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Another Chance:

Preventing Additional Births to Teen Mothers

By Lorraine V. Klerman, Dr.P.H.

May 2004



KLERMAN

ANOTHER CHANCE

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NOAPPPP
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Pregnancy, Parenting and Prevention, Inc.

Acknowledgments from the National Campaign

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The National Campaign to Prevent Teen Pregnancy Effective Programs and Research Task Force

This paper was developed and reviewed by this Task Force. The conclusions, however, are those of the author and the National Campaign itself.

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About the Author

Lorraine V. Klerman, Dr.P.H., is a Professor of Public Health at The Heller School for Social Policy and Management, Brandeis University, Waltham, Massachusetts. She has studied teenage pregnancy and parenting since the 1960s when, with funding from the Children's Bureau, she conducted a pioneering study of a program for this population in New Haven, Connecticut. She also participated in the 20-year follow-up study of this sample, funded by the William T. Grant Foundation. She participated in a study of comprehensive programs for pregnant and parenting teenagers, funded by the federal Office of Adolescent Family Life, and of demonstration programs to prevent teenage pregnancy, funded by the Centers for Disease Control and Prevention. She is currently a member of the team examining the parenting practices of teenage mothers under grants from the National Institute of Child Health and Human Development and the Robert Wood Johnson Foundation. Her teaching and research interests go beyond teenage motherhood and include the health and well-being of children generally, with special attention to those who are economically deprived. She has authored alone and with others almost 150 research and review articles, editorials, and book chapters, as well as two monographs, including *School-Age Mothers: Problems, Programs, and Policy* and *Alive and Well? A Research and Policy Review of Health Programs for Poor Young Children*. She has served on numerous federal and foundation advisory groups and received teaching awards at two schools of public health. In 1996, she was awarded the American Public Health Association's Martha May Eliot Award "honoring exceptional health services to mothers and children."

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Summary

Introduction

Although overall teen birth rates have declined dramatically in the last decade, additional births to teens who are already mothers are disturbingly common. In 2002, there were nearly 89,000 such births, representing 21 percent of all births to teenagers. Nearly one-quarter of teen mothers have a second birth before turning 20. These additional births impose significant burdens on the young mothers, their children, their families, and society generally.

These additional births also seem somewhat puzzling. After all, many teen mothers struggle with caring for their infant or toddler, whether alone or with help from family, and often with little or no help from the child's father. They regularly confront sleepless nights, crowded days, and restricted social activities. Attending school can be challenging, and graduating even more so. Given all this, why do such a large percentage become pregnant again and have a second child relatively quickly after the first, and what can be done to alter this pattern?

With these concerns and questions in mind, the National Campaign to Prevent Teen Pregnancy

asked Dr. Lorraine Klerman, an expert on adolescent pregnancy and parenting, to summarize what is known about additional births to teen mothers—the dimensions of the problem, the factors that seem to increase the chances of such births occurring to teen mothers, their consequences, and the potential for prevention. *Another Chance: Preventing Additional Births to Teen Mothers* presents the findings from Dr. Klerman's investigation and review.

The primary contribution of *Another Chance*—and the focus of this summary—is its critical review and assessment of various programs. Relying on evaluation research, this review tries to answer the simple question, “what works?” That is, what types of programs are most effective in preventing additional pregnancies and births to teen mothers? *Another Chance* provides those who work with pregnant and parenting teens some clues about effective programming; it also encourages others to explore, develop, and evaluate new and possibly more effective interventions for these young mothers.

In so doing, *Another Chance* joins a growing list of research reports published by the National Campaign to Prevent Teen Pregnancy on such top-

ics as parent and peer influence, basic statistical facts and trends, the effectiveness of programs to prevent first teen pregnancies and births, and more. All of these reports reflect the commitment of the National Campaign to “getting the facts straight”—an essential task given that the field of teen pregnancy prevention seems to generate so much controversy and conflict.

What Does the Evaluation Research Show?

The results of the evaluation literature assessed in *Another Chance* are mixed. Over half of the 19 studies reviewed reported that they had been able

Inclusion criteria

An extensive search was conducted to locate evaluations of programs that had among their objectives postponing additional pregnancies or births to teen mothers. Many program evaluations were examined, but *Another Chance* reviews only those that met the following criteria:

- The program targeted pregnant teens or teen mothers exclusively or primarily, or conducted separate analyses for teens;
- The program was in operation in 1980 or later;
- The study was conducted in the United States;
- The study used an experimental or quasi-experimental design;
- The analyses were based on a sample size of at least 50 in the intervention group and at least 50 in the comparison group; and
- The teenage mothers were followed for at least 12 months after the initial birth.

to significantly postpone additional pregnancies or births to teen mothers for some time period. However, only three of the studies showing significant positive effects were based on randomized, controlled designs: two home visiting programs and one program in a medical setting. Moreover, the size of the effects was often small, and the rates of subsequent birth were often still large. With the exception of the studies based on teens who used the contraceptive implant, few programs that have been carefully evaluated have been able to reduce the percentage of additional births in the two years after the first birth to less than 20–25 percent. That rate is close to what would have been expected without any intervention at all.

Even so, the program evaluations point to several factors that may be especially important in programs trying to prevent additional births to teen mothers:

Service Location and Type. *Another Chance* looks at a variety of programs: multi-site, community-based programs; programs in medical settings; school-based programs; home visiting programs; contraceptive implant programs; and a few miscellaneous others. No single site or approach seems overwhelmingly better than any other. Instead, the most important factor in preventing subsequent pregnancies may be the strength of the relationship built between the teenage mother and the individual working with her. For instance, home visiting programs may encourage strong relationships because each interaction is usually longer, and the home environments may be less stressful than medical clinics, schools, or community-based agencies. Nevertheless, it may be possible to build close relationships in these institutional settings if sufficient time, privacy, and continuity can be assured.

The most important factor in preventing subsequent pregnancies may be the strength of the relationship between the teenage mother and the individual working with her.

Program Personnel. There are some indications that the background of the individual who works directly with the teenage client may make a difference. For example, home visiting programs that employed trained nurses appear to be more successful in reducing additional births to teen mothers than those that used workers who primarily had on-the-job training. Perhaps paraprofessionals, unless they are exceptionally well trained, do not have the confidence and authority to affect the behavior of the teen mothers.

Service Initiation and Length. It may be easier to build close relationships between teens and program personnel if contact begins during pregnancy—an interval when the teenagers may be under less pressure than after the infant is born. In addition, longer involvement in a program by teen mothers may also contribute to postponing additional births. For instance, success in an alternative school for teen mothers was attributed in part to keeping the teenage mothers in the special school for several months postpartum.

Major Emphasis. Although all the evaluations reviewed in *Another Chance* included preventing additional pregnancies and births among their goals, it appeared that many programs were primarily concerned with healthy pregnancies and infants, return to school, and high school graduation. Several programs had a welfare-to-work focus and enrolled only teenagers whose households received cash assistance. With the possible exception of the nurse home visiting programs—with their emphasis on maternal and child development—the major emphasis of the programs did not seem to make a difference in their effectiveness in preventing additional pregnancies or births.

Incentives and Disincentives. Several programs offered modest financial incentives to young people for avoiding pregnancy or enforced financial penalties for program non-participation. Neither condition yielded positive results, although perhaps larger incentives and/or disincentives might have led to different results.

Attention to Family Planning. The amount of time and effort devoted to family planning varied among the programs reviewed. Programs that provided contraceptive implants appeared to be successful in reducing additional births to teen mothers, but these studies were based on self-selected populations. The nurses in the home-visiting programs were possibly more comfortable emphasizing contraceptive use, but other programs with a major family planning focus were not successful, perhaps because some workers resisted dealing fully with this subject.

Fidelity of Implementation. Some programs may not have shown positive results because of their inability to actually carry out their proposed interventions, rather than because the interventions themselves were not effective. Teen mothers are often difficult to engage in programs. For instance, some programs reported that teen participants did not attend sessions for which they were enrolled or skipped scheduled home visits. Other programs reported that some staff completed fewer home visits than expected.

Other Measures of Success. Even the programs without positive results in preventing subsequent births should be placed in context. Many of the programs that did not claim success in delaying additional pregnancies and births—as well as some that did—reported success in other aspects of their programs, including better rates of returning to school and graduating or improved maternal-child relationships.

What Would a Good Prevention Program Look Like?

Taken as a whole, the evaluation research offers clues about what a successful program to delay additional births among first-time teenage mothers should probably do:

- Develop close and sustained relationships with pregnant teenagers and young mothers.
- Begin when teenagers are pregnant with their first child and continue until the first child is at

least two years old and the mother is 18 years of age or older.

- Employ personnel who have the training and the authority to counsel in such sensitive areas as family planning and domestic violence—and who are willing to do so.
- Avoid relying on groups for education or counseling. Teenage mothers appear to need more intense, individualized attention that does not just tell them what they should do, but actually affects their thinking and judgment.
- Discuss with teen mothers the detrimental effects of two or more births before the age of 20 and of closely spaced births. Establish mutually agreed-upon, specific targets for future births—for example, waiting until they reach certain milestones (e.g., high school graduation, employment, and/or marriage).
- Help the teenagers select a contraceptive method, describe its good points as well as its possible side effects, and provide intense, ongoing, specific support to encourage its proper and consistent use. This may include taking teen mothers to family planning facilities for their initial visits, and perhaps for follow-up visits as well.
- Make teenagers aware that they might decide to stop using a certain contraceptive method

because of its side effects or other reasons. They should be advised to get help in choosing another contraceptive rather than to stop using contraception at all.

- Encourage teen mothers to use a long-lasting, non-coital-dependent contraceptive, such as periodic hormonal injections (i.e., Depo-Provera). This method should be accompanied by condom use to avoid sexually transmitted diseases including HIV/AIDS.
- Encourage teen mothers to return to school after a birth and to complete the education and training needed for economic self-sufficiency. In some instances, the unique educational needs of pregnant teenagers and teenage mothers require special services.
- Provide childcare for teenage mothers who are attending school or are in employment training.
- Encourage teen mothers to live with their parents or other adults who can provide economic and social support. Living with a boyfriend should be discouraged. Second Chance Homes—maternity group homes that provide housing and on-site social support services for pregnant teenagers and new mothers who cannot live at home—may be one solution to the housing problems of teen mothers who cannot live with their parents.

Section One

The Scope of the Problem

Overview

While often viewed as a single phenomenon, teen pregnancy has many complexities. Some births are within marriage and some are not. Some pregnancies are terminated by abortion and others lead to live births. And there is also the distinction that is the subject of this report: some births to teenage girls are first births, but an appreciable number are to girls who already have one or more children.

The reasons for these additional births to teenage girls are less apparent than the reasons for the first births. A first birth might be due, for example, to lack of knowledge of contraception, limited understanding of the burden of caring for an infant, or a belief that having a baby will strengthen ties to a male partner. But a teen mother presumably has a more realistic view of motherhood. Many of these young mothers struggle with caring for an infant or toddler, whether alone or with help from family, less often from the child's father who may provide decreasing social and economic support over time. Sleepless nights, crowded days, and restricted opportunities for social activities are the norm for teen mothers. Attending school regularly and completing homework are challenges. Also,

teen mothers often receive family planning advice and services after they have their first baby. Given all this, why do such a large percentage become pregnant again and have a second child relatively quickly after the first—and what can be done to alter this pattern?

Preventing additional births to teen mothers deserves special attention because of the dimensions of the problem (described in this section), the risk factors and consequences of such births (described in Section Two) and, most important, the potential for *Another Chance* at prevention, given that the population at risk for a second birth is so much smaller and easier to identify than those at risk for a first teen birth. Section Three describes some of the programs that have tried to postpone additional pregnancies and births to teen mothers, as well as some of the challenges involved in measuring the impact of these programs (which are discussed at length in the appendix). The report concludes with suggestions for approaches that programs might take to reducing the rate of additional pregnancies and births to teen mothers and offers recommendations for the research needed to better understand the impact of such programs.

While teen mothers who have additional children *as adults* (defined here as 20 years of age or older) clearly face tough challenges, both for themselves and their children, this paper focuses predominantly on teen mothers who have additional births *while still teens*. This approach is taken for two reasons. First, most teen mothers who delay additional births until their twenties have completed high school or obtained a GED, and many will have some work experience. For these mothers, additional births will probably have less of a detrimental effect on their life opportunities than having a second child before age 20. The second reason that this monograph focuses on teens with two or more births is that these births are likely to be very closely spaced, which in turn leads to poorer pregnancy outcomes and to children at higher risk of developmental problems.

A final note: This monograph does not always distinguish between births to married versus unmarried teens because so few teen births occur within marriage.

How Big Is the Problem of Additional Births to Teen Mothers?

There are several ways to ask the question, “How big is the problem of additional births to teenagers?”¹

How many teen mothers give birth again while teens? In 2002, the latest year for which data are available, there were 432,808 births to women under the age of 20. Overall, 343,210 (79.5 percent) were first births; 74,697 (17.3 percent) were second births; and 13,805 (3.3 percent) were third and higher order births to women who still had not reached their twentieth birthday. Birth order was not reported for 1,096 teen births. Thus, almost 89,000—or 20.5 percent—of teenage births were

second and higher order births (Martin, Hamilton, Sutton, McNacker & Munson, 2003).

What is the rate of second or higher order births to teens? One way to determine such a rate is to divide the number of additional births by the number of teenage girls to derive an “additional birth rate” per 1,000 (female) teenagers of a given age. This rate is often compared with the rate of first births. In 2002, the rate of first births was 34.0 per 1,000 girls aged 15 to 19 years, the rate of second births was 7.5, and the rate of third births was 1.2. As has been widely reported, the birth rate for girls aged 15 to 19 years declined steadily over the last decade, particularly for second and higher order births. Between 1991 (when teenage birth rates were the highest that they had ever been in 20 years) and 2002, the rate of first births declined by 27 percent, of second births by 39 percent, and of third births by 55 percent (Hamilton, Martin, & Sutton, 2003; Hamilton, Sutton, & Ventura, 2003).

An additional and arguably more useful rate can be calculated by dividing the total (or cumulative) rate of second births to teens by the total rate of first births to teens. This requires summing birth rates for first births and for second births to teens by single year of age from the time of the first birth to the time when the mother became 20 years old. This method reveals that over one-quarter (27.5 percent) of those women born in 1973 who had their first child before age 20 went on to have an additional child by 1993 by which time they were all age 20. But less than one-quarter (23.5 percent) of those women born in 1982 who had their first child before age 20 went on to have an additional child by 2002 by which time they were all age 20. Thus between 1993 and 2002, the percentage of teen mothers having a second birth before age 20 declined by 14.5 percent (unpublished data provided by Stephanie Ventura, National Center for Health Statistics).

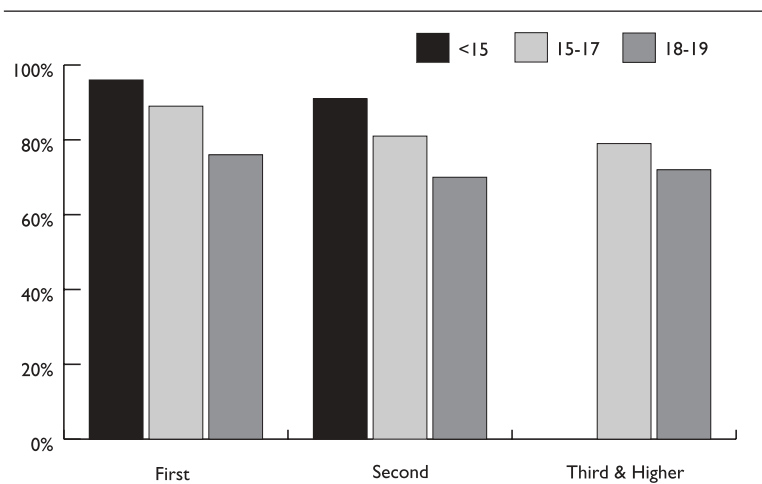
¹ The data provided in the subsequent paragraphs are for all teenagers regardless of marital status, unless otherwise specified. Also, these figures relate to births only; the number of pregnancies is probably at least one-third higher. The National Center for Health Statistics estimated that in 1999 (the most recent year that *both* teen birth and pregnancy data are available) there were 867,000 pregnancies among women under age 20, of which 485,000 (56 percent) ended in a live birth, 250,000 (29 percent) in an induced abortion, and 133,000 (15 percent) in fetal loss. These data, however, are not available by birth order (Ventura, Abma, Mosher, & Henshaw, 2003).

How closely spaced are teens' first and subsequent births?

Policymakers are also interested in the interval *between* births because of the possible adverse impact of short intervals on both mother and child. Such information is available from studies that examine the percentage of teenage mothers in a given sample who had a second birth within a specified period, usually one to five years after the first birth. (This is the approach taken by most of the evaluations reviewed in Section Three.) Using data from the National Longitudinal Survey of Youth for women who were 14 to 21 years of age in 1979, Kalmuss and Namerow (1994) reported that 31.3 percent of those under age 17 at their first birth had a second birth within 24 months, as did 23.9 percent of those who were 17 years of age. Using a later study (the National Education Longitudinal Study of 1988), Manlove, Mariner, and Papillo (2000) found that, among women who had a first teen birth between 1988 and 1992, 29.7 percent of those under age 16, 26.7 percent of those 16 years of age, and 22.2 percent of those aged 17 had a second birth within 24 months. (Data from both these national studies on teens having their first birth when they were over 17 are not included here because most of the women would have been 20 or older by 24 months after the first birth.)

How many additional births to teens take place within marriage? The problem of teen child-bearing is often considered in relationship to marital status, perhaps because researchers and policymakers assume that if teenage mothers were married, their problems would be less because their husbands would provide some financial and emotional support. Regardless of the truth of this assumption, the fact is that few first or subsequent teenage births take place within marriage. In fact, the percentage of births to 15- to 19-year-olds who are unmarried has increased steadily, doubling between 1975 and 2002 (38.2 percent to 80 percent)

Figure 1: Percentage of All Births to Teens That Are to Unmarried Teens, by Age and Birth Order, 2001



Source: Ventura, S.J., personal communication, 2003. Note that there were too few third and higher order births to girls under age 15 to calculate a reliable percentage.

(Hamilton, Martin, & Sutton, 2003; Ventura, Mathews, & Hamilton, 2001). It is also somewhat more likely that an additional birth to a teen mother will occur within marriage: in 2001, 81 percent of first births to teenagers were non-marital as compared to 72 percent of second and higher order births. The younger the mother, the higher the likelihood that the birth will be non-marital (see Figure One, unpublished data provided by Stephanie Ventura, National Center for Health Statistics).

In sum, second and higher order births to teenage mothers represent an important fraction of all births to teenagers; moreover, they are often closely spaced and are predominantly outside of marriage. These characteristics of subsequent teenage births make them of particular concern.

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Section Two

Risk Factors and Consequences

Although much has been written about the factors associated with additional births to teenage mothers and the consequences of such births, many gaps remain in our understanding of the problem. One reason for such gaps is that studies examining the risk factors—the “antecedents”—of additional births are based on associations among variables, and the direction of causality is often uncertain. For instance, does poverty increase the risk of a second birth or does a second birth increase the risk of poverty? Does dropping out of school increase the risk of second pregnancy or does a second pregnancy increase the risk of school dropout? A second reason is that many analyses of the effects of subsequent births are based on small samples of teen mothers who are patients in clinics specializing in pregnant or parenting teens or students in alternative schools for pregnant teenagers. Generalizing from these samples to the full population of teen mothers should be done with considerable caution because we do not know what percentage of teenagers nationally have the benefit of such specialized facilities. Moreover, such programs may attract teenagers who are motivated to have healthy babies and to continue their own educations. Alternatively, these programs may actively seek high-risk teens. In either case, teen mothers in these

samples are probably not representative of all teen mothers, and, consequently, conclusions about the antecedents and consequences of additional teen births drawn from these studies do not necessarily apply to all teen mothers.

Antecedents of Additional Births

Many studies have examined the antecedents of teen sexual behavior, contraceptive use, pregnancy, and childbirth. For instance, Kirby (2001) identified more than 100 separate, interacting antecedents in such categories as community disadvantage; family structure and economic disadvantage; family, peer, and partner attitudes and behavior; and characteristics of teens themselves, including biology, detachment from school, emotional distress, and sexual beliefs, attitudes, and skills.

Although the whole issue of additional births to teen mothers is not well studied, some information about antecedents and consequences is available from two large, nationally representative studies of youth: the National Longitudinal Study of Youth (NLSY) of 1979 and the National Education Longitudinal Study (NELS) of 1988. The NLSY of 1979 studied women who were between

14 and 21 when they were recruited in 1979. Using these NLSY data, Kalmuss and Namerow (1994) examined closely spaced teen births—defined as less than 24 months since the first birth—through 1988, and Shearer, et al. (2002) analyzed second teenage births through 1990.² The NELS studied girls who had a first teenage birth between 1988, when they were in eighth grade, and 1992. Manlove, Mariner, and Papillo (2000) analyzed the NELS data in two ways: the percentage of girls who had a second birth while a teenager and the percentage who had a closely spaced birth (within 24 months).³

Age. In bivariate analyses, the NLSY study found that teenage mothers who were 16 years of age or younger were at higher risk for a closely spaced second birth than were those who were 17- to 19-years-old. In multivariate analyses, however, age was not a significant factor. In bivariate analyses, the NELS study reported that teenage mothers who were 15 years of age or younger were at higher risk for a second teen birth than were those who were older. When multivariate techniques were used, a later age at first birth increased the likelihood of a second teen birth.

Race/Ethnicity. A multivariate analysis of the NLSY study indicated that black and Hispanic teenage mothers were more likely to have closely spaced second births than were non-poor white mothers. Poor white mothers were slightly more likely to have a closely spaced second birth than non-poor white mothers, although this finding was not significant. The NELS multivariate analysis showed that blacks were marginally more likely than whites to have a second teen birth,⁴ but significantly more likely to have a closely spaced birth.

Marital Status. Multivariate analyses of the NLSY study found that teen mothers who had a marital first birth and remained married for 24

months were more likely to have a closely spaced second birth than those who were unmarried throughout the interval. Those who were unmarried at the first birth but who married during the interval were also more likely to have a closely spaced birth than those who remained unmarried. Marital history was not significant in the NELS analyses. Manlove, Mariner, and Papillo (2000) suggest that the differences between the two studies might be due to the decline in marriage rates among teenage mothers between 1979 through 1988 when the NLSY collected its data and the late 1980s and early 1990s when NELS was in the field.

Education. The multivariate analysis of the NLSY study found that having 12 or more years of schooling at the time of the first birth and completing at least one year of school in the two years following the birth were related to a delay in the second birth. In the NELS multivariate analysis, dropping out of school before or after the first birth was associated with a greater risk of a second teen birth and a closely spaced birth. Being in a “gifted” class by eighth grade, receipt of a high school diploma or a GED, and being enrolled in school or employed after the first birth were all associated with lower risks of either or both measures (i.e., a second birth and a closely spaced birth). Educational aspirations and enrollment in further education were not significantly associated with either measure.

Cognitive Ability and Educational Aspirations. The NLSY study by Shearer, et al. (2002) employed a case-control analysis to examine the relationship of teen births to cognitive ability using a composite score from the Armed Services Vocational Aptitude Battery. In bivariate analyses, teenage mothers who had a second birth before age 20, as compared to those who had one birth only, were found to have lower mean scores and were less likely to have a score in the highest quartile. Those with a second birth expected to complete fewer

2 Unless otherwise stated, references to the NLSY study in this section are to the Kalmuss & Namerow (1994) study.

3 Only results significant at the $p < .05$ level are cited, unless otherwise noted. (A finding—for example, the observed difference between the means of two random samples—is described as statistically significant when the probability of obtaining such a difference by chance only is relatively low.)

4 Significant at $p < .10$.

years of school, and their mean age at first sexual intercourse was lower.⁵ In the multivariate analysis, women with low cognitive ability were almost three times more likely than those with high cognitive ability to have a second teenage birth. Lower educational expectations and younger age at first sexual intercourse remained associated with having an additional birth. Poverty was not significantly associated with a subsequent birth in either the bivariate or multivariate analyses.

Other Factors. The multivariate analysis in the NLSY study showed that a teen mother who reported retrospectively that she wanted her first birth was more likely to have a closely spaced second birth, and that having one or both parents with 12 or more years of education was associated with not having a second birth. Among the factors that were not significantly associated, either positively or negatively, with additional births were living in an intact family at age 14, attending church more than once a month, having three or more siblings, and the presence of reading materials in the home during childhood.

The NELS multivariate analysis included two poverty-related indicators. The teenage mother or another family member going on welfare after the first birth was not associated with subsequent birth measures, but the teen mother receiving free lunches in 8th grade was associated with a second birth. The living situation for teen mothers also influenced the likelihood of additional births. Teenage mothers living with at least one parent or on their own with a child (rather than living with a boyfriend, spouse, or other adult) were less likely to have a second and/or close-spaced birth. Teen mothers who lived in situations where the child's father provided childcare were more likely to have an additional birth. Factors not associated either positively or negatively with a second and/or close-spaced birth included family socioeconomic status, living with both biological parents in the eighth grade, standardized test scores, post-secondary education plans before the first birth or after it, and religious involvement.

Studies of Non-Representative Samples.

Although not nationally representative, studies of smaller samples of teen mothers receiving health, educational, or other services also shed some light on the risk factors for second births to teen mothers. Some of these studies provide support for risk factors identified in one or more of the national studies, including marital status, limited education of parents or heads of household, and wanting the first birth. These non-representative studies also found other factors associated with additional births, including younger age, low socioeconomic status, and using no contraception or using a contraceptive other than the implant (Rigsby, Macones, & Driscoll, 1998). (Contraceptive use was not assessed in NLSY or NELS.) Physical or sexual violence was associated with a rapid additional pregnancy in one clinical sample (Jacoby, Gorenflo, Black, Wunterlich & Eyler, 1999).

Conclusions About Antecedents. Many studies have compared the characteristics of teenagers who had a first birth with those who had a second one, but they do not all reach the same conclusions. The NLSY study and the NELS study do not agree on the importance of age at first birth, and some of the non-nationally representative studies suggest that younger age at first birth increases the likelihood of a second birth. The significance of race varies by study and is not very strong when other factors are controlled in the analyses. However, there is some indication that minority teenage mothers are more likely to have a closely spaced birth than are white teen mothers.

Being married at the time of the first birth or soon afterward appears to increase the likelihood of a second birth, but teenage marriages are now infrequent. However, living with a boyfriend, spouse, or other adult—rather than with at least one parent or alone with a child—or having the father of the child help with childcare increases the likelihood of a second birth. This suggests that such arrangements may be having the same impact that marriage once had.

5 Both significant at $p < .001$ but with less than a one-year difference.

Teenage mothers who stay in school and who receive high school degrees or GEDs are more likely to postpone another birth. One study has indicated that low cognitive ability is another determining factor in subsequent births. This seems likely because cognitive ability is probably associated with educational attainment: those with low cognitive ability are probably more likely to drop out or to not receive a high school diploma or a GED. Cognitive ability is probably also related to effective contraceptive use and educational aspirations.

Having wanted the first birth appears to increase the likelihood of a second teenage birth. One study found that experiencing physical or sexual violence increased the chances of a rapid additional pregnancy.

Surprisingly, neither the NLSY study nor the NELS study found poverty to be a major factor in subsequent births once other factors were controlled. Some of the non-nationally representative studies did find economic status important.

Consequences of Additional Births

Before examining the consequences of additional births to teen mothers, it is worth reviewing the general effects of childbearing on teenage girls and their children. Teens who give birth are less likely to complete school and more likely to be single parents because they are less likely to marry. Their children's prospects are equally dismal—they have less supportive and stimulating home environments, poorer health, lower cognitive development, worse educational outcomes, more behavior problems, and are more likely to become teen parents themselves (Kirby, 2001).

Table 1: Percentage of Births by Initiation of Prenatal Care, by Maternal Age and Birth Order, 2001

	1st trimester	2nd trimester	late or none
< 15			
first births	47.7%	35.7%	16.6%
second births	42.4%	34.7%	22.9%
third and higher	N/A	N/A	N/A
15–17			
first births	65.7%	26.7%	7.6%
second births	54.1%	31.5%	14.4%
third and higher	51.2%	31.3%	17.5%
18–19			
first births	75.1%	20.0%	4.9%
second births	64.2%	26.6%	9.2%
third and higher	55.9%	30.4%	13.7%

Source: Ventura, S.J., personal communication, 2003. Note that there were too few third and higher order births to girls under age 15 to calculate reliable percentages.

Several studies have concluded that second and higher order births to teenage mothers have more adverse consequences for both mothers and children than do first births. But since teenage mothers who give birth a second time before reaching age 20 have different characteristics than those who delay a second birth until after the teen years, many of the negative consequences may be related to those characteristics rather than to the second birth per se.

Adverse Consequences for Teen Mothers. The adverse consequences for teen mothers of additional births are largely in the areas of education and economic self-sufficiency, although the potential for medical problems is probably increased by the fact that teenage mothers initiate prenatal care later when they are expecting a second child and even later when they are expecting a third. For example, among 15- to 17-year-olds in 2001, 65.7 percent started prenatal care in the first trimester for their first birth as compared to 54.1 percent for their second, and 51.2 percent for their third or higher order birth (see Table One). The rates of late or no prenatal care actually increase with birth order in all adolescent age groups (unpublished

data provided by Stephanie Ventura, National Center for Health Statistics).

Several short- and long-term follow-up studies have concluded that bearing a second child while still a teenager (or soon thereafter) makes it more difficult for the mother to return to school, complete a high school education, or attain economic self-sufficiency. For example, comparing a follow-up sample of Project Redirection participants and their controls, Polit and Kahn (1986) found (after controlling for baseline characteristics) that teenage mothers who experienced a second pregnancy within 24 months of their initial interview were less likely to be in school, to have completed school, or to be working, and were more likely to be receiving welfare.

Similarly, on the basis of a 17-year follow-up of a Baltimore sample of teenage mothers, Furstenberg, Brooks-Gunn, and Morgan (1987) commented, “Additional births at young ages severely constrain the mother’s ability to attend school and accrue job experience, crucial human capital for economic self-sufficiency in later life” (p. 75). And in a 20-year follow-up of the Young Mothers Program, Horwitz, Klerman, Kuo, and Jekel (1991) found that being in school with no additional pregnancies at 26 months postpartum was one of the features associated with long-term success, defined as both currently employed or supported by a spouse or partner and having completed high school or received a GED.

Consequences for Pregnancy Outcomes. The research evidence is mixed about the effects of subsequent pregnancies on infant birthweight, preterm delivery, and infant mortality. Cross-sectional studies, which compare the outcomes for all teenagers with a first birth to those of all teenagers with a second birth, have usually concluded that the first infants born to teenagers are heavier than infants born to teenagers who have already had a first child (McCormick, Shapiro, & Starfield, 1984; Hellerstedt, Pirie, & Alexander, 1995). However, four longitudinal studies that compare the outcomes for the same teenager during successive pregnancies found that the second infant weighed about the same or

was even slighter heavier than the first one (Sukanich, Rogers, & McDonald, 1986; Sweeney, 1989; Santelli & Jacobson, 1990; Blankson, et al., 1993). There is some agreement that preterm delivery is more likely in a second birth, but less on whether this is true for infant mortality (McCormick, Shapiro, & Starfield, 1984; Sweeney, 1989; Blankson, Cliver, Goldenberg, et al., 1993; Hellerstedt, Pirie & Alexander, 1995; Cowden & Funkhouser, 2001).

These mixed findings suggest that additional studies are needed to assess the role of subsequent births on pregnancy outcomes. The longitudinal approach probably provides a more valid method for determining the impact of a second pregnancy, particularly since its findings on birthweight among teen mothers are consistent with the data on older women—that is, that second and higher order infants usually weigh more (Stevens-Simon, Roghmann, & McAnarney, 1990; Hickey, Cliver, Goldenberg, & Blankson, 1992). Comparing all first births with all second or higher order births may be misleading since teen mothers who have an additional birth may be different from those who stop at one in ways that are important to pregnancy outcomes.

Several studies have suggested that interpregnancy intervals of less than six months (that is, from the birth of one child to the conception of the next) may be associated with adverse effects for infants born to mothers across the age spectrum. These include preterm births, intrauterine growth retardation, low birthweight, and neonatal death (Zhu, et al., 2001; Smith, Pell, & Doobie, 2003). Since some teenage mothers have additional pregnancies in this brief a period, they may put their children at elevated risk for such problems.

Consequences for Children. Additional births to teenage mothers also have important consequences for their children. In the same Baltimore study noted earlier, Furstenberg, Brooks-Gunn, and Morgan (1987) reported that, five years postpartum, the children of teen mothers who had avoided additional births, as compared to the children of those who had not, were better prepared for school,

better behaved, and more outgoing and happy. The results at 17 years were in the same direction but not statistically significant. The authors noted, “It is the timing of the subsequent fertility that seems most important. Rapid subsequent fertility reduces the time and resources spent on the first child. The importance of subsequent fertility for mother and child makes this an important point for policy intervention” (p. 127).

These findings confirm an earlier study that was not confined to teenage mothers. In a study of children on the Hawaiian island of Kauai, Werner and Smith (1982) found that both girls and boys were more likely to have serious coping problems in childhood and in adolescence if their mothers had been pregnant or given birth before they were two years old.

Conclusions About Consequences. An additional birth to a teen mother shortly after her first birth appears to be associated with detrimental consequences for the mother, for the outcome of the second pregnancy, and for her children. For the mother, an additional birth is associated with reduced ability to complete her education or to attain economic self-sufficiency. There may also be increased risk of preterm delivery, low birthweight, and infant mortality—although the evidence in these areas is mixed. If a teen mother gives birth again as a teenager or shortly thereafter, her children are more likely to have reduced educational achievement and possibly behavioral problems—problems that may be explained, in part, by the inadequate education of the mothers themselves or by the poverty and lifestyle of the family as a result of school failure and the inability to secure employment. They, therefore, seek assistance from welfare. The exact period during which having a second child may worsen child well-being is uncertain, but it may well be before the first child reaches age two.

It remains unclear whether many of the adverse consequences of second births among teenagers are due to the second birth per se or to the underlying characteristics of those who have a second birth before age 20. Probably both explanations have merit. As Furstenberg, Brooks-Gunn,

and Morgan (1987) have stated, teenage mothers “who have additional children seem to be less competent and motivated and to have fewer family resources on which to draw. Additional childbearing is thus selective of those on the more ominous paths. Statistical controls on these prior variables suggest, however, that subsequent fertility still has an independent influence and does not just mediate the influence of earlier measured variables” (p. 75).

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Section Three

Evaluations of Programs to Postpone Additional Pregnancies or Births to Teen Mothers

Programs for pregnant teenagers started to appear in the 1960s as the number of teen births was rising to its 1970 peak.⁶ There was also growing concern about the increasing percentage of teen births that were to unmarried women. The early programs concentrated primarily on ensuring that pregnant teenagers received prenatal care to reduce the incidence of poor pregnancy outcomes and on keeping the teenagers in school or returning them to school if they had dropped out. Most programs were located in prenatal clinics or alternative schools and were augmented with social services (Klerman, 1981).

Over time, concern with the long-term prospects of teen parents and their children led to programs that paid more attention to enhancing the life skills of teen mothers, improving their parenting abilities, and training them for employment. These programs were often operated within community agencies, including welfare offices in the

1980s and 1990s, as states started experimenting with reforming welfare. More programs began to offer extended postpartum services, some continuing for two years or longer after the child's birth (Klerman & Horwitz, 1992). Postponing so-called "repeat pregnancies" had always been one goal of these various programs. However, as program developers and policymakers increasingly saw the connection between additional teen births and welfare dependence, preventing additional births to teens received more attention.

Researchers launched evaluation studies to try to understand what programs were actually achieving, for whom, why, and under what circumstances. Some of these studies were quite simple in intent and design, others far more complex. This section reviews the studies that examined additional pregnancies and births in an effort to answer the important question, "what works?" That is, what does research tell us about the impact of these programs

6 Even though the birth rate was declining in those years, the absolute number of teens was very large and thus the absolute number of births was high—over 600,000.

on subsequent births to teen mothers? The section first summarizes some of the weaknesses of the research in this area and then describes how the studies included in this review were located and the criteria used in deciding which to include. It also explains how the programs are categorized. Then the programs themselves and their results are presented by category. Finally, some conclusions are offered about the relationship between program characteristics and preventing additional pregnancies and births to teen mothers.

Caveats About the Evaluation Research

Meaningful *comparisons* among studies in this area are hampered by many methodological problems (see the Appendix for a full discussion of these issues). These include:

- the use of quasi-experimental designs that compare teenage mothers in the intervention sample to teenage mothers in a comparison sample who are different in important ways;
- restricting samples to those under 18 in some studies and to those under 20 in others;
- the use of pregnancies as an outcome in some studies, births in others, and birth spacing in still others;
- differences in whether the intervention was limited to first-time mothers-to-be, or included—or was limited to—teenagers with previous pregnancies or births;
- differences in the length of follow-up, varying from 12 months after the first birth (the lower limit for the studies included in this review; see below) to 60 months;
- differences in the “starting point” from which additional pregnancies or births were measured (most studies measured from the first birth but some measured from the first interview, which might have been prenatal or postpartum);

- the inability of some studies to find many of the teenage mothers at 12 or more months after the first birth or the first interview; and
- inadequate descriptions of many of the programs as they were actually operated. For example, providers may not have offered all the services that they had planned to offer, or teenagers may not have attended all the classes or kept all the appointments that they should have. As a result, it is difficult to determine whether a lack of success was due to a failure of the intervention as designed or a failure of the intervention as it actually took place.

This section focuses primarily on programs designed for pregnant and parenting teenagers, even though a few of these programs enrolled a small percentage of women age 20 and older. Other programs created for women, regardless of age, at high risk of poor pregnancy outcome, poor parenting practices, or welfare dependency, have also enrolled high percentages of pregnant teenagers or young mothers, but they are included in this review only if analyses were conducted separately for the teenagers.

Assembling the Program Evaluations for Review

Literature Search. Several methods were used to locate evaluations of programs that had among their objectives postponing additional pregnancies or births to teenage mothers. First, Medline was searched from 1970 to 2002 using the following key words: teenagers, adolescents, pregnancies (repeat, second, subsequent), births (repeat, second, subsequent), and United States. A similar search was conducted in several social science databases and in two educational databases (Education Index and Educational Resource Information Center, ERIC). In order to obtain unpublished program evaluations, the National Campaign to Prevent Teen Pregnancy sent a letter to 62 maternal and child health leaders and organizations interested in teenage pregnancy. Also, requests for relevant evaluations were placed in the *Campaign Update*, the National Campaign’s newsletter that reaches 35,000

people, and in the newsletter of the National Organization for Adolescent Pregnancy, Parenting, and Prevention. Three organizations (Advocates for Youth, the American College of Obstetricians and Gynecologists, and the National Center for Education in Maternal and Child Health) searched their databases and provided lists of possible sources. The members of the National Campaign's Task Force on Effective Programs and Research provided additional leads. Finally, lists of references from various research articles and reports were searched for further sources.

Criteria for Inclusion. These sources located many studies of programs to prevent subsequent births or pregnancies, but this report reviews only those program evaluations that met the following criteria:

- The program targeted pregnant teenagers or teenage mothers exclusively or primarily, or conducted separate analyses for teenagers;
- The program was in operation in 1980 or later;
- The study was conducted in the United States;
- The study used an experimental or quasi-experimental design. Programs that only compared their results with those of other programs without some form of matching were not included;
- The analyses were based on a sample size of at least 50 in the intervention group and at least 50 in the comparison group; and
- The teenage mothers were followed for at least 12 months after the initial birth.

Categorization of Programs. Nineteen studies met these criteria. These programs differed in the populations that they targeted, although the majority served poor and minority teenagers. They also varied in the locations where the services were offered and in their strategies for preventing additional pregnancies and births. Most of the programs considered themselves comprehensive in scope, meaning that they offered health services,

delivered directly or by referral to the teenagers and sometimes their children; educational services, including formal schooling, GED preparation, employment training, and enhancement of parenting skills; and social services provided by case managers, social workers, nurses, and others.

To assist readers especially interested in designing intervention programs, this review categorizes the programs by the type of organizations that operated them and by their approach to the problem of subsequent teenage pregnancies or births. Thus, the material that follows describes:

- Interventions run by agencies in several communities over the same time period—these multi-site programs are often operated by community-based organizations (six studies);
- Interventions that took place in medical settings (four studies);
- Interventions operated in schools (but not in school-based clinics) (three studies);
- Interventions whose major component was home visiting (three studies);
- Studies of the use of the contraceptive implant (two studies); and
- Other interventions (one study).

Although some programs could have been placed in more than one category, each was placed in the category that seemed to best reflect the program's major component or emphasis. For example, the Teenage Parent Home Visitor Services Demonstration was operated in three sites but was categorized as a home visiting program, while the Parents Too Soon Project used home visitors but was categorized as a multi-site, community-based organization program.

The programs and their evaluations are described below and in Tables 2 through 7 (beginning on p.31) in chronological order within each category. Findings are considered statistically significant if the p value was equal to or less than

0.05, and marginally significant if the p value was between 0.06 and 0.10.

The descriptions in this chapter are based on the program's design—that is, the services that the program directors planned to provide—rather than the way the program actually operated. In many cases, there was a discrepancy between the plan and its implementation; some of the publications described such inconsistencies and problems. For more detailed information about the services provided by the programs, the research designs, and the results, readers should consult the publications cited.

Results of the Program Evaluation Review

Interventions Operated by Agencies in Several Communities Over the Same Time Period.

Project Redirection was one of the first multi-site programs funded by governmental agencies and foundations (in this instance by the federal Department of Labor and the Ford Foundation) to help disadvantaged teen mothers. It featured service coordination, employment training, development of “Individualized Participation Plans,” peer group sessions, and use of community women—volunteers who served as role models and supported the teenagers as they worked towards their personal goals. It enrolled pregnant teenagers or new mothers who were under age 18, without a high school diploma or GED, and living in a household in which one or more person was either receiving or eligible to receive welfare. Teenagers received services for about a year. Operated by community-based organizations in Boston, Harlem, Phoenix, and Riverside, California, it was evaluated with a quasi-experimental design that used, as comparison groups, teenagers who met program criteria but lived in matched communities. At 12 months after they enrolled in the program, the percentage of mothers with an additional pregnancy was significantly lower in the intervention than in the comparison groups. The data from longer follow-up were less positive. When the intervention and comparison groups were compared at

24 months, the percentage of pregnancies was not significantly different between the two groups, but the percentage of live births was marginally lower in the intervention group. While the intervals between pregnancies were significantly longer in the intervention group, the difference was only about two months. At 60 months after the initial interview, when a sub-sample was studied, the mean number of pregnancies was not significantly different between groups and the mean number of live births was higher in the intervention group (Polit & Kahn, 1985; Polit, 1989).

A second multi-site program, the Parents Too Soon Project of the Ounce of Prevention Fund, was a network of local programs funded by the Illinois Department of Children and Family Services. The sites for the community-based programs were selected on the basis of several community-level indicators of risk, including the adolescent birth rate. The program used a family support and education model of service delivery and was designed to serve pregnant teens or young mothers for up to two years after the birth of their children. The primary services were home visiting and parent groups. Paraprofessionals conducted home visits for up to two years postpartum. The parent groups met weekly using a peer-support model. Most of the facilitators were former adolescent mothers. The program was evaluated with a quasi-experimental design using a comparison group of teen women in the National Longitudinal Survey of Youth (NLSY) who had their first children between the 1978 and 1981 surveys. Controlling for baseline differences in the two groups, the NLSY sample was about 1.4 times more likely than the Parents Too Soon group to experience an additional pregnancy by 12 months postpartum. (Ruch-Ross, Jones, & Musick, 1992).

A second evaluation of the Parents Too Soon Project was undertaken, focusing on four sites. A quasi-experimental design was used with participants matched with non-participants on three variables: receipt of Aid to Families with Dependent Children (AFDC) medical assistance grants, a birth before age 21, and geographic area. Two years after the initial birth, only one of the sites showed a

marginally significant lower percentage of births than did the comparison group. The researcher hypothesized that this might have been due to the participants in the successful program being more likely to still be involved two years after the initial birth than the participants in the other programs (Kirby, 1992).

A third multi-site program, the Teenage Parent Welfare Demonstration, received funding from the federal Administration for Children and Families, U.S. Department of Health and Human Services. The demonstration required all first-time teenage parents who were newly eligible for welfare to participate. Welfare offices in Camden and Newark, New Jersey, and in Chicago operated the program, which enrolled pregnant teens as well as teen mothers. Its primary intervention was a case manager, specially trained to work with teen parents, who helped the participants move toward self-sufficiency. Participants were required to attend workshops designed to promote personal and parenting skills, increase awareness of contraceptive methods and of sexually transmitted diseases, and prepare them for education, training, and employment. The case managers could impose financial penalties on teenage mothers who persistently failed to participate in planned activities. The demonstration was evaluated using a randomized, controlled design. At a follow-up approximately two years after intake, there was a marginally significant positive impact on subsequent pregnancies at one of the three sites (Maynard & Rangarajan, 1994).

The fourth multi-site program, New Chance, received funding from the federal Department of Labor as well as several other sources. It offered employment preparation, a life skills and opportunities curriculum, health education and health care, parenting education, case management, and child-care. Women were recruited who had first given birth as teenagers, who had dropped out of high school, and who were receiving welfare. The program was operated by community organizations at 16 sites. It was evaluated using a randomized, controlled design. There were no significant differences between the intervention and the control groups in the percentage becoming pregnant or giving birth

at any time up to 42 months (Quint, Bos, & Polit, 1997).

The fifth multi-site program is Early Head Start, an ongoing program of the federal Administration on Children, Youth, and Families. The program enrolls low-income pregnant women and those with a child under one year of age. It initiates services during pregnancy (for women who enroll when pregnant) and continues until the child is three years of age. In the evaluation study, some sites were center-based programs, providing center-based child care and education, parent education, and a minimum of two home visits per year; others were home-based programs, providing all services to families through weekly home visits and at least two group socializations per month; and some used a mixed approach. All programs concentrated on enhancing the child's development and supporting families. Like the nurse home visiting program (see below), Early Head Start was not targeted primarily to teenagers, but the final report of its evaluation provided analyses of service receipt and outcomes for the almost two-fifths of participants who were teenage mothers. The evaluation used a randomized, controlled design and was limited to 17 sites. The researchers reported that at 24 months after random assignment, subsequent births among the teenage parents were lower in the experimental than in the control group, but the results were not statistically significant. The research team noted, "service receipt, particularly receipt of intensive services, by teen mothers in the program group tended to be lower than service receipt by older mothers in the program, consistent with staff perceptions that it was harder to serve a teenage mother. The only exception was child care use by teen mothers in the program group, which was generally higher than child care use by older mothers in the program group" (p. 332) (Love, Kisker, Ross, et al., 2002).

Interventions Conducted in Medical Settings.

Many medical clinics serving pregnant teenagers and/or their children have expanded to include educational and social services. The four published studies described here were all conducted in the 1980s.

The Comprehensive Adolescent Program at the Queens Hospital Center in New York provided prenatal and postpartum care to teenagers. Each pregnant teenager and newborn was assigned to a team comprised of an obstetrician, pediatrician, social worker, and health educator for the duration of care. Biweekly classes for the patient, her partner, and her family focused on reproductive health and family life education. The program was evaluated using a quasi-experimental design with a comparison group of adolescents who received care at the hospital's adult obstetric and family planning clinics and its pediatrics clinic in the two years before the inception of the adolescent program. A significantly smaller percentage of those in the intervention than in the comparison group became pregnant or gave birth again during their adolescence for all years of the program (Rabin, Seltzer, & Pollack, 1991).

The Teen Mother and Child Program in Salt Lake City, Utah offered a comprehensive prenatal and postpartum program that provided medical, psychosocial, and nutritional services to young mothers and their infants. Services began during pregnancy and continued for two years postpartum. The program was evaluated using a quasi-experimental design with a comparison group composed of WIC participants at a county health department. The difference between the intervention and the comparison groups in the percentage with an additional pregnancy was marginally significant at 12 months (that is, the intervention group had fewer pregnancies), but not in the 12- to 26-month period (the results were not presented cumulatively) (Elster, Lamb, Tavare, & Ralston, 1987).

The Teen Baby Clinic offered enhanced postpartum care, including social worker contacts, care by a pediatrician and nurse-practitioners, family planning counseling by all three professionals, health teaching in the waiting room by a nurse-practitioner and trained volunteers, and reminders for missed visits. The program was evaluated using a randomized, controlled design with the comparison group receiving routine well-baby care in the same hospital. At 18 months, a significantly lower

percentage of the women in the intervention than the comparison group had experienced an additional pregnancy (Sullivan & Jacobsen, 1992).

The West Dallas Youth Clinic in Texas offered prenatal and postpartum services in a school-based comprehensive clinic. Pregnant and parenting students received prenatal care, nutrition counseling, a parenting education program, postpartum family planning referrals, and some primary care services. The program was evaluated using a quasi-experimental design with teenagers who attended a general reproductive health clinic serving as a comparison group. There were no significant differences in subsequent births at 24 months postpartum (Setzer & Smith, 1992).

Interventions Conducted in Schools. Schools were some of the earliest sites of programs for pregnant adolescents and alternative education programs for this population continue to flourish across the country. (Note that an intervention in a school-based *health* center is included in the section on interventions in medical settings, above, reflecting its primary focus.)

The Polly T. McCabe Center was an alternative public school operated for pregnant students in New Haven, Connecticut. In addition to the usual academic curriculum, the school offered general and pregnancy-related educational programs and social and medical services specifically for pregnant teenagers. Nurses and social workers offered counseling. The program was evaluated using a quasi-experimental design based on a natural experiment. Students were allowed to remain in the alternative school through the academic quarter in which they delivered; but if the delivery occurred in the third academic quarter, they were permitted to complete the fourth quarter as well and to continue receiving medical and social services along with education. This enabled the researchers to divide the study population into an intervention group that spent more than seven weeks postpartum at the alternative school and a control group that spent seven weeks or less. There was a significantly lower percentage of second deliveries at 24 and 60 months in the group with the longer stay (Seitz & Apfel, 1993).

The Special School program in Dallas County, Texas, provided prenatal care and information on health care issues related to pregnancy, childbirth, and child care at an alternative school. The program was evaluated using a quasi-experimental design with one control group drawn from a special program at community prenatal clinics and the other from those who received prenatal care at the same clinics in the three months before the initiation of the special program. (The prenatal clinic program had too few participants to be included in the medical setting category.) At the end of five years, no significant differences were found among the three groups in the proportion giving birth (Jones & Mondy, 1994).

The Second Chance Club in a South Carolina urban public high school offered weekly group meetings focused on parenting, career planning and group support, participation in school events, individual case management and home visits, medical care for the adolescent and infant through a linked university clinic and a school-based clinic, and service projects in the community. The evaluation used a quasi-experimental design with a comparison group of teenage mothers selected from birth certificates and matched on race, age at delivery, year of delivery, parity, prenatal care, and mother's education. There was a significant difference in the percentage of additional births between the intervention and the comparison group within three years—with the intervention group having fewer births (Key, Barbosa, & Owens, 2001).

Interventions Whose Major Component Was Home Visiting. Nurse home visiting programs in Elmira, New York (1978–1983), and Memphis, Tennessee (1988–1992), used specially trained nurses who started visiting their clients during pregnancy and continued through two years postpartum. The nurses visited on a regular schedule and followed a protocol for what was to be discussed at each visit. The three basic activities were parent education, enhancing the women's informal support systems, and linking them with community services. Nurses emphasized the strengths of the women and their families. Pregnant women selected for the study were at elevated risk for a

poor pregnancy outcome, a poor maternal life course generally, and/or child development problems. Both programs were evaluated using a randomized, controlled design. While both programs enrolled large numbers of pregnant teenagers, the results published by the research team were not limited to this age group (Olds, Henderson, Tatelbaum, & Chamberlin, 1988; Olds, et al., 1997; Kitzman, et al., 1997; Kitzman, et al., 2000). A reanalysis restricted the samples to those who were under age 20 at the time of randomization. In Elmira, the proportion who had a second birth in the home-visited group was not significantly different from the comparison group at 12 months, but it was significantly lower at 24, 36, and 45 months. Similarly, in Memphis, the proportion with a second birth in the home-visited group was significantly lower at 24, 36, and 45 months, but not at 12 months (Klerman, Baker, & Howard, 2003).

The Teenage Parent Home Visitor Services Demonstration was a multi-site demonstration program funded by the federal Administration for Children and Families and the Henry J. Kaiser Family Foundation. The demonstration took place in South Chicago, Illinois; Dayton, Ohio; and Portland, Oregon in the mid-1990s. The study population consisted of first-time teenage parents who were receiving AFDC and participating in the Jobs Opportunities and Basic Skills Training (JOBS) program. Each site established two programs: one operated by a community-based organization with substantial experience in providing home visiting services and the other by the local welfare agency with limited experience with home visiting. Visits were weekly or biweekly and addressed a range of issues detailed in the demonstration's curricula, including parenting skills, family planning, obtaining health care for the mothers and their children, and securing necessary resources and supports. Non-compliance with home visits or other JOBS requirements could result in sanctions—that is, reductions in their cash assistance grants. The program was evaluated using a randomized, controlled design with the control group participating in the JOBS program only. At a mean of 21 months after enrollment, the percentage who had been pregnant

or given birth again was slightly higher in the home-visited group than in the comparison group, despite the fact that a higher percentage of the home-visited group reported using any form of contraception (Kelsey, Johnson, & Maynard, 2001).

Studies of Use of the Contraceptive Implant.

In the last 15 years or so, several new methods of providing hormonal contraception to women have become available, including implants, patches, injections, and emergency contraception. Each of these methods has the potential for substantially reducing unwanted pregnancies because, unlike most forms of contraception, they require neither daily maintenance (like birth control pills) nor use at each instance of sexual intercourse (like condoms). Two studies have assessed the effect of one of these methods—a contraceptive implant—on additional pregnancies and births among teenage mothers. Although both showed significant positive results, these evaluations were not randomized trials: teenage mothers who requested the implant were compared with those who did not. It is likely that those who requested this contraceptive method, even if they later requested that the implant be removed, were more motivated to prevent a rapid subsequent pregnancy than those who chose another contraceptive method or no method at all.

The first study was a natural experiment made possible when Colorado approved Medicaid coverage for the implant in 1991. Medicaid-eligible teenage mothers could request the implant in 1992 but not in 1991. At 12, 18, and 24 months after their first Medicaid birth, the proportion who had a second Medicaid-financed birth was higher among those in the 1991 than in the 1992 group. The 29 percent difference in the rate of second and higher order births between the 1991 and 1992 groups at 24 months (22.3 percent to 15.9 percent) was statistically significant. Also, among the teenagers who delivered in 1992 and chose the implant, only 2.3 percent had a second delivery within two years, compared to 22.1 percent of those who did not choose this method (Ricketts, 1996).

Teenage mothers who received their care in the Colorado Adolescent Maternity Program in the early 1990s, a comprehensive program in a medical setting, were also given a choice of contraceptives. At both 12 and 24 months, those who had the implant inserted within six months of delivery (an average of 1.1 weeks) had a significantly lower percentage of subsequent pregnancies than those who chose another method or no method (Stevens-Simon, Kelly, & Singer, 1999).

Other Interventions. The Dollar-a-Day Program was developed in the early 1990s. It offered adolescent mothers one dollar for each non-pregnant day. In the intervention as implemented in Denver, participants attended weekly peer support meetings, shared snacks, and discussed present concerns and goals for the future in a supportive, adult-led environment. The group leaders used the mothers' problems and concerns to encourage discussion of contraception, as well as of education and training requirements associated with specific career choices. Participants were recruited from the postpartum ward at a university hospital and from an adolescent maternity program. The program was evaluated using a randomized, controlled design. One comparison group received the financial incentive but was not involved in the peer groups. A second comparison group was involved in the peer groups only, and a third comparison group received neither a financial incentive nor was invited to the group sessions. Among the four groups, there was no significant difference in the percentage pregnant again at 6, 12, 18, or 24 months postpartum (Stevens-Simon, Dolgan, Kelly, & Singer, 1997).

Three additional programs are relevant to this review, but either do not have pregnancy prevention as a primary focus or have not yet been evaluated.

- Ohio's Learning, Earning and Parenting (LEAP) program has as its primary focus increasing the percentage of teenage mothers who attend school and graduate, and assessing the impact of these outcomes on employment and earnings. A 7-county survey of LEAP conducted three years after random assignment

found no significant differences in births between the intervention and control groups. In the year before the survey, 26.7 percent of the intervention group and 25.7 percent of the control group had given birth again (Bos & Fellerath, 1997).

- Cal-Learn, a program with a similar purpose, also used a randomized design and found no significant impact on subsequent childbearing among women assessed two years after entering the program. Overall, 28 percent of the teens overall had conceived again (Mauldon, Malvin, Stiles, et. al., 2000).
- Second Chance Homes are maternity group homes that provide housing and on-site social support services for pregnant teenagers and new mothers who cannot live at home. Several states and the federal government are interested in this approach to reducing the problems associated with teen pregnancies and births, including additional pregnancies. No large-scale evaluation of this program is yet available, but limited evidence suggests that the homes may reduce subsequent pregnancies.

Conclusions

The results of this review are mixed. Over half of the studies reported that they had been able to significantly postpone additional pregnancies or births to teen mothers for some time period. But only three of these studies showing significant positive effects were based on randomized, controlled designs: the nurse home visiting studies in Elmira and Memphis and the Teen Baby Clinic. Moreover, the size of the effects was often small, and the rates of subsequent birth were often still large (Stevens-Simon, 2003). Questions can be raised about the results of almost all of the other studies that used quasi-experimental designs. Few programs that have been carefully evaluated through using strong research designs have been able to reduce the percentage of additional births in the two years after the prior birth to less than 20-25 percent, which is close to what would have been expected without an intervention.

Even so, understanding the relationship between specific program characteristics and positive results may help define the elements of successful programs. Accordingly, the balance of this section examines the programs according to their settings, the services they provided, the personnel delivering the services, when the services began and how long they continued, their major emphasis, their use of incentives or disincentives, the attention they gave to family planning, and the extent to which the programs were conducted according to plan (that is, the “fidelity” of implementation).

Service Location and Type. Four of the six multi-site programs based largely in community agencies reported limited success. Project Redirection had marginal success in preventing additional births at 24 months. Parents Too Soon may have been successful, but the use of the NLSY comparison group in the first study may not have been appropriate and success was reported for only one of four programs in the second study. The Teenage Parent Welfare Demonstration reported success at one site. Two of the four programs in a medical setting reported positive results, but the Queens program provided little information about its samples and did not conduct multivariate analyses, so its positive results are questionable.

Two of the three programs in school settings reported positive results, but the McCabe Center had a small sample and has never been replicated. The Second Chance Club probably biased its findings by comparing teenage mothers who were recruited from the school and returned to school following delivery to a control group whose postpartum school status was unknown (Stevens-Simon, 2001).

Two of the three home visiting programs were successful—the ones that used trained nurses. The fact that the nurse home visiting program had a positive impact both with largely white (Elmira) and with largely African-American (Memphis) populations makes the evidence stronger. The home visiting program that did not have a significant effect used paraprofessionals (see discussion under Program Personnel below). The absence

of a strong effect in the home-based Early Head Start sites is puzzling.

Programs that used welfare offices or welfare personnel (the Teenage Parent Welfare Demonstration and the Teenage Parent Home Visitor Services Demonstration) report limited or no success. And the results from the two contraceptive implant studies are very impressive, but the intervention groups were self-selected.

Programs that involved classroom instruction, such as workshops or peer support groups, were not particularly effective, even when their focus was on family planning. (The report on the Dollar-A-Day program noted that some of the teenagers in the peer support groups talked about the benefits of having another child or reservations about contraception, thereby reinforcing the very attitudes that the groups were designed to change.) Programs that involved one-on-one contact were sometimes effective if they involved professional counseling, but seldom when they used case managers or community volunteers serving as mentors.

Thus, no single site or approach seems overwhelmingly better than any other. The most important factor in preventing subsequent pregnancies may be the strength of the relationship built between the teenage mother and the individual working with her. Interactions in the home may encourage strong relationships because each interaction is usually longer, and the environment may be less stressful than that of a medical clinic, school, or community-based agency. Nevertheless, it may be possible to build such relationships in these settings if sufficient time is allowed for the interaction and if a place can be found for such interaction to take place with minimum interference. The strength of the relationships developed may explain the success of the two home visiting programs that used nurses, as well as some of the programs that did not involve home visiting but were able to meet the conditions mentioned above, such as the McCabe Center. In addition, teenagers may have greater exposure to home visiting programs because the visitor comes to the teenagers. Other programs place the responsibility for an interaction

on the teenager, who may not schedule or keep appointments for services.

Program Personnel. There are some indications that the background of the individual who delivers the intervention may make a difference, at least when the service is home visiting. The home visiting programs in Elmira and Memphis, which employed trained nurses had significant positive findings, while the Teenage Parent Home Visitor Services Demonstration program that used workers who primarily had on-the-job training, did not. Moreover, a nurse home visiting program in Denver that was basically the same as the ones in Elmira and Memphis has also reported significant delays in subsequent pregnancies, although these results were not limited to teenagers. The Denver study also showed that paraprofessional visitors who received the same training as nurses were less effective than trained nurses (Olds, Robinson, O'Brien, et al., 2002).

Data and comments from the Teenage Parent Home Visitor Services Demonstration shed some light on this issue. Thirty percent of the demonstration's home visitors had been teenage parents and 60 percent were former welfare recipients. While most had completed high school and some had attended college, less than one-quarter had a bachelor's degree and none had professional degrees in nursing, counseling, or social work. Those paraprofessional visitors may not have been perceived as authority figures by the teenagers, although the nurses in Elmira and Memphis probably were. Interestingly, the teenage mothers in the demonstration whose visitors were employed by the welfare agency were significantly more likely than those whose visitors were employed by a community agency to become pregnant (42 percent vs. 34 percent). The researchers noted, "This pattern of outcomes is consistent with the observation that the home visitors employed by the welfare agencies seemed to be especially uncomfortable addressing issues of sexual health and providing serious contraceptive information and support" (p.57). Musick (1993) has also noted the problems in using paraprofessional workers in programs for teenagers. She states that such workers "lack easy access to the

mainstream institutions and organizations that are vital pathways to success” and that “lay staff workers are more likely to be hampered by their own inadequately resolved problems around sexuality, relationships to men, childrearing practices, family violence, assertiveness, or autonomy” (p.200). As a result, these subjects may not be raised often, with enough emphasis, or at all. The Parents Too Soon program, however, employed paraprofessional home visitors and reported some success, but these evaluations had weak designs.

Service Initiation and Length. Most of the programs sought to develop a close relationship between the teenagers and the personnel who served them in the belief that such a relationship was crucial to achieving positive results. It may be easier to build such relationships if contact begins during the pregnancy, when the teenagers may be under less pressure than after the infant is born. (Some of the programs serving pregnant teenagers were restricted to those expecting a first birth.) Both of the successful nurse home visiting programs started in the prenatal period and continued to the end of the child’s second year. But so did many of the other, less successful programs. One of those that was postpartum-only claimed success (Teen Baby Clinic), but others did not (New Chance and Dollar-a-Day). On the other hand, the one program that was prenatal-only, the Special School, did not report success at 60 months. Thus, the evidence about the importance of prenatal initiation is mixed.

Longer program involvement may also contribute to postponing additional births. Success in the McCabe Center was attributed to maintaining the teenage mothers in the special school for a long time. The Elmira and Memphis home visiting programs scheduled visits until the child’s second birthday. The one successful site in the second evaluation of Parents Too Soon was the one where participants were more likely to be involved for two years postpartum. Moreover, several of the studies that found their initial success in preventing births was *not* sustained attributed the increase in births to the termination of services by agency policy or because teenagers stopped participating even if ser-

vices were still available. On the basis of such results, Early Head Start with its three-year program should have shown a positive effect.

Thus, the success of the nurse home visiting programs may be due neither to the personnel (nurses) nor to the site (homes), but rather to the length of the follow-up. Although other programs attempted to provide services for two years (and the nurse home visiting programs did not provide services to all of its participants for this length of time), the nurse home visiting programs may have been the most successful in maintaining long-term, intense relationships with teenage mothers.

Major Emphasis. Although all the programs reviewed included preventing additional pregnancies and births among their goals, it appeared that many were more concerned with healthy pregnancies and infants, return to school, and high school graduation. The nurse home visiting programs were perhaps unique in their attention to the mother’s and the infant’s development. Several programs had a welfare-to-work focus and enrolled only teenagers whose households received cash assistance (Teenage Parent Welfare Demonstration, New Chance, and Teenage Parent Home Visitor Services Demonstration). With the possible exception of the nurse home visiting programs, the major emphasis of the programs did not seem to make a difference in their effectiveness in preventing additional pregnancies or births.

Incentives and Disincentives. The Dollar-a-Day program offered financial incentives for avoiding pregnancy. The results were not positive. The case managers in the Teenage Parent Welfare Demonstration and the Teenage Parent Home Visitor Services Demonstration could impose financial penalties on clients in the intervention group who persistently failed to participate in planned activities. The results were marginally significant at only one of the three sites of the Welfare Demonstration. Thus, financial incentives and disincentives at the levels offered in these programs did not seem to have much impact in these evaluations. Perhaps larger incentives and/or disincentives might lead to different results.

Attention to Family Planning. The amount of time and effort devoted to family planning varied, in so far as it could be judged by the short published program descriptions. The contraceptive implant programs appeared to be successful, but the evaluations were based on self-selected populations. The Dollar-a-Day program had a major family planning focus, and receipt of the financial incentive was based on staying non-pregnant, yet it was not successful. The programs with a welfare-to-work focus included a good deal of material on family planning in their curricula. But as was indicated in the section on Program Personnel, some workers resisted dealing fully with this subject. The nurses in two of the home visiting programs probably felt less discomfort about discussing fertility issues. Moreover, the home may be a more conducive environment for such discussions. Without additional detail on what family planning education and services were expected in each of the programs and how much of what was planned actually took place, it is impossible to determine whether the degree of attention paid to family planning made a difference.

Fidelity of Implementation. It is possible that some of the interventions could not report success in postponing subsequent pregnancies and births because of their inability to actually carry out their proposed interventions, rather than because the interventions themselves did not have the potential to reach their objectives. Both teenagers and staff can cause implementation problems. For instance, some programs reported that their teenage participants did not always attend support groups for which they had enrolled and were not always present when home visitors arrived for scheduled visits. The Early Head Start report made particular note of the difficulties in involving teenage mothers. Programs also reported that staff sometimes made fewer visits and other contacts than scheduled, although it is generally unclear whether this was because the staff did not try hard enough or the teenagers were unavailable. Reports on the Denver home visiting program indicate both that paraprofessionals completed fewer visits than did the nurses (Korfmacher, O'Brien, Hiatt, & Olds, 1999) and that nurse-visited participants had better

outcomes on most measures than those who were visited by paraprofessionals, suggesting that implementation does make a difference (Olds, et al., 2002).

Not All Bad News? But even the programs without positive results should be placed in context. Many of the programs that did not claim success in delaying additional pregnancies and births—and even some that did—reported success in other aspects of their programs, including better rates of returning to school and graduating or improved maternal-child relationships. Postponing additional pregnancies and births was only one of several goals in all the projects except three: the Dollar-a-Day program and the two implant studies.

The results may also be negatively skewed by the fact that several of the studies chose an inappropriately long period over which to measure outcomes, asking the program to achieve an unrealistically lofty goal. Defining subsequent births within a 12- or even a 24-month period as a failure may be reasonable, but considering births after 36 months or even later as program failures may be unrealistic, especially for teenage mothers who may be 20 years or older and high school graduates by that time.

In addition, most of the evaluations were conducted before the contraceptive implant or other newer methods of hormone administration were widely available. The use of the contraceptive implant had a significant impact on subsequent pregnancies in two studies, although the self-selected nature of the intervention group makes it difficult to generalize. Perhaps if some of the earlier interventions were combined with newer contraceptive methods (such as periodic injections, the contraceptive patch, and emergency contraception), they would show significant positive results.

Finally, it is important to remember that many of the programs showed favorable results overall, even though they were not statistically significant, and that some showed favorable results in subgroups. Perhaps with more subjects and over a

longer period of time, the results would have been more favorable.

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Legend for Tables 2 Through 7

AFDC	Aid to Families with Dependent Children
CBO	Community-based organization
Mos	Months
JOBS	Jobs Opportunities & Basic Skills Program
NLSY	National Longitudinal Survey of Youth
Yrs	Years

Note on Statistical Significance: In the tables, the statistical significance of some findings is provided when the results were in the anticipated direction, that is, the intervention group had better results than the comparison group:

Significant = Statistically significant ($p < .05$)

Marginally significant = Statistical significance is marginal ($p > .05 / < .11$)

Not significant = Not statistically significant ($p > .10$)

Table 2: Interventions Implemented by Agencies in Several Communities over the Same Time Period

Program Authors Publication Year	Program Period & Sites	Service Period	Eligibility: Age Pregnancy Welfare/Medicaid	Sample Size: Intervention; Comparison	Black & Hispanic Percentage: Intervention; Comparison	Research Design Analytic Method	Results: Pregnancies Intervention; Comparison	Results: Births Intervention; Comparison
Project Redirection Polit & Kahn 1985 Polit 1989	1980-1983 CBOs at 4 sites	Prenatal & postpartum (average 1 yr)	< 18 yrs Pregnant or parent	789	86.1%; 89.8%	Quasi-experimental Comparison group: teens in matched communities Multivariate analyses	At initial interview, 60% pregnant At 12 mos after initial interview: 14%; 22% (significant) At 24 mos after initial interview: 45%; 49% (not significant) Mean # of pregnancies at 60 mos: 3.1; 2.9	At initial interview, 60% pregnant At 24 mos after initial interview: 22%; 29% (marginally significant) Mean # of births at 60 mos: 2.4; 2.0 (not significant)
Parents Too Soon Ruch-Ross, Jones, & Musick 1992	1985-1988 27 CBOs in Chicago area	Prenatal & postpartum (up to 2 yrs)	<20 Pregnant or 1 child	1,004; 790	58.2%; 53.2%	Quasi-experimental Comparison group: NLSY respondents <20 yrs with first child between 1978 & 1981 surveys Multivariate analyses	12 mos. post-baseline: NLSY sample 1.4 times more likely to be pregnant (significant)	No data
Parents Too Soon Kirby 1992	1985-1988 3 sites in Chicago 1 in Southern Seven counties	Prenatal & postpartum (up to 2 yrs)	<20 Pregnant or 1 child	Chicago: 1,049; 1,715 County: 111; 121	Chicago: >90% County: 38%	Quasi-experimental Comparison group: selected from birth certificates matched on AFDC receipt, birth prior to 21 yrs, geographical area Multivariate analyses	No data	12 mos: Chicago range: 0.0%-1.3%; 3.0% (marginally significant for 2 sites) County: 0.9%; 2.5% (not significant) 24 mos: Chicago range: 16.7%-22.4%; 20.3% (significant for 1 site) County: 14.7%; 9.9% (not significant)

Teenage Parent Welfare Demonstration Maynard & Rangarajan 1994	1987-1991 Camden & Newark, NJ, Chicago	Prenatal & postpartum	Pregnant or 1 child AFDC recipient (3.9% \geq 20 yrs at enrollment)	1,721/1,691 (for sample that completed follow-up survey at least 23 mos postpartum)	92.1% of overall sample	Randomized, controlled trial Multivariate analyses	At 29 mos (average follow-up post-intake), mean percentage point difference between intervention and comparison group: Camden: +5.3 Newark: +4.4 Chicago: +6.8	36 mos: Chicago range: 24.0%-29.5%; 27.5% (not significant) County: 19.0%; 13.6% (not significant)
New Chance Quint, Bos, & Polit 1997	1989-1994 16 sites at CBOs, schools & others	Postpartum only (18 mos)	First birth < 20 years One or more children AFDC recipient (32.6% \geq 20 yrs at enrollment)	1,553; 769 at randomization	74.8%; 76.1%	Randomized, controlled trial Multivariate analyses	At 29 mos (average follow-up post-intake), mean percentage point difference between intervention and comparison group: Camden: -5.5 (marginally significant) Newark: +6.5 Chicago: + 4.1	12 mos: 11.4%; 10.7% 24 mos: 35.0%; 33.6% 36 mos: 49.1%; 50.1% (not significant)
Early Head Start Love, Kisker, Ross, et al. 2002 Corrected results based on personal communication, Kisker, E.E.	1996-2001 17 sites	Prenatal & postpartum	Pregnant or child < 12 mos	total: 1,513; 1,488; sample for teenage mother birth analysis: 373; 349	58% of overall sample	Randomized controlled trial Multivariate analysis	No data	24 mos after randomization: 22.9; 29.2% (not significant)

Table 3: Interventions Conducted in Medical Settings

Program Authors Publication Year	Program Period & Sites	Service Period	Eligibility: Age Pregnancy Welfare/Medicaid	Sample Size: Intervention; Comparison	Black & Hispanic Percentage: Intervention; Comparison	Research Design Analytic Method	Results: Pregnancies Intervention; Comparison	Results: Births Intervention; Comparison
Comprehensive Adolescent Program Rabin, Seltzer, & Pollack, 1991	1982-1989 Queens Hospital Center	Prenatal & postpartum (until 20 yrs or thru 1989)	<20 yrs at delivery (Prior pregnancy or birth not specified)	498; 91	No data	Quasi-experimental Comparison group: Care from hospital Adult Obstetric Clinic before program inception Chi-square statistical test	Over all program years: 9%; 70% (no significance test reported)	Over all program years: 3%; 36% (significant)
Teen Mother & Child Program Elster, Lamb, Tavare, & Ralston, 1987	1983-1986 University of Utah School of Medicine	Prenatal & postpartum (2 yrs)	< 18 yrs at intake Prior pregnancy: 25%; 21%	125; 135	14%; 22%	Quasi-experimental Comparison group: WIC recipients at county health dept Multivariate analyses	12 mos: 8%; 18% (marginally significant) 12-26 mos: 29%; 39% (not significant)	No data
Teen Baby Clinic Sullivan & Jacobsen, 1992	1983-1986 Hospital	Postpartum only	< 18 yrs No prior birth	120; 123	100%	Randomized, controlled trial Chi-square statistical test	18 mos: 12%; 28% (significant)	No data
West Dallas Youth Clinic Seltzer & Smith, 1992	1986-1988 School-based primary health care clinic	Prenatal & postpartum	12-19 yrs Prior birth: 17%; 33%	174; 165	99%; 95%	Quasi-experimental Comparison group: categorical reproductive health clinic Proportions; life table analyses	No data	24 mos: 19%; 28% (not significant)

Table 4: Interventions Conducted in School Settings

Program Authors Publication Year	Program Period & Sites	Service Period	Eligibility: Age Pregnancy Welfare/Medicaid	Sample Size: Intervention; Comparison	Black & Hispanic Percentage: Intervention; Comparison	Research Design Analytic Method	Results: Pregnancies Intervention; Comparison	Results: Births Intervention; Comparison
Polly T. McCabe Center Seitz & Apfel, 1993	1979-1980 Alternative school	Prenatal & postpartum (up to 32 wks)	< 19 yrs at delivery No prior birth	50; 52	100%	Quasi-experimental Intervention group: students who attended >7 wks Comparison group: students who attended 7 or fewer wks Bivariate analyses	No data	24 mos: 12%; 36% (significant) 60 mos: 45%; 70% (significant)
Special School Jones & Mondy, 1994	1984-1985 Alternative school	Prenatal	< 18 yrs at delivery No prior birth	Intervention group: 71 Two comparison groups: 37; 108	100%	Quasi-experimental Comparison groups: special program at community prenatal clinics & those receiving prenatal care at same clinics in 3 mos prior to special program initiation Bivariate analyses	No data	At 60 mos: 1 birth: 25%; 35%; 25% 2 births: 38%; 43%; 42% 3 births: 21%; 22%; 26% 4 births: 16%; 0%; 7% (all not significant)
Second Chance Club Key, Barbosa, & Owens, 2001	1994-1997 High school	Prenatal and postpartum (thru school years)	Enrolled in school	50; 255	98%; 92%	Quasi-experimental Comparison group: randomly selected from birth certificates matched on race, age at delivery, yr of delivery, parity, prenatal care, education Bivariate analyses	No data	36 mos: 6%; 37% (significant)

Table 5: Interventions Whose Major Component was Home Visiting

Program Authors Publication Year	Program Period & Sites	Service Period	Eligibility: Age Pregnancy Welfare/ Medicaid	Sample Size: Intervention; Comparison	Black & Hispanic Percentage: Intervention; Comparison	Research Design Analytic Method	Results: Pregnancies Intervention; Comparison	Results: Births Intervention; Comparison
Nurse Home Visitation Olds, Henderson, Tatalbaum, & Chamberlin, 1988 Olds, Eckenrode, Henderson, et al., 1997 Results based on re-analysis by Klerman, Baker, & Howard 2003, because original study included those 20 yrs & older	1978-1983 Elmira, NY	Prenatal & postpartum (2 yrs)	Original: included some >20 yrs Reanalysis: <20 yrs No prior birth	99 visited prenatal & postpartum 90 visited prenatal only 165 not visited	Approx 90%	Original: randomized controlled trial Re-analysis: survival analyses	No data	12 mos: 0%; 0.7% (not significant) 24 mos: 16.0%; 25.6% (significant) 36 mos: 30.6%; 42.9% (significant) 45 mos: 43.4%; 63.0% (significant)
Nurse Home Visitation Kitzman, Olds, Henderson, et al., 1997 Kitzman, Olds, Sidora, et al., 2000 Results based on re-analysis by Klerman, Baker, & Howard, 2003, because original	1990-1994 Memphis, TN	Prenatal & postpartum (2 yrs)	Original: included some >20 Reanalysis: <20 No prior birth	228 visited prenatal and postpartum 515 not visited	92%; 89%	Original: randomized, controlled trial Re-analysis: survival analyses	No data	12 mos: 1.9%; 0.3% 24 mos: 21.0%; 28.3% (significant) 36 mos: 41.9%; 51.9% (significant) 45 mos: 50.5%; 63.0% (significant)

study included those 20 yrs & older	Teenage Parent Home Visitor Services Demonstration Kelsey, Johnson, & Maynard, 2001	1995-1999 Chicago, IL; Dayton, OH; Portland, OR (CBO & welfare agency in each)	Postpartum only (6-30 mos)	<20 (some may have given birth as teenagers but been older at enrollment) No prior birth On AFDC & in JOBS program	392; 362 (at follow-up survey)	56%; 60%	Randomized, controlled trial Multivariate analyses	14-27 mos (average 21 mos); 39.2%; 34.4%	14-27 mos (average 21 mos); 18.1%; 13.8%
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Table 6: Studies of the Use of the Contraceptive Implant

Program Authors Publication Year	Program Period & Sites	Service Period	Eligibility: Age Pregnancy Welfare/Medicaid	Sample Size: Intervention; Comparison	Black & Hispanic Percentage: Intervention; Comparison	Research Design Analytic Method	Results: Pregnancies Intervention; Comparison	Results: Births Intervention; Comparison
Medicaid Implant	1991-1994	Postpartum	<20 yrs	Intervention group: 3,561 teenage mothers with first Medicaid birth in 1992	No data	Quasi-experimental	No data	12 mos: 1.9%; 2.9% 18 mos: 9.3%; 13.1% 24 mos: 15.9%; 22.3% (significant)
Ricketts, 1996	Colorado		Medicaid-eligible	Comparison group: 2,815 teenage mothers with first Medicaid birth in 1991		Life table		
Colorado Adolescent Maternity Program	1992-1993 Denver	Postpartum	13-18 yrs No prior birth: 79%; 91%	Intervention group: 171 teenagers who chose implant Comparison group: 138 who chose other or no method	45%; 54%	Quasi-experimental Bivariate analyses	12 mos: 0.6%; 20% (significant) 24 mos: 12%; 46% (significant)	No data
Stevens-Simon, Kelly, & Singer, 1999								

Table 7: Other Interventions

Program Authors Publication Year	Program Period & Sites	Service Period	Eligibility: Age Pregnancy Welfare/ Medicaid	Sample Size: Intervention; Comparison	Black & Hispanic Percentage: Intervention; Comparison	Research Design Analytic Method	Results: Pregnancies Intervention; Comparison	Results: Births Intervention; Comparison
Dollar-A-Day Program	1991-1995 Denver	Postpartum only (2 yrs)	< 18 yrs No prior births	Incentive + group: 107 Group only: 24 Incentive only: 101 Control: 54	54%	Randomized, controlled trial Multivariate analyses	6 mos: 7.2%; 8.7%; 13.1%; 4.6% 12 mos: 18.6%; 30.4%; 22.6%; 11.4% 18 mos: 27.8%; 34.8%; 34.5%; 18.2% 24 mos: 35.1%; 56.5%; 41.7%; 34.1% (all not significant)	No data
Stevens-Simon, Dolgan, Kelly, & Singer, 1997								

Section Four

Looking Forward: Recommendations and Final Thoughts

Perhaps the most important finding of this research review is that postponing additional births to teen mothers is possible, although difficult. The studies also point to the great need for additional research about why teen mothers are so likely to have closely spaced second births and about how programs to prevent these births can be made more effective. This review also clearly demonstrates that evaluation studies themselves would be far more useful if researchers would agree on some basic measurement issues. Looking forward, this section provides suggestions on future directions for research, outlines some characteristics of successful programs, and offers some thoughts on what a comprehensive prevention program might look like.

Future Directions for Research

Researchers and those who fund them should concentrate on three goals: (1) learning more about the attitudes of teen mothers (and those around them) that affect the likelihood of additional pregnancies and births and about how these attitudes influence the behavior of young mothers; (2) updating the research on the risk factors associated with subsequent pregnancies and births; and

(3) improving evaluation research on programs that attempt to prevent additional pregnancies and births (by testing the effectiveness of promising interventions, ensuring uniform standards across studies, and using stronger randomized or quasi-experimental research designs).

Study the Attitudes of Teen Mothers. Little is known about what teen mothers, their partners and peers, their families, or their neighbors believe about second births to teen mothers. Perhaps they do not agree with program staff and policymakers that relatively rapid, additional pregnancies can be detrimental to the well-being of mothers and children. It may be that, in some communities, having two or more children while still an unmarried teen is not seen as a problem—it may even be supported or encouraged. For example, Geronimus (2003) has suggested that early fertility may actually be an “adaptive practice for African-American residents of high-poverty urban areas, in no small measure because they contend with structural constraints that shorten healthy life expectancy” (p. 881). If this is so, then society may need to change those constraints so that life expectancy and, as a side benefit, child-spacing can be markedly improved. But, at present, the reasons that teen mothers behave as

they do in relationship to sex, contraception, and the chances of pregnancy are not fully understood. Preventing additional births to teens—and changing their motivation and behavior—requires more research about their attitudes and those of the important people in their lives.

In the meantime, social workers and others who work closely with teenage mothers have suggested some explanations for their propensity to have quick second births, including:

- they want to strengthen their relationship with a new boyfriend or to maintain a relationship with the father of the first child;
- they want to have children who are closely spaced so that their children can play together;
- they want to have at least two children and do not think that their spacing makes much difference;
- they want to recapture the attention that they received from family and friends when their first child was born; and
- they want to have all their children while still relatively young, so that their mothers (the babies' grandmothers) and other adult female relatives are more likely to be available, healthy, and willing to help care for the children.

Testing the validity of these assumptions about such attitudes and finding ways to convince teenage mothers that acting on these or related beliefs is not in their best interests will require intensive interviewing of diverse samples of teenage mothers. One such study using focus groups of teen mothers and their parents was conducted by Bull and Hogue (1998). They concluded that:

- “Parents who assume that their children know about contraception may place them at an increased risk for subsequent unintended pregnancies.”
- “Parents who assume a large share of the care of children born to their teen daughters may

prevent their daughters from understanding the full scope of parental responsibilities.”

- “Teen mothers who believe that completing their families is a more attractive option than finishing school or developing a vocation may be at an increased risk for subsequent child-bearing” (p. 60).

Update Research on Risk Factors. Many studies of the risk factors for subsequent pregnancies are based on small, unrepresentative samples of teens. In addition, much of the research is old, pre-dating recent trends in sexual activity, the availability of new contraceptive methods, and welfare reform with its restrictions on cash assistance to young mothers. Moreover, most studies of risk factors limit themselves to fairly traditional measures—age, race, marital status, and education. While some add items, such as educational aspirations or the intendedness of the pregnancy, few conduct in-depth analyses of why so many teenage mothers become pregnant again so quickly.

Invest in More and Better Research on Program Effectiveness. As noted earlier, much of the research in this field is old—so, at a minimum, we need more evaluations of programs currently in operation. In addition, we need more investment in replicating programs already found to be promising, evaluating their results, and building on those findings. To help fill this gap, the federal government—perhaps in concert with foundations—should sponsor a series of demonstration projects testing the effectiveness of such promising interventions as home visiting and some of the other programs discussed in Section Three, as well as Second Chance Homes, which are receiving increased attention.

More studies of program effectiveness will be of limited utility, however, unless the methodologies used in assessing prevention programs are strengthened. In particular, standardized measures should be defined and adopted. A large federal-and/or foundation-funded set of projects could require uniformity in measurement across studies. At a minimum, program evaluations should mea-

sure additional births at 24 months postpartum and the interval between the first and the second delivery. Other measures of pregnancies or births should be encouraged, but not replace these. Studies should also limit participants to those under 18 at their first delivery—or at least measure program effectiveness separately for this group. Using such techniques as time-to-event or survival analyses would also assist in clarifying program results and in making comparisons across programs. (See the Appendix for details.)

Finally, studies should be based on randomized, controlled trials where at all possible; the next best choice is a strong quasi-experimental research design. If the control group is provided the usual array of services available in the area, randomized trials of the effectiveness of augmented services should be acceptable. In addition, all projects should be urged to use the intent-to-treat model, which considers all participants lost to follow-up as probable failures of the program. Finally, data analyses should consider rates of participation in the program, as well as the extent to which the program actually followed the program's design.

Characteristics of Successful Programs

Despite the limitations of the research, this review of the antecedents of second teenage births and of programs that showed some success in postponing such births points to several components that should be considered for future programs:

Close and Sustained Relationships with Teen Mothers. Close relationships between program staff and the teenage mother seem to lead to success. For example, the nurse home visiting program—one of the apparently effective interventions—encouraged the development of close relationships by initiating contact with the teens while they were pregnant with their first child, rather than during the busy time that often follows a birth; by interacting on a one-to-one basis, rather than in groups; and by providing education and counseling in teens' homes rather than in more impersonal offices or clinics.

The studies also suggest that, once a relationship is developed, it must be sustained over a relatively long time to be successful. Interventions that cease soon after a first birth cannot expect to have an effect over the next two years of the teen mother's life. Granted, it is difficult to keep in contact with young mothers who may be busy with a new baby or attending school—even married mothers in their 20s can find it hard to return to a clinic or agency for follow-up services. But continuing the relationship by home visits or by finding ways to stay close that fit with the teenager's daily life and activities, as did the McCabe Center's school program and the Teen Baby Clinic, may help overcome these obstacles to a sustained relationship.

Effective Personnel. Professionally trained personnel are associated with program success. The nurses in the nurse home visiting program appear to have been effective. (In the Denver replication of the model, nurses were more effective than paraprofessionals, but the study was not limited to teenagers.) The researchers in the Teenage Parent Home Visitor Service Demonstration questioned the ability of welfare workers to transmit information about family planning with sufficient vigor. And Musick and others have noted the psychological problems faced by paraprofessionals (Musick, 1993; Musick & Stott, 2000). Nurses may not be essential, but it seems important that teen mothers receive attention from individuals who have the requisite training and authority that allow them to provide credible, persuasive counseling and advice in such sensitive areas as family planning and domestic violence.

Family Planning Emphasis. It would be tempting to state that programs that emphasized family planning were more successful, but the evidence is inconclusive. The Dollar-a-Day program, which focused on family planning, was not successful. In the Teenage Parent Welfare Demonstration, teenagers at one site who completed a lengthy and comprehensive workshop in family planning were significantly more likely than those who did not to use an effective method of contraception. But completing the workshop did not have an independent

effect on the probability of a second pregnancy. The implant studies show that a contraceptive regime that does not require on-going attention can prevent rapid additional births. The injectable contraceptive might also be effective, but no studies have identified successful methods for convincing teen mothers to adopt these long-acting methods. Easy access to emergency contraception might enable teenage mothers to prevent a rapid subsequent birth, but this has not been studied.

A recent study found that many teenage mothers use a hormonal contraceptive in the early postpartum period (six months after their initial interview), but that the use of such contraceptives decreases over the following six months (Kershaw, Nicolai, Ickovics, et al., 2003). The authors commented, “The effect of becoming a mother on subsequent contraceptive use weakens over time. A ‘booster’ intervention may be needed in the later postpartum period to further reinforce contraceptive behavior and maintain consistent contraceptive use” (p. 365). These findings confirm what clinicians report—that teenagers often are diligent about avoiding pregnancies in the difficult period immediately following the birth of their first child, but that once the baby is easier to care for and more fun to be with, the teenage mother seems to feel less committed to preventing another birth. These findings also may help explain why several of the studies reviewed in Section Three showed an ability to prevent additional pregnancies at 12 months but were unable to sustain this success.

Although an emphasis on family planning per se may not be the complete answer to delaying additional pregnancies, programs that focus primarily on maternal and child health and on parenting—important subjects to be sure—are unlikely to postpone births. As Musick (1993) noted:

[S]ocial support programs as they currently exist are not a sufficient response to the problems of adolescent childbearing. In spite of the oft-used phrase “comprehensive,” most intervention efforts emphasize one domain over the others, generally either school or work...or parenting. Far

less attention is paid to reproductive behavior unless a program is part of a medical or family planning institution, in which case it may neglect the other domains. Few programs devote sustained, unambiguous attention to adolescents’ relationships with males, although many do encourage discussion about relationships with family members and friends. No matter what their brochures say, prevention and intervention programs typically do most of what they feel equipped to do best. (p. 199).

Encouraging Education. Research on the antecedents of second births underscores the importance of returning to school after a first child’s birth and attending until graduation. Teenage mothers who have high educational aspirations are likely to try to postpone a second pregnancy, but it may be possible that returning and staying in school can encourage delay even among those with lower expectations. Certainly any program that wishes to avoid rapid subsequent births should devote considerable resources to removing barriers to school return and completion. Possible approaches are alternative schools that provide remedial education and childcare for students while in school or doing their homework. Remedial education may be important because many teenage mothers drop out of school because they are discouraged by their inability to keep up with their classmates. The finding that those who have a second teen pregnancy are likely to have low cognitive ability also suggests that more attention needs to be paid to the educational needs of teen mothers if second births are to be postponed.

What Might a Good Comprehensive Prevention Program Look Like?

On the basis of the studies reviewed in this monograph, a comprehensive program to delay additional births among first time teenage mothers should probably do the following things:

- Develop close and sustained relationships with pregnant teenagers and young mothers. This is probably most easily—and expensively—accomplished by visits to the teens’ homes. Such relationships are more difficult to establish in clinics, schools, or agency settings and are probably impossible to create through phone calls or in classes.
- Begin when teenagers are pregnant with their first child and continue until the first child is at least two years old and the mother is 18 years of age or older.
- Employ personnel who have the training and the authority to counsel in such sensitive areas as family planning and domestic violence—and who are willing to do so.
- Avoid relying on group formats for education or counseling. Teenage mothers appear to need more intense, individualized attention that does not just tell them what they should do but actually affects their thinking and judgment.
- Discuss the possible detrimental effects of two or more births before the age of 20 and of closely spaced births. Then, within this context, discuss fertility goals with pregnant teenagers and young mothers and establish mutually agreed-upon, specific targets for future births. Simply suggesting that an additional birth be “delayed” is less helpful than suggesting, for example, that additional births should wait until certain milestones are reached (e.g., education, employment, marriage). Such goal-setting is probably more likely to be accomplished through individual counseling rather than through groups. The counseling should be supportive, not threatening.
- Help the teenagers select a contraceptive method, describe its good points as well as its possible side effects, and provide on-going, specific support to encourage its proper and consistent use. Counselors should make certain that teenagers know where and how often to secure free or low-cost family planning supplies and services.
- Teenagers should be made aware that they may decide to stop using a certain contraceptive method because of side effects or other reasons. They should be advised to seek assistance with choosing another contraceptive rather than to stop using contraception at all.
- Encourage use of a long-lasting, non-coital-dependent contraceptive, such as periodic hormone injections (i.e., Depo-Provera). Teenage mothers should also be instructed about the use of emergency contraception and provided with a supply. Condom use to help prevent sexually transmitted diseases should also be stressed.
- Have a close affiliation with a family planning service. Personnel should take teenagers to the facility for their initial visits, and perhaps for follow-up visits as well, to help ensure that the young women continue using contraception.
- Encourage returning to school after a birth and completing the education and training needed for economic self-sufficiency.
- Consider the special educational needs of pregnant teenagers and teenage mothers. Some will be behind in grade level or receiving poor grades in classes appropriate for their age. Unless remedial action is taken, these teenagers are at elevated risk for dropping out during or after the pregnancy. Alternative schools or special programs within regular schools should be available to assist pregnant teenagers and teenage mothers, especially those with low cognitive ability.
- Provide childcare for teenage mothers who are attending school or are in employment training.
- Encourage teen mothers to live with their parents or other adults who can provide economic and social support. Living with a boyfriend should be discouraged. Second Chance Homes

may be one solution to the housing problems of teen mothers who cannot live with their parents.

Final Thoughts

Additional births to teen mothers are a significant problem. Such births have adverse consequences for mothers, their children, their families, and society generally. One would expect rapid second births to be easier to prevent than first births because the population at risk is smaller and has been identified. Despite this advantage, the rate of second and higher order births to teen mothers remains disturbingly high.

Perhaps it is not clear to teenage mothers and to those who influence them that such births are not wise and that short interpregnancy intervals may be detrimental to the mother's life course and to infant health and child development. Perhaps teen mothers have reasons for closely spaced births that they have not shared with those who wish to prevent them. Or perhaps the services that attempt to postpone births are using inappropriate methods, or are providing services at the wrong times, in inconvenient places, or by personnel who are not sufficiently skilled or sympathetic.

America is finally making progress in reducing the rate of teen births generally, but most efforts to prevent teen births focus on the first birth. Although the risk factors for first and second births are similar, the services needed to prevent the second births are likely to be different. Program

planners and policymakers, in consultation with researchers, should take a fresh look at this problem and consider new approaches to reducing it. Focusing more attention on teenagers who have already had one birth may provide *Another Chance* to reduce the rate of teen births.

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Appendix

The Challenge of Assessing Evaluations of Programs to Prevent Additional Births to Teen Mothers

Section Three listed some of the problems encountered in *comparing* the results of studies and also noted the shortcomings of the methods sometimes used. This appendix takes a more in depth look at the methodological problems encountered by researchers who attempt to study the impact of interventions on the likelihood of additional pregnancies and births to teenage mothers. It looks first at the difficulties faced in deciding on program objectives and then describes such technical issues as period at risk, loss to follow-up, program participation and fidelity, comparison group conditions, and outcome measures.

Program Objectives. Most programs for teenage mothers state that one of their objectives is to “prevent,” “delay,” or “postpone” additional pregnancies or births. This is an inadequate specification for several reasons. First, a pure “prevention” objective is unrealistic because most young people do not plan to have only one child during their lifetime. Second, if the objective is to postpone or delay, how long must the interval between births be in order for the program to be successful? Is it one, two, three, or more years from the initial delivery?

And should the teenage mother’s age at the time of the initial delivery be considered? A program might define success for an 18-year-old mother as waiting until she was 20 for a second birth, while that same two-year delay for a 14-year-old mother would be a failure. It might be more meaningful to define success in delaying additional births until the teenage mother has achieved certain milestones, such as graduating from high school, obtaining financial independence through employment, or marriage. Being clear about program objectives would not only be helpful to evaluators, allowing programs to be compared in terms of their success in reaching their own objectives, but it might also assist program staff in counseling of teenage mothers by offering some guidelines for how long subsequent births should ideally be delayed and why.

Period at Risk. An important measure for comparison among programs for teen mothers is called the “period of risk”—that is, the amount of time that the teenage mothers in the programs are at risk for a second birth. Some evaluations define the period at risk as dating from the initial interviews with the teens during their first pregnancy or

early in the postpartum period, while others use the date of the first birth. Still other evaluations are based on all teenagers who participated in a program from the time of its inception.

Interventions should be analyzed by the number of months or years during which each of the participants was at risk for an additional birth. This can be accomplished, for example, by the use of a table that indicates what percentage of the teenage mothers being studied who were 12, 18, or 24 months postpartum experienced a second birth or pregnancy. The more elegant approach to this problem is “time-to-event” or “survival analysis,” which integrates period-at-risk and loss to follow-up and provides statistics that can be compared for experimental and control groups and across programs (Klerman, Baker & Howard, 2002).

Lost to Follow-Up. In evaluation research, “lost to follow-up” refers to those participants in a study who have dropped out of a program or who cannot be located when follow-up data are being collected. Most of the studies in this review compare the percentage of program participants who had experienced either a second pregnancy or a second birth during a defined follow-up period with the percentage in some other group of teenage mothers. Some of these studies are methodologically weak because the denominators on which the percentages are based are not specified. Usually the results reflect only those teen mothers who could be contacted by the program for follow-up information at the time the analyses were conducted. Because dropouts and those lost to follow-up may be at elevated risk for rapid additional births, excluding these groups from the evaluation may make programs look more successful than they really are. Moreover, follow-up rates may be lower in comparison groups, because the young mothers in these groups may have little incentive to stay in touch with the investigators. An unbiased assessment of a program requires not only including in the numerator all those considered successes or failures, but also including in the denominator all those who originally entered the program—even those who participated minimally or who could not be located during the follow-up period. This is termed the

“intent-to-treat” approach. Attempts to understand program successes and failures by analyzing levels of participation and why some participants drop out should, of course, be encouraged, but the overall success of the program should be evaluated in terms of the outcomes for those originally recruited, as well as for those who were sufficiently motivated to remain in the program and in touch with the investigators.

Program Participation and Fidelity. Some of the investigators in the studies reviewed in this report were very careful to report how many of the intervention group subjects participated in the various program components. Other studies, however, did not provide such data. Without this information, it is impossible to determine the relative value of various program components and whether program failure was actually due to low program participation.

Investigators also often failed to account for whether the program operated according to its original design. For instance, not all the home visits or training sessions envisioned by the program planners may have occurred. This is particularly a problem in multi-site studies. Researchers should describe the intervention that was actually *delivered*, rather than what was *planned*.

Comparison Groups. The preferred way of determining whether a program has an impact is to conduct a randomized, controlled trial in which pregnant teenagers or new teenage mothers are divided randomly into an experimental group that receives the intervention and a control group that does not. Some of the studies in this review used this approach. Many program managers, however, resist such an approach because they believe that it deprives the population selected for the control group of a valuable service. They prefer to find a population that did not receive the intervention and to compare it to the one that did (because, for example they live in a state or neighborhood where the program was not available). Some studies develop comparison groups from teenagers in the same school, clinic, or agency who gave birth before the program began (a historical control) and other studies from a population of teenagers in a similar

clinic, school, agency, or community without the intervention program. In the best studies of these kinds, the intervention and the control group are matched on the variables that are believed to be associated with a subsequent birth or these variables are controlled statistically. Unfortunately, many of the variables that might be associated with a second birth are unknown or not available for matching, leading to comparison groups that may not be the same as the intervention groups in important ways. Such studies produce results that are not as conclusive as randomized trials.

Outcome Measures. Some studies measure subsequent pregnancies while others measure subsequent births. The best approach is to measure both. But, if that is impossible, it is probably better to use births—the measure with higher validity. Although it certainly would be valuable to learn whether a teenage mother had a miscarriage or fetal loss or, more important, chose an abortion to terminate a poorly timed or unwanted pregnancy, self-reports of miscarriages and abortions are unreliable, and verification by medical records is almost impossible. Most teenage mothers, however, will report a birth and are able to provide an exact date. Investigators should explain why they chose pregnancies and/or births as outcome measures, as well as the benefits and limitations associated with their decisions.

Another approach to studying outcomes is the interval *between* births—that is, the number of months from the first delivery to the second one. Measuring birth intervals is sometimes preferable to measuring the percentage of teen mothers who have an additional birth because birth interval is a continuous variable; as such, it allows the calculation of mean differences among subgroups, rather than only the percentages that did or did not have a pregnancy or birth in a specified period.

Program directors and evaluators use different periods of time in which to measure results. Some report additional pregnancies or births by 12 months (usually from the date of the first birth), while others report pregnancies or births at 24 months or more. Although the end of the first postpartum year is a reasonable period at which to

examine subsequent pregnancies, it is too soon to look at subsequent births. A follow-up of 24 months is probably preferable for both pregnancies and births.

Some studies restrict their analyses to additional births to women who are still teenagers, regardless of the number of years since the first birth. This method excludes many older teen mothers, particularly 18- and 19-years-olds, who have little chance of having a second birth while still a teenager, but includes all younger teen mothers, who may delay a second birth for two years yet still have time for a second birth before turning 20. Other studies include all additional births within a specified period, usually two years, to women who had their first births as teenagers, regardless of the women's age at the second birth. Each of these approaches has merit; in the context of this report, however, the measure of greatest interest is additional births to teen mothers who are still under age 20.

Conclusion

Our knowledge of the ability of specific programs to postpone additional births to teen mothers would be significantly enhanced by greater consistency among evaluators in what, when, and how they measure. Program managers and investigators should be encouraged to conduct randomized, controlled studies with follow-up periods of at least two years. Investigators should use appropriate techniques to analyze their data, such as intent-to-treat and survival analyses. Evaluations should describe the program as it was actually operated and provide information about the extent to which the study group received the program's various services. Studies with such characteristics would help policymakers better determine which interventions produce the best results.

Reference

Klerman, L.V., Baker, B.A., & Howard, G.H. (2002). Second births among teenage mothers: Program results and statistical methods. *Journal of Adolescent Health, 32*(6), 452-455.

