



Effects of Carrying an Unwanted Pregnancy to Term on Women's Existing Children

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Objective To examine how receiving or being denied a wanted abortion affects the subsequent development, health, caregiving, and socioeconomics of women's existing children at time of seeking abortion.

Study design The Turnaway Study is a 5-year longitudinal study with a quasi-experimental design. Women were recruited from January 2008 to December 2010 from 30 abortion facilities throughout the US. We interviewed women regarding the health and development of their living children via telephone 1 week after seeking an abortion and semiannually for 5 years. We compare the youngest existing children younger than the age 5 years of women denied abortion because they presented for care beyond a facility's gestational limit (Turnaway group) with those of women who received the abortion (Abortion group). We used mixed-effects regression models to test for differences in outcomes of existing children of women in the Turnaway group (n = 55 children) compared with existing children of women in the Abortion group (n = 293 children).

Results From 6 months to 4.5 years after their mothers sought abortions, existing children of women denied abortions had lower mean child development scores (adjusted β -0.04, 95% CI -0.07 to -0.00) and were more likely to live below the Federal Poverty Level (aOR 3.74, 95% CI 1.59-8.79) than the children of women who received a wanted abortion. There were no significant differences in child health or time spent with a caregiver other than the mother.

Conclusions Denying women a wanted abortion may have negative developmental and socioeconomic consequences for their existing children. (*J Pediatr* 2019;205:183-9).

Approximately 60% of women in the US who have abortions are already mothers.¹ Approximately one-third of women seeking an abortion say that their reason for wanting to terminate the pregnancy is to care for children they already have.^{2,3}

The Turnaway Study was designed to examine the consequences of terminating an unwanted pregnancy vs carrying it to term. We followed 956 women for 5 years, all of whom sought an abortion at 1 of 30 abortion facilities across the country. Some of the women in the study received the abortion, and some were denied the wanted abortion. Other findings from this study have indicated that being denied an abortion places women at greater risk of anxiety, stress, and low self-esteem at the time of being denied an abortion; however, mental health symptoms improve over time whether or not the woman received the abortion.⁴⁻⁷ Women from this study who were denied abortions were more likely to live in poverty,⁸ to raise children alone, to stay tethered to an abusive partner,⁹ and were less likely to have and achieve aspirational plans for the future,¹⁰ compared with women who obtained the wanted abortion. These factors may affect the home environment and resources available to children in the family and therefore may affect the well-being of existing children in the home. In this article, we investigate the effect of being denied an abortion on the health and development of women's existing children at the time of abortion-seeking by comparing the outcomes of existing children of women who received vs were denied a wanted abortion.

Methods

The Turnaway Study is a 5-year, longitudinal telephone-interview study of the effects of receiving vs being denied abortion on women's physical health, mental health, and socioeconomic well-being, as well as those of their children. Details have been published previously.¹¹ The study was approved by the Committee for Human Research at the University of California, San Francisco.

Study participants included English- and Spanish-speaking women aged 15 or older, with no known fetal anomalies or demise, presenting for abortion care between

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PEDS:DM Parents' Evaluation of Developmental Status: Developmental Milestones
TANF Temporary Assistance to Needy Families program

2008 and 2010 at 30 facilities throughout the US. Recruitment facilities were selected based on the criterion that they had the latest gestational limit of any other facility within 150 miles. We identified facilities using the National Abortion Federation directory and contacts within the abortion research community. Women were recruited into 1 of 3 designated study groups in a 2:1:1 ratio based on the gestational age limit of the facility: 1) women receiving an abortion up to 2 weeks under a facility's gestational limit, 2) women who received a first-trimester abortion, and 3) women who were denied an abortion with gestations up to 3 weeks over a facility's limit.

For this analysis, we compared the outcomes of the existing children of all women in the study who received an abortion (Abortion group) regardless of original study group with the outcomes of existing children whose mothers were denied the abortion and carried the pregnancy to term (Turnaway group). Women in the Turnaway group who went on to have an abortion elsewhere were included in the Abortion group. Previous analyses have shown that women who received an abortion elsewhere after being turned away were, on average, a month earlier in pregnancy⁸; they were less likely to be Latina and also less likely to have had a difficult time deciding to have the abortion than women in the Turnaway group who carried their pregnancies to term.¹² Women were interviewed by telephone 8 days after seeking the abortion and then every 6 months for 5 years.

Measures

We collected data on child development, health, socioeconomic well-being, and caregiving of women's youngest living child younger than age 5 years at 1 week after abortion-seeking and every 6 months through 4 years. Child development was assessed using the Parents' Evaluation of Developmental Status: Developmental Milestones (PEDS:DM) instrument.¹³ The PEDS:DM is a parent-reported screening and surveillance tool for children ages birth to 8 years to assess 6 age-specific measures of child development: fine motor, receptive language, expressive language, gross motor, self-help, and social emotional. We used longitudinal reports from mothers to assess whether the child achieved each milestone (yes/no), as well as an overall percentage across the 6 milestones. Child health included any diagnoses and recent attacks of asthma, physical disabilities, and injuries severe enough to consider seeking medical attention. Caregiving was assessed by asking whether the child lived with the mother; hours per week the child spent with other caregivers; and, for children ages 3 and 4 years, whether they attended preschool. Finally, measures to assess child's socioeconomic well-being included questions about the mother and the household: whether the mother lived with adult family members, with a male partner, or on her own (without a male partner or adult family members) and whether the mother received public assistance from the Women, Infants, and Children program, Temporary Assistance for Needy Families (TANF), and Supplemental Nutritional Assistance Program, also known as food stamps. We calculated poverty based on each survey calendar year's federal poverty threshold, the number of people sharing expenses in the household, and the total house-

hold income, including public assistance. We measured subjective poverty by asking the woman whether she had enough money to meet basic living needs, such as food, housing, and transportation in the previous month. We dichotomized this outcome to indicate women who reported that they did not always have enough money to cover basic living expenses.

Our primary independent variable was analytic group (Turnaway vs Abortion). We also included baseline covariates that could confound the relationship between the analytic group and child outcomes. Child-specific covariates included birth order (first, second, third, and fourth or greater), sex, presence of a physical disability at baseline, and a time-varying measure of child age. Maternal covariates were all measured at baseline and included age, self-reported race/ethnicity (white, black, Hispanic/Latina, and other), education (less than high school, high school/General Educational Development, and more than high school/General Educational Development), and union status (married, cohabitating, never married and not cohabiting, previously married and not cohabiting).

Statistical Analyses

We used mixed-effects linear and logistic regression to test for baseline analytic group differences in mothers' and youngest existing children's characteristics at the time of abortion-seeking, with random effects for site. We assessed differences in child development, health, caregiving, and socioeconomic status over the 5-year study period by analytic group (existing children in the Turnaway vs Abortion group). Specifically, we compared outcomes of the youngest existing child to each woman beginning at the 6-month interview (after mothers in the Turnaway group gave birth) and continuing at each subsequent interview until the last existing child reached age 5 years. We present the results of the adjusted analyses for all outcomes, with the exception of physical disabilities, because the number of children with physical disabilities was too small to fit adjusted models. All analyses accounted for clustering by site and multiple observations per child over time with random effects. Analyses were performed using Stata 14 (StataCorp, College Station, Texas).¹⁴ Statistical tests are reported at $P < .10$ and $P < .05$ using 2-tailed tests. For models in which the adjusted model showed significant differences between the Abortion and Turnaway groups, we report marginal predicted probabilities generated from the adjusted model.

For all analyses, we omitted existing children whose mother did not complete more than the first interview ($n = 26$) and existing children ($n = 50$) from 1 site where nearly all women who were turned away went on to get an abortion elsewhere (Figure). Given the unique health risks for twin births,¹⁵ we also excluded twins ($n = 14$). In the main analyses, we also excluded existing children of women in the Turnaway group who reported that they had a miscarriage ($n = 4$) or who placed the new child for adoption ($n = 7$). As a sensitivity check, we tested whether there were substantive differences in the results if we separated the Abortion group into Near-Limit, First Trimester, and Turnaways who did not give birth (those who placed the child for adoption, miscarried, or went on to receive an abortion elsewhere).

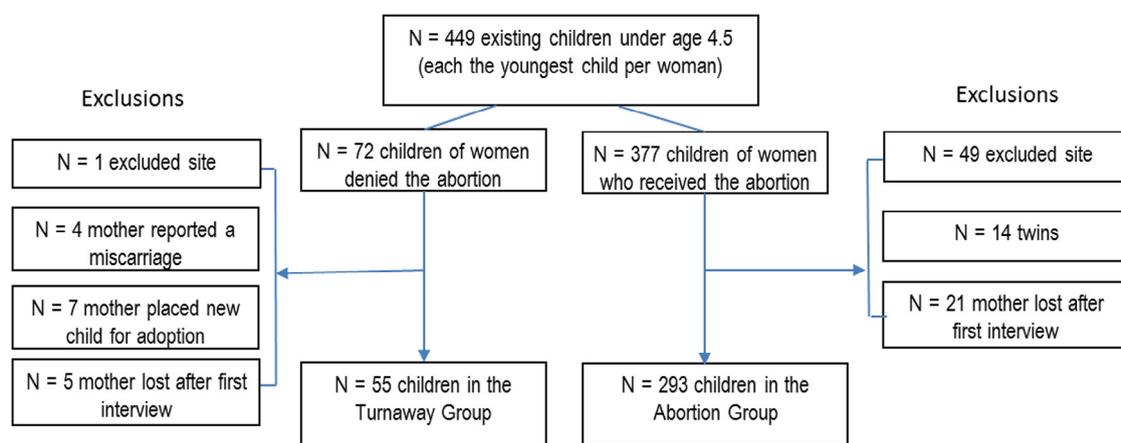


Figure. Existing children by analytic group and reason for exclusion.

Results

A total of 37.5% (1132/3016) of eligible participants approached consented to participate. Overall, 956 women seeking abortions completed baseline interviews between January 2008 and December 2010. At the time of seeking abortion, 603 (63%) women reported at least one living existing child, and 449 were younger than age 5 years. Among the 210 mothers in the Turnaway group who were interviewed, 44 (21%) received an abortion elsewhere. The final sample of observations of existing children in this analysis includes 1944 semiannual data points for 348 children. This includes 293 children of mothers in the Abortion group (180 from the Near-Limit group, 14 from women who were initially denied an abortion but received one elsewhere, and 99 from First-Trimesters) and 55 children of mothers in the Turnaway group.

Baseline Characteristics

At the time of the baseline survey, 8 days after receipt or denial of abortion, the average age of youngest existing children at or younger than age 4.5 years was 2.1 years (range 4 months to 4.5 years) (Table I). Forty-three percent were only children, 29% were the second child, and 28% had a higher birth order. There were no statistically significant baseline differences by analytic group in any child demographic characteristics, child development, child health, caregiving, and most socioeconomic outcomes, except mothers in the Turnaway group were more likely than mothers in the Abortion group to report that they did not always have enough money to pay for food, housing, and transportation ($P < .05$).

Differences by Analytic Group from 6 Months to 5 Years Postabortion-Seeking

By 6 months, all women in the Turnaway group had given birth. The mean child development score from 6 months to 5 years among existing children in the Turnaway group was 4 percentage points lower than that of the existing children of women

in the Abortion group (73% vs 77% of milestones achieved, $a\beta -0.04$, 95% CI -0.07 to -0.003) (Table II). Self-help was the only 1 of the 6 individual child development domains that was significantly different by analytic group in adjusted models: existing children of women in the Turnaway group were less likely to achieve self-help milestones compared with existing children of women in the Abortion group (59% vs 93%, aOR 0.71, 95% CI 0.52-0.97).

In terms of the existing child's health, we found no significant differences in frequency of reported injuries or in episodes of asthma by analytic group in adjusted analyses (Table II). In unadjusted analyses, the proportions of existing children with physical disabilities were not significantly different by group.

There were no differences by analytic group in the odds that existing children lived with their mothers or in hours spent with other caregivers. Among 3- and 4-year-old children, existing children of women in the Turnaway group were more likely to attend preschool (56% vs 45%, aOR 2.25, 95% CI 1.02-4.95) than children of mothers in the Abortion group.

We found significant differences in socioeconomic well-being by analytic group (Table II). Existing children of women in the Turnaway group had more than 3 times greater odds of living in a household that received assistance from the Women, Infants, and Children program (aOR 3.66, 95% CI 1.97-6.79) and TANF (19% vs 10% receiving TANF, aOR 5.34, 95% CI 1.64-17.42,) and also greater odds of living in a household below the Federal Poverty Level (72% vs 55%, aOR 3.74, 95% CI 1.59-8.79) compared with children of women who received an abortion. The household income relative to Federal Poverty Level was lower among children of women in the Turnaway group (115% vs 83% of the Federal Poverty Level, $a\beta -0.32$, 95% CI -0.54 to -0.10) than among children of women who received the abortion. Existing children were more likely to live in a household in which their mother reported not having enough money to pay for food, housing, and transportation if their mother was denied vs received the abortion (87% vs 70%, aOR 6.13, 95% CI 2.47-15.22).

Table I. Characteristics of mothers and existing children by analytic group 1 week after abortion-seeking

| Characteristics | Turnaway group | Abortion group | Total |
|---|----------------|----------------|-------------|
| | N = 55 | N = 293 | N = 348 |
| Mother's characteristics | | | |
| Age, y, mean (SD) | 24.3 (4.7) | 25.0 (4.5) | 24.9 (4.6) |
| Race/ethnicity, % | | | |
| White (reference) | 15 | 27 | 25 |
| Black | 40 | 37 | 38 |
| Hispanic/Latina | 27 | 20 | 21 |
| Other | 18 | 16 | 16 |
| Highest level of education, % | | | |
| Less than high school (reference) | 22 | 19 | 19 |
| High school or GED | 35 | 35 | 35 |
| More than high school/GED | 44 | 46 | 46 |
| Union status, % | | | |
| Married (reference) | 20 | 12 | 14 |
| Cohabiting | 15 | 21 | 20 |
| Never married, not cohabiting | 56 | 53 | 53 |
| Previously married, not cohabiting | 9 | 14 | 13 |
| Child's characteristics | | | |
| Age, y, mean (SD) | 2.1 (1.1) | 2.0 (1.2) | 2.1 (1.2) |
| Female sex, % | 42 | 52 | 51 |
| Birth order, % | | | |
| First child (reference) | 40 | 44 | 43 |
| Second child | 33 | 28 | 29 |
| Third child | 15 | 18 | 17 |
| Fourth child or higher | 13 | 11 | 11 |
| Child's development | | | |
| Expressive language, % | 94 | 89 | 90 |
| Fine motor, % | 85 | 87 | 87 |
| Gross motor, % | 75 | 75 | 75 |
| Receptive language, % | 85 | 83 | 84 |
| Social emotional, % | 83 | 90 | 89 |
| Self-help, % | 75 | 75 | 75 |
| Overall percentage, mean (SD) | 83 (21) | 83 (23) | 83 (23) |
| Child's health | | | |
| Experienced injury in past 6 mo, % | 5 | 9 | 8 |
| Has asthma, % | 18 | 11 | 12 |
| Has a physical disability, % | 2 | 1 | 1 |
| Caregiving | | | |
| Lives with mother, % | 93 | 96 | 95 |
| Time with caregiver other than mother, h/wk, mean (SD) | 15.6* (20.6) | 22.0 (25.3) | 21.0 (24.7) |
| Preschool attendance (among 3 and 4 years old, n = 85), % | 31 | 42 | 40 |
| Socioeconomics | | | |
| Mother lives on her own, % | 31 | 39 | 38 |
| Mother lives with family, % | 36 | 29 | 30 |
| Mother lives with male partner, % | 33 | 32 | 32 |
| Household receives assistance from WIC, % | 38† | 27 | 28 |
| Household receives TANF, % | 24 | 16 | 17 |
| Household receives food stamps, % | 56 | 45 | 47 |
| Household income below the Federal Poverty Level, % | 58 | 63 | 62 |
| Percent of the Federal Poverty Level, mean (SD) | 95 (72) | 101 (86) | 100 (84) |
| Missing household income, % | 35* | 22 | 24 |
| Not enough money to cover basic living expenses, % | 96† | 83 | 85 |

GED, General Educational Development; WIC, Women, Infants, and Children.

Reference group: Abortion group. Statistical significance is based on mixed-effects regression analyses accounting for clustering by site. Tests for differences compare the Turnaway group with the Abortion group (the reference group). For categorical variables with more than 2 categories (race/ethnicity, parity, and marital status), we used an omnibus postestimation test to accommodate multiple category associations.

* $P < .10$.

† $P < .05$.

Results from sensitivity analyses, in which we examined the original abortion study groups (Near-Limits and First-Trimesters) separately instead of combining them into 1 Abortion group were similar in direction, magnitude, and significance for all but 2 outcomes (Table III; available at www.jpeds.com). Although analytic group differences for self-help and overall mean child development were similar in

direction, the differences were no longer statistically significant at a $P < .05$ level ($P = .067$ and $P = .074$, respectively).

Discussion

Women's concerns that having another child may affect their ability to care for existing children are supported by a limited,

Table II. Differences in outcomes between existing children of mothers in the Turnaway group compared with those in the Abortion group

| Outcomes | Measurement | Unadjusted estimate | P value | 95% CI | Adjusted* estimate | P value | 95% CI |
|--|-------------|---------------------|---------|------------------|--------------------|---------|------------------|
| Child development | | | | | | | |
| Expressive language | OR | 0.55 [†] | .029 | (0.32-0.94) | 0.67 | .135 | (0.40-1.13) |
| Fine motor | OR | 0.57 [‡] | .052 | (0.33-1.00) | 0.63 | .104 | (0.35-1.10) |
| Gross motor | OR | 0.76 [‡] | .055 | (0.57-1.01) | 0.73 [‡] | .060 | (0.52-1.01) |
| Receptive language | OR | 0.81 | .206 | (0.58-1.12) | 0.93 | .691 | (0.66-1.32) |
| Social emotional | OR | 0.92 | .627 | (0.64-1.31) | 1.02 | .932 | (0.70-1.49) |
| Self help | OR | 0.70 [†] | .017 | (0.52-0.94) | 0.71 [†] | .033 | (0.52-0.97) |
| Overall percentage PEDS:DM | β | -0.05 [†] | .004 | (-0.09 to -0.02) | -0.04 [†] | .030 | (-0.07 to 0.00) |
| Child health | | | | | | | |
| Injury in the past 6 mo | OR | 0.78 | .508 | (0.37-1.64) | 0.72 | .368 | (0.35-1.48) |
| Asthma | OR | § | | | 2.92 | .259 | (0.45-18.73) |
| Physical disability | OR | 3.73 | .193 | (0.51-27.19) | § | | |
| Caregiving | | | | | | | |
| Hours with caregivers other than mother | β | -2.97 | .220 | (-7.71 to 1.78) | -2.59 | .269 | (-7.19 to 2.01) |
| Preschool attendance (among 3 and 4 years old) | OR | 1.92 [‡] | .062 | (0.97-3.82) | 2.25 [†] | .045 | (1.02-4.95) |
| Socioeconomic | | | | | | | |
| Mother lives on her own | OR | 0.74 | .560 | (0.27-2.04) | 0.91 | .847 | (0.37-2.26) |
| Mother lives with family | OR | 1.53 | .422 | (0.54-4.34) | 1.28 | .603 | (0.50-3.28) |
| Mother lives with male partner | OR | 0.96 | .952 | (0.28-3.35) | 0.84 | .731 | (0.30-2.30) |
| Household receives WIC | OR | 3.76 [†] | .000 | (2.03-6.97) | 3.66 [†] | .000 | (1.97-6.79) |
| Household receives TANF | OR | 4.90 [†] | .008 | (1.52-15.86) | 5.34 [†] | .005 | (1.64-17.42) |
| Household receives food stamps | OR | 1.66 | .209 | (0.75-3.63) | 1.51 | .294 | (0.70-3.24) |
| Household income below the Federal Poverty Level | OR | 3.99 [†] | .003 | (1.58-10.10) | 3.74 [†] | .002 | (1.59-8.79) |
| Percent of the Federal Poverty Level | β | -0.37 [†] | .003 | (-0.62 to -0.13) | -0.32 [†] | .004 | (-0.54 to -0.10) |
| Not enough money to cover basic living expenses | OR | 5.59 [†] | .000 | (2.30-13.63) | 6.13 [†] | .000 | (2.47-15.22) |

β , beta coefficient.

Reference group: Abortion group.

*Adjusted models include age, education, race/ethnicity and union status of mother at recruitment, birth order, sex, and time varying age of child at interview and include site and child random effects.

[†] $P < .05$.

[‡] $P < .10$.

§Not available; model would not converge.

yet growing body of empirical evidence demonstrating adverse effects of unintended childbearing, both for the child resulting from an unintended pregnancy, as well as for older siblings.¹⁶⁻²¹ This study prospectively assessed the effects of access to wanted abortion care on women's existing children. We found slightly lower child development scores and poorer socioeconomic well-being for the existing children of women denied abortions compared with children whose mothers received an abortion. These 2 major findings may be linked. Diminished resources may lead to slowed development, as is supported by the resource-dilution model.²²⁻²⁴ A mother who is stressed may invest less in her children, emotionally and financially. That existing children of women denied abortion were more likely to live in poorer households is commensurate with previous research from this same study on the effects of abortion denial on women.⁸ Although increases in preschool attendance among existing children in the Turnaway group may help to counterbalance some of the effect of diminished financial well-being on their development, we find that any such benefit is not sufficient to keep development scores on par with the children of women who received an abortion.

This study has several limitations. The sample size of existing children at time of abortion-seeking is small in this study and did not allow us to examine how outcomes varied over time. We only collected data on the youngest existing child, which limits our ability to detect effects on other children

in the family. We may not have been sufficiently powered to detect differences in all the outcomes we measured. Further, we test many outcomes within 4 domains—socioeconomic, development, health, and caregiving—raising the possibility of a type I error. However, the consistency of findings within the socioeconomic and development domains are reassuring. Our measure of child development, the PEDS:DM, is primarily used as a screening tool in clinic settings, rather than in research, and we do not know whether the small measured differences in development are good indicators of these children's long-term well-being. The apparent differences in subjective poverty at the baseline interview may be due to the fact that the first interview took place 1 week after the woman learned that she was going to have a/another child, so she may have had a heightened sense of inadequate income. Yet, given the small number of children under study, our significant findings on child development and poverty are particularly striking. Future study should include all existing children and follow more women to examine whether the results vary by age of the existing child or are concentrated in specific ages.

There are 2 mechanisms by which older siblings may be affected by a subsequent unintended pregnancy carried to term. The resource-dilution model posits that parents' time, money, and energy are finite, so as the number of children in a family increases, resources allocated to any one child decline,

ultimately impacting outcomes of all children in the household.²²⁻²⁴ A second mechanism suggests that apart from the effects of family size, the occurrence of an unintended pregnancy carried to term may negatively impact the woman. These impacts may result from the woman's greater stress or depression associated with the unintended pregnancy measured during the pregnancy,^{25,26} in the perinatal period,²⁷ or beyond.^{20,28} These adverse effects have been shown to extend beyond the woman to the child resulting from the unintended pregnancy, as well as her existing children, via lower-quality mother-child relationships^{20,29,30} more physical punishment of children,²⁰ a deterioration of the home environment,³¹ and an increase in behavioral problems among boys whose younger sibling was unintended.³¹

Efforts to examine the extent of the effects of unintended childbearing on existing children, however, have been hampered by 3 main methodologic challenges. First, to isolate the effect of being born from unintended pregnancies, these children often are compared with children born from intended pregnancies. However, the differences in child well-being resulting from this comparison could be confounded by factors such as the pregnant woman's circumstances—financial, health, or relationship status, for example, that might lead to both poor child outcomes, as well as to the increased likelihood of having an unintended pregnancy or of retrospectively reporting a pregnancy as unintended.

Second, efforts to control for these confounding factors have compared siblings, one from an unintended pregnancy and one from an intended pregnancy, within the same family. This approach, however, may underestimate the effect of unintended pregnancy if there are negative spillover effects from the unintended pregnancy to the other children in the family.^{19,31} If other children in the family are negatively affected by the unintended pregnancy, what is perceived as a family effect may actually be a consequence of the unintended pregnancy. To prevent spillover effects, in this study we compared existing children, otherwise similar, who did and did not experience an additional sibling from an unintended pregnancy.

Lastly, "unintended pregnancy"—the broad term including both unwanted and mistimed pregnancy and most often used in previous studies—is an inherently complex phenomenon to measure. Women may have mixed or ambivalent feelings toward pregnancy,^{32,33} and these feelings may change over the course of pregnancy and after childbirth.³⁴ Despite its complexity, many studies examining unintended pregnancy rely on crude, retrospective measures that are likely to lead to misclassification of "unintended" pregnancy and underestimate any associated consequences. This small study has overcome these methodologic challenges to detect an effect on existing children by whether their mother received or was denied a wanted abortion. This study shows that the effect of a birth following an unwanted pregnancy may not just redound to the child born from that pregnancy; there may also be negative effects on existing children. These findings support the legitimacy of women's concerns about the effect of carrying an unwanted pregnancy to term on the well-being of their existing children.

Until now, research on the effects of denial of wanted abortion has focused on women and the child born as a result of abortion denial.^{17,35} This study, in contrast, highlights the potential negative effects on existing children of women who are denied a wanted abortion, underscoring women's own concerns about the well-being of their families when faced with the prospect of carrying an unintended pregnancy to term. We find small negative effects on existing children's development and an increased chance of living in poverty among children whose mothers were denied rather than obtained a wanted abortion. ■

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References

1. Jones RK, Kavanaugh ML. Changes in abortion rates between 2000 and 2008 and lifetime incidence of abortion. *Obstet Gynecol* 2011;117:1358-66.
2. Biggs MA, Gould H, Foster DG. Understanding why women seek abortions in the US. *BMC Womens Health* 2013;13:29.
3. Finer LB, Frohworth LF, Dauphinee LA, Singh S, Moore AM. Reasons U.S. women have abortions: quantitative and qualitative perspectives. *Perspect Sex Reprod Health* 2005;37:110-8.
4. Biggs MA, Upadhyay UD, McCulloch CE, Foster DG. Women's mental health and well-being 5 years after receiving or being denied an abortion: a prospective, longitudinal cohort study. *JAMA Psychiatry* 2016.
5. Biggs MA, Upadhyay UD, Steinberg JR, Foster DG. Does abortion reduce self-esteem and life satisfaction? *Qual Life Res* 2014;23:2505-13.
6. Foster DG, Steinberg JR, Roberts SCM, Neuhaus J, Biggs MA. A comparison of depression and anxiety symptom trajectories between women who had an abortion and women denied one. *Psychol Med* 2015;45:2073-82.
7. Harris LF, Roberts SC, Biggs MA, Rocca CH, Foster DG. Perceived stress and emotional social support among women who are denied or receive abortions in the United States: a prospective cohort study. *BMC Womens Health* 2014;14:76.
8. Foster DG, Biggs MA, Ralph L, Gerds C, Roberts S, Glymour MM. Socioeconomic outcomes of women who receive and women who are denied wanted abortions in the United States. *Am J Public Health* 2018;e1-7.
9. Roberts SC, Biggs MA, Chibber KS, Gould H, Rocca CH, Foster DG. Risk of violence from the man involved in the pregnancy after receiving or being denied an abortion. *BMC Med* 2014;12:144.
10. Upadhyay UD, Biggs MA, Foster DG. The effect of abortion on having and achieving aspirational one-year plans. *BMC Womens Health* 2015;15:102.
11. Dobkin LMGH, Barar RE, Ferrari M, Weiss EI, Foster DG. Implementing a prospective study of women seeking abortion in the United States:

- understanding and overcoming barriers to recruitment. *Womens Health Issues* 2014;24.
12. Upadhyay U, Weitz T, Jones R, Barar R, Foster D. Denial of abortion because of provider gestational age limits in the United States. *Am J Public Health* 2014;104:1687-94.
 13. Brothers KB, Glascoe FP, Robertshaw NS. PEDS: developmental milestones—an accurate brief tool for surveillance and screening. *Clin Pediatr (Phila)* 2008;47:271-9.
 14. McCulloch CESS, Neuhaus JM. Generalized, linear, and mixed models. 2nd ed. New York: Wiley; 2008.
 15. Alexander GR, Kogan M, Martin J, Papiernik E. What are the fetal growth patterns of singletons, twins, and triplets in the United States? *Clin Obstet Gynecol* 1998;41:114-25.
 16. Gipson JD, Koenig MA, Hindin MJ. The effects of unintended pregnancy on infant, child, and parental health: a review of the literature. *Stud Fam Plann* 2008;39:18-38.
 17. David HP, Dytrych Z, Matejcek Z. Born unwanted. Observations from the Prague Study. *Am Psychol* 2003;58:224-9.
 18. de La Rochebrochard E, Joshi H. Children born after unplanned pregnancies and cognitive development at 3 years: social differentials in the United Kingdom Millennium Cohort. *Am J Epidemiol* 2013;178:910-20.
 19. Joyce TJKR, Korenman S. The effect of pregnancy intention on child development. *Demography* 2000;37:83-94.
 20. Barber JS, Axinn WG, Thornton A. Unwanted childbearing, health, and mother-child relationships. *J Health Soc Behav* 1999;40:231-57.
 21. Kost K, Lindberg L. Pregnancy intentions, maternal behaviors, and infant health: investigating relationships with new measures and propensity score analysis. *Demography* 2015;52:83-111.
 22. Foster EM. How economists think about family resources and child development. *Child Dev* 2002;73:1904-14.
 23. Blake J. Family size and the quality of children. *Demography* 1981;18:421-42.
 24. Downey D. When bigger is not better: family size, parental resources, and children's educational performance. *Am Sociol Rev* 1995;60:15.
 25. Bouchard G. Adult couples facing a planned or an unplanned pregnancy—two realities. *J Fam Issues* 2005;26:619-37.
 26. Orr ST, Miller CA. Unintended pregnancy and the psychosocial well-being of pregnant women. *Womens Health Issues* 1997;7:38-46.
 27. Abajobir AA, Maravilla JC, Alati R, Najman JM. A systematic review and meta-analysis of the association between unintended pregnancy and perinatal depression. *J Affect Disord* 2016;192:56-63.
 28. Herd P, Higgins J, Sicinski K, Merkurieva I. The implications of unintended pregnancies for mental health in later life. *Am J Public Health* 2016;106:421-9.
 29. Baydar N. Consequences for children of their birth planning status. *Fam Plann Perspect* 1995;27:228-34, 245.
 30. Nelson JA, O'Brien M. Does an unplanned pregnancy have long-term implications for mother-child relationships? *J Fam Issues* 2012;33:506-26.
 31. Barber JS, East PL. Children's experiences after the unintended birth of a sibling. *Demography* 2011;48:101-25.
 32. Aiken AR, Borrero S, Callegari LS, Dehlendorf C. Rethinking the pregnancy planning paradigm: unintended conceptions or unrepresentative concepts? *Perspect Sex Reprod Health* 2016;48:147-51.
 33. Santelli JS, Lindberg LD, Orr MG, Finer LB, Speizer I. Toward a multi-dimensional measure of pregnancy intentions: evidence from the United States. *Stud Fam Plann* 2009;40:87-100.
 34. Poole VL, Flowers JS, Goldenberg RL, Cliver SP, McNeal S. Changes in intendedness during pregnancy in a high-risk multiparous population. *Matern Child Health J* 2000;4:179-82.
 35. Foster DG, Biggs MA, Raifman S, Gipson J, Kimport K, Rocca CH. Comparison of health, development, maternal bonding, and poverty among children born after denial of abortion vs after pregnancies subsequent to an abortion. *JAMA Pediatr* 2018, in press.

Table III. Differences in outcomes between existing children of mothers in the Turnaway group compared with those in the Abortion group (all abortion vs by study group)

| Outcomes | Measurement | Parent in Turnaway group compared with all Abortion group (original model) | | | T-Parent in Turnaway group compared with near limit (sensitivity model) | | |
|--|-------------|--|---------|------------------|---|---------|------------------|
| | | OR/ β | P value | 95% CI | OR/ β | P value | 95% CI |
| Child development | | | | | | | |
| Expressive language | OR | 0.67 | .135 | (0.40-1.13) | 0.71 | .222 | (0.42-1.23) |
| Fine motor | OR | 0.63 | .104 | (0.35-1.10) | 0.65 | .151 | (0.36-1.17) |
| Gross motor | OR | 0.73* | .06 | (0.52-1.01) | 0.74* | .089 | (0.52-1.05) |
| Receptive language | OR | 0.93 | .691 | (0.66-1.32) | 0.97 | .857 | (0.68-1.39) |
| Social emotional | OR | 1.02 | .932 | (0.70-1.49) | 1.04 | .838 | (0.70-1.55) |
| Self help | OR | 0.71 [†] | .033 | (0.52-0.97) | 0.74* | .067 | (0.53-1.02) |
| Overall percentage PEDS:DM | β | -0.04 [†] | .03 | (-0.07 to 0.00) | -0.03* | .074 | (-0.07 to 0.00) |
| Child health | | | | | | | |
| Injury in the past 6 months | OR | 0.72 | .368 | (0.35-1.48) | 0.74 | .420 | (0.35-1.55) |
| Asthma | OR | 2.92 | .259 | (0.45-18.73) | ‡ | | |
| Physical disability | OR | ‡ | | | ‡ | | |
| Caregiving | | | | | | | |
| Hours with caregivers other than mother | β | -2.59 | .269 | (-7.19 to 2.01) | -2.39 | .329 | (-7.18 to 2.40) |
| Preschool attendance (among 3 and 4 years old) | OR | 2.25 [†] | .045 | (1.02-4.95) | 2.92 [†] | .010 | (1.29-6.64) |
| Socioeconomic | | | | | | | |
| Mother lives on her own | OR | 0.91 | .847 | (0.37-2.26) | 1.03 | .948 | (0.41-2.62) |
| Mother lives with family | OR | 1.28 | .603 | (0.50-3.28) | 0.92 | .864 | (0.35-2.40) |
| Mother lives with male partner | OR | 0.84 | .731 | (0.30-2.30) | 0.97 | .947 | (0.34-2.74) |
| Household receives WIC | OR | 3.66 [†] | 0 | (1.97-6.79) | 3.80 [†] | .000 | (1.98-7.30) |
| Household receives TANF | OR | 5.34 [†] | .005 | (1.64-17.42) | 3.38 [†] | .045 | (1.03-11.13) |
| Household receives food stamps | OR | 1.51 | .294 | (0.70-3.24) | 1.39 | .414 | (0.63-3.09) |
| Household income below the Federal Poverty Level | OR | 3.74 [†] | .002 | (1.59-8.79) | 3.50 [†] | .005 | (1.46-8.44) |
| Percent of the Federal Poverty Level | β | -0.32 [†] | .004 | (-0.54 to -0.10) | -0.31 [†] | .008 | (-0.54 to -0.08) |
| Not enough money to cover basic living expenses | OR | 6.13 [†] | 0 | (2.47-15.22) | 5.21 [†] | .001 | (2.14-13.28) |

Adjusted models include maternal age, education, race/ethnicity and union status at recruitment, and child's birth order, sex, and time varying age at interview. Models include site and child random effects.

*P < .10.

†P < .05.

‡Not available; model would not converge.