Substance abuse policies and prenatal health behaviors

Do punitive policies improve birth outcomes and increase prenatal care?

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Abstract

Recent high-profile court cases about suspected prenatal drug use and actions by state legislatures to criminalize illegal drug use during pregnancy have drawn national attention to substance abuse policies in the United States. Although punitive substance abuse policies (e.g., civil and criminal child abuse laws) are gaining favor among some states, very little is known about the impact of these policies on prenatal health behaviors and on birth outcomes. I use the variation in the timing of substance abuse policy implementation across states from 1985 to 2000 to study the effects of punitive substance abuse policies on birth outcomes (birth weight, low birth weight, early gestation, and low Apgar score) and on the receipt of prenatal care, as measured in the National Vital Statistics natality data. I find that civil child abuse laws decrease average birth weight by 33.5 grams and they increase the probability of early gestation by 0.7 percentage points. Additionally, civil child abuse laws increase the risk of a low Apgar score by 0.2 percentage points, indicating fetal distress. Qualitative studies suggest that punitive substance abuse policies deter women from receiving prenatal care. I also find that civil child abuse policies decrease the probability of receiving any prenatal care by 2.4 percentage points and they decrease the probability of initiating prenatal care during the first trimester by 1.8 percentage points.

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1 Introduction

Prenatal drug use first drew national attention during the mid-1980s, when crack cocaine was popular among women and youth due to its low prices and the perceived safety of smoking crack relative to intravenous drug use (Nadel, 1991). Television broadcasters and newspaper reporters depicted drug dependent mothers as the greatest threat to their children (Gomez, 1997), contrary to opinion of public health organizations and medical experts (Amicus Curiae Brief of the American Medical Association in *Ferguson, et. al. v. City of Charleston et. al.*, in the United States Supreme Court, No. 99-936, 1988). The media attacks on pregnant women were not limited to areas with high rates of prenatal drug use, but rather they were part of a national campaign against drug-dependent mothers and for the protection of substance-exposed infants. For example, in 1986, the six largest American newspapers ran more than 1,000 articles on crack cocaine use and crack babies (Gomez, 1997).

In response to this national campaign, state legislators proposed bills to fund targeted treatment programs and drug education and they drafted amendments to civil child welfare laws defining prenatal drug use as child neglect or abuse. By 2000, states had enacted a variety of policies to deter women from using alcohol and illegal drugs during pregnancy. While most states focused on educating women and treating drug addicted mothers, some states prosecuted women for drug use during pregnancy under existing criminal laws or amendments to civil child welfare laws (Paltrow et al., 2000). More than 400 pregnant women were arrested or forced to receive medical treatment from 1973 to 2005, and illegal drug use was reported in 87 percent of cases (Paltrow and Flavin, 2013). The most punitive substance abuse policies allowed states to commit women to treatment programs and to terminate parental rights on the basis of a positive toxicology report.

Recent high-profile court cases about suspected prenatal drug use and actions by state legislatures to criminalize illegal drug use during pregnancy have redrawn national attention to substance abuse policies in the United States. For example, in July 2013, Wisconsin prosecutors used the "cocaine mom" law to forcibly detain a pregnant woman at a drug treatment center for 78 days after she admitted to a previous opioid addiction during a prenatal care visit (Eckholm, 2013). Additionally, in April 2014, Tennessee became the first state to criminalize prenatal drug use (Gonzalez, 2014); state prosecutors charged a pregnant woman with aggravated assault, which carries a maximum

sentence of 15 years in prison, for using methamphetamines while pregnant (Altman, 2014).

Although punitive substance abuse policies are gaining favor, very little is known about the impact of these policies on prenatal health behaviors and on birth outcomes. This is the first paper to comprehensively identify the enactment dates of state-level substance abuse policies and to study their impacts on birth outcomes and on health behaviors. I use the variation in the timing of substance abuse policy implementation across states from 1985 to 2000 to study the effects of civil child abuse policies on birth outcomes (birth weight, low birth weight, early gestation, and low Apgar score) and on the receipt of prenatal care. I find that civil child abuse laws decrease average birth weight by 33.5 grams and they increase the probability of early gestation by 0.7 percentage points. Additionally, civil child abuse laws increase the risk of a low Apgar score by 0.2 percentage points, indicating fetal distress. Qualitative studies suggest that punitive substance abuse policies deter women from receiving prenatal care (Terplan et al., 2009). I also find that civil child abuse policies decrease the probability of receiving any prenatal care by 2.4 percentage points and they decrease the probability of initiating prenatal care during the first trimester by 1.8 percentage points.

There are a number of important reasons to study the impact of substance abuse policies on birth outcomes and on prenatal health behaviors. First, the conditions of fetal development can have large and persistent effects on child health outcomes (Almond and Currie, 2011). Fetal exposure to alcohol or drugs may lead to adverse infant health outcomes, including physical and developmental problems (Noonan et al., 2007). Therefore, substance abuse policies that reduce alcohol and drug use among pregnant women may improve child outcomes. Second, Medicaid finances almost half of all births in the United States (Markus et al., 2013) and prenatal drug use can significantly increases the cost of neonatal care, primarily because of premature births (Norton et al., 1996). Therefore, substance abuse policies that reduce the prevalence of prenatal drug use may decrease state and federal health care spending. Finally, this paper provides important results for state legislators to consider as they debate new punitive substance abuse policies.

2 Background and previous literature

2.1 Substance abuse policies

Prior to the 1980s, drug and alcohol policies in the United States did not include provisions for pregnant women nor was there a consensus in the medical literature on the effects of drug exposure on infant health. Therefore, as state legislators responded to the media barrage, they proposed a variety of solutions to the perceived problems of illegal drug use among pregnant women. For example, between 1983 and 1996, the California Legislature proposed 57 pieces of legislation about prenatal drug use (Gomez, 1997). However, by 1996, only one-third of the bills and none of the proposed punitive policies were signed into law. Most states rejected the punitive legislative proposals, but by 2000, 12 states had amended their civil child welfare laws and 3 states had enacted involuntary detention or civil commitment policies (Paltrow et al., 2000).

In October 1985, Nevada became the first state to amend their civil child welfare laws to address prenatal alcohol and drug use. The amendment modified the definition of children "in need of protection" to include children suffering from drug addiction or fetal alcohol syndrome. Figure 2 summarizes by state the amendments to civil child welfare laws that were enacted between 1985 and 2000. The amendments modified the definitions of child neglect and abuse to include prenatal drug exposure. Additionally, the amendments gave some states the authority to remove the child from the home or to terminate parental rights in the case of prima facie evidence of prenatal drug exposure. Minnesota, South Dakota, and Wisconsin each passed a civil commitment law between 1989 and 1998, which gave them the authority to detain pregnant women based on a report of prenatal drug use (see figure 3). For example, the Wisconsin "cocaine mom" law grants "state's juvenile court 'exclusive jurisdiction' over an unborn child when a pregnant woman 'habitually lacks self-control' with regard to alcohol or controlled substances" (Dailard and Nash, 2000).

A number of states approved legislation to require medical practitioners to test and to report children that they suspected had been exposed to or born affected by illegal drugs. Figure 4 summarizes the mandatory testing and reporting requirements among the states with civil child abuse or civil commitment policies. Additionally, legislators authorized priority admissions to drug treatment programs for pregnant women (see figure 5). Other proposals approved by the states included funding for drug education, oversight committees and task forces, and third-party liability.

2.2 Effect of substance abuse policies on birth outcomes

Punitive substance abuse policies are designed to increase the costs associated with alcohol and drug use during pregnancy. Using data from the Fragile Families and Child Wellbeing Study, Corman et al. (2005) find that pregnant women have a relatively elastic demand for illegal drugs. Additionally, fetal exposure to alcohol and drugs may lead to adverse infant health outcomes (Noonan et al., 2007). Therefore, substance abuse policies that reduce the demand for alcohol and illegal drugs among pregnant women may improve birth outcomes. For example, Fertig and Watson (2009) study the effects of minimum legal drinking age laws on prenatal drinking and on birth outcomes. They find that lenient drinking laws are associated with higher rates of alcohol use prior to pregnancy and during pregnancy, and that lenient drinking laws increase the rate of unplanned pregnancies among young women.

However, punitive substance abuse policies may also indirectly impact birth outcomes by influencing the health behaviors of pregnant women. Wolfe et al. (2007) retrospectively studied drug treatment utilization among a sample of women who had a screened substance abuse problem at the time of delivery. Only 53 percent of the women received any drug treatment the year before, during, or one year after delivery. Among those women who received drug treatment, most women were treated during only the postpartum period. Treatment for substance abuse after delivery may improve maternal health and child welfare (e.g., reduce the likelihood of future drug use), but postpartum drug treatment will not reduce the effects of maternal drug use on contemporaneous birth outcomes. Howell et al. suggest that the greatest challenge to effective drug treatment is identifying drug users among pregnant women and referring them for treatment.

Terplan et al. (2009) find that women who received child care during treatment are more likely to abstain from future drug use, and that women who are mandated to receive treatment by the criminal justice system are less likely to abstain from future drug use. Additionally, in a review of findings on substance abuse treatment for pregnant women, Howell et al. (1999) find that the most effective substance abuse treatment programs for pregnant women address their social and mental health needs.

2.3 Effect of substance abuse policies on prenatal care

Qualitative studies suggest that punitive substance abuse policies may deter pregnant women from receiving prenatal care, which could have a negative effect on birth outcomes. In interviews with 20 low-income female drug users in a California county, Roberts and Pies (2011) find that most women cited a fear of being reported to child protective services and losing custody of their children as reasons for not receiving prenatal care. The women also reported multiple barriers to prenatal care including transportation, health insurance, and drug use.

Finally, state-level identification, testing, and reporting requirements may also affect birth outcomes by forcing medical practitioners to report alcohol or illegal drug use to child and family services. The direction of this effect is a priori ambiguous because reporting requirements may reduce alcohol or drug use among reported pregnant women. However, the American Congress of Obstetricians and Gynecologists (ACOG) also suggests that reporting requirements may discourage women from receiving important prenatal care or alcohol and drug treatment (The American College of Obstetricians and Gynecologists, 2011).

3 Data

The primary data for this study are the National Vital Statistics natality public use files for the years 1985–2000, which provide a census of the 63.3 million live births in the United States and the District of Columbia. The Vital Statistics data include detailed infant health outcomes, self-reported maternal health behaviors, birth characteristics, maternal and paternal demographics, and geographic indicators as reported on the state birth certificates. I restrict the sample to live births among women ages 15 to 44 (99.7 percent of all live births) to exclude potential outliers in birth outcomes and prenatal health behaviors unrelated to substance abuse policies. I also exclude interstate nonresident and foreign nonresident births, which together account for approximately 2.4 percent of all live births annually. The final sample includes 61,508,241 live births among women ages 15 to 44 from 1985 to 2000.

Table 1 reports summary statistics for the birth outcomes and the prenatal health behavior outcomes of this restricted sample. The birth outcomes that I measure are birth weight, low birth weight, early gestation, and low Apgar score. Low birth weight is defined as less than 2,500 grams

(approximately 5.5 lbs). The average birth weight was 3334.9 grams (approximately 7.4 lbs) and the prevalence of low birth weight was 7.1 percent. Early gestation is defined as less than 36 weeks; approximately 7.0 percent of infants were born before 36 weeks. Finally, the Apgar score is a summary measure of infant health at five minutes after birth, based on five criteria: complexion, pulse rate, reflex irritability, activity, and respiratory effort. The Apgar score ranges from 0 to 10, and a low score is defined as less than 7. Approximately 1.5 percent of infants had a low Apgar score.

The National Vital Statistics natality data include self-reported measures of prenatal care, including the month of pregnancy that prenatal care began. The ACOG recommends that women begin receiving prenatal care between 8 and 10 weeks of pregnancy (American Congress of Obstetricians and Gynecologists, 2012). Therefore, I measure the receipt of prenatal care during the first trimester (1st to 3rd month), as well as a summary measure of any prenatal care and the total number of prenatal care visits. Nearly all women had at least one prenatal care visit (98.4 percent), but only 80.2 percent of women ages 15 to 44 began receiving prenatal care during their first trimester (see table 1). On average, women received prenatal care 11.2 times during their pregnancy. These measures of prenatal care are important health behavior outcomes because qualitative research suggests that they are potential mechanisms through which substance abuse policies may impact birth outcomes.

The 1989 revision to the U.S. Standard Certificate of Live Birth added self-reported measures of prenatal tobacco use, alcohol use and weight gain during pregnancy, and abnormal conditions of the newborn, including fetal alcohol syndrome. These measures could provide additional evidence on birth outcomes and on prenatal health behavior outcomes, as well as control for confounding health behaviors. For example, maternal smoking during pregnancy is a leading cause of low birth weight (Almond et al., 2005). However, states are not required to use the standard birth certificate and thus these data are not available for all years and all states. Additionally, none of the reported congenital anomalies (e.g., heart malformations) are directly attributable to prenatal substance use.

Table 1 also presents summary statistics for the maternal and child characteristics at birth. The maternal characteristics in the public use National Vital Statistics natality data include age, education (less than high school, high school, some college, college or more), race (white, black,

other), marital status, number of other live births, and metropolitan status (i.e., whether the county of residence is metropolitan). Nearly 50 percent of all live births were among women ages 15 to 25, with approximately 4.6 percent among women ages 15 to 17. Ethnicity was not measured in all data years; therefore, the indicator for white mothers (79.2 percent) likely includes white Hispanic women, for example. Finally, the child characteristics include sex and an indicator of plural births (2.5 percent), both of which likely impact birth weight and gestation.

The 1985 National Survey on Drug Use and Health (NSDUH) suggests that an estimated 5.8 million Americans used cocaine during the past 12 months and that the prevalence of cocaine use was approximately 6.3 percent of the population aged 12 and older. Unfortunately, pregnancy status was not asked of NSDUH respondents until 1996 and the Pregnancy Risk Assessment Monitoring System data are not available for all states and all years. Combined data from the 2011 and 2012 NSDUH indicate that 5.9 percent of pregnant women reported using illegal drugs in the past 30 days, 8.5 percent currently used alcohol (and 2.7 percent binge drank), and about one in six smoked cigarettes. The prevalence of these risky prenatal health behaviors was highest among young mothers. For example, 18.3 percent of pregnant women ages 15 to 17 reported illegal drug use in the past 30 days compared to 3.4 percent of pregnant women ages 26 to 44.

Figure 6 shows the prevalence of substance use among women ages 15 to 44 by pregnancy status and age from the 2003–2012 NSDUH. Figure 7 shows the prevalence of illegal drug use by drug type. The patterns of prenatal substance use by age are relatively consistent over time. Similarly, the patterns of illegal drug use among pregnant women are relatively consistent over time—younger women are significantly more likely to use any illegal drugs and to use cocaine, specifically. I assume that these more recent patterns of substance use during pregnancy are similar to those from 1985 to 2000. Therefore, I also study the subsample of live births among among women ages 15 to 25 (27,475,246 million) because they are plausibly more likely to be affected by changes in substance abuse policies due to their greater prevalence of substance use during pregnancy.

Finally, I collected the data on state-level substance abuse policies from multiple sources. First, in 2000, Paltrow et al. surveyed states' civil and criminal laws to identify every statute that specifically addressed the use of illegal drugs during pregnancy and infants born affected by maternal substance use. I reviewed the text of each of these statutes and I summarized them by state into the following categories: civil child abuse policies; civil commitment/involuntary detention policies;

testing and mandatory reporting policies; substance abuse treatment policies; and other policies (e.g., funding to provide information on prenatal drug use to birth centers). For example, the civil child abuse policies (see figure 2) comprise statutes defining prenatal drug exposure as child neglect or abuse and defining children born affected by illegal drugs as "in need of services." These statutes gave states the authority to initiate child welfare proceedings on the basis of prenatal drug use, possibly resulting in emergency removal of a child from its mother and termination of parental rights.

I emphasize civil child abuse policies because they are the most prevalent punitive substance abuse policies (12 states as of 2000) and they are likely the most salient policies for women—the termination of parental rights is a permanent and powerful state action. Three states also passed punitive civil commitment or involuntary detention policies as of 2000 (see figure 3), which gave these states the authority to detain pregnant women at, for example, inpatient substance abuse treatment facilities. Among the 13 states that passed a punitive substance abuse policy as of 2000, 6 states also established mandatory testing and reporting requirements for suspected prenatal drug use (see figure 4) and 6 states granted priority substance abuse treatment admissions to pregnant women (see figure 5).

I identified the enactment and effective dates for each substance abuse policy by searching electronic legal records (LexisNexis and WestLaw) for amendments to state laws by the statutes summarized within each policy. For example, Indiana's civil child abuse policy consists of five state statutes (e.g., IND. CODE ANN. §31-34-1-11, IND. CODE ANN. §31-34-20-1, etc.). If a policy comprised statutes with more than one set of enactment and effective dates, I assigned the earliest set of dates to the policy. Additionally, if I was unable to identify an effective date, I assigned the enactment date to the policy.

4 Empirical strategy

I use the variation in the timing of substance abuse policy implementation across states from 1985 to 2000 to estimate difference-in-differences (DD) models of the impacts of punitive substance abuse policies on birth outcomes and on prenatal care, controlling for state- and individual-level

covariates. The DD models are of the form

$$y_{ist} = \alpha + \tau \text{child abuse}_{st} + X'_{st}\beta_1 + X'_{ist}\beta_2 + \gamma_s + \delta_t + \varepsilon_{ist} \quad (1)$$

where y_{ist} is the outcome of interest (e.g., low birth weight) for individual i, in state s, and year t; child abuse$_{st}$ is the treatment variable that indicates a civil child abuse policy in state s and year t; X_{st} is a vector of indicator variables for other substance abuse policies that may also affect the outcome of interest (i.e., civil commitment, testing and mandatory reporting, and substance abuse treatment); X_{ist} is a vector of maternal characteristics (i.e., age, education, race, marital status, number of other live births, and metropolitan status) and child characteristics (i.e., sex, plurality of birth); and γ_s and δ_t are state and year fixed effects, respectively.

The treatment variable, child abuse$_{st}$, equals 0 in all years prior to the effective date of the civil child abuse policy and it equals 1 in all years after the effective date. In the year the civil child abuse policy was implemented, the treatment variable equals the fraction of the year the policy was effective. I construct the indicator variables for all substance abuse policies (including the treatment variable) relative to the year of conception in the National Vital Statistics natality data, rather than the year of birth, because my outcomes of interest include prenatal health behaviors. The estimated date of conception equals the date of birth minus the reported gestational age.

The parameter of interest in the DD models, τ, is identified from quasi-experimental within-state overtime variation. The main identifying assumption for τ is that the outcome trends are the same in treated and control states in the absence of treatment (i.e., common trends). More specifically, in the absence of treatment, the trends in birth outcomes and prenatal health behaviors should be the same in states that adopted punitive substance abuse policies *(treated)* and in states that did not adopt punitive policies *(control)*. The state fixed effects control for time invariant differences in trends across states and the year fixed effects control for nationwide differences in trends over time. The DD models also assume constant treatment effects (i.e., constant τ). I test this assumption by estimating the DD models among young mothers (ages 15 to 25) who have a higher prevalence of substance use during pregnancy, and thus they may respond differently to punitive substance abuse policies.

The primary threat to the identification of τ is correlation between treatment assignment

and omitted state-specific trends. For example, the treatment assignment would not be quasi-experimental if a state amended their civil child welfare laws in response to an increase in the state-specific prevalence of prenatal drug use. However, I do not believe that differential trends in prenatal drug use were strongly associated with the enactment of substance abuse policies. First, the national dialogue around crack cocaine during the 1980s prompted states to enact new substance abuse policies for at least a decade afterward. For example, Wisconsin implemented their civil commitment policy in 1998, known as the "cocaine mom" law, 11 years after crack cocaine arrived in the state. Second, on average, states implemented punitive substance abuse policies 8 years after crack cocaine arrived, as measured by state-specific increases in cocaine-related deaths (Evans et al., 2014). Also, Nevada and Oklahoma amended their civil child abuse laws to include infants born affected by drugs two years before crack cocaine arrived in their states. Therefore, the adoption of punitive substance abuse policies appears unrelated to state-specific trends in drug use.

The second threat to the identification of τ is selection—correlation between treatment assignment and outcomes in the absence of treatment. For example, τ could be biased downwards by selection if states with punitive substance abuse policies were politically conservative and thus they were more likely than control states to limit access to women's health services (e.g., abortion). Figure 1 shows the spatial variation in states with punitive substance abuse policies from 1985 to 2000; the dark blue states (NV, OK, MN, FL, IA, and IL) implemented punitive substance abuse policies before 1995 ("early adopters"), whereas the light blue states (SC, IN, TX, MD, SD, VA, and WI) implemented punitive substance abuse policies after 1995 ("late adopters"). Although the spatial variation in treatment assignment appears relatively random, there may be selection as a result of omitted variables (e.g., state fetal rights sentiments) that are correlated with punitive substance abuse policies and the potential outcomes. I test for selection by estimating the DD models with the subsample of states that ever adopted a punitive substance abuse policy, for which assignment to treatment before or after 1995 is arguably quasi-random.

The final threat to the identification of τ is policy endogeneity due to states enacting civil child abuse policies in conjunction with other legislation. For example, some states may have passed substance abuse policies as part of a broader legislative agreement on maternal and child health. I partly address this threat by controlling for other prenatal substance abuse policies (e.g., testing

and mandatory reporting policies). However, other omitted variables may still be correlated with the treatment and the outcomes. Therefore, I use women ages 26 and older as a placebo group in triple-difference (DDD) models because older mothers are less likely to be affected by punitive substance abuse policies due to their low rates of substance use during pregnancy, but are plausibly equally likely to be affected by other state policies.

The DDD models are of the form

$$\begin{aligned} y_{ist} =& \alpha + \tau \text{child abuse}_{st} \cdot \mathbb{1}\{\text{age} < 26\} + \\ & \gamma_s \cdot \mathbb{1}\{\text{age} < 26\} + \delta_t \cdot \mathbb{1}\{\text{age} < 26\} + \gamma_s \cdot \delta_t + \\ & X'_{st}\beta_1 + X'_{ist}\beta_2 + \mathbb{1}\{\text{age} < 26\} + \gamma_s + \delta_t + \varepsilon_{ist} \end{aligned} \tag{2}$$

where y_{ist}, X_{st}, X_{ist}, γ_s, and δ_t are defined as above, but the model now includes additional fixed effects to control state-age, year-age, state-year, and age differences. The parameter of interest in the DDD models, τ, is identified from quasi-experimental within-state-age overtime variation.

I estimate equations 1 and 2 with probit models for the binary outcomes (i.e., low birth weight, early gestation, low Apgar score, any prenatal care, and first trimester care) and I report marginal effects. As a robustness check, I also estimate linear probability models for the binary outcomes (not shown), and the results are quantitatively and qualitatively similar to the probit results. For the continuos outcomes (i.e., birth weight and number of prenatal care visits), I estimate equations 1 and 2 with OLS models. All standard errors are clustered at the state level.

5 Effect of substance abuse policies on birth outcomes

Table 2 shows the results from the DD models of the impact of civil child abuse policies on birth outcomes among live births to women ages 15 to 44. The first column for each birth outcome reports the DD coefficient without controlling for state and birth characteristics. The second set of columns report the DD coefficient and the coefficients for the other substance abuse policies (e.g., civil commitment). Finally, the third set of columns report the preferred specification of the DD models, which controls for state and birth characteristics. The results suggest that civil child abuse policies reduce the average birth weight by 12.7 grams or 0.03 lbs (column 3) and they increase the

risk of low birth weight by 0.4 percentage points (approximately 5.6 percent). The probability of early gestation is 0.3 percentage points higher among live births to women in states with civil child abuse policies (column 9). Finally, civil child abuse policies are associated with a 0.2 percentage point increase in the probability of a low Apgar score (column 12), which would indicate fetal distress. Table 3 reports nearly identical results for the subset of live births among women ages 15 to 25.

The results from tables 2 and 3 could be biased by selection if the states that enacted civil child abuse policies differed across unobservable dimensions that were correlated with the potential outcomes. To partly address this concern, I restrict my sample to states that adopted a civil child abuse policy by 2000. I estimate the DD models among live births to women ages 15 to 44 between 1985 and 1995, using the states that enacted their civil child abuse policies after 1995 as the control states. The results in table 4 are qualitatively similar to but larger than the results from the unrestricted sample (table 2). For example, civil child abuse policies decrease average birth weight by 32.7 grams and they increase the probability of low birth weight by 1.2 percentage points. However, the restricted sample DD results suggest that civil child abuse policies do not affect the probability of early gestation. Again, table 5 reports nearly identical results for the subset of live births among women ages 15 to 25.

In addition to selection, the results could also be biased by policy endogeneity if states enacted other maternal and child health policies in conjunction with the civil child abuse policies. The DDD results reported in table 6 use women ages 26 to 44 as a placebo group to remove differences in birth outcomes associated with other potentially confounding policies (e.g., access to women's health services). Panel A reports the DD results among women ages 15 to 25 in the subset of states that enacted a civil child abuse policy by 2000 (from table 5), and panel B reports the DDD results for the same subset of states. The DDD model estimates that civil child abuse policies decrease average birth weight by 33.5 grams; this result is consistent with the DD model (panel A). The effects of civil child abuse policies on low birth weight are similar in the DD and DDD models, but the increase of 1.0 percentage points in the DDD model is not statistically significant. The probability of early gestation increases by 0.7 percentage points in the DDD model, which is significantly higher than the statistically insignificant 0.1 percentage point increase in the DD model. Therefore, this result suggests that the effect of civil child abuse policies on early gestation

is biased downward in the DD model. Finally, the DDD results show that civil child abuse policies increase the risk of a low Apgar score by 0.2 percentage points, relative to 0.4 percentage points in the DD model.

6 Effect of substance abuse policies on prenatal care

Table 7 shows the results from the DD models of the impact of civil child abuse policies on prenatal care among live births to women ages 15 to 44 in the subset of states that enacted a civil child abuse policy by 2000. The DD models find no statistically significant effects of civil child abuse policies on the receipt of any prenatal care, the total number of prenatal care visits, nor the receipt of prenatal care during the first trimester. However, mandatory testing and reporting requirements are strongly associated with reductions in the use of prenatal care. For example, women in states with mandatory testing and reporting requirements receive approximately 0.5 fewer prenatal care visits and they are 5.8 percentage points less likely to receive prenatal care during their first trimester. The results reported in table 8 are similar for young mothers ages 15 to 25.

The concern about policy endogeneity is particularly important in the case of prenatal care because other maternal and child health policies may directly affect a woman's ability to access prenatal care services. For example, if Medicaid expansions to pregnant women are positively correlated with both civil child abuse policies and prenatal care, then the results in tables 7 and 7 would be biased upwards. Table 9 shows the results from the DDD models (panel B), where women ages 26 to 44 are used as a placebo group to remove potential differences in prenatal care associated with other policies. The DDD result in column 3 suggests that civil child abuse policies decrease the probability that a woman receives any prenatal care by 2.4 percentage points; this result is quantitatively similar to the DD model that was statistically insignificant. Additionally, women are 1.8 percentage points less likely to initiate prenatal care during their first trimester in states with civil child abuse policies (column 9). Civil child abuse policies are also associated with a decline in the total number of prenatal care visits (0.65 visits), but this result is not statistically significant.

7 Conclusions

This paper broadly examines the impact of punitive substance abuse policies on birth outcomes and on prenatal health behaviors. The triple-difference results, that control for potential selection and policy endogeneity, suggest that civil child abuse policies decrease birth weight and increase the probabilities of early gestation and fetal distress. The poor birth outcomes associated with civil child abuse policies may be the result of reductions in the use of prenatal care among women in states with punitive substance abuse policies. Although these results suggest that punitive substance abuse policies may have unintended effects on birth outcomes and on prenatal health behaviors, these results should be interpreted with caution due to a number of limitations.

First, data on prenatal substance use are not available for 1985–2000 to directly measure the impact of punitive substance abuse policies on alcohol and drug use during pregnancy. Starting in 1989, a subset of states began collecting self-reported measures of alcohol use and drug use on birth certificates. These birth certificate data and the NSDUH data from 1996 onwards may provide some indication of the effects of civil child abuse policies on drug use during pregnancy. However, self-reported measures of prenatal substance use likely suffer from significant underreporting due to social desirability bias and concerns over the legal consequences of reporting drug use.

Second, these preliminary results do not include measures of eligibility for public health insurance or other state characteristics (e.g., unemployment) that may also be strongly correlated with birth outcomes and with prenatal health behaviors. The triple-difference results remove some of the potential variation associated with with these confounders, but future work needs to control for these other characteristics.

Additionally, punitive substance abuse policies may affect the composition of births through, for example, selective abortions. I do not find that civil child abuse policies significantly affect rates of fertility (results not shown), but fertility effects should be explored further. Finally, recent work by the National Advocates for Pregnant Women suggests that judicial activism may occur in states without punitive substance abuse policies, which could result in measurement error.

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Table 1: Summary statistics among ages 15 to 44, 1985–2000

	Mean	Std. Dev.	Min	Max
Outcomes				
Birth weight (grams)	3334.896	602.810	227	8164
Low birth weight (< 2500 grams)	0.071	0.257	0	1
Early gestation (< 36 weeks)	0.070	0.254	0	1
Low Apgar (< 7)	0.015	0.122	0	1
Any prenatal care	0.984	0.124	0	1
Number prenatal care visits	11.217	4.125	0	49
First trimester prenatal care	0.802	0.398	0	1
Substance abuse policies				
Civil child abuse	0.117	0.315	0	1
Civil commitment	0.014	0.115	0	1
Mandatory reporting	0.077	0.264	0	1
Substance abuse treatment	0.081	0.269	0	1
Maternal characteristics				
Age 15 to 17	0.046	0.209	0	1
Age 18 to 25	0.401	0.490	0	1
Age 26 to 44 *(omitted)*	0.553	0.497	0	1
Less than high school *(omitted)*	0.205	0.403	0	1
High school	0.334	0.472	0	1
Some college	0.195	0.396	0	1
College or more	0.266	0.442	0	1
White *(omitted)*	0.792	0.406	0	1
Black	0.159	0.366	0	1
Other race	0.049	0.215	0	1
Married	0.705	0.456	0	1
Number live births	1.020	1.204	0	40
Metro status	0.807	0.395	0	1
Child characteristics				
Male	0.512	0.500	0	1
Plural birth	0.025	0.157	0	1
N	61,508,241			

Source: National Vital Statistics natality data, 1985–2000

Figure 1: States with punitive substance abuse policies, 1985–2000

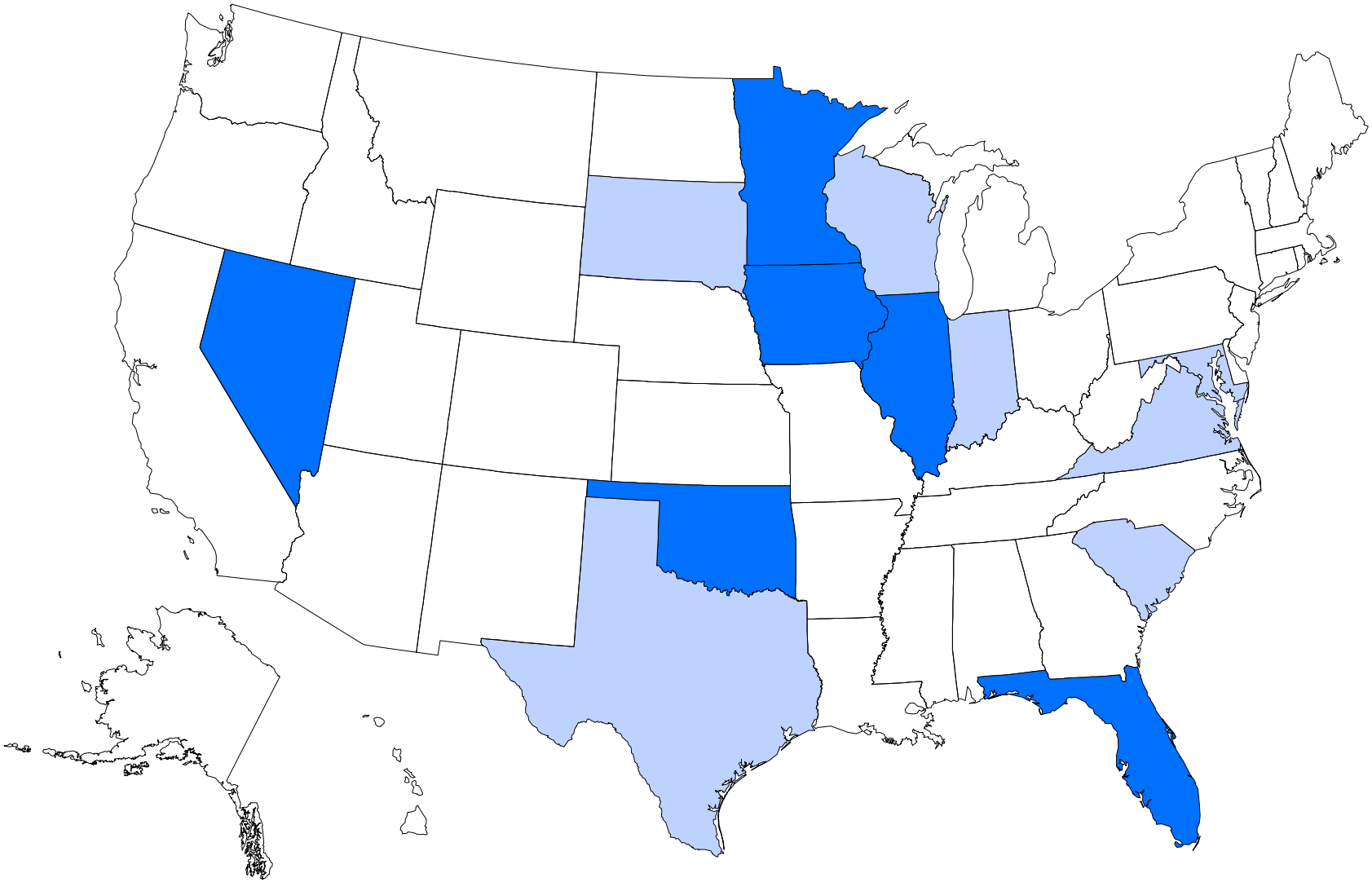


Figure 2: Civil child abuse policies

State	Summary	Date
Nevada	Child is "in need of protection" if suffering from drug addiction or fetal alcohol syndrome	10/01/1985
Oklahoma	Child is "deprived" if born drug dependent and parent fails to provide care	07/01/1987
Minnesota	Definition of neglect includes prenatal drug exposure	08/01/1989
Florida	Guardian must be appointed for child born drug dependent	10/01/1989
Iowa	Definition of child "in need of services" includes those affected by drugs	07/01/1993
Illinois	Positive infant toxicology prima facie evidence of abuse or neglect; definition of harm includes positive toxicology; parent deemed unfit from positive toxicology and another neglected minor	08/13/1993 *
South Carolina	Child is "in need of protection" if suffering from drug addiction or fetal alcohol syndrome	01/01/1997
Indiana	Definition of neglect/abuse includes affected by drugs and in need of treatment or condition aggravated by mother's drug use; neglected child can be removed from home; law enforcement can remove perpetrator from residence with neglected child	07/01/1997
Texas	Child is "abused" if born addicted to drugs or alcohol; drug addiction at birth grounds for termination of parental rights	09/01/1997
Maryland	Presume child not receiving proper care if child born affected by drugs; state can terminate parental rights after report of suspected neglect	10/01/1997
Virginia	Child suspected abused/neglected based on physician report of prenatal drug exposure; emergency removal of child in response to report of prenatal addiction or FAS	07/01/1998
Wisconsin	Definition of abuse includes drug and alcohol use by mother	07/01/1998

* Definition of neglect effective 1/1/1990

Figure 3: Civil commitment/involuntary detention policies

State	Summary	Date
Minnesota	State may seek emergency admission upon report of prenatal drug use	08/01/1989
South Dakota	Prenatal drug use grounds for involuntary commitment; commitment by relative, physician, treatment administrator and person lacks self-control	07/01/1998
Wisconsin	Juvenile court has jurisdiction over unborn child in case of drug or alcohol use; procedures for taking a pregnant adult/minor into custody; Criteria for taking pregnant adult/minor into custody; procedures for hearing for taking pregnant adult/minor into custody	07/01/1998

Figure 4: Testing and mandatory reporting policies

State	Summary	Date
Oklahoma	Practitioner required to report child suspected affected by drugs at birth; Testing for substance abuse of family members after removal of a child from the home	07/01/1987
Minnesota	Practitioner required to test and report child suspected affected by drugs after birth; Pregnant women treated for alcohol abuse also screened for drugs	08/01/1989
Wisconsin	Expectant mothers suspected of drug use referred for testing (only tested with consent)	01/31/1990
Illinois	Pregnant women addicted to drugs are assigned case management	07/01/1990
Iowa	Practitioner required to test and report child suspected affected by drugs; Professionals may screen pregnant women for substance abuse	07/01/1990
Virginia	Physicians required to screen pregnant women for substance abuse	07/01/1992

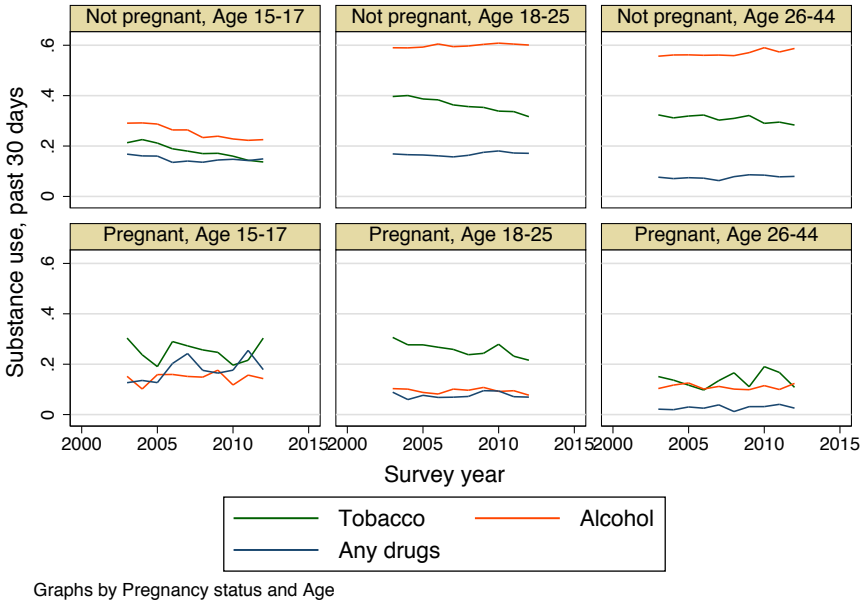
Notes: Testing and mandatory reporting policies among states with punitive substance abuse policies only.

Figure 5: Substance abuse treatment policies

State	Summary	Date
Florida	Cannot deny access to primary care for women at risk for adverse outcomes due to drugs	07/01/1987
Maryland	Priority admissions for treatment	07/01/1993
Virgina	Expanded prenatal care services that include residential treatment	07/01/1993
Illinois	Referral to treatment and prohibits sanctions based solely on substance abuse; Priority admissions for treatment	07/13/1993
South Carolina	Family Independence Program, treatment through Self-Sufficiency Plan	05/26/1995
Wisconsin	Priority admissions for treatment	09/01/2001

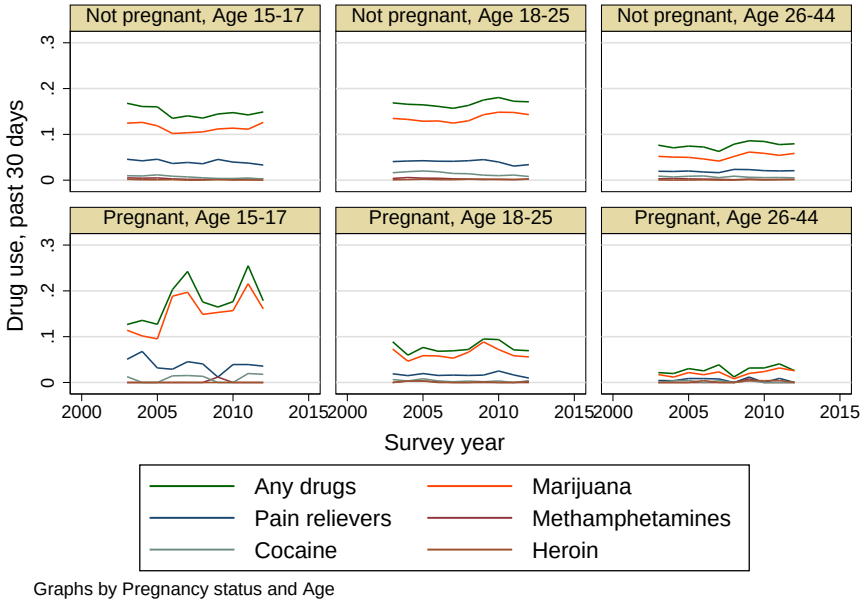
Notes: Substance abuse treatment policies among states with punitive substance abuse policies only.

Figure 6: Substance use among women ages 15 to 44



Source: National Survey on Drug Use and Health, 2003–2012

Figure 7: Illegal drug use by type among women ages 15 to 44



Source: National Survey on Drug Use and Health, 2003–2012

Table 2: Difference-in-differences, live births among women ages 15 to 44, 1985–2000

	Birth outcomes											
	Birth weight (grams) [3334.9 grams]			Low birth weight (< 2500 grams) [7.1 percent]			Early gestation (< 36 weeks) [7.0 percent]			Low Apgar score (< 7) [1.5 percent]		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Civil child abuse	-23.440***	-21.820***	-12.670***	0.007***	0.006***	0.004***	0.005***	0.004***	0.003**	0.002***	0.002**	0.002**
	(4.971)	(5.044)	(4.226)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.000)	(0.001)	(0.001)
Civil commitment		-10.920**	-11.610***		0.008***	0.007***		0.005***	0.005***		0.001	0.000
		(4.736)	(4.215)		(0.002)	(0.001)		(0.002)	(0.002)		(0.001)	(0.001)
Mandatory reporting		-4.861	-12.370***		0.002	0.004***		0.004***	0.005***		0.000	0.000
		(4.455)	(3.926)		(0.001)	(0.001)		(0.001)	(0.001)		(0.000)	(0.000)
Substance abuse treatment		1.978	-10.080*		-0.001	0.002		-0.002	0.000		0.001	0.001*
		(6.343)	(5.374)		(0.002)	(0.001)		(0.002)	(0.001)		(0.001)	(0.000)
Age 15 to 17			-11.110			-0.007**			0.011***			-0.001***
			(15.560)			(0.003)			(0.002)			(0.000)
Age 18 to 25			-9.481*			-0.007***			-0.001			-0.002***
			(5.109)			(0.001)			(0.001)			(0.000)
High school			65.300***			-0.012***			-0.009***			-0.002***
			(7.881)			(0.002)			(0.001)			(0.000)
Some college			106.600***			-0.0213***			-0.016***			-0.003***
			(10.160)			(0.003)			(0.001)			(0.000)
College or more			113.000***			-0.024***			-0.018***			-0.003***
			(13.850)			(0.004)			(0.001)			(0.000)
Black			-219.100***			0.043***			0.041***			0.010***
			(6.727)			(0.001)			(0.001)			(0.000)
Other race			-137.100***			0.014***			0.012***			-0.000
			(16.390)			(0.002)			(0.001)			(0.000)
Married			96.370***			-0.025***			-0.024***			-0.005***
			(4.306)			(0.001)			(0.001)			(0.000)
Number of live births			30.780***			-0.004***			0.001***			-0.001***
			(1.175)			(0.000)			(0.000)			(0.000)
Metro status			-3.662			0.001*			0.001			-0.002***
			(2.810)			(0.001)			(0.001)			(0.000)
Male			116.700***			-0.010***			0.007***			0.002***
			(1.114)			(0.000)			(0.000)			(0.000)
Plural birth			-1,019***			0.208***			0.160***			0.025***
			(4.503)			(0.001)			(0.002)			(0.000)
State FE	X	X	X	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X	X	X	X	X
N	61,435,593	61,435,593	61,171,992	61,435,593	61,435,593	61,171,992	60,411,474	60,411,474	60,209,700	47,020,672	47,020,672	46,831,809

Source: National Vital Statistics natality data, 1985–2000
Notes: Unconditional dependent variable means are reported in brackets. Standard errors clustered at the state level are reported in parentheses.
* p < 0.10, ** p < 0.05, *** p < 0.01

Table 3: Difference-in-differences, live births among women ages 15 to 25, 1985–2000

	Birth outcomes											
	Birth weight (grams) [3280.5 grams]			Low birth weight (< 2500 grams) [7.7 percent]			Early gestation (< 36 weeks) [7.7 percent]			Low Apgar score (< 7) [1.7 percent]		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Civil child abuse	-24.150***	-20.340***	-13.520***	0.008***	0.007***	0.005***	0.005***	0.005***	0.004***	0.003***	0.002***	0.002**
	(5.499)	(5.312)	(4.163)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Civil commitment		-24.790***	-16.130***		0.009***	0.007***		0.007***	0.004**		0.001	0.001
		(6.865)	(5.146)		(0.002)	(0.001)		(0.002)	(0.002)		(0.001)	(0.001)
Mandatory reporting		-6.658	-9.901**		0.002	0.003**		0.004**	0.004***		-0.000	-0.000
		(6.442)	(4.016)		(0.002)	(0.001)		(0.002)	(0.001)		(0.001)	(0.000)
Substance abuse treatment		-0.058	-5.998		-0.001	0.000		-0.003*	-0.002*		0.001	0.001**
		(7.277)	(4.467)		(0.002)	(0.001)		(0.002)	(0.001)		(0.001)	(0.001)
Age 15 to 17			-19.390***			0.005***			0.018***			0.001***
			(6.952)			(0.001)			(0.001)			(0.000)
High school			66.640***			-0.013***			-0.009***			-0.001***
			(4.544)			(0.001)			(0.000)			(0.000)
Some college			106.500***			-0.022***			-0.015***			-0.003***
			(5.960)			(0.002)			(0.000)			(0.000)
College or more			72.980***			-0.013***			-0.008***			0.001*
			(8.794)			(0.002)			(0.001)			(0.000)
Black			-200.700***			0.0401***			0.039***			0.009***
			(4.810)			(0.001)			(0.001)			(0.000)
Other race			-97.890***			0.012***			0.017***			-0.001***
			(23.620)			(0.004)			(0.002)			(0.000)
Married			77.550***			-0.020***			-0.024***			-0.004***
			(3.347)			(0.001)			(0.001)			(0.000)
Number of live births			18.520***			-0.003***			0.006***			-0.002***
			(1.418)			(0.000)			(0.000)			(0.000)
Metro status			-3.372			0.002***			0.000			-0.002***
			(2.983)			(0.001)			(0.001)			(0.000)
Male			111.500***			-0.011***			0.007***			0.003***
			(0.987)			(0.000)			(0.000)			(0.000)
Plural birth			-1,020***			0.231***			0.169***			0.031***
			(3.537)			(0.001)			(0.001)			(0.000)
State FE	X	X	X	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X	X	X	X	X
N	27,443,185	27,443,185	27,324,360	27,443,185	27,443,185	27,324,360	26,916,300	26,916,300	26,824,093	20,860,352	20,860,352	20,779,869

Source: National Vital Statistics natality data, 1985–2000
Notes: Unconditional dependent variable means are reported in brackets. Standard errors clustered at the state level are reported in parentheses.
* p < 0.10, ** p < 0.05, *** p < 0.01

Table 4: Difference-in-differences, live births among women ages 15 to 44, 1985–1995

	Birth outcomes											
	Birth weight (grams) [3341.6 grams]			Low birth weight (< 2500 grams) [7.0 percent]			Early gestation (< 36 weeks) [7.0 percent]			Low Apgar score (< 7) [1.6 percent]		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Civil child abuse	-41.480***	-32.870*	-32.650*	0.016***	0.012**	0.012**	0.006***	0.000	0.002	0.006***	0.004***	0.003***
	(11.440)	(15.870)	(17.090)	(0.004)	(0.006)	(0.006)	(0.002)	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)
Civil commitment		-4.716	0.631		0.006	0.003		0.009***	0.006**		-0.001	-0.001
		(16.870)	(15.750)		(0.006)	(0.005)		(0.003)	(0.003)		(0.001)	(0.001)
Mandatory reporting		-17.600	-28.370***		0.006*	0.009***		0.008***	0.010***		0.003**	0.003**
		(11.200)	(8.509)		(0.004)	(0.003)		(0.002)	(0.002)		(0.001)	(0.001)
Substance abuse treatment		-8.191	-16.460		0.003	0.005		0.007**	0.009***		0.003**	0.003**
		(17.510)	(12.350)		(0.006)	(0.005)		(0.003)	(0.003)		(0.001)	(0.001)
Age 15 to 17			-3.302			-0.008			0.014***			-0.002***
			(30.840)			(0.006)			(0.004)			(0.000)
Age 18 to 25			-7.100			-0.007***			0.001			-0.001***
			(10.760)			(0.002)			(0.002)			(0.000)
High school			71.840***			-0.013***			-0.009***			-0.002***
			(9.843)			(0.002)			(0.001)			(0.000)
Some college			114.200***			-0.023***			-0.016***			-0.004***
			(11.690)			(0.003)			(0.002)			(0.000)
College or more			124.200***			-0.028***			-0.020***			-0.004***
			(15.530)			(0.003)			(0.002)			(0.000)
Black			-226.700***			0.044***			0.043***			0.011***
			(9.367)			(0.002)			(0.001)			(0.000)
Other race			-121.400***			0.012***			0.013***			0.000
			(29.460)			(0.003)			(0.002)			(0.001)
Married			102.800***			-0.025***			-0.026***			-0.005***
			(3.767)			(0.001)			(0.001)			(0.000)
Number of live births			31.700***			-0.004***			0.002**			-0.001***
			(2.493)			(0.001)			(0.001)			(0.000)
Metro status			-7.903			0.001			0.001			-0.002***
			(5.234)			(0.001)			(0.001)			(0.000)
Male			119.700***			-0.010***			0.007***			0.002***
			(1.699)			(0.000)			(0.000)			(0.000)
Plural birth			-1,006***			0.204***			0.155***			0.027***
			(3.017)			(0.001)			(0.001)			(0.000)
State FE	X	X	X	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X	X	X	X	X
N	13,253,697	13,253,697	13,202,267	13,253,697	13,253,697	13,202,267	13,020,886	13,020,886	12,986,274	9,459,004	9,459,004	9,435,384

Source: National Vital Statistics natality data, 1985–1995

Notes: Subsample of states with a punitive substance abuse policy. Unconditional dependent variable means are reported in brackets. Standard errors clustered at the state level are reported in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Difference-in-differences, live births among women ages 15 to 25, 1985–1995

	Birth outcomes											
	Birth weight (grams) [3287.2 grams]			Low birth weight (< 2500 grams) [7.6 percent]			Early gestation (< 36 weeks) [8.0 percent]			Low Apgar score (< 7) [1.8 percent]		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Civil child abuse	-44.610***	-34.810*	-31.620*	0.017***	0.014**	0.012*	0.006**	0.000	0.001	0.007***	0.004***	0.004***
	(12.560)	(18.380)	(17.040)	(0.004)	(0.007)	(0.006)	(0.002)	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)
Civil commitment		-17.970	-7.174		0.007	0.004		0.012***	0.007***		-0.000	-0.000
		(19.700)	(17.350)		(0.007)	(0.006)		(0.003)	(0.003)		(0.001)	(0.001)
Mandatory reporting		-18.430	-24.020**		0.006	0.008**		0.009***	0.009***		0.003*	0.003*
		(12.490)	(9.648)		(0.004)	(0.004)		(0.002)	(0.002)		(0.001)	(0.001)
Substance abuse treatment		-6.891	-11.520		0.002	0.003		0.006**	0.007***		0.003**	0.003***
		(18.970)	(13.740)		(0.007)	(0.005)		(0.003)	(0.003)		(0.001)	(0.001)
Age 15 to 17			-16.610			0.005			0.020***			0.001***
			(15.320)			(0.003)			(0.002)			(0.000)
High school			70.260***			-0.013***			-0.008***			-0.002***
			(6.884)			(0.001)			(0.000)			(0.000)
Some college			110.900***			-0.023***			-0.015***			-0.003***
			(7.200)			(0.002)			(0.001)			(0.000)
College or more			85.310***			-0.018***			-0.013***			0.000
			(8.638)			(0.002)			(0.002)			(0.001)
Black			-212.700***			0.042***			0.043***			0.010***
			(5.383)			(0.001)			(0.001)			(0.000)
Other race			-70.680*			0.007			0.015***			-0.001
			(38.640)			(0.006)			(0.003)			(0.001)
Married			82.920***			-0.021***			-0.027***			-0.005***
			(2.397)			(0.001)			(0.001)			(0.000)
Number of live births			17.200***			-0.002***			0.006***			-0.002***
			(1.392)			(0.001)			(0.000)			(0.000)
Metro status			-7.794			0.002**			0.001			-0.002***
			(4.813)			(0.001)			(0.001)			(0.000)
Male			114.500***			-0.011***			0.007***			0.003***
			(1.420)			(0.001)			(0.000)			(0.000)
Plural birth			-1,016***			0.229***			0.167***			0.033***
			(3.341)			(0.002)			(0.001)			(0.001)
State FE	X	X	X	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X	X	X	X	X
N	6,237,849	6,237,849	6,210,442	6,237,849	6,237,849	6,210,442	6,109,208	6,109,208	6,089,509	4,282,649	4,282,649	4,270,997

Source: National Vital Statistics natality data, 1985–1995

Notes: Subsample of states with a punitive substance abuse policy. Unconditional dependent variable means are reported in brackets. Standard errors clustered at the state level are reported in parentheses.

* p < 0.10, ** p < 0.05, *** p < 0.01

Table 6: Difference-in-differences and triple-difference, 1985–1995

	Birth outcomes											
	Birth weight (grams) [3287.2 grams]			Low birth weight (< 2500 grams) [7.6 percent]			Early gestation (< 36 weeks) [8.0 percent]			Low Apgar score (< 7) [1.8 percent]		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A. Difference-in-differences, mothers ages 15 to 25												
Civil child abuse	-44.610***	-34.810*	-31.620*	0.017***	0.014**	0.012*	0.006**	0.000	0.001	0.007***	0.004***	0.004***
	(12.560)	(18.380)	(17.040)	(0.004)	(0.007)	(0.006)	(0.002)	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)
State FE	X	X	X	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X	X	X	X	X
Substance abuse policies		X	X		X	X		X	X			
Maternal/child characteristics			X			X			X			X
N	6,237,849	6,237,849	6,210,442	6,237,849	6,237,849	6,210,442	6,109,208	6,109,208	6,089,509	4,282,649	4,282,649	4,270,997
Panel B. Triple-difference, mothers ages 15 to 44												
Civil child abuse $\times \mathbb{1}\{\text{age} < 26\}$	-74.200***	-34.610*	-33.530*	0.025***	0.011	0.010	0.012***	0.006**	0.007***	0.009***	0.002*	0.002*
	(9.561)	(17.520)	(17.990)	(0.003)	(0.006)	(0.006)	(0.003)	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)
State FE	X	X	X	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X	X	X	X	X
Substance abuse policies		X	X		X	X		X	X			
Maternal/child characteristics			X			X			X			X
N	13,253,697	13,253,697	13,202,267	13,253,697	13,253,697	13,202,267	13,020,886	13,020,886	12,986,274	9,459,004	9,459,004	9,435,384

Source: National Vital Statistics natality data, 1985–1995

Notes: Subsample of states with a punitive substance abuse policy. Unconditional dependent variable means are reported in brackets. Standard errors clustered at the state level are reported in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Difference-in-differences, live births among women ages 15 to 44, 1985–1995

	Prenatal care								
	Any prenatal care [97.9 percent]			First trimester prenatal care [77.8 percent]			Number prenatal care visits [11.0 visits]		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Civil child abuse	-0.0178	-0.0203	-0.0190	-0.00692	-0.00160	-0.00376	-0.280	-0.316	-0.276
	(0.0111)	(0.0154)	(0.0140)	(0.0203)	(0.0144)	(0.0137)	(0.346)	(0.389)	(0.371)
Civil commitment		-0.00241	-0.000754		0.000774	0.00425		0.0883	0.0860
		(0.0162)	(0.0130)		(0.0153)	(0.0110)		(0.329)	(0.291)
Mandatory reporting		-0.0104	-0.0117*		-0.0432***	-0.0577***		-0.455**	-0.520**
		(0.00732)	(0.00646)		(0.0102)	(0.0111)		(0.184)	(0.175)
Substance abuse treatment		0.00924	0.00739		0.0108	-0.000852		0.297	0.225
		(0.0121)	(0.00983)		(0.00973)	(0.00760)		(0.252)	(0.197)
Age 15 to 17			-0.0123***			-0.162***			-1.080***
			(0.00134)			(0.0154)			(0.262)
Age 18 to 25			-0.0107***			-0.109***			-0.780***
			(0.00119)			(0.00884)			(0.154)
High school			0.0105***			0.0642***			1.039***
			(0.00193)			(0.00251)			(0.107)
Some college			0.0167***			0.105***			1.361***
			(0.00265)			(0.00459)			(0.130)
College			0.0152***			0.123***			1.202***
			(0.00316)			(0.00810)			(0.131)
Black			-0.00384**			-0.0358***			-0.580***
			(0.00191)			(0.00892)			(0.153)
Other race			-0.00209			-0.0830***			-0.981***
			(0.00225)			(0.0181)			(0.181)
Married			0.0225***			0.128***			1.338***
			(0.00128)			(0.00173)			(0.0903)
Number of live births			-0.00776***			-0.0449***			-0.564***
			(0.000218)			(0.00244)			(0.0441)
Metro status			-0.00443***			0.0241***			0.0772
			(0.000907)			(0.00489)			(0.0660)
Male			-3.86e-05			-0.00257***			-0.0351***
			(9.96e-05)			(0.000316)			(0.00317)
Plural birth			0.00378***			0.0448***			1.411***
			(0.000443)			(0.00149)			(0.0422)
State FE	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X	X
N	13,049,444	13,049,444	13,020,204	12,700,055	12,700,055	12,673,898	12,821,999	12,821,999	12,795,365

Source: Vital Statistics natality data, 1985-1995

Notes: Subsample of states with a punitive substance abuse policy. Unconditional dependent variable means are reported in brackets. Standard errors clustered at the state level are reported in parentheses.

* p < 0.10, ** p < 0.05, *** p < 0.01

Table 8: Difference-in-differences, live births among women ages 15 to 25, 1985–1995

	Prenatal care								
	Any prenatal care [97.1 percent]			First trimester prenatal care [68.8 percent]			Number prenatal care visits [10.3 visits]		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Civil child abuse	-0.025*	-0.029	-0.027	-0.008	0.003	0.002	-0.401	-0.457	-0.400
	(0.015)	(0.020)	(0.019)	(0.026)	(0.016)	(0.015)	(0.407)	(0.460)	(0.435)
Civil commitment		-0.003	-0.001		-0.027	-0.011		0.062	0.178
		(0.021)	(0.018)		(0.018)	(0.014)		(0.401)	(0.358)
Mandatory reporting		-0.014	-0.015		-0.055***	-0.068***		-0.537**	-0.573**
		(0.010)	(0.010)		(0.012)	(0.013)		(0.220)	(0.211)
Substance abuse treatment		0.015	0.013		0.012	0.004		0.396	0.352
		(0.016)	(0.014)		(0.014)	(0.012)		(0.315)	(0.258)
Age 15 to 17			-0.005***			-0.075***			-0.442***
			(0.000)			(0.008)			(0.102)
High school			0.014***			0.071***			0.926***
			(0.003)			(0.003)			(0.097)
Some college			0.020***			0.123***			1.286***
			(0.004)			(0.006)			(0.141)
College or more			0.013**			0.108***			0.908***
			(0.005)			(0.011)			(0.130)
Black			-0.002			-0.035***			-0.590***
			(0.002)			(0.011)			(0.157)
Other race			-0.005			-0.091***			-1.119***
			(0.003)			(0.022)			(0.221)
Married			0.027***			0.151***			1.339***
			(0.002)			(0.003)			(0.076)
Number of live births			-0.012***			-0.053***			-0.733***
			(0.001)			(0.003)			(0.033)
Metro status			-0.007***			0.018***			0.016
			(0.001)			(0.007)			(0.056)
Male			0.000			-0.004***			-0.033***
			(0.000)			(0.000)			(0.004)
Plural birth			0.006***			0.056***			1.177***
			(0.001)			(0.002)			(0.052)
State FE	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X	X
N	6,134,026	6,134,026	6,116,689	5,914,529	5,914,529	5,898,952	6,012,033	6,012,033	5,996,261

Source: Vital Statistics natality data, 1985-1995
Notes: Subsample of states with a punitive substance abuse policy. Unconditional dependent variable means are reported in brackets. Standard errors clustered at the state level are reported in parentheses.
* p < 0.10, ** p < 0.05, *** p < 0.01

Table 9: Difference-in-differences and triple-difference, 1985–1995

	Prenatal care								
	Any prenatal care [97.1 percent]			Number prenatal care visits [10.3 visits]			First trimester prenatal care [68.8 percent]		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A. Difference-in-differences, mothers ages 15 to 25									
Civil child abuse	-0.025*	-0.029	-0.027	-0.401	-0.457	-0.400	-0.008	0.003	0.002
	(0.015)	(0.020)	(0.019)	(0.407)	(0.460)	(0.435)	(0.026)	(0.016)	(0.015)
State FE	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X	X
Substance abuse policies		X	X		X	X		X	X
Maternal/child characteristics			X			X			X
N	6,134,026	6,134,026	6,116,689	5,914,529	5,914,529	5,898,952	6,012,033	6,012,033	5,996,261
Panel B. Triple-difference, mothers ages 15 to 44									
Civil child abuse $\times \mathbb{1}\{\text{age} < 26\}$	-0.0333***	-0.0246**	-0.0235**	-0.886**	-0.667	-0.648	-0.0290***	-0.0156	-0.0180*
	(0.00771)	(0.0114)	(0.0104)	(0.336)	(0.387)	(0.396)	(0.00987)	(0.00959)	(0.0109)
State FE	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X	X
Substance abuse policies		X	X		X	X		X	X
Maternal/child characteristics			X			X			X
N	13,049,444	13,049,444	13,020,204	12,700,055	12,700,055	12,673,898	12,821,999	12,821,999	12,795,365

Source: National Vital Statistics natality data, 1985–1995

Notes: Subsample of states with a punitive substance abuse policy. Unconditional dependent variable means are reported in brackets. Standard errors clustered at the state level are reported in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A1: Summary statistics among ages 15 to 44, 1985–1995

	Mean	Std. Dev.	Min	Max
Outcomes				
Birth weight (grams)	3341.580	601.971	227	8164
Low birth weight (< 2500 grams)	0.070	0.255	0	1
Early gestation (< 36 weeks)	0.070	0.256	0	1
Low Apgar score (< 7)	0.016	0.124	0	1
Any prenatal care	0.979	0.144	0	1
Number prenatal care visits	10.960	4.266	0	49
First trimester prenatal care	0.778	0.416	0	1
Substance abuse policies				
Civil child abuse	0.201	0.389	0	1
Civil commitment	0.031	0.170	0	1
Mandatory reporting	0.178	0.371	0	1
Substance abuse treatment	0.160	0.353	0	1
Maternal characteristics				
Age 15 to 17	0.049	0.217	0	1
Age 18 to 25	0.421	0.494	0	1
Age 26 to 44 *(omitted)*	0.529	0.499	0	1
Less than high school *(omitted)*	0.201	0.401	0	1
High school	0.339	0.474	0	1
Some college	0.187	0.390	0	1
College or more	0.273	0.445	0	1
White *(omitted)*	0.798	0.402	0	1
Black	0.173	0.378	0	1
Other race	0.029	0.169	0	1
Married	0.739	0.439	0	1
Number of live births	1.013	1.180	0	30
Metro status	0.803	0.398	0	1
Child characteristics				
Male	0.512	0.500	0	1
Plural birth	0.023	0.150	0	1
N	13,268,856			

Source: National Vital Statistics natality data, 1985–1995
Notes: Subsample of states with a punitive substance abuse policy.