

# Differences Between Mistimed and Unwanted Pregnancies Among Women Who Have Live Births

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**CONTEXT:** Mistimed and unwanted pregnancies that result in live births are commonly considered together as unintended pregnancies, but they may have different precursors and outcomes.

**METHODS:** Data from 15 states participating in the 1998 Pregnancy Risk Assessment Monitoring System were used to calculate the prevalence of intended, mistimed and unwanted conceptions, by selected variables. Associations between unintendedness and women's behaviors and experiences before, during and after the pregnancy were assessed through unadjusted relative risks.

**RESULTS:** The distribution of intended, mistimed and unwanted pregnancies differed on nearly every variable examined; risky behaviors and adverse experiences were more common among women with mistimed than intended pregnancies and were most common among those whose pregnancies were unwanted. The likelihood of having an unwanted rather than mistimed pregnancy was elevated for women 35 or older (relative risk, 2.3) and was reduced for those younger than 25 (0.8); the pattern was reversed for the likelihood of mistimed rather than intended pregnancy (0.5 vs. 1.7–2.7). Parous women had an increased risk of an unwanted pregnancy (2.1–4.0) but a decreased risk of a mistimed one (0.9). Women who smoked in the third trimester, received delayed or no prenatal care, did not breast-feed, were physically abused during pregnancy, said their partner had not wanted a pregnancy or had a low-birth-weight infant had an increased risk of unintended pregnancy; the size of the increase depended on whether the pregnancy was unwanted or mistimed.

**CONCLUSION:** Clarifying the difference in risk between mistimed and unwanted pregnancies may help guide decisions regarding services to women and infants.

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Nearly one-third of live U.S. births are the result of an unintended pregnancy—one that was either mistimed (occurred earlier than desired) or unwanted.<sup>1</sup> A study using data from the 1995 National Survey of Family Growth (NSFG) estimated that 31% of pregnancies that resulted in a live birth were unintended.<sup>2</sup>

The health effects of unintended pregnancies are commonly studied by combining data on mistimed pregnancies and unwanted pregnancies and considering the joint impact.<sup>3</sup> This is done for all unintended pregnancies and for those ending in a live birth. However, the meaning of mistimed and unwanted pregnancies, and the circumstances in which they occur, are important and have not been well described.

A few studies have examined mistimed and unwanted pregnancies separately,<sup>4</sup> but they have examined a very limited range of characteristics; in addition, not all have directly compared mistimed with unwanted pregnancies. For example, Adams and colleagues compared women who had mistimed pregnancies and women who had unwanted pregnancies with women who had intended pregnancies. Women in both of the groups with unintended pregnancies were more likely than women with planned pregnancies to have smoked before conception;<sup>5</sup> however, the study

did not compare the two unintended groups directly. Dye and colleagues found that women with unintended pregnancies were less likely than women with intended pregnancies to breast-feed, and that women with unwanted pregnancies were less likely than women with mistimed pregnancies to do so.<sup>6</sup> Kost and colleagues, comparing mistimed and unwanted pregnancies, observed a similar relationship for breast-feeding but found no between-group difference in the proportion accessing well-baby care.<sup>7</sup>

Pulley and colleagues found degree of mistiming to be associated with selected maternal characteristics, maternal behaviors and pregnancy outcomes, with the most positive behaviors and outcomes (e.g., initiating early prenatal care, breast-feeding, having a full-term delivery and having a normal-birth-weight infant) seen among women who considered their pregnancy intended or only moderately mistimed.<sup>8</sup> That study examined only a few characteristics, however, and it did not compare mistimed pregnancies with unwanted pregnancies.

We sought to examine the components of pregnancy intention and to assess whether women with a mistimed pregnancy and those with an unwanted pregnancy should be considered separately—analytically and in practice—rather than together. Our analysis used a large, population-based

sample, enabling us to analyze a greater number of demographic and behavioral risk factors than were used in earlier studies. In this article, we focus on comparisons between women who report mistimed pregnancies and those who report unwanted pregnancies among respondents with a recent live birth.

## METHODS

We analyzed data from the Pregnancy Risk Assessment Monitoring System (PRAMS)—an ongoing population-based surveillance system developed, technically supported and funded in part by the Centers for Disease Control and Prevention—for 1998, the most recent survey year available at the outset of the study. PRAMS uses a mixed-mode data collection system to obtain self-reported information on perinatal and maternal health indicators from mothers who recently gave birth to a live infant. A sample of eligible women is drawn from birth certificates each month in participating states. As many as three mailings are sent to selected respondents 2–6 months after the birth of their baby; nonrespondents are followed up by telephone. Information from birth certificates is also collected, and can be analyzed in conjunction with data from the survey. Women whose live-born infant died are included in the sample. Women who gave birth outside their state of residence or who adopted their infant are excluded. More details of the methods used in PRAMS are described elsewhere.<sup>9</sup>

We examined data from the 15 states that had fully implemented the PRAMS methods (Alabama, Alaska, Arkansas, Colorado, Florida, Illinois, Louisiana, Maine, New Mexico, New York, North Carolina, Oklahoma, South Carolina, Washington and West Virginia). The 1998 data set comprises the responses of 25,027 women, representing the 986,510 women who had live births in these states in 1998.\*

Pregnancy intention was determined by the mother's response to the question "Thinking back to just before you got pregnant, how did you feel about becoming pregnant?" The pregnancy was defined as intended if the woman reported having wanted to be pregnant at conception or earlier. It was considered mistimed if the woman reported having wanted the pregnancy later, and unwanted if she had not wanted to become pregnant then or later. The response options included "I don't know."

Self-reported data from the PRAMS questionnaire yielded information on women's behaviors and experiences before, during and after the pregnancy. We looked at dichotomous variables on smoking and drinking during the third trimester of pregnancy. Prenatal care was categorized as delayed if the woman had started care after the 12th week of pregnancy. We considered a woman to have breast-fed her infant if she reported doing so currently or having done so at some point for more than one week. We classified a woman as a Medicaid beneficiary if she reported that she had received Medicaid benefits just before her pregnancy or that Medicaid had paid for her prenatal care or delivery.

The woman's yes-or-no answer to the statement "Your husband or partner said he did not want you to be preg-

**TABLE 1. Percentage distribution (and 95% confidence intervals) of women from 15 U.S. states with a recent live birth, by pregnancy intention status, Pregnancy Risk Assessment Monitoring System, 1998**

Intention status	% (N=25,027)
Intended	56.9 (55.9–57.9)
Unintended	43.1 (42.1–44.1)
Mistimed	31.8 (30.8–32.8)
Unwanted	11.2 (10.5–11.9)
Total	100.0

Note: Data are from Alabama, Alaska, Arkansas, Colorado, Florida, Illinois, Louisiana, Maine, New Mexico, New York, North Carolina, Oklahoma, South Carolina, Washington and West Virginia.

nant" determined partner intention. We considered a woman to have experienced physical abuse if she reported that her husband or partner, another household member, a relative, a friend or any other person pushed, hit, slapped, kicked or otherwise physically hurt her during the pregnancy.

Nonresponse was less than 4% for all variables except breast-feeding (8%) and pregnancy intention. For pregnancy intention, 8% of respondents answered "I don't know" to the question or left it blank. All missing values were excluded from the analysis.

We used information from the birth certificate for maternal age, marital status, parity and infant birth weight. Low-birth-weight infants were those weighing less than 2,500 g at birth.

We performed the analyses using SUDAAN software, which could take into account the complex sampling design and statistical weighting used in PRAMS.<sup>10</sup> We calculated percentages and standard errors to obtain the percentage distributions for each intendedness category by selected characteristics. A chi-square test was used to assess differences among intendedness groups. To further examine the relationship between the mistimed and unwanted pregnancy groups and selected characteristics, we calculated unadjusted relative risks, along with 95% confidence intervals. Using similar methods, we also examined whether the mistimed and intended groups differed from one other.

## RESULTS

The majority of births in this analysis—57%—involved intended pregnancies (Table 1). Among the unintended pregnancies, three-quarters were mistimed (32% of all pregnancies) and one-quarter were unwanted (11% of all pregnancies).

### Descriptive Characteristics

When the women were grouped according to the intendedness of their pregnancy, the three groups differed on nearly all variables examined. Among women whose pregnan-

\*Data for New York State do not include New York City. Data for New Mexico involve births from July 1997 through December 1998. Weighted response rates for the 15 states ranged from 70% (in New Mexico) to 83% (in Maine and Florida).

**TABLE 2. Percentage distribution (and 95% confidence intervals) of women who had a live birth, by selected characteristics, according to pregnancy intention status**

Characteristic	Intended (N=13,728)	Mistimed (N=8,373)	Unwanted (N=2,926)
<b>MATERNAL CHARACTERISTICS</b>			
<b>Age*</b>			
<20	5.9 (5.4–6.4)	26.2 (24.8–27.6)	18.6 (16.4–20.8)
20–24	22.0 (20.8–23.2)	33.5 (31.7–35.2)	27.2 (24.6–29.9)
25–34	56.7 (55.2–58.1)	36.4 (34.6–38.1)	37.4 (34.3–40.4)
≥35	15.5 (14.4–16.6)	3.9 (3.2–4.7)	16.8 (14.4–19.3)
<b>Marital status*</b>			
Married	82.9 (81.8–83.9)	48.9 (47.1–50.7)	41.4 (38.4–44.5)
Other	17.1 (16.1–18.2)	51.1 (49.3–52.9)	58.6 (55.5–61.6)
<b>Education*</b>			
<H.S.	14.1 (13.1–15.1)	25.9 (24.3–27.4)	30.4 (27.0–33.8)
H.S.	30.9 (29.6–32.2)	38.2 (36.4–40.0)	38.3 (35.3–41.3)
>H.S.	55.0 (53.6–56.4)	35.9 (34.2–37.7)	31.3 (28.4–34.2)
<b>Race*</b>			
White	86.0 (85.1–86.8)	69.8 (68.3–71.3)	54.9 (52.0–57.9)
Black	10.4 (9.7–11.1)	26.2 (24.9–27.6)	41.5 (38.6–44.4)
Native American/ Alaska Native	1.2 (1.0–1.4)	2.0 (1.6–2.3)	1.5 (1.1–2.0)
Other	2.4 (2.0–2.8)	2.0 (1.5–2.5)	2.1 (1.1–3.0)
<b>Ethnicity</b>			
Hispanic	17.9 (16.6–19.2)	17.2 (15.4–19.0)	16.9 (13.8–20.0)
Non-Hispanic	82.1 (80.8–83.4)	82.8 (81.0–84.6)	83.2 (80.1–86.3)
<b>Parity*</b>			
0	42.6 (41.2–44.0)	48.9 (47.1–50.7)	23.2 (20.7–25.6)
1–2	51.2 (49.7–52.6)	45.4 (43.6–47.2)	54.8 (51.8–57.9)
≥3	6.3 (5.5–7.0)	5.7 (4.8–6.5)	22.0 (19.4–24.6)
<b>Medicaid coverage*</b>			
No	72.9 (71.7–74.1)	45.8 (44.0–47.6)	38.2 (35.2–41.2)
Yes	27.1 (25.9–28.3)	54.2 (52.4–56.0)	61.8 (58.8–64.8)
<b>MATERNAL BEHAVIORS</b>			
<b>Smoked in third trimester*</b>			
No	88.8 (87.9–89.7)	83.1 (81.7–84.4)	77.3 (74.6–80.0)
Yes	11.2 (10.3–12.1)	16.9 (15.6–18.3)	22.7 (20.0–25.4)
<b>Drank alcohol in third trimester</b>			
No	94.8 (94.2–95.5)	95.5 (94.6–96.3)	94.3 (93.0–95.6)
Yes	5.2 (4.5–5.8)	4.5 (3.7–5.4)	5.7 (4.4–7.0)
<b>Received prenatal care*</b>			
None	0.3 (0.2–0.5)	0.8 (0.5–1.0)	3.4 (2.3–4.5)
Delayed	13.8 (12.8–14.7)	30.8 (29.2–32.5)	39.4 (36.3–42.4)
First trimester	85.9 (84.9–86.8)	68.4 (66.7–70.1)	57.2 (54.1–60.3)
<b>Breast-fed*</b>			
No	30.3 (29.0–31.6)	42.1 (40.3–43.8)	51.5 (48.5–54.6)
Yes	69.7 (68.4–71.0)	57.9 (56.2–59.7)	48.5 (45.4–51.5)
<b>OTHER</b>			
<b>Physical abuse during pregnancy*</b>			
No	96.9 (96.5–97.4)	93.1 (92.1–94.0)	90.1 (88.3–91.9)
Yes	3.1 (2.6–3.5)	6.9 (6.0–7.9)	9.9 (8.1–11.7)
<b>Partner wanted pregnancy*</b>			
No	4.7 (4.1–5.3)	16.7 (15.3–18.1)	24.6 (22.0–27.3)
Yes	95.3 (94.7–95.9)	83.3 (81.9–84.7)	75.4 (72.7–78.0)
<b>INFANT OUTCOME</b>			
<b>Birth weight*</b>			
Low	6.5 (6.3–6.8)	7.5 (7.1–8.0)	9.6 (8.7–10.5)
Normal	93.5 (93.2–93.7)	92.5 (92.0–92.9)	90.4 (89.5–91.3)
Total	100.0	100.0	100.0

\*For difference among intended, mistimed and unwanted pregnancy groups,  $p < .001$ .

cies were intended, the largest proportion (57%) were 25–34 years of age, and the smallest proportion (6%) were teenagers (Table 2). By contrast, women aged 20–24 and those aged 25–34 represented the largest fractions of the mistimed group (34% and 36%, respectively), and women aged 35 or older the smallest (4%). Women aged 25–34 made up the greatest share of those who reported unwanted pregnancies (37%), and women aged 35 or older the smallest (17%). The proportion of mothers who were teenagers was highest in the mistimed group.

Most women with intended pregnancies, but fewer than half of those with mistimed or unwanted pregnancies, were married. The proportion of women who were unmarried was largest in the unwanted pregnancy group. The majority of women with intended pregnancies had more than a high school education; the majority in both other groups had at least a high school education.

Black women made up 10% of the intended pregnancy group but higher proportions of both the mistimed and the unwanted groups (26% and 42%, respectively).

About half of women in each group had already had 1–2 births. However, whereas the rest of those in the intended and mistimed groups were mainly first-time mothers, the remainder in the unwanted group were evenly divided between women having their first birth and those who had already had at least three. Medicaid beneficiaries constituted a minority of the intended pregnancy group but a majority of the mistimed and the unwanted groups.

In each group, a minority of women smoked, received no or delayed prenatal care, were abused, delivered a low-birth-weight infant and had a partner who considered the pregnancy unwanted; however, the proportions were largest among women with unwanted pregnancies. Similarly, no more than half in any group breast-fed, yet the highest proportion of women who did not breast-feed was in the unwanted group.

### Analyses of Association

Women differed significantly in their unadjusted relative risks of unwanted (vs. mistimed) pregnancy and mistimed (vs. intended) pregnancy according to most demographic characteristics, notably age and parity (Table 3). For example, compared with women aged 25–34, women who were teenagers or in their early 20s had a decreased risk of unwanted pregnancy (relative risk, 0.8 for each age-group), but the risk was increased in women aged 35 or older (2.3). In contrast, the risk of mistimed pregnancy was elevated in the two youngest age categories (relative risks, 2.7 and 1.7) but was decreased in the oldest group (0.5). Women who had had 1–2 previous children, or three or more, were at increased risk of reporting unwanted pregnancy (2.1 and 4.0, respectively), but they were at decreased risk of reporting mistimed pregnancy (0.9 for both). Women's marital status, education, race and Medicaid status were also associated with the outcomes of interest, but ethnicity was not.

Among the other variables examined, all but one—drinking in the third trimester—were associated with women's

**TABLE 3. Unadjusted relative risks (and 95% confidence intervals) of unwanted and mistimed pregnancy among women's recent live births, by selected characteristics**

Characteristic	Unwanted (vs. mistimed)	Mistimed (vs. intended)
<b>MATERNAL CHARACTERISTICS</b>		
<b>Age</b>		
<20	0.75 (0.65–0.87)	2.66 (2.50–2.84)
20–24	0.84 (0.73–0.96)	1.73 (1.61–1.86)
25–34 (ref)	1.00	1.00
≥35	2.27 (1.98–2.61)	0.47 (0.39–0.57)
<b>Marital status</b>		
Married (ref)	1.00	1.00
Other	1.25 (1.12–1.39)	2.52 (2.39–2.67)
<b>Education</b>		
<H.S.	1.25 (1.09–1.43)	1.89 (1.76–2.04)
H.S.	1.11 (0.98–1.27)	1.53 (1.43–1.64)
>H.S. (ref)	1.00	1.00
<b>Race</b>		
White (ref)	1.00	1.00
Black	1.65 (1.48–1.83)	1.87 (1.77–1.98)
Native American/ Alaska Native	0.98 (0.74–1.31)	1.54 (1.35–1.76)
Other	1.24 (0.83–1.84)	1.01 (0.81–1.25)
<b>Ethnicity</b>		
Hispanic	0.98 (0.81–1.19)	0.97 (0.87–1.08)
Non-Hispanic (ref)	1.00	1.00
<b>Parity</b>		
0 (ref)	1.00	1.00
1–2	2.08 (1.83–2.37)	0.85 (0.80–0.90)
≥3	4.02 (3.50–4.62)	0.86 (0.75–0.98)
<b>Medicaid coverage</b>		
No (ref)	1.00	1.00
Yes	1.26 (1.13–1.41)	2.03 (1.92–2.15)
<b>MATERNAL BEHAVIORS</b>		
<b>Smoked in third trimester</b>		
No (ref)	1.00	1.00
Yes	1.30 (1.15–1.48)	1.34 (1.24–1.44)
<b>Drank alcohol in third trimester</b>		
No (ref)	1.00	1.00
Yes	1.19 (0.96–1.48)	0.91 (0.78–1.07)
<b>Received prenatal care</b>		
None	2.66 (2.19–3.22)	1.83 (1.47–2.28)
Delayed	1.36 (1.22–1.52)	1.81 (1.71–1.91)
First trimester (ref)	1.00	1.00
<b>Breast-fed</b>		
No	1.32 (1.19–1.47)	1.38 (1.30–1.46)
Yes (ref)	1.00	1.00
<b>OTHER</b>		
<b>Physical abuse during pregnancy</b>		
No (ref)	1.00	1.00
Yes	1.32 (1.12–1.55)	1.59 (1.44–1.75)
<b>Partner wanted pregnancy</b>		
No	1.42 (1.26–1.60)	2.03 (1.91–2.16)
Yes (ref)	1.00	1.00
<b>INFANT OUTCOME</b>		
<b>Birth weight</b>		
Low	1.21 (1.11–1.32)	1.10 (1.05–1.16)
Normal (ref)	1.00	1.00

Note: ref=reference group.

risks of reporting unintended pregnancies. The risks of unwanted and mistimed pregnancies were elevated significantly if the woman had smoked in the third trimester (relative risk, 1.3 for each), had received no prenatal care (2.7 and 1.8) or delayed care (1.4 and 1.8), had not breast-fed (1.3 and 1.4), had been physically abused (1.3 and 1.6), had a partner who had not wanted the pregnancy (1.4 and 2.0) or had a low-birth-weight baby (1.2 and 1.1).

## DISCUSSION

A woman was more likely to report that her pregnancy had been unwanted rather than mistimed if she had certain behavioral risk factors. Women who were at least 35 or parous were more likely to report an unwanted rather than mistimed pregnancy. This finding could be expected, because older women and women with children are more likely than younger women and childless women to have achieved their desired family size.<sup>11</sup> However, this relationship has been masked in other analyses when all unintended pregnancies have been considered as a single group.<sup>12</sup>

Our findings also show that the majority of pregnancies were intended. Among women reporting an unintended pregnancy, most said that the pregnancy was mistimed rather than unwanted. This result is consistent with NSFG findings.<sup>13</sup> However, the proportion of pregnancies reported as unintended was larger in the 1998 PRAMS (43%) than in the 1995 NSFG (31%).<sup>14</sup>

Differences between NSFG and PRAMS survey methods contribute to the difference in the prevalence of unintended pregnancy reported by each survey. For example, the NSFG provides a national estimate, whereas the PRAMS data set used in this study represented 15 states. In addition, pregnancy intention is measured by using different instruments, which could result in women's responding to the intention item in different ways.<sup>15</sup> The NSFG uses a series of questions to define pregnancy intention, whereas PRAMS uses a single item. PRAMS is primarily a mail survey with telephone follow-up, whereas the NSFG is conducted primarily as a face-to-face interview. Meanwhile, survey response rates can vary according to the manner in which the survey is administered;<sup>16</sup> moreover, respondents are generally less likely to answer sensitive questions when they are asked face-to-face.<sup>17</sup> With PRAMS, participants' responses are recorded 2–6 months postpartum; however, the NSFG, using a calendar method to assist participants in their recall and reporting, assesses pregnancies over the previous five years. Meanwhile, over time, women may come to view the intendedness of a given pregnancy in an increasingly positive light.<sup>18</sup>

## Limitations

This study has several limitations. The PRAMS survey collects data 2–6 months postpartum, at which point a mother's feelings toward her pregnancy or recall of her feelings at the time that she learned she was pregnant may have changed.<sup>19</sup> In addition, PRAMS collects data on only a subset of all pregnancies—those resulting in live births. Thus,



we could not assess women with unintended pregnancies ending in abortion, miscarriage or stillbirth, whose characteristics probably differ from those of the women with unintended pregnancies in our analysis.

Pregnancy intendedness is complex and difficult to measure. Previous research has shown that the concept may not be meaningful to some women<sup>20</sup> or that women may be ambivalent.<sup>21</sup> Studies that have looked at other ways to measure pregnancy intention status, such as by assessing attitudes and happiness, suggest that considering unintendedness in terms of mistimed and unwanted pregnancies may not be the only way to study women's intentions<sup>22</sup> or that this concept may be best suited for estimating unintendedness on a population level but not necessarily for unraveling the complex array of cultural and social factors that operate on an individual level.<sup>23</sup> In this study, for example, 8% of women did not answer the pregnancy intention question or responded that they did not know. Alternative measures of pregnancy intendedness should be explored in PRAMS and other studies.

Additional measures of attitudes and happiness are now available in PRAMS. Since 2000, PRAMS has offered states the option to include standard questions on the woman's attitudes and degree of happiness regarding her recent pregnancy, and on her partner's pregnancy intention. As a result, 10 states have added 1–3 questions on these topics.

Finally, we chose not to perform a multivariate analysis with adjustment for socioeconomic status. Many births in the PRAMS data set are to teenagers, and conventional measures of socioeconomic status, such as level of education completed and income, are inappropriate in this population.<sup>24</sup> Moreover, socioeconomic status would have been more important if we had been examining differences between intended and unintended pregnancies; however, our primary comparison was between unwanted and mistimed pregnancies. Compared with births among women with intended pregnancies, those among women with unwanted or mistimed pregnancies are more likely to involve poor and minority women.

### Conclusions

The use of a single category to represent unintended pregnancy masks apparent differences between women with mistimed pregnancies and those with unwanted pregnancies: According to our analysis, women with behavioral risk factors that could negatively affect their pregnancy outcomes are more likely to report unwanted than mistimed pregnancy. Beyond measurement issues, our findings have practical implications. For example, prenatal care providers, family planning providers and other public health professionals may find this information useful for targeting pregnant women who could benefit from counseling regarding the effects of unhealthy behaviors on their unborn child.

Because unintended pregnancy is associated with unfavorable maternal behaviors and unfavorable outcomes for both mother and child,<sup>25</sup> clarifying the difference in risk between mistimed and unwanted pregnancies may help guide

decisions regarding direct services to women and to infants. Moreover, further research on alternate ways to measure pregnancy intendedness and on the best ways to prevent or ameliorate the risk of unintended pregnancies may lead to the development of programs targeting each group. Finally, this research suggests that studies examining the relationships between pregnancy intention, health behaviors and health outcomes among women with live births should examine mistimed and unwanted pregnancies separately.

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