

## Mini-Review

# Risk Factors for Rapid Repeat Pregnancy Among Adolescent Mothers: A Review of the Literature

D.C. Rigsby, MD,<sup>1</sup> G.A. Macones, MD, MSCE,<sup>2</sup> and D.A. Driscoll, MD<sup>2</sup>

<sup>1</sup>University of Pennsylvania School of Medicine and the <sup>2</sup>Department of Obstetrics and Gynecology, University of Pennsylvania Medical Center, Philadelphia, Pennsylvania

**Abstract.** *Study Objective:* To review risk factors for rapid repeat pregnancy that have been studied among adolescents, and to determine which of these factors serve as useful predictors for second pregnancy.

*Design:* A Medline search of journal articles from 1966 to 1997 identified English language articles addressing repeat pregnancy among adolescents. All relevant citations within these articles were also included.

*Main Outcome Measures:* Risk factors that were correlated with rapid repeat pregnancy in studies using rigorous statistical analysis were considered to be significant.

*Results:* Significant predictors of rapid repeat pregnancy included younger age, low socioeconomic status, low education of teen's mother or head of household, marriage, intended or desired first pregnancy, and use of a contraceptive method other than Norplant postpartum.

*Conclusions:* There is little consensus as to which risk factors are the most important predictors of recidivism. With as many as half of teenage mothers conceiving again within two years, the identification of "high-risk" teens may be less important than the development of intervention strategies for all these young women.

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**Key Words.** Teenage pregnancy—Repeat pregnancy—Teenage demographics—Risk factors for pregnancy

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## Introduction

Teenage pregnancy has been recognized as a serious problem by the medical community and society at large for more than 30 years. In the United States, close to 1 million teenage women become pregnant each year<sup>1</sup>; more than half of these become mothers,<sup>1</sup> and most teenage mothers choose to keep and raise their infants.<sup>1–3</sup>

It is well known that women who begin childbearing in their teens face a variety of problems during pregnancy and in later life. They have higher rates of poor obstetric and neonatal outcomes,<sup>3–7</sup> lower educational and occupational achievement,<sup>3,6,8,9</sup> and higher rates of poverty and welfare dependence.<sup>3,6,8,9</sup> They also adopt more punitive parenting styles,<sup>3,10</sup> are less responsive to their infants,<sup>3,6</sup> and may be more prone to child abuse.<sup>11</sup> Their children perform less well than children of older mothers on intelligence and vocabulary testing<sup>3,6,12</sup> and are more likely to have behavioral problems and fail at school.<sup>8,9</sup> Not all adolescent mothers have uniformly negative outcomes, however, and their "life courses" vary significantly.<sup>8,9</sup>

One of the factors that has been noted to predict worse medical, financial, educational, and psychosocial outcomes among these young women is rapid repeat pregnancy.<sup>7–9,13–20</sup> Most investigators define *rapid repeat pregnancy* as a second pregnancy within 24 months of resolution of the first. Estimates of rapid repeat pregnancy rates among adolescents range from 30% to 50% in the absence of postpartum intervention.<sup>16,18,21–26</sup>

Although many excellent studies have examined the risk factors for a first teenage pregnancy,<sup>19,20,27–37</sup> less is known about factors that distinguish repeat childbearers from their peers who do not conceive again as teens. The only review of this subject to date identifies four variables associated with rapid repeat pregnancy: inconsistent contraception, marital status, level of education, and weak parental relationships.<sup>38</sup> But many other factors have also been studied by investigators from diverse disciplines. This review examines all variables that have been studied over the past 30 years as possible predictors of rapid repeat pregnancy among teenage mothers.

## Methods

A MEDLINE search (1966–1997) was performed to identify articles that addressed repeat pregnancy in adoles-

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Address reprint requests to: D.A. Driscoll, MD, Division of Reproductive Genetics, Department of Obstetrics and Gynecology, Hospital of the University of Pennsylvania, 3400 Spruce Street, Philadelphia, PA 19104.

cents. English-language articles that addressed risk factors for rapid repeat pregnancy, or reported on intervention programs to prevent it, were included. A review of the bibliographies of these articles was used to identify additional articles for inclusion. The studies and some of their pertinent design features are listed in Table 1. Included in the table is the type of statistical analysis performed; articles that presented results with no statistical analysis are listed as “descriptive.”

## Results

Many of the variables associated with primary adolescent pregnancy have also been investigated as risk fac-

tors for rapid repeat pregnancy. These include sociodemographic, psychological, educational, obstetric, and family planning characteristics. Factors that have been analyzed statistically are presented in Table 2. Data from manuscripts without statistical analysis are excluded because of the difficulty of interpreting these results. Risk factors supported by at least two multivariate analyses and rejected by no more than one such analysis are indicated in boldface type. For many factors there are conflicting reports about their relationship to repeat pregnancy. A few factors are universally supported or rejected, and some factors have been studied by a single author only.

When evaluating this body of literature, readers must have an understanding of some fundamental methodo-

**Table 1.** Studies of Rapid Repeat Pregnancy Among Adolescents

Author(s)	Year	Ref. No.	No. of Patients	Design	Population Source	Analysis
Atkin et al	1992	41	137	Retrospective/Case control	Teens aged $\leq 17$ y receiving prenatal care (first pregnancy) at a public clinic in Mexico City	Multivariate
Ford	1982	40	483	Retrospective/Case control	National Survey of Family Growth	Descriptive
Gispert et al	1984	43	116	Retrospective/Case control	Unspecified	Descriptive
Jekel et al	1973	42	180	Nonrandomized uncontrolled trial	Yale Young Mothers Program	Univariate
Kalmuss & Namerow	1994	14	1452	Retrospective/Case control	National Longitudinal Survey of Youth	Multivariate
Klein	1974	39	1824	Descriptive	Teens aged 16 y and younger participating in an “Intraconceptional Care Unit,” 1971–1972	Descriptive
Koenig & Zelnik	1982	21	NS	Cross-sectional	3 National probability samples of women aged 15–19 y in 1971, 1976, and 1979	Descriptive
Linares et al	1992	46	111	Prospective/Cohort	Teen mothers recruited at first birth at a large urban teaching hospital	Multivariate
Matsushi et al	1989	15	150	Case control	Patients aged 12–19 y attending UCSD Teen OB Clinic from 1984–1987	Univariate
Mott	1986	22	1448	Cohort	National Longitudinal Survey of Work Experience of Youth	Multivariate
Peabody	1981	44	26	Retrospective/Case control	Participants aged $\leq 16$ y in the High-Risk Perinatal Project of OSU College of Medicine	Multivariate
Polanczky et al	1994	50	98	Cohort	Teens receiving postpartum contraception at Hospital of the University of Pennsylvania	Multivariate
Polit & Kahn	1986	23	675	Retrospective/Case control	Participants in multisite intervention Program (Project Redirection)	Multivariate
Seitz & Apfel	1993	16	102	Longitudinal/Cohort	Attendees of a special school for pregnant students (the McCabe Center)	Univariate
Stevens-Simons et al	1986	17	29	Prospective/Cohort	Patients at the Young Mother’s Clinic at Denver General Hospital Teen Pregnancy Program	Univariate
Stevens-Simons et al	1995	49	187	Case control	Participants in the Colorado Adolescent Maternity Program	Univariate
Stevens-Simons et al	1996	25	200	Prospective cross-sectional	Participants in the Colorado Adolescent Maternity Program	Multivariate
Stevens-Simons et al	1997	24	286	Prospective randomized controlled trial	Participants in 4 structured interventions to prevent second pregnancy	Multivariate
Trussell & Menken	1978	18	9800	Retrospective/Cohort	National Survey of Family Growth	Descriptive
Zelnik	1980	26	NS	Cross-sectional	2 National probability samples of women aged 15–19 y in 1971 and 1976	Descriptive

Abbreviations: NS, not specified; OSU, Ohio State University; UCSD, University of California at San Diego.

**Table 2.** Risk Factor Analysis

Risk Factors	Univariate Analysis		Multivariate Analysis	
	Support	Reject	Support	Reject
Background				
<b>Younger age</b>	3	3	<b>2</b>	
<b>Lower socioeconomic status</b>		2	<b>2</b>	
Minority race/ethnicity	3	2	<b>2</b>	<b>2</b>
Number of years living in area		1		
Family structure				
<b>Low education of teen's mom/Head of household</b>	1		<b>2</b>	<b>1</b>
<b>Married</b>	1	2	<b>2</b>	<b>1</b>
Teen's mom was an early childbearer	1		<b>1</b>	<b>1</b>
Not in a two parent home	1			<b>1</b>
Not living with parents	2			<b>1</b>
Large family		1		<b>2</b>
Ordinal position		2		
Psychosocial factors				
Poor social support	1	1	<b>1</b>	<b>1</b>
Depression		1		
Lack of religion			<b>1</b>	<b>1</b>
Older father of baby/boyfriend	3			
Education and employment				
<b>School dropout</b>	5		<b>2</b>	<b>1</b>
Poor school performance	1	1	<b>1</b>	<b>1</b>
No schooling postpartum			<b>1</b>	
Not attending special school for pregnant girls	1	1		<b>1</b>
Low educational goals	2	1		<b>2</b>
No current or past employment history	1			<b>3</b>
Low career goals				<b>1</b>
Obstetric variables				
Noncompliance with prenatal care		1		
History of therapeutic abortion		1		<b>1</b>
History of miscarriage	1		<b>1</b>	
Family planning				
<b>First pregnancy desired/Intended</b>	3		<b>2</b>	<b>1</b>
<b>Method other than Norplant postpartum</b>	1		<b>2</b>	
No postpartum contraceptive plans		1		
History of oral contraceptive use				<b>1</b>
Past failure to remember birth control	1		<b>1</b>	
Continued sexual activity			<b>1</b>	

Numbers refer to the number of studies to analyze each risk factor using each type of statistical analysis. Bold-faced risk factors are those that are supported by at least two multivariate analyses, and rejected by no more than one such analysis.

logic issues in these data. First, many of the variables studied have a high degree of collinearity; that is, they commonly coexist and, therefore, are highly correlated. For example, in a study population at a university-based clinic, all of the African-American patients may be poor, and all of the poor patients may be African American. Any attempts to separate the independent effects of race from socioeconomic status in this group would be futile.

Second, even if variables do not demonstrate a high degree of collinearity, distinguishing the independent effect of a variable can be difficult. Specifically, in observational studies, one needs to take into account multiple factors when assessing individual variables (to control for confounding factors). This is most commonly performed using multivariable analysis. Univariate analyses, which examine a single factor at a time, often yield

apparently significant results that then vanish when other factors are included in a more complete statistical model. For example, one study found with univariate analysis that minority race or ethnicity was significantly associated with rapid repeat pregnancy, but when a multivariate model including socioeconomic status was used, race was insignificant.<sup>14</sup> Therefore, the results of univariate analyses must be interpreted with great caution.

Third, many of the manuscripts included in this review study homogenous populations. By homogenous, we mean that the population is uniform or very similar with respect to the variables studied. For example, in the university clinic population described previously, if all or almost all patients are African Americans, any comparison of African Americans to other groups is not possible. This can severely limit the generalizability of the study.

## Background Characteristics

**Race/Ethnicity.** The most commonly cited risk factor for both primary and repeat pregnancy among adolescents is race; African Americans and Hispanics are thought to have higher teenage pregnancy rates than are non-Hispanic Caucasians; however, the research on this point is far from conclusive; some authors who claim that race is predictive of recidivism do not control for socioeconomic or other factors, whereas others who find no differences have studied very racially homogeneous populations.

The earliest report to consider race (Klein, 1974) found that among teens followed closely postpartum by an "Intraconceptional Care Unit," African-American participants had higher rates of repeat pregnancy than did Caucasian participants (11.2% versus 7.1%)<sup>39</sup>; however, the majority of study participants were African American (89%). Rates of recidivism were lower than predicted for both races, an outcome attributed to the intervention program. No statistical analysis of these data was performed.

The relationship between race and rapid repeat pregnancy seems to be variable. Using data from the National Survey of Family Growth (NSFG), Koenig and Zelnik<sup>21</sup> and Zelnik<sup>26</sup> reported that, in 1971, recidivism was higher among Caucasians than African Americans (58% v 41%, respectively); however, by 1976, rates of repeat pregnancy had decreased sharply among Caucasians, falling below the level of African Americans (25% v 39%). In 1979, no significant difference was found among races (Caucasians, 39%; African Americans, 37%). Using the 1976 NSFG data, Ford<sup>40</sup> reported that pregnancy rates within the first year postpartum were equal among Caucasians and African Americans (17%); however, when she corrected for the lower rates of marriage and sexual activity among African-American respondents, she found that pregnancy rates among sexually active teens were higher among African Americans than among Caucasians. In a 1986 study, Mott<sup>22</sup> reported that among respondents to the large, population-based National Longitudinal Survey of Youth (NSLY), African-American women 16 years of age or younger had higher rates of recidivism than their Caucasian counterparts; however, among women aged 17 years or older, the reverse was true. Kalmuss and Namerow<sup>14</sup> found that when African Americans were compared with poor Caucasians, no significant difference was found. In 1986, Polit and Kahn,<sup>23</sup> applying regression analysis to NSFG data, reported that race was not predictive of rapid repeat pregnancy. One possible explanation for this is the homogeneity of their sample; it is probably also relevant that all respondents were eligible for or receiving benefits from Aid to Families with Dependent Children (AFDC). Thus, Kalmuss's finding that poverty eliminates racial differences may have skewed their results. Trussell and Menken,<sup>18</sup> also using NSFG data, found no

significant difference in recidivism among races when age at first birth was controlled (see subsequent discussion).

Although in 1996 Stevens-Simon et al<sup>25</sup> found no significant difference among races when using a univariate analysis of pregnancy rates at 1 year postpartum, a trend toward higher rates was found among non-Caucasians. In a subsequent study at 2 years postpartum, the same authors reported<sup>24</sup> that race was a strong independent predictor of repeat pregnancy based on a logistic regression model.

Clearly, no consensus exists on whether race is a useful predictor of rapid repeat pregnancy. Although some studies indicate that the effects of race are related to socioeconomic factors, one study suggests that a difference remains even after these factors have been taken into consideration. Furthermore, a major problem with several of the negative studies is the racial homogeneity of their populations; hence, these studies may lack the power to demonstrate racial differences if they do exist.

**Age at First Conception.** Younger age at the time of first conception has also been proposed as a risk factor for a rapid second conception. Different authors use different age cutoffs in their investigations, making comparisons across studies difficult. Using NSFG data, Zelnik<sup>26</sup> reported that, in 1971, rates of rapid repeat pregnancy were higher among women 16 years of age or older than among their younger peers. In 1976, the pattern had switched, with women 15 years of age or younger having the higher rates of recidivism. Using 1979 NSFG data, Koenig and Zelnik<sup>21</sup> reported no significant difference in repeat pregnancy rates among women 16 years of age or younger and women aged 17 to 19 years.

Although Trussell and Menken<sup>18</sup> did not specifically study rapid repeat pregnancy, they found that women who were younger at their first birth (15–17 years) had higher total number of children at 3, 5, 10, and 15 years postpartum. The 3-year data may be taken as a proxy for rapid repeat pregnancy. He also found that the younger women had higher rates of unwanted births and out-of-wedlock births over time.

Ford<sup>40</sup> reported higher rates of repeat pregnancy among African-American women 17 years of age or younger; the reverse was true for Caucasian women. She also noted that the youngest African-American women were the least likely to use contraception. Similarly, Mott<sup>22</sup> reported that Hispanics and African Americans were more likely to have rapid repeat births if they were 16 years of age or younger at first birth; no age effect was observed among Caucasians. Finally, using multivariate analysis, Kalmuss and Namerow<sup>14</sup> found that younger age was predictive of recidivism only among African Americans and Hispanic adolescent women and not among Caucasians.

Several authors have found no age effects on rates of recidivism. In a 1973 study, Jekel et al<sup>42</sup> reportedly found no age differences between women 17 years of age or younger who conceived again and those who did not in Yale's Young Mothers Program. They stated that the sample was homogeneous on many variables but failed to specify whether age is among these. The study population excluded older teens, which may limit its conclusions. Polit and Kahn<sup>23</sup> reported no age effect in a multivariate analysis of teens participating in a secondary prevention program (Project Redirection). This was a homogenous population consisting primarily of minorities, whereas other authors have reported the strongest age effects in minority populations. Stevens-Simon et al<sup>25</sup> also reported no age effect on repeat pregnancy at 1 year postpartum.

Although conflicting reports exist on the effects of younger age on rapid repeat pregnancy, the evidence largely supports an association. Population homogeneity may account for the failure of some studies to demonstrate an age effect. Very young age is intellectually appealing as a risk factor because it is consistent with the cognitive development of adolescents. Younger teens are less likely to have achieved operational thinking; they are, therefore, less capable of planning for the future and understanding the long-term consequences of their actions. Both of these factors may contribute to inconsistent contraceptive behavior and repeat pregnancy among younger teens.

**Socioeconomic Status.** Another variable associated with both first and rapid repeat pregnancy among teens is low socioeconomic status (SES). Different investigators have used different measures to assess SES (income, Medicaid status, or AFDC status). As with race and age, there is some dispute as to whether lower SES is directly related to higher rates of rapid repeat pregnancy.

In 1982, Ford<sup>40</sup> found a strong association of poverty with pregnancy in the first 12 months postpartum. Among NSFG respondents, those who had household incomes 150% of the poverty level or greater had a recidivism rate of 11%; those with incomes of less than 150% of the poverty level had a rate of 21%. She also noted that second pregnancies among low-income women were less likely to have been intended. Kalmuss and Namerow<sup>14</sup> and Mott<sup>22</sup> reported that low-income Caucasians had higher rates of rapid second pregnancies than higher-income Caucasians. Neither offers specific information about the effects of SES within minority groups; there may not have been enough variability in SES among minorities in their populations to draw any conclusions.

Jekel et al<sup>42</sup> reported no effect of socioeconomic quartile on rates of second pregnancies among women in the Yale Young Mother's Program. No data were provided on the diversity of participants with respect to SES; the

authors did note that the population was homogeneous and that all the women were seen in a hospital-based clinic. Probably few of the subjects were above the lowest socioeconomic quartile, reducing the power of the study to identify SES as a risk factor for repeat pregnancy. Similarly, Stevens-Simon et al reported in two studies<sup>24,25</sup> that Medicaid recipients were no more likely to become pregnant again within 2 years postpartum than those women not receiving Medicaid benefits; however, the rate of Medicaid receipt among both populations was very high. In the first study, 93% of women with a single pregnancy and 96% of women with a second pregnancy were receiving Medicaid; in the second study, the rate of Medicaid receipt was similar, 87% and 89%, respectively. Finally, in 1992, Atkin and Alatorre-Rico<sup>41</sup> found no effects of SES in a study of adolescent mothers in Mexico City; however, all patients were recruited from a public clinic serving "low and lower middle income women."

In summary, the clinic patients who participate in many academic studies may not have enough socioeconomic diversity to determine whether SES has an impact on rapid repeat pregnancy. Broader population-based studies and studies using multivariate analyses seem to support poverty as one important variable. Furthermore, SES may be the primary mediator of race effects on second pregnancy.

**Family Structure and Stability.** Many aspects of family structure have been examined as risk factors for primary and repeat teen pregnancy, including family size, number of siblings, and parental education. The amount of family support and the way in which the adolescent perceives her support network have also been examined; these will be discussed under *Psychosocial Factors*.

Using multivariate analysis, Kalmuss and Namerow<sup>14</sup> found that having more than three siblings was associated with a slightly higher rate of repeat pregnancy. In contrast, Jekel et al<sup>42</sup> reported no effect of the total number of persons in the teen's household on rates of second pregnancy. In a study conducted in the early 1970s, Gispert et al<sup>43</sup> found that young women with rapid repeat pregnancies had no more siblings than women without a second pregnancy. It is interesting that most of these young women had large families, with the average number of siblings just under five. Ordinal position within the family was examined in two studies<sup>15,42</sup> and was found to have no predictive value.

The level of education of the adolescent's mother or the head of her household is another variable that has been studied. The underlying assumption is that more educated parents might provide their daughters with higher educational and employment goals, thereby motivating them to avoid pregnancy. Whether parental education has an impact on adolescents who have already

had one pregnancy is unclear. Using multivariate analysis, Kalmuss and Namerow<sup>14</sup> reported that parental education of high school or beyond was predictive of lower rates of rapid repeat pregnancy. Mott<sup>22</sup> also found that the teen's mother's completion of high school predicted longer intervals between first and second births, particularly for African-American teens whose first birth was before age 16 years. He found no effects among Hispanics or Caucasians. In contrast, Gispert et al<sup>43</sup> found that women with and without second pregnancies had similar parental total years of education, although she did not analyze the data statistically. Polit and Kahn<sup>23</sup> found that maternal education was not predictive of rapid repeat pregnancy in a multivariate model that included many demographic and psychosocial factors. The majority of the evidence supports an association between more parental education and lower rates of repeat adolescent pregnancy.

Another parental variable thought to be a risk factor for first adolescent pregnancies is having a mother who was an early childbearer.<sup>8,9</sup> Polit and Kahn<sup>23</sup> found that the adolescent's mother's age at first birth was not predictive of rapid repeat pregnancy in her adolescent daughter; however, Atkin and Alatorre-Rico<sup>41</sup> found that having an early childbearing mother predicted early childbearing in the adolescent daughter, both in univariate and multivariate analyses. Cultural differences may explain the different findings; the study by Atkin and Alatorre-Rico was conducted in Mexico City, and Polit's in the United States. Clearly, no conclusions can be drawn from this small number of studies.

Adolescents living in two-parent households have been found by some authors to have lower rates of second pregnancies than those raised by their mothers alone.<sup>15,43</sup> Gispert et al<sup>43</sup> hypothesized that the father's presence in the home may exert its effects by several mechanisms:

The presence of the father in the home usually implies that an adolescent's parents have managed to build a relatively stable relationship and that they value marital ties . . . [He] may also have a more direct effect because two parents are available to supervise their daughter's sexual behavior . . . And clinicians have long observed that many pregnant adolescents apparently become involved in sexual relationships in an effort to find . . . paternal caring that is absent in their homes.<sup>43</sup>

This provides a very attractive explanation for the effects of a father on his daughter's sexual behavior; however, the literature is equivocal. Jekel et al<sup>42</sup> found no association between the number of parents in an adolescent's home and repeat pregnancy. They also reported that young women who moved out of their mothers' homes, either to marry or to live alone, had higher rates of recidivism. Stevens-Simon et al<sup>25</sup> note in one study that not living with parents was predictive of rapid repeat

pregnancy in univariate analysis but not in a multivariate analysis that included other sociodemographic factors.

Parental education is the only family variable for which there is good evidence of impact on repeat pregnancy rates. Parents who are more educated may provide role models and goals that make their daughters more likely to avoid repeat pregnancy. Family stability, reflected by living with parents and in a two-parent household, may exert a protective effect against repeat adolescent pregnancy; Gispert et al<sup>43</sup> gives compelling reasons why this might be so; however, little objective evidence supports this idea. Daughters of early childbearers, although often thought of as a high-risk group, also have not yet been shown to have more recidivism than their peers.

**Geography.** Geographic variables have been examined as risk factors for rapid repeat pregnancy. Koenig and Zelnik<sup>21</sup> reported that recidivism rates differed between metropolitan and nonmetropolitan teens. In 1971, the rates were higher among the nonmetropolitan population; however, by 1976, metropolitan rates had passed nonmetropolitan rates. Jekel et al<sup>42</sup> examined number of years of residence in New Haven, CT, among his population; it was not found to be significant.

### The Role of Marriage

Many early studies of teenage pregnancy focused on marriage as a means to legitimize birth. It is now recognized that the negative consequences of early pregnancy are not solved by early marriage and that these early marriages are likely to end in divorce.<sup>8,9</sup> The idea that marriage may be a risk factor for rapid repeat pregnancy has two possible theoretical bases. First, teens who marry may be at the stage of building their families, and, therefore, desire more pregnancies. Second, teens who marry to legitimize a birth may in fact not desire a second pregnancy, but may have more frequent sexual intercourse because of the availability of a regular sexual partner. The majority of investigators have found a correlation between marriage and rapid second pregnancy, but this correlation does not explain why married teens conceive again.

In surveys of two national probability samples, Zelnik<sup>26</sup> found that the effect of marriage on repeat pregnancy was inconsistent. In 1971, adolescent women who married during the first pregnancy had higher rates of rapid repeat pregnancy than did unmarried adolescents; in 1976, however, married teens had lower rates than unmarried teens. Ford reported that marriage before the first pregnancy was associated with rapid repeat childbearing; no association was found with marriage during the pregnancy.<sup>40</sup> Neither study analyzed the data statistically. Mott<sup>22</sup> and Kalmuss and Namerow<sup>14</sup> found that marriage at first birth was predictive of recidivism among African Americans and Caucasians using multi-

variate analyses. Gispert et al<sup>43</sup> noted that, although marriage predicted repeat pregnancy, repeat pregnancy did not predict marriage, because most of the young women remained single. And Jekel et al<sup>42</sup> found a positive association between marriage at 15 months postpartum and repeat pregnancy.

Two studies found no correlation between marriage and second pregnancy<sup>18,23</sup>; however, the population in one of the two studies included very few married teens (6.4%). The failure of some studies to identify an association between marriage and rapid repeat pregnancy may be caused in part by the generally low rates of adolescent marriage. The evidence for marriage as a significant risk factor is marginally better than the evidence against it.

### Psychosocial Factors

**Social Support.** The social support available to pregnant adolescents should be examined for several reasons. Adolescents' assessments of the amount of support they receive from their families and their peers may reveal unmet emotional needs. Teenagers who feel that they do not receive adequate support may be more prone to seek sexual intimacy or to bear children who they hope will fulfill their need to feel loved. In addition, teenagers who do not receive encouragement of academic and employment goals may see these as less important and, therefore, not choose to delay childbearing. Finally, if they have poor communication with their families and peers, they may have less practical information about sexuality and birth control and may be less likely to seek medical contraception, either out of ignorance or for fear of punishment.

In a recent study, Stevens-Simon et al<sup>25</sup> found that teens with poor family support had higher rates of rapid repeat pregnancy than those with supportive families. In fact, lack of family support was the most important predictor of rapid repeat pregnancy in her logistic regression model.

In a study published in 1984, Gispert et al<sup>43</sup> attempted to characterize the quality of the mother-daughter relationship in pregnant adolescents. They asked adolescents at the time of their first pregnancy a variety of questions, including:

Was the mother the first person told of the pregnancy? Was the mother aware of the sexual relationship between her daughter and her boyfriend? Was there agreement between the mother and daughter regarding the outcome of the pregnancy, educational goals, rules about dating, and the use of contraception?

Teens whose responses indicated a good relationship with their mothers were less likely than teens with poor mother-daughter communication to have a second preg-

nancy at a follow-up interview 2 years later, although no statistical comparison was made.

As discussed previously, some authors correlate a two-parent home and living in the parental home with decreased rates of repeat pregnancy. These findings may also reflect the contributions of a social support network.

Two studies have rejected an association between social support and repeat pregnancy. Linares et al<sup>46</sup> found no association with "quality of intrafamily relations prior to pregnancy, couple relationship during pregnancy, . . . [or] family and partner support during pregnancy." In a study of a secondary pregnancy prevention program, Peabody<sup>44</sup> found that measures of "emotional support from friends and peers" and "alienation" had no predictive value for repeat pregnancy. The small number of participants ( $n = 26$ ) may limit the power of this study significantly. Neither study discusses what questions interviewers posed to assess these variables; perhaps some difference in instrument, interview technique, or final "rating" system exists between these two studies and those that found significant correlations. The difficulty of assessing the quality of a teen's support network may explain the lack of consensus in the literature.

**Depression.** Depression has been extensively studied in first-time pregnant teens, although the results are equivocal.<sup>19,28,31</sup> In a single study, Stevens-Simon et al<sup>25</sup> found no difference in scores on the Center for Epidemiological Studies—Depression Scale between adolescents who had a second pregnancy and those who did not. No conclusions can be drawn from these few data.

**Religion.** Some early research on teen pregnancy attempted to assess the effects of religion on teen pregnancy rates. In 1978, Trussell and Menken<sup>18</sup> found that Catholics had higher rates of rapid repeat pregnancy than Protestants and a higher total number of children at 15-year follow-up. This was true regardless of the legitimacy status of the births. More recently, Mott<sup>22</sup> reported that in a multivariate analysis model, adherence to fundamental Protestantism was predictive of lower rates of repeat pregnancy; however, Peabody<sup>44</sup> found no correlation between stated religious affiliation and recidivism.

Adherence to a fundamentalist sect of Protestantism may provide some protection by motivating teenagers to remain abstinent; however, the importance of religion to the individual is difficult to measure objectively, and general conclusions cannot be drawn from the small number of studies.

**Substance Abuse.** Extensive evidence suggests that substance abuse may be a risk factor for first pregnancy.<sup>20,31,32,45</sup> In a single study of repeat pregnancy, Stevens-Simon et al<sup>25</sup> found that substance abuse was correlated with higher rates of rapid repeat pregnancy in

univariate analysis, but it was not significant in a multivariate model.

### The Father of the Baby

Until fairly recently, the fathers of babies born to adolescent mothers have largely been ignored by the research community; however, a few investigators have found associations between characteristics of the babies' fathers or the young women's boyfriends and rates of rapid repeat pregnancy. Stevens-Simon et al<sup>25</sup> reported that the following partner variables were associated with repeat pregnancy: older boyfriend, new boyfriend since the conception of the first pregnancy, and boyfriend who wanted a child; however, none of these was an independent predictor of repeat pregnancy in a multivariate model. In 1989, Matsushi et al<sup>15</sup> found that the average age of the boyfriends of teens pregnant both for the first and second times was 4 to 5 years older than the young women. In addition, boyfriends of second-time pregnant teens were more likely to be older than 21 years.

Little information is available on the roles of the partners of adolescent mothers. Their impact on decision making about contraceptive use, conception, and pregnancy resolution is unclear; further research is necessary to determine how their intentions and behaviors affect the choices of the mothers.

### Education and Employment

**School Failure/School Completion.** In general, women who begin childbearing as teens have fewer total years of education and are less likely to complete high school than are women who postpone pregnancy.<sup>3,8,9,18</sup> These effects are even more marked among women with multiple pregnancies in their teenage years.<sup>8,9</sup> Furthermore, adolescent mothers are more likely to have a history of school failure and have lower educational goals than their nonparenting peers.<sup>6,19,33</sup> The direction of causality is unclear; early parenting may lead to school failure, or adolescents failing in school may see childbearing as an alternative path to adult role fulfillment.

Most investigators have found low educational achievement to be a strong predictor of rapid repeat pregnancy. Using a logistic regression model, Polit and Kahn<sup>23</sup> found that two variables predicted recidivism: one, being out of school at baseline (during the first pregnancy or shortly postpartum) and two, the number of times an adolescent had dropped out of school. Similarly, Stevens-Simon et al<sup>24,25</sup> reported in two studies that dropping out of school predicted higher rates of recidivism, and Matsushi et al<sup>15</sup> found that first-time pregnant adolescents were more likely to be in school full-time than were teens with second or higher-order pregnancies. Finally, Atkin and Alatorre-Rico<sup>41</sup> reported that in univariate analysis, teens who had repeat pregnancies were less likely to have been full-time students at baseline;

however, this association was rejected in a multivariate model. Among teens with no history of dropout, poor school performance may be predictive of repeat pregnancy.<sup>24,44</sup> Using a logistic regression model, Linares et al<sup>46</sup> found that poor performance before the first birth predicted higher rates of rapid second birth. In two studies, no association between poor performance and rates of recidivism was found.<sup>42,44</sup>

In addition to baseline school status, further schooling in the 2 years postpartum may predict lower rates of repeat pregnancy.<sup>14,42</sup> Furthermore, teens who delay second pregnancies may be more likely to return to school later.<sup>17</sup> It is unclear whether school attendance exerts a protective effect or whether the teens who return to school are more motivated to avoid second pregnancies. Stevens-Simon et al<sup>24</sup> found that teens with no plans to return to school had higher rates of repeat pregnancy, which suggests that these young women did not value education as highly as did their peers, rather than that they were prevented from returning to school by additional pregnancies. Atkin and Alatorre-Rico<sup>41</sup> also reports that low school aspirations before first pregnancy predicted rapid second pregnancies. In contrast, Jekel et al<sup>42</sup> and Peabody<sup>44</sup> found that educational aspirations had no significant association with repeat pregnancy.

Several investigators have reported that high school completion within 2 years postpartum is highly predictive of low rates of rapid repeat pregnancy<sup>14,18,24</sup>; however, the usefulness of this measure is fairly low. As one can imagine, teens who can complete high school in the 2 years postpartum must be 16 years of age or older at the time of the first birth. Thus, very young adolescent mothers, with their higher rates of recidivism, are excluded from this group. Accordingly, Trussell and Menken<sup>18</sup> reported that much of the effect of educational completion on repeat pregnancy was explained by age at first birth.

Although no true consensus exists, powerful evidence shows that teens failing in school may seek parenthood as an alternative route to "success." Those who become adolescent mothers then face a variety of practical obstacles that make their return to school more difficult. Thus, early interventions aimed at teenagers with poor school performance might reduce both first and repeat pregnancies, and improved support in the form of day care might reduce second pregnancies by facilitating continued education.

**Special Schools for Teenage Parents.** One forum for educational intervention has been separate schools for pregnant and parenting teens. In 1973, Jekel et al<sup>42</sup> reported that adolescents who attended special schools had lower rates of rapid repeat pregnancy than did their "mainstreamed" peers. This effect was strongest among teens with regular attendance records and teens who attended more group sessions run by the school. Klein<sup>39</sup>



reported similar findings among adolescents participating in an intensive multidisciplinary postpartum care center for young mothers. It remains uncertain whether the participants in these studies were more motivated than were nonparticipants at the outset, or whether they benefited from the intervention. In a more recent study, Seitz and Apfel<sup>16</sup> reported that teens who were allowed to remain in special schools longer than 7 weeks postpartum had lower rates of recidivism than did their peers who returned to mainstream schools. They postulated that there might be a “critical time” in the second month postpartum when decisions are made about resumption of sexual activity and contraceptive use. Before this time, the adolescent is still undergoing significant physical healing and may still be adjusting to her new baby. Therefore, information about contraception and life planning may not have as much impact during the immediate postpartum period.

Only one study refutes an association between greater exposure to special school programs for teenage parents and rapid repeat pregnancy. Polit and Kahn<sup>23</sup> found no correlation between the number of semesters spent in a special school program and the probability of repeat pregnancy. Several possible explanations for this finding include: 1) whether teens were in a separate school or participating in special programs at mainstream schools is unclear; 2) the authors state that the population was homogeneous with respect to many of the baseline variables (whether or not program attendance was one of these is not stated); and 3) the length and timing of the program is not specified; if all interventions occurred prenatally, then Seitz and Apfel’s notion of a “critical time” postpartum might explain the lack of significant findings.

**Employment.** The relationship of employment to repeat pregnancy has been less well studied and less well supported. Polit and Kahn<sup>23</sup> found that neither current nor past employment had any correlation with rates of second pregnancy. Similarly, Peabody<sup>44</sup> found that neither occupational achievement nor occupational goals were useful predictors; however, the sample size was small ( $n = 26$ ).

### Obstetric Variables

**Obstetric History.** It is reasonable to assume that the course of an adolescent’s first pregnancy influences her decisions regarding future childbearing. Likewise, an adolescent’s behavior during one pregnancy may be indicative of her attitudes toward pregnancy and childbearing. These factors are easily identified by practitioners caring for pregnant teens and may provide information about which teens are at highest risk for repeat pregnancy.

Jekel et al<sup>42</sup> examined compliance with prenatal care

during the first pregnancy and found that the number of prenatal visits attended did not predict rapid repeat pregnancy. He also noted that the number of prior pregnancies among multiparous teens did not predict the pace of childbearing.

Several authors have investigated the relationship between pregnancy termination in adolescents and subsequent fertility. The results of these studies are mixed. In 1971, Zelnik<sup>26</sup> reported that an adolescent who terminated her first pregnancy was more likely to have a rapid repeat pregnancy than one who had a live or stillbirth; however, in 1976, an adolescent who terminated her first pregnancy was less likely to conceive again than were her peers who chose to continue their pregnancies. This shift likely reflects changes in the availability of and attitudes toward abortion after *Roe v Wade*. In 1979, Koenig and Zelnik<sup>21</sup> reported that teens who underwent therapeutic abortions were less likely to get pregnant a second time than were teens who delivered live or stillborn infants. On the other hand, neither Matsushi et al<sup>15</sup> nor Polit and Kahn<sup>23</sup> found a correlation between prior pregnancy termination(s) and subsequent rapid repeat pregnancy.

Stevens-Simon et al<sup>25</sup> found that women whose first pregnancy ended in miscarriage were more likely to have a rapid repeat pregnancy. They also reported that history of miscarriage before the index pregnancy was associated with increased recidivism, regardless of the outcome of the index pregnancy.<sup>24</sup> Feelings of guilt or a desire to replace a lost pregnancy may be more important in these cases than in cases of pregnancy termination.

### Family Planning and Fertility Behaviors

**Intended or Unintended?** Growing evidence shows that many teens intend to conceive, or feel sufficiently ambivalent about pregnancy and childbearing that they do not bother with contraception.<sup>19,30,32,35,37,47</sup> It seems logical that the subset of young women who plan their first pregnancy are beginning to build their families and would, therefore, have higher rates of second pregnancies. The overwhelming majority of investigators have found that a desired first birth was a significant predictor of rapid second pregnancy. Stevens-Simon et al<sup>25</sup> reported that a desired index pregnancy was predictive of rapid repeat pregnancy in univariate analysis; however, it was not significant in a multivariate model. Kalmuss and Namerow<sup>14</sup> and Mott<sup>22</sup> found that an intended first pregnancy was a significant predictor of rapid repeat pregnancy in both univariate and multivariate models. And teens who explicitly express a desire for more children at the first birth do have more rapid second pregnancies, as expected.<sup>24</sup>

Matsushi et al<sup>15</sup> reported that a higher percentage of second pregnancies than first pregnancies were intended. This may result from an actual difference in intentions

for first and second pregnancy; it may also reflect an unwillingness of teens to admit that they wanted their first pregnancy and growing comfort with the role of motherhood by the second pregnancy. Ford<sup>40</sup> reported that wantedness of second births varied with the age and race of the adolescent. Younger teens were more likely to have planned their second pregnancies than were older teens. Among women 17 years of age or younger, African Americans were more likely than Caucasians to have desired a second pregnancy, although Caucasian women aged 18 or 19 years were more likely to plan a rapid second pregnancy. On the other hand, Trussell and Menken<sup>18</sup> found no difference in the pace of subsequent childbearing related to the wantedness of the first pregnancy. They reported that younger adolescents had more unintended pregnancies than did their older peers.

Not all of the above studies analyzed these trends statistically. Of those that do, the evidence seems to support "wantedness" of the first birth as a predictor of rapid second births.

**Contraception.** Although some repeat pregnancies are undoubtedly intended, a great many are not and could have been prevented by effective contraception. Several studies have addressed the effects of postpartum contraceptive plans on incidence of repeat pregnancy. Stevens-Simon et al<sup>25</sup> reported that plans to use Norplant postpartum correlated with lower rates of repeat pregnancy in logistic regression models. Stevens-Simon et al<sup>49</sup> also examined which teens accepted Norplant postpartum and found that the teens at highest risk for repeat pregnancy had acceptance rates similar to their lower-risk peers. In 1994, Polaneczky et al<sup>50</sup> demonstrated that teenage mothers who use Norplant postpartum have dramatically lower pregnancy rates than those who choose birth control pills. She also found that the Norplant group had no increase in sexual activity or sexually transmitted diseases and no decrease in condom use. This suggests that Norplant may be an attractive option for preventing second pregnancies among high-risk teens.

Jekel et al<sup>42</sup> reported in 1973 that rates of contraceptive acceptance postpartum did not differ among teens who had a rapid repeat pregnancy and those who did not conceive a second time; however, the measure they used was acceptance of a prescription for birth control pills at the postpartum visit. Willingness to accept a prescription may not accurately reflect willingness to use the pills; teens may not wish to disagree with providers who tell them they should use the pills. Furthermore, even teens willing to try birth control pills may be noncompliant with them for a variety of reasons, including adverse side effects and forgetfulness.

Peabody<sup>44</sup> examined this last aspect in a study of 26 participants enrolled in a postpartum intervention program; she found that teens who admitted to noncompliance with birth control had higher rates of rapid repeat

pregnancy. Gispert et al<sup>43</sup> found that teens who did not become pregnant again had more negative attitudes toward pregnancy and more consistent use of contraception; teens with more than one pregnancy reported more positive attitudes toward contraception but lower rates of use. These researchers postulate that this discord between attitude and action is the result of greater exposure to the side effects and inconveniences of contraception; therefore, people who consistently use contraception would have both more realistic attitudes toward contraception and lower rates of repeat pregnancy than people who did not use contraceptives. Polit and Kahn<sup>23</sup> found that a history of having used birth control pills in the past had no effect on the rate of repeat pregnancy. More detailed inquiry into past consistency of use, incidence of side effects, or plans for future use may have provided more useful predictors of behavior.

Only Norplant use seems to reliably decrease recidivism; no other aspect of contraceptive use is significant. Given its high levels of acceptance and satisfaction, Norplant insertion could be an important intervention for adolescent mothers.

**Sexual Activity.** Only one study evaluated sexual behavior as a predictor of repeat pregnancy. Peabody<sup>44</sup> reported that teens who stated that they "do plan to continue to engage in sexual intercourse" had increased rates of recidivism. Also, as discussed earlier, some of the effects of marriage on repeat pregnancy may be caused by more frequent sexual intercourse, based on the assumption that married adolescents are likely to have regular intercourse. Further exploration of patterns of sexual behavior among teenage mothers is needed to determine its relation to repeat pregnancy.

## Conclusions

Most adolescent mothers have multiple risk factors for repeat pregnancy. Each factor may have different predictive value among different populations, and how all of the variables interact is still unclear; however, it seems logical that teenagers with more risk factors are at higher risk for a rapid second pregnancy. Consistent with this, Stevens-Simon et al<sup>25</sup> reported that having five or more risk factors together predicted rapid repeat pregnancy in a logistic regression model, although none of the variables reached significance when examined alone; however, with as many as half of adolescent mothers conceiving again within 2 years, it may be that we should treat all pregnant teens as "high risk" for a second pregnancy. Even more critical than predicting which teens will have a second pregnancy may be determining what interventions will work best for different teenagers.

Teen pregnancy has been referred to by some authors as part of a pattern of "nonconformist" or problem behaviors.<sup>19,20,28,32</sup> The idea that there is a "normative

state of nonpregnancy”<sup>44</sup> from which adolescent mothers must be willing to deviate probably has little relevance to the teenagers at highest risk, such as impoverished African-American or Hispanic urban youth. In some communities, adolescent pregnancy is sufficiently widespread to constitute a “normative state” in and of itself; for these teens, pregnancy may represent the achievement of adult membership in the community.<sup>48</sup> Programs designed to reduce risk-taking behaviors may not reach this group of adolescent mothers because pregnancy is not perceived as a “risk.”<sup>47</sup> For teens who actually intend a second pregnancy, discussions of birth control are likewise irrelevant. Providing alternative life goals for these mothers—such as higher education or better employment—might encourage a delay to second pregnancy, although this is open to debate. Indeed, some might argue that trying to dissuade these young women from a second pregnancy would be disrespectful of their rights to control their own reproduction.

On the other hand, teenage mothers who genuinely wish to delay a second pregnancy should benefit from sex education and provision of contraception. Despite the availability of free public health clinics that provide contraceptives at no charge, young women who do not wish to become pregnant are not using effective methods of birth control consistently.<sup>25</sup> In teens motivated to prevent pregnancy, providers must address their concerns regarding birth control.<sup>51</sup> Fears of side effects are prevalent, and teenagers who perceive birth control as dangerous are unlikely to use it.<sup>52</sup> Furthermore, clinics for adolescents should be located where the teens can reach them easily; school clinics are one way to make health professionals more accessible<sup>53</sup>; however, these clinics may miss one high-risk group: those who have already dropped out of school.

The group with the greatest possibility for intervention may be the teenage mothers who are ambivalent about the timing of future pregnancies. In these women, motivation toward different goals might indeed be the key; however, this would require societal changes far beyond the scope of the health care provider. For example, the availability of affordable day care would certainly facilitate a return to school for those mothers who choose to do so. Job-training programs that give them the skills to obtain higher-paid positions would make working a logical alternative to welfare. The problem of repeat pregnancy among these women will not be solved by obstetricians or pediatricians alone; comprehensive programs that address the many facets of adolescent mothers’ lives will be required.

Further research is required to determine what types of programs work best for the various subgroups of teenage mothers. Certainly, all practitioners should be aware that the motivations and intentions of their patients vary significantly and that treating all teenage pregnancy as

unintended will fail to address the goals and plans of many young mothers.

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