen Mothers. Fact Sheet." Bethesda, MD: Child Trends, 2010.

Romero, Lisa, Karen Pazol, Lee Warner, Lorrie Gavin, Susan Moskosky, Ghenet Besera, Ana Carolina Loyola Briceno, Tara Jatlaoui, and Wanda Barfield. "Vital signs: trends in use of long-acting reversible contraception among teens aged 15–19 years seeking contraceptive services—United States, 2005–2013." *Morbidity and Mortality Weekly Report*, vol. 64, no. 13, 2015, pp. 363-369.

Rotz, Dana, Dara Lee Luca, Brian Goesling, Elizabeth Cook, Kelly Murphy, and Jack Stevens. "Final Impacts of the Teen Options to Prevent Pregnancy Program." Washington, DC: U.S. Department of Health and Human Services, Office of Adolescent Health, 2016.

Rubin, D.B. "Estimating Causal Effects of Treatments in Randomized and Nonrandomized Studies." *Journal of Education Psychology*, vol. 66, 1974, pp. 688–701.

Rubin, D. B. "Assignment to Treatment Group on the Basis of a Covariate." *Journal of Education Statistics*, vol. 2, no. 1, 1977, pp. 1–26.

Schochet, Peter Z. "An Approach for Addressing the Multiple Testing Problem in Social Policy Impact Evaluations." *Evaluation Review*, vol. 33, no. 6, 2009, pp. 539–567.

Schochet, Peter Z. "Statistical Theory for the RCT-YES Software: Design-Based Causal Inference for RCTs, Second Edition." NCEE 2015–4011. Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Analytic Technical Assistance and Development. Available at http://ies.ed.gov/ncee/edlabs. Accessed December 27, 2017.

Smith, Kimberly, Silvie Colman, Christopher Trenholm, Alan Hershey, Brian Goesling, Anastasia Erbe, Caitlin Davis, Brice Overcash, Kristine Andrews, Amanda Berger, Lori Ann Delale-O'Connor, and Mindy Scott. "Evaluation of Adolescent Pregnancy Prevention Approaches: Design of the Impact Study." Princeton, NJ: Mathematica Policy Research, 2012.

Steiner, Riley J., Nicole Liddon, Andrea L. Swartzendruber, Catherine N. Rasberry, and Jessica M. Sales. "Long-Acting Reversible Contraception and Condom Use Among Female U.S. High School Students: Implications for Sexually Transmitted Infection Prevention." *JAMA Pediatrics*, vol. 170, no. 5, 2016, pp. 428–434.

Stevens-Simon, Catherine, Lisa Kelly, and Dena Singer. "Preventing Repeat Adolescent Pregnancies with Early Adoption of the Contraceptive Implant." *Family Planning Perspectives*, vol. 31, no. 2, 1999, pp. 88–93.

Tocce, K., J. Sheeder, J. Python, and S. B. Teal. "Long Acting Reversible Contraception in Postpartum Adolescents: Early Initiation of Etonogestrel Implant Is Superior to IUDS in the Outpatient Setting." *Journal of Pediatric and Adolescent Gynecology*, vol. 25, no. 1, 2012, pp. 59–63.

Trenholm, Christopher, Barbara Devaney, Ken Fortson, Ken Quay, Justin Wheeler, and Melissa Clark. "Impacts of Four Title V, Section 510 Abstinence Education Programs. Final Report." Princeton, NJ: Mathematica Policy Research, 2007.

U.S. Bureau of Labor Statistics. "National Longitudinal Survey of Youth, 1997." n.d. Available at https://www.nlsinfo.org/content/cohorts/nlsy97/other-documentation/questionnaires. Accessed December 27, 2017.

Wood, Robert G., Quinn Moore, Andrew Clarkwest, JoAnn Hsueh, and Sheena McConnell. "Strengthening Unmarried Parents' Relationships: The Early Impacts of Building Strong Families. Technical Supplement." Princeton, NJ: Mathematica Policy Research, 2010.

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