

# Are Pregnancy Intentions Associated with Transitions Into and Out of Marriage?

**CONTEXT:** In addition to having associations with health outcomes, pregnancy intentions may be associated with social outcomes, including marital transitions.

**METHODS:** Linked data from the 2004–2008 Oklahoma Pregnancy Risk Assessment Monitoring System and The Oklahoma Toddler Survey for 2006–2010 on 3,617 women who were married and 2,123 who were unmarried at conception were used to examine the relationship between pregnancy intention status (intended, mistimed by less than two years, mistimed by two or more years, or unwanted) and marital formation or dissolution by the time of the birth and two years later. Logistic regression analyses were conducted, and propensity score methods were used to adjust for confounding characteristics.

**RESULTS:** Intention status was associated with marital transition two years after the birth, but not between conception and birth. In adjusted models, among women married at conception, those with a birth resulting from an unwanted pregnancy were more likely than those with a birth resulting from an intended pregnancy to transition out of marriage by the time their child was two years old (odds ratio, 2.2). Among women unmarried at conception, those with a birth following an unwanted pregnancy were less likely than those with a birth following an intended pregnancy to marry by the time their child was two (0.5). Births following mistimed pregnancies were not associated with marital transition.

**CONCLUSIONS:** The findings should motivate researchers to broaden the scope of research on the consequences of unintended childbearing. Future research should distinguish between mistimed and unwanted births.

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By Isaac Maddow-Zimet, Laura Lindberg, Kathryn Kost and Alicia Lincoln

Isaac Maddow-Zimet is research associate, and Laura Lindberg and Kathryn Kost are principal research scientists, all with the Guttmacher Institute, New York. Alicia Lincoln is administrative program manager, Oklahoma Department of Health, Oklahoma City.

National public health policy and research on reproductive behaviors have been strongly influenced by the premise that unintended childbearing has significant negative consequences.<sup>1,2</sup> Much research has focused on health consequences of unintended childbearing, particularly its effect on the behavior of mothers both during pregnancy and afterward, such as use of prenatal care or breast-feeding.<sup>3–5</sup> Far less attention has been given to the potential relationship between unintended childbearing and negative social outcomes. In the 1995 watershed report *The Best Intentions*, the National Academy of Sciences reviewed research on the consequences of unintended pregnancy and concluded that “such consequences undoubtedly impede the formation and maintenance of strong families.”<sup>6(p.251)</sup> In the years since this report, however, despite the substantial research and policy focus on how marriage formation and stability are associated with childbearing, potential associations between unintended childbearing and marital behaviors have received little attention. Yet, transitions into or out of marriage may be influenced by the experience of having a birth resulting from an unintended pregnancy. Given that 37% of all U.S. births each year result from unintended pregnancies,<sup>7</sup> research is needed to better understand the relationship between unintended childbearing and marital transitions.

In this article, we examine associations between childbearing intentions and women’s transitions into and out of marriage by using a unique longitudinal data set representative of all women giving birth in Oklahoma. Beyond providing high-quality data about childbearing and marriage transitions, Oklahoma offers an important setting for studying the relationship between intention status and both marriage formation and stability. Forty-six percent of all live births in the state in 2010 resulted from an unintended pregnancy (compared with 38% nationally).<sup>8</sup> Additionally, when faced with an unintended pregnancy, about two-thirds of women in Oklahoma carry it to term—a share that is among the highest in the country.<sup>9</sup> Childbearing women in Oklahoma also face relatively severe economic challenges: For example, 65% of deliveries in Oklahoma in 2010 were paid for with public funding (through programs such as Medicaid and the Indian Health Service), compared with 51% in the country overall.<sup>8</sup>

At the same time, Oklahoma has made marriage promotion a state-level priority. The Oklahoma Marriage Initiative,\* launched in 1999, is the nation’s longest running and largest marriage promotion program.<sup>10</sup> It provides free educational workshops “designed to teach individuals

\*In 2015, the program’s name was changed to Project Relate Oklahoma.

and couples the attitudes, communication, and behavioral skills known to improve relationship quality and increase family stability.<sup>11(p. 4)</sup> The reach of the program is extensive: Between 2001 and 2007, some 5–10% of Oklahoma households participated in workshops funded by the program.<sup>12</sup> Yet, despite the initiative, the share of births in Oklahoma that are to unmarried women has largely mirrored that for the country overall—rising from 34% to 41% between 2000 and 2007, and then remaining stable through 2012.<sup>13</sup> In addition, although the divorce rate in Oklahoma declined by about 25% between 2000 and 2013,<sup>14</sup> it is still the third highest in the nation.<sup>15</sup>

## BACKGROUND

Research on the associations between childbearing and marital transitions tends to examine marital and nonmarital conceptions separately. For married couples, strong evidence suggests that childbearing is associated with increased marital stability.<sup>16,17</sup> In contrast, for couples unmarried at conception, childbearing generally is not followed by the formation of marriages. For example, in an analysis of national data, few nonmarital conceptions were followed by marriages before the birth.<sup>18</sup> Even after a birth, small proportions of women marry: Research from the Fragile Families and Child Wellbeing Study found that only 16% of women with nonmarital births married the father by the child's fifth birthday.<sup>19</sup> Whether the pregnancy leading to the birth was intended, mistimed or unwanted was not considered in any of these analyses.\*

Only a handful of studies have directly examined the association of pregnancy intentions with marriage transitions following childbirth. Among women experiencing a nonmarital birth, some evidence exists of an association between marriage formation and pregnancy intention. In the Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), a nationally representative sample of children born in 2001, analyses that controlled for background characteristics indicated that cohabiting women who gave birth after having an intended pregnancy were more likely than those with a birth resulting from an unintended pregnancy to marry within two years of the birth;<sup>20</sup> similarly, women not in a union at conception were more likely to be cohabiting or married two years postpartum if the pregnancy was intended than if it was unintended. Using data from the 2002 National Survey of Family Growth (NSFG), Manlove et al. conducted regression analyses controlling for background characteristics and found a positive association between pregnancy intentions and marriage among cohabiting women, but only among white women.<sup>21</sup> Employing the same data, Guzzo and Hayford found in a bivariate model that marriage following a birth was more likely among cohabiting women with an intended pregnancy than among those with an unintended pregnancy;<sup>22</sup> however, the association was no longer apparent

in analyses that controlled for confounding background characteristics.

Evidence is also limited in regard to the relationship between pregnancy intentions and marital stability. In an analysis of marital first births reported in the 2002 NSFG, women whose pregnancy had been unintended were more likely than those whose pregnancy had been intended to experience marriage dissolution, even when stable unobserved characteristics were accounted for using fixed-effects models.<sup>23</sup> In an analysis of the ECLS-B, women who had been married at conception were more likely to still be married when the child was two years old if the pregnancy was intended than if it was unintended.<sup>20</sup> Other studies have not differentiated between cohabiting and marital relationships, but their results still suggest that compared with births resulting from intended pregnancies, those resulting from unintended pregnancies are generally negatively associated with the stability of unions.<sup>24,25</sup>

Studies of marital transitions associated with childbearing find significant relationships between a range of background characteristics—age, race and ethnicity, parity, education, income and intimate partner violence—and both marital formation and marital dissolution after a birth.<sup>16,17,26–28</sup> Analyses have used a variety of statistical approaches to adjust for potential confounding between intention status and these demographic variables; these variables may also have a direct and independent association with marital transitions beyond their relationship with intention status.

This article addresses a number of research and methodological gaps in the study of marital formation and stability. First, existing studies refer to births in 2001 or earlier, and since that time, the proportion of all births occurring outside of marriage has increased substantially, from 34% in 2001 to 41% in 2013;<sup>29</sup> the majority of these nonmarital births result from unintended pregnancies.<sup>30</sup> Second, although recent studies show that meaningful distinctions can be made between unintended pregnancies by the extent of mistiming,<sup>5,7</sup> the few prior studies on intention status and marital transitions either do not identify the extent of mistiming<sup>20,21</sup> or combine births resulting from mistimed pregnancies with those resulting from either intended or unintended ones.<sup>22,23</sup> Thus, they cannot examine differences in the association between the extent of mistiming and union transitions. For example, modestly mistimed nonmarital conceptions may simply hasten longer range marriage plans, whereas more seriously mistimed ones may have different effects or none at all. Third, to identify the relationship between pregnancy intentions and marital transitions, the potential confounding of pregnancy intention and other demographic and socioeconomic characteristics needs to be addressed.

To address these gaps, this study capitalizes on longitudinal data from the 2004–2008 Oklahoma Pregnancy Risk Assessment Monitoring System (PRAMS) and The Oklahoma Toddler Survey (TOTS) for 2006–2010 to investigate the association between women's pregnancy

\*In fact, the Fragile Families study, a highly influential survey of nonmarital childbearing, has no measure of intention status.

intentions and marital transitions using measures of formal relationship status at three points in time: at conception, at birth and two years after birth. The longitudinal nature of these data is a key advantage of this analysis, as we measure pregnancy intention shortly after delivery and prior to measurement of marital status two years after birth. In contrast, in national cross-sectional surveys, such as the NSFG, both pregnancy intention and marital status are reported retrospectively. If recall of pregnancy intention at two years or beyond the birth is affected by relationship quality or other factors that led to either marital formation or dissolution, then estimates of the association could be biased.

## METHODS

### Data

The annual Oklahoma PRAMS is based on a random sample of birth certificates of children born in the state; mothers of selected children are sent a survey 2–4 months after their child's date of birth. PRAMS respondents are sent TOTS questionnaires when their child reaches two years of age. Nonrespondents to the PRAMS and TOTS mail surveys are followed up by telephone. A detailed explanation of the methodology is documented elsewhere.<sup>31,32</sup>

From 2004 to 2008, some 9,829 mothers completed the Oklahoma PRAMS questionnaire; of these, 68% completed TOTS two years later. We found no differences in the distributions of PRAMS and TOTS respondents by social and demographic measures and intention status, which suggests that loss to follow-up was not selective for the variables included in our analyses.

### Measures

•**Pregnancy intention.** All state-level PRAMS questionnaires include the following question: “Thinking back to *just before* you got pregnant with your *new* baby, how did you feel about becoming pregnant?” Response categories are “I wanted to be pregnant sooner,” “I wanted to be pregnant later,” “I wanted to be pregnant then” and “I didn't want to be pregnant then or at any time in the future.” Pregnancies among women who report having wanted to become pregnant sooner or then are considered intended, those among women who had wanted to become pregnant later are considered mistimed, and those among women who had not wanted to become pregnant are considered unwanted. The Oklahoma PRAMS has a follow-up question for women who report having wanted to be pregnant later: “How much later did you want to become pregnant?” Response categories are “less than one year,” “one year to less than two years,” “two years to less than three years,” “three years to less than four years” and “four years or more.”\* We combined responses to these two questions to create the same four categories of intention status used in other studies:<sup>5,7</sup> intended, mistimed by less than two years, mistimed by two or more years, and unwanted.

•**Marital status.** Linked responses to PRAMS and TOTS data provide indicators of formal marital status (married or unmarried) at three points in time: at conception

(measured retrospectively in PRAMS), at birth (taken from the birth certificate, as reported in the PRAMS data set) and when the child is two years old (measured in TOTS).

•**Other measures.** PRAMS and TOTS provide a range of demographic and socioeconomic measures that have been shown to be directly associated with both marital transitions and pregnancy intentions.<sup>5,16–18</sup> These include respondent's age (measured in PRAMS as age at the time of the birth), race and ethnicity (non-Hispanic white, non-Hispanic black, Hispanic or non-Hispanic other),† education (less than high school, high school, or college or more) and poverty status (at or above the federal poverty line, or below the federal poverty line, in the 12 months prior to the birth), as well as a measure of whether the respondent had had a prior live birth. In addition, PRAMS asks respondents about physical abuse by a current or previous partner in the 12 months prior to conception, as well as during pregnancy, which has been found to be associated with an increased likelihood of unintended childbearing;<sup>33,34</sup> we recoded these as dichotomous indicators of intimate partner violence in each period.

### Analyses

We excluded from the analysis 75 births in the linked PRAMS-TOTS data set because of missing data on intention status, as well as 34 births with missing data on marital status from at least one time point; 799 additional births were excluded because of missing values on other covariates used in our propensity model. The resulting analytic sample comprised 5,740 women who gave birth during the survey period—3,617 who were married at conception and 2,123 who were unmarried at conception. All analyses were stratified by the mother's marital status at conception; this enabled us to examine separately the odds of marital dissolution and marital formation after a birth.

We first examined bivariate associations between pregnancy intentions and marital status at conception, at birth and two years after birth. We then investigated the extent to which mothers differed in their background characteristics across the four intention status groups, stratified by marital status at conception. Such differences indicate a need to control for the social and demographic composition of each group.

Next, we employed inverse probability weights, an adaptation of propensity score analysis. Generally, propensity score methods are used for adjusting the distribution of two groups by selected characteristics so that they are matched—that is, balanced with respect to observed characteristics that are relevant to group assignment, but that also may affect the outcome of interest.<sup>35,36</sup> Because we had four pregnancy intention groups rather than two, we used an alternate approach, inverse probability weighting.<sup>37</sup> This

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\*Only one other state (Utah) included such a question in the PRAMS survey during the same period.

†For brevity, we use “black,” “white,” “Hispanic” and “other” throughout the text.

methodology entails first estimating and then applying inverse probability weights to create balanced groups for comparison.<sup>38</sup> These steps were done separately by marital status at time of conception.

Initially, we calculated the propensity scores—that is, the probability of a birth's being in each intention status group, given the observed covariates—using a multinomial logistic regression model with pregnancy intention status as the dependent variable. We used a nonparsimonious approach and included in the model all available covariates that are known to be related to both pregnancy intentions and marital transitions—and that preceded the pregnancy—regardless of statistical significance (Appendix Table 1, Supporting Information). The inclusion of multiple covariates in propensity score models is important because estimates based on only a few covariates are more likely to be biased.<sup>39</sup> We next constructed weights using the inverse of the propensity score, and then multiplied each observation's inverse probability weight by the population weight to obtain unbiased effects based on the population of all births in the state.<sup>40</sup> To assess the quality of the propensity score estimation, we calculated a measure of standardized bias in the balanced samples. We considered the adjusted distributions adequately balanced once all estimates of standardized biases fell below 0.25.<sup>36</sup> In addition, we trimmed inverse probability weights to the value at the 99th percentile, so that large weights of any outliers did not have a strong influence on the analysis.<sup>41</sup>

Finally, we estimated logistic regression models of transitions in marital status using the propensity weighted, or “balanced” samples. Among women unmarried at conception, the outcomes of interest were marital status at birth and by the time the child was two years old (unmarried vs. married). Among women married at conception, the outcome of interest was marital dissolution by the time the child was two years old (stayed married vs. ended marriage); too few mothers ended their marriage between conception and birth to allow us to estimate a robust

model of this transition. For each outcome, we estimated two models using the balanced sample: One included only the four-category measure of intention status, to examine the direct association between intention status and marital transitions for the balanced sample; the other also included social and demographic variables that may have direct associations with marriage transitions, as well as an indicator of reported intimate partner violence during pregnancy.

We performed all analyses using *svy* commands in Stata 13.1 to account for the complex sampling designs of the surveys. Only statistically significant differences at  $p < .05$  are discussed in the text.

## RESULTS

### Bivariate Analysis

Pregnancy intentions differed dramatically between women who were married at conception and those who were not. Sixty-seven percent of married women reported that the pregnancy was intended, compared with 31% of unmarried women (Table 1). In contrast, a greater proportion of unmarried women than of married women reported that the pregnancy was mistimed by two or more years (38% vs. 10%) or was unwanted (13% vs. 8%).

Among women married at conception, few transitioned out of marriage: Overall, 99% were still married when they gave birth, and 93% were still married by the time the child was two years old. Marital transition was more common among women unmarried at conception: Sixteen percent were married at the birth, and 30% were married two years later.

These overall patterns, however, mask significant differences by pregnancy intention status. In the group of women who were married at conception, all of those whose pregnancy was intended were still married at the birth; the proportion was significantly smaller (97%) among those whose pregnancy was mistimed by two or more years. By the time their child was two, 94% of women with a birth resulting from an intended marital pregnancy were still married—a significantly greater proportion than that for women whose pregnancy was mistimed by two or more years (89%) or was unwanted (85%). Similarly, among women unmarried at conception, the proportions who transitioned into marriage by the time they gave birth and by the time the child was two were higher if the pregnancy had been intended (21% and 37%, respectively) than if it had been mistimed by two or more years (14% and 26%) or had been unwanted (10% and 24%). No differences in marital transition were found between women with a birth following an intended pregnancy and those with a birth following a pregnancy that was mistimed by less than two years, regardless of marital status at conception.

In descriptive analyses including women's social and demographic characteristics, most measures varied significantly by intention status within each marital status group (Table 2). Among women married at conception, a greater proportion of those with an unwanted pregnancy than of those with an intended pregnancy were aged 30–44 at the

**TABLE 1. Percentage distribution of women; and percentages who were married at conception, at birth and two years after birth—all by marital status at conception and pregnancy intention status, Oklahoma PRAMS 2004–2008 and TOTS 2006–2010**

Marital/intention status	% distribution	% married		
		At conception	At birth	Two years after birth
<b>Married</b>	(N=3,617)			
All	100	100	99	93
Intended	67	100	100	94
Mistimed by <2 years	16	100	99	93
Mistimed by ≥2 years	10	100	97*	89*
Unwanted	8	100	98	85*
<b>Unmarried</b>	(N=2,123)			
All	100	0	16	30
Intended	31†	0	21	37
Mistimed by <2 years	18	0	15	31
Mistimed by ≥2 years	38†	0	14*	26*
Unwanted	13†	0	10*	24*

\*Different from women with intended pregnancy at  $p < .05$ . †Different from women married at conception at  $p < .05$ . Notes: PRAMS=Pregnancy Risk Assessment Monitoring System. TOTS=The Oklahoma Toddler Survey.

**TABLE 2. Percentage distribution of women, by social and demographic characteristics, according to marital status at conception and pregnancy intention status**

Characteristic	All women (N=5,740)	Married					Unmarried				
		All (N=3,617)	Intended (N=2,516)	Mistimed by <2 years (N=511)	Mistimed by ≥2 years (N=314)	Unwanted (N=276)	All (N=2,123)	Intended (N=702)	Mistimed by <2 years (N=383)	Mistimed by ≥2 years (N=753)	Unwanted (N=285)
<b>Age at birth</b>											
15–24	38	23	20	34*	36*	8*	58†	51	57	73*	38
15–19	8	1	u	u	u	u	17†	12	11	27*	9
20–24	30	21	19	31*	32*	8*	41†	38	46	46	29
25–29	33	39	39	38	45	32	26†	29	34	19*	31
30–44	28	39	41	28*	19*	60*	15†	21	9*	8*	31
<b>First birth</b>											
Yes	42	33	39	30*	21*	6*	53†	50	49	64*	32*
No	58	67	61	70	79	94	47†	50	51	36	68
<b>Race/ethnicity</b>											
Non-Hispanic white	70	78	79	76	70*	79	60†	58	62	62	53
Hispanic	10	9	8	10	15*	6	12†	19	11*	6*	11*
Non-Hispanic black	8	4	3	5	5	6	13†	9	11	16*	18*
Non-Hispanic other	13	10	11	9	10	9	15†	14	16	15	18
<b>Education</b>											
<high school	17	9	7	10	18*	9	28†	35	25*	27	16*
High school	38	30	28	33	37*	36	47†	43	51	47	53
≥college	45	61	66	57*	45*	55*	25†	22	25	26	31
<b>Poverty status‡</b>											
≥100% FPL	65	83	87	77*	64*	79*	42†	39	43	43	46
<100% FPL	35	17	13	23	36	21	58†	61	57	57	54
<b>Intimate partner violence§</b>											
Yes	5	2	2	1	3	1	10†	7	12	10	14*
No	95	98	98	99	97	99	90†	93	88	90	86
Total	100	100	100	100	100	100	100	100	100	100	100

\*Different from women with intended pregnancy at  $p < .05$ . †Different from women married at conception at  $p < .05$ . ‡In 12 months before birth. §In 12 months before conception. Notes: u=unavailable because of small sample size. FPL=federal poverty line.

time of the birth (60% vs. 41%), while greater proportions of women with a mistimed pregnancy than of those with an intended pregnancy were aged 15–24 (34–36% vs. 20%). A smaller proportion of women with a mistimed or unwanted pregnancy than of those with an intended pregnancy reported that the birth was their first (6–30% vs. 39%), they had at least a college education (45–57% vs. 66%) and they lived at or above the federal poverty line during the 12 months prior to the birth (64–79% vs. 87%). Only women whose pregnancy was mistimed by two or more years differed by race and ethnicity from women whose pregnancy was intended; such women were more likely to be Hispanic (15% vs. 8%) and less likely to be white (70% vs. 79%).

The findings were slightly different for women unmarried at conception. Compared with the proportion among unmarried women with an intended pregnancy, a larger proportion of those with a greatly mistimed pregnancy were aged 15–19 at the time of the birth (27% vs. 12%) and reported that the birth was their first (64% vs. 50%); a smaller proportion of women with a mistimed pregnancy were in the oldest age-group at birth (8–9% vs. 21%), and a smaller proportion of women with an unwanted pregnancy said that the birth was their first (32% vs. 50%). In addition, a greater proportion of women with a greatly mistimed or unwanted pregnancy were black (16% and 18% vs. 9%), and a smaller proportion of women with a mistimed or unwanted pregnancy were Hispanic (6–11% v. 19%).

Women with a slightly mistimed or unwanted pregnancy were less likely than those with an intended pregnancy to have less than a high school education (25% and 16% vs. 35%), and those with an unwanted pregnancy were more likely to have experienced intimate partner violence in the 12 months before conception (14% vs. 7%).

We compared the standardized bias of the distributions of women's characteristics by intention status both before and after inverse probability weighting to determine whether the adjusted sample was balanced (Appendix Table 1). In the unbalanced data, large standardized bias estimates for many covariates indicate large and potentially meaningful differences in the distribution of these characteristics by intention status. After we weighted the observations by the inverse of the propensity scores derived from multinomial regression, the measure of standardized bias fell below 0.25 for all variables except one: For mothers married at conception, whether the birth was the women's first had a standardized bias value of 0.26 in a comparison of intended and unwanted pregnancies. A sensitivity analysis including and excluding the measure as a control in all models indicated that the slight imbalance did not affect our results.

#### Inverse Probability Weighted Analyses

•**Marital dissolution.** In the balanced sample of mothers married at conception, our model that included only the four-category measure of intention status shows that

women whose pregnancy was unwanted had greater odds than those whose pregnancy was intended of transitioning out of marriage by the time the child was two years old (Table 3; odds ratio, 2.2). Marital dissolution among women with a mistimed pregnancy, regardless of the

extent, was not associated with pregnancy intention status. In the expanded model, intimate partner violence during the pregnancy was strongly and positively associated with marital dissolution (5.0), whereas having at least a college education (rather than having only a high school degree) was negatively associated with the outcome (0.2).

•**Marital formation.** After we balanced the sample of women unmarried at conception with the inverse probability weights, we found no differences by intention status in women's likelihood of being married by the time the child was born (Table 4). However, in our model examining the likelihood of marriage by two years after the birth, unmarried women who had had an unwanted pregnancy were less likely than those whose pregnancy had been intended to transition into marriage (0.5). No differences were found in either outcome between women with a pregnancy that was mistimed, regardless of the extent of mistiming, and those with an intended pregnancy.

We found a few other differences in the expanded models. Black women were less likely than white women to marry by the time they gave birth and by the time the child was two (odds ratio, 0.1 for each); differences between black and Hispanic women were also significant (not shown). In addition, women with less than a high school education had lower odds of marrying between conception and birth than those with a high school degree (0.5); they were also less likely than college-educated women to marry during this time period (not shown). And intimate partner violence during pregnancy was negatively associated with a woman's transition to marriage by the time the child was two (0.3); no association was found between intimate partner violence and marriage by the time of the birth.

**TABLE 3. Odds ratios from inverse probability weighted logistic regression analyses estimating the likelihood that women who were married at conception experienced marital dissolution by the time their child was two years old**

Characteristic	Model 1	Model 2
<b>Pregnancy intention status</b>		
Intended (ref)	1.00	1.00
Mistimed by <2 years	1.07	1.08
Mistimed by ≥2 years	1.33	1.34
Unwanted	2.23*	3.01**
<b>Age at birth</b>		
15–24	na	1.38
25–29 (ref)	na	1.00
30–44	na	1.51
<b>First birth</b>		
	na	1.60
<b>Race/ethnicity</b>		
Non-Hispanic white (ref)	na	1.00
Hispanic	na	0.71
Non-Hispanic black	na	2.52
Non-Hispanic other	na	0.99
<b>Education</b>		
<high school	na	1.06
High school (ref)	na	1.00
≥college	na	0.22**
<b>Intimate partner violence during pregnancy</b>		
	na	5.04**

\*p<.05. \*\*p<.01. Notes: ref=reference group. na=not applicable.

**TABLE 4. Odds ratios from inverse probability weighted logistic regression analyses estimating the likelihood that women who were unmarried at conception had married by the time their child was born and was two years old**

Characteristic	Married by time of birth		Married by time child was two years old	
	Model 1	Model 2	Model 1	Model 2
<b>Pregnancy intention status</b>				
Intended (ref)	1.00	1.00	1.00	1.00
Mistimed by <2 years	1.01	1.00	0.79	0.76
Mistimed by ≥2 years	0.92	0.93	0.77	0.77
Unwanted	0.56	0.53	0.46*	0.45*
<b>Age at birth</b>				
15–24	na	0.66	na	0.54
20–24	na	0.83	na	0.68
25–29 (ref)	na	1.00	na	1.00
30–44	na	0.76	na	0.64
<b>First birth</b>				
	na	1.04	na	0.70
<b>Race/ethnicity</b>				
Non-Hispanic white (ref)	na	1.00	na	1.00
Hispanic	na	0.78	na	1.30
Non-Hispanic black	na	0.08**	na	0.06**
Non-Hispanic other	na	0.57	na	0.66
<b>Education</b>				
<high school	na	0.48*	na	0.61
High school (ref)	na	1.00	na	1.00
≥college	na	1.53	na	1.18
<b>Intimate partner violence during pregnancy</b>				
	na	0.76	na	0.33**

\*p<.05. \*\*p<.01. Notes: ref=reference group. na=not applicable.

## DISCUSSION

In this analysis of women who gave birth in Oklahoma, unintended pregnancy—particularly, unwanted pregnancy—was associated with mothers' transitions both into and out of marriage by the time their child was age two, even when differences in background characteristics were accounted for using propensity score methods. Similarly, research using the 2001 ECLS-B showed less transition to marriage and more marital dissolution among mothers with an unintended pregnancy than among those with an intended one.<sup>20</sup> Here, by distinguishing between unintended pregnancies that were mistimed and those that were unwanted, we find that the associations are limited to births resulting from unwanted pregnancies. This finding mirrors those from analyses of relationships between health outcomes and unintended pregnancy nationally,<sup>5</sup> as well as in Oklahoma specifically.<sup>42</sup>

Fewer than one in five women who were unmarried at conception married before the birth of their child. In the unadjusted data, these marriages were less common among women with a birth following a greatly mistimed or unwanted pregnancy than among women with a birth following an intended pregnancy; however, after we adjusted for confounding background characteristics, no

such relationship was apparent. Of particular interest is the lack of association between having a pregnancy mistimed by less than two years and transitioning into marriage before the birth or within two years after it; we might have expected to observe a positive association, reflecting that marriages already planned or expected simply shifted to an earlier time. In addition, the adjusted data showed no differences by extent of mistiming; this suggests that the decreased odds of marital formation (and increased odds of marital dissolution) seen in the unadjusted sample are attributable to demographic and life course differences between the two mistimed groups.

We used two approaches to help disentangle women's intentions from their other social and demographic traits: stratifying by marital status at conception and employing propensity score methods. Yet, we likely were not able to uncouple all associations between marital status at conception and intention status, as the two are inextricably linked. Women reporting a pregnancy as mistimed or unwanted are likely reflecting, at least in part, on the quality and status of their partnership at the time. The characterization of a pregnancy as unintended at conception may be a direct result of the absence of a formal relationship between the woman and her partner. Individuals who are in more stable or higher quality unions may also be more likely than others to plan a birth.<sup>43</sup> In the Turnaway Study, romantic relationships dissolved rapidly among women who terminated an unintended pregnancy, as well as among those who carried an unintended pregnancy to term, which suggests that relationships in which unintended pregnancies occur are already particularly fragile.<sup>44</sup> In addition, although women whose pregnancy is categorized as unwanted have reported not wanting to conceive "then or at any time in the future," this intention category may indicate women's strength of feeling about being pregnant at a particular time, as opposed to long-term childbearing desires.<sup>45-47</sup> Women who report a pregnancy as having been unwanted may later say they want another child in response to changing life or partnership circumstances.<sup>48</sup> Given that pregnancy intention was measured 2-4 months after the birth, the stated intention may have been influenced by the ongoing quality or stability of the mother's relationship with the child's father. Future efforts should focus on incorporating measures of union quality—not available in the PRAMS and TOTS data—into analyses of the association between intention status and marriage formation and stability.

Many studies that purport to show that marriage is the best setting for children do not address the intention status of the pregnancy leading to the birth,<sup>49,50</sup> which itself is associated with a variety of child outcomes.<sup>3,5,42</sup> Intention status is, unsurprisingly, strongly associated with the union in which a pregnancy occurs.<sup>30</sup> We found substantial variation in intention status by marital status at conception, as one-third of births to married women resulted from unintended pregnancy, compared with more than two-thirds of births to unmarried women. Accordingly, some positive associations between marriage and child well-being

may be confounded with the intention status of the pregnancy itself. Future work should further investigate these relationships, particularly as this has relevance for policies promoting family formation and stability. Additionally, it is important to recognize that nonmarital childbearing is not synonymous with unintended childbearing, and unintended childbearing is not limited to unmarried women; a substantial share of births to married women result from unintended pregnancies.

Consistent with findings from previous studies,<sup>26,28</sup> our results show strong evidence that women who experience intimate partner violence during pregnancy have weakened marital stability if they are already married at conception, and greatly decreased odds of transitioning to marriage if they are unmarried at conception; these negative associations exist regardless of intention status. Other research, however, has suggested that unintended pregnancies themselves may be a risk factor for abuse by a partner.<sup>34</sup> Indeed, the influences work in both directions, as intimate partner violence also has been identified as a risk factor for unintended pregnancy through a variety of individual and partner-specific mechanisms, including reproductive control by the abusive partner.<sup>33,51</sup> Efforts to promote the well-being of women—whether through marriage promotion programs, family planning programs, programs to identify and treat partner abuse or others—need to be responsive to the interrelationships among these factors.

### Limitations

Our study has several limitations. The analysis investigates only experiences in Oklahoma; more research is needed to determine if similar patterns emerge in national data. With the data available, we were able to examine marital transitions only in the two years following a birth; previous research, however, has shown that rates of both union formation and dissolution are highest during this early period<sup>19,22</sup> and that early patterns of marriage have influences on child well-being that extend far beyond the first two years of life.<sup>49,50</sup> The available data also limited our analysis to formal marriages, as PRAMS does not measure cohabitation at conception and TOTS does not measure it when the child is two years old; cohabiting women are included among unmarried women, and we were therefore unable to identify transitions in cohabitation associated with intention status. Future data collection efforts should include measures of informal union status to help distinguish differential patterns of marriage formation and stability between cohabiting and noncohabiting women. However, given work on the relative instability of cohabiting unions,<sup>24,52</sup> and mixed research on the benefits for children of even stable cohabitation,<sup>49,53</sup> we feel this focus on transitions into and out of marriage is a useful contribution.

This research demonstrates the necessity of adjusting for confounding variables. We adjusted for measured variables, but unobserved characteristics may have been associated with marital transitions and stability. If we failed to measure important characteristics of women that are

predictive of intention status and that also affect marriage transitions or stability, then our findings may be biased. Notably, many factors contribute to couples' decisions to marry, stay together or divorce, and the measures available in the Oklahoma PRAMS and TOTS data provide only a limited perspective. In particular, we lack detailed information on the characteristics and quality of the relationships in which these pregnancies occur, as well as on any demographic characteristics of fathers; all of these characteristics may influence marital stability and formation.

### Conclusions

This investigation constitutes an important step toward understanding the relationship between unintended childbearing and marriage. The patterns observed in Oklahoma should be further investigated in other settings to clarify potential linkages between unintended childbearing and marriage. Such relationships are likely to play an important role in the health and well-being of American families.

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**Author contact:** [imaddowzimet@guttmacher.org](mailto:imaddowzimet@guttmacher.org)