



## OPEN Punitive state policies targeting alcohol use during pregnancy and alcohol consumption among pregnant women

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This study aimed to determine whether punitive state alcohol policies targeting pregnant women who drink alcohol are associated with decreased alcohol consumption among pregnant women over time. This study used data from the Pregnancy Risk Assessment Monitoring System (15 states) between 1990 and 2015. A difference-in-difference (DiD) approach was employed to determine whether passage of state laws changed alcohol consumption rates among pregnant women, while controlling for state and time fixed effects. The study specifically examined punitive state alcohol policies that clarify the admissibility of evidence in child welfare proceedings related to prenatal alcohol exposure, focusing on allegations of child abuse, child neglect, child deprivation, or child dependence, as well as proceedings seeking termination of parental rights. Punitive state alcohol policies were not significantly associated with decreased rates of alcohol consumption among pregnant women (+1.54%, 95% CI, -1.47-4.55), within 3 years of implementation. State alcohol policies that adopted a punitive stance toward pregnant women who drink alcohol did not result in the reduction of drinking during pregnancy. Given that punitive policies may not effectively reduce alcohol consumption during pregnancy, our findings highlight the need for reevaluation and potential reform to better address maternal/child health outcomes.

**Keywords** Alcohol, Pregnancy, Addiction, Policy, Punitive

The U.S. Centers for Disease Control and Prevention (CDC) advises all women of reproductive age to “avoid alcohol unless they are using contraception”<sup>1</sup>. Against this backdrop of public health advice, there has been increasing concern regarding restrictions placed on women’s reproductive rights. Some scholars have argued that rather than improving public health, certain policies targeting alcohol use during pregnancy may have the primary goal of paternalistically restricting women’s reproductive rights<sup>2</sup>.

Currently, an estimated 15–20% of women in the United States (US) are believed to consume alcohol during pregnancy<sup>3</sup>. It is undeniable that prenatal alcohol exposure increases the risk of lifelong disabilities and birth defects, such as fetal alcohol spectrum disorders and adverse birth-related outcomes including stillbirth, preterm birth, and low birthweight<sup>4</sup>. However, few studies have attempted to evaluate whether state-level alcohol and pregnancy policies have their intended effects (i.e., reducing drinking during pregnancy); and until recently, such policies received little media or public attention<sup>5</sup>.

Yet the number of states with policies targeting alcohol use during pregnancy have steadily increased between 1974 ( $n = 1$ ) to 2013 ( $n = 43$ )<sup>5</sup>, with more states adopting “punitive” policies that seek to punish pregnant women’s behaviors<sup>5</sup>. In fact, punitive policies (i.e., policies that initiate child welfare proceedings in the case of prenatal alcohol exposure as it pertains to allegations of child abuse or child neglect, as well as proceedings seeking termination of parental rights), are more common than “supportive” policies (i.e., policies mandating priority access to public and private treatment for substance use disorder or alcohol addiction, especially among postpartum women who misuse or are addicted to alcohol).

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Multiple medical associations including the American Medical Association, American College of Obstetricians and Gynecologists, and American Academy of Pediatrics, have spoken out about the potential for punitive and stigmatizing policies to deter individuals from receiving necessary prenatal care (PNC) and/or substance use disorder treatment<sup>6</sup>. For example, in a recent study of women with substance use disorders, it was found that women who delivered in states with punitive policies involving child welfare involvement for substance use during pregnancy were less likely to receive adequate PNC, possibly due to fears of detection, legal consequences, and/or loss of infant custody<sup>6</sup>.

Furthermore, some scholars believe that punitive alcohol policies have the primary goal of restricting women's reproductive rights, rather than reducing alcohol-related harms in the population<sup>5</sup>. There is a need to directly address the question of whether these alcohol policies, especially in terms of their punitive or supportive environment, are likely to reduce the harms from prenatal alcohol exposure<sup>5,7</sup>.

## Methods

### Data sources

We obtained individual data on drinking during the last 3 months of pregnancy from the Pregnancy Risk Assessment Monitoring System (PRAMS). PRAMS was created in 1987 as part of an initiative by the CDC to collect population-based data on the health of mothers and infants around the US<sup>8</sup>. Currently, PRAMS covers more than 80% of births in the country, and includes 47 states, the District of Columbia, New York City, Puerto Rico, and the Great Plains Tribal Chairman's Health Board<sup>8</sup>.

For data collection, each state must follow a standardized protocol and gather information on women in their state, who have given birth to a live-born infant in the last 2–6 months<sup>8</sup>. To enhance response rates, a “mixed-model” (mail and telephone) method is employed by local healthcare workers that make use of telephone databases (e.g., newborn screening and immunization programs and the Special Supplemental Nutrition Program for Women, Infants, and Children) to contact candidates for interviews<sup>8</sup>. The mail questionnaire (14 pages; 20 min) and phone interview (25–30 min) both contain identical questions about sociodemographic characteristics (e.g., household income, physical abuse, health insurance coverage etc.) and pregnancy/birth-related topics (e.g., pregnancy intention, fertility treatment, health conditions during pregnancy, prenatal counseling etc.)<sup>8</sup>. An informed consent document is read verbally over the phone, or included in survey packets for written interviews; with various rewards ranging from gift cards to baby-items (e.g. t-shirt, sippy cup, tote bag, toothbrush) sent to respondents upon survey completion<sup>8</sup>. The Harvard T.H. Chan School of Public Health IRB approved analyses of these secondary data (Protocol #: IRB21-1261), and all research was performed in accordance with the Declaration of Helsinki.

## Measures

### State policy categories

Our study looked at the implementation of *punitive policies* that involve child welfare when it comes to women who consume alcohol during pregnancy; and define prenatal alcohol exposure as pertaining to allegations of child abuse or child neglect, or proceedings seeking termination of parental rights. In this study, punitive policies were specifically limited to those involving **Legal Significance for Child Abuse/Child Neglect**, which includes laws clarifying how prenatal alcohol exposure is managed in child welfare proceedings concerning allegations of child abuse, child neglect, child deprivation, or child dependence, as well as those related to termination of parental rights. This definition, as well as the data for all laws were as based on the guidelines provided by the National Institute for Alcohol Abuse and Alcoholism Alcohol Policy Information System (APIS)<sup>9</sup>, from the APIS website ([www.alcoholpolicy.niaaa.nih.gov](http://www.alcoholpolicy.niaaa.nih.gov)).

We intentionally excluded **Reporting Requirements**, which pertain to laws mandating or permitting the reporting of alcohol use during pregnancy by various parties, such as law enforcement, healthcare professionals, or social workers, for purposes like data gathering, referral for assessment or treatment, or referral to child welfare agencies. We also excluded **Limitations on Criminal Prosecution**, which involve the use of medical test results in criminal cases, and **Civil Commitment laws**, which concern the involuntary commitment of pregnant women for treatment or protective custody of the fetus. Additionally, we excluded **Priority Treatment** laws that mandate priority access to substance abuse treatment for pregnant and postpartum women who abuse alcohol. This focused approach was chosen to concentrate on punitive policies that directly impact child welfare decisions, thereby avoiding confusion with other legal processes related to reporting, criminal prosecution, civil commitment, or treatment prioritization. This approach aims to highlight the need for potential reform in child welfare policies to improve maternal and child health outcomes.

The data for all laws were States without sufficient years of data for release by the CDC, and/or inadequate information regarding state alcohol policy implementation were removed from our analyses. 15 states could be used in our final analyses as they provided PRAMS data for multiple years before and after alcohol policy implementation (+/- 3 years); for example, Texas implemented a punitive policy in 1997, but only provided PRAMS data from 2009 to 2010, so could not be included in our sample.

### Alcohol consumption during pregnancy

From 1990 to 2015 PRAMS asked all women to report whether or not they had consumed any alcohol in the last 3 months of pregnancy. Women who reported ‘yes’ to this question, were categorized as pregnant women who consumed alcohol; ‘no’ to this question, non-drinkers. From 1990 to 2015, PRAMS asked women to report whether they had consumed any alcohol during the last three months of their pregnancy. This timeframe was specifically chosen to capture recent alcohol use close to the time of delivery, reflecting potential impacts on both maternal and fetal health, there is no known safe amount of alcohol use during pregnancy, nor is there a safe

time for alcohol consumption during pregnancy. By focusing on this period, PRAMS sought to minimize recall bias and provide a clear picture of alcohol use in a critical period. Women who answered ‘yes’ were classified as having consumed alcohol during pregnancy, while those who responded ‘no’ were categorized as non-drinkers.

### Difference-in-differences (did) estimation

DiD., a quasi-experimental research design that makes use of longitudinal data from treatment and control groups to obtain a counterfactual to estimate causal effect of interventions<sup>10</sup>, was employed in our analyses to determine the effect of an alcohol-policy intervention on the drinking rates of pregnant women residing in states with these laws. In our model, we used the following regression equation to obtain an average treatment effect on the treated (ATET), using equation:

$$y_{ist} = \alpha_i + \gamma t + z_{ist}\beta + D_{st}\delta + \varepsilon_{ist}$$

where  $i$  denotes the individual,  $s$  the state, and  $t$  the periods before and after policy implementation. While  $\alpha_i$  (individual effects) and  $\gamma t$  (time effects) were fixed,  $D_{st}$  denotes the drinking % rates that vary at different groups (i.e. case and control states) and time levels, because different states implemented their alcohol policy in different years (e.g., Oklahoma 2000; Colorado 2004).  $\varepsilon_{ist}$  is the error term which indicates the uncertainty of our model, and is a residual variable for lack of perfect goodness of fit<sup>11</sup>.

Between the study period from 1990 to 2015, we examined alcohol consumption rates among pregnant women in states where each policy was implemented – these women were part of the ‘treatment’ group. Women in other states where no policy was implemented in the related time period were the ‘control’ group. All state and time fixed effects were controlled for in our DiD model.

An unconditional parallel trends assumption was used to estimate the effect of implementing each policy on pregnancy drinking rates. For each policy, average treatment effects were reported with 95% confidence intervals, and pre-treatment estimates were used to “pre-test” parallel trends and treatment estimates upon post-policy implementation. All codes for implementing this approach were found in STATA and the R DiD package by Callaway and Sant’Anna (2021), designed to identify and estimate average effects of certain interventions that allow for multiple periods and variation in implementation timing<sup>12</sup>.

## Results

Summary statistics for state characteristics are provided in Table 1. Overall, 92.1% of the population did not consume alcohol during pregnancy, while 7.9% did. Women over the age of 35 were most likely to consume alcohol in the last three months of pregnancy (13.6%), relative to other age groups. Non-Hispanic Black women were the least likely racial group to consume alcohol during pregnancy (7.3%). Women with a bachelor’s degree or more (11.8%), the uninsured or self-payer (13.1%), women with adequate prenatal care (12.4%), and women living in Colorado (12.2%), or New York (11.9%) had higher rates of pregnancy drinking than their counterparts.

As seen in Table 2, punitive state alcohol policies were not significantly associated with decreased rates of alcohol consumption among pregnant women (+ 1.54%, 95% CI, -1.47-4.55), within 3 years of implementation. A parallel trends tests for this interaction was not statistically significant (p-value=0.26), and implied that pre-intervention trends for cases and control states were similar.

## Discussion

### Principal results

Our results suggest that punitive policies that use coercion to compel behavioral change among pregnant women may not be effective in decreasing alcohol consumption among pregnant women. While there may be short-term decreases in alcohol consumption in the initial period of implementation for states that implement a reporting policy, any effect may erode over time as such stigmatizing and punitive policies discourage pregnant women from disclosing alcohol use. This is concerning as state-level policy environments are becoming increasingly punitive; with the number of states that define prenatal alcohol use as “child abuse/neglect” increasing by 40% in recent years<sup>5</sup>.

Previous studies have found that punitive policies related to alcohol use may lead to delays in entering treatment, which result in the impediment of successful treatment completion among pregnant women, and ultimately, become barriers to treatment for pre/post-natal care<sup>3</sup>. Other studies have also found that such policies have no statistically significant effect on alcohol use by women during pregnancy<sup>13</sup>. Scholars have emphasized that criminal justice-focused policies may only be effective when used in combination with other provisions – e.g., medication-assisted treatment, care from friends or family members, alleviation of fear about being reported to authorities, and cross-sector policy engagement -- will there be a positive effect on pregnancy admissions<sup>14</sup>.

### Limitations

Our findings must be considered in the context of several limitations. First, because of the nature of our investigation and the PRAMS dataset, there is potential for underreporting of alcohol use during pregnancy due to fear of repercussions and/or recall bias. However, a previous study of the PRAMS dataset to investigate pregnancy intentions among pregnant women who use drugs, stated that because of the “confidential nature” of PRAMS, many women are likely to “report exposures or habits that they may otherwise not report due to stigma or bias” in other circumstances<sup>15</sup>.

Second, unlike studies of substance abuse among pregnant women using the PRAMS dataset, we only had limited data on a small number of states ( $n=15$ ) that provided information on both pre-/and post-policy alcohol consumption rates within our study period. Furthermore, since Phase 8 (2016-), PRAMS has stopped

	None	Alcohol Consumption				
		Pre-Pregnancy		Last 3 months		p-value
		n	%	n	%	
<b>Maternal level</b>						
<i>Age</i>						
19 or less	37,255	8497	22.8	2011	5.4	<0.0001
20–24	72,433	22,425	31.0	4673	6.5	
25–29	70,297	23,083	32.8	5637	8.0	
30–34	52,218	18,496	35.4	6089	11.7	
35 or more	29,705	9743	32.8	4045	13.6	
<i>Race/ethnicity</i>						
Non-Hispanic white	116,120	37,077	31.9	9298	8.0	<0.0001
Non-Hispanic black	34,982	6854	19.6	2553	7.3	
Hispanic	22,162	3975	17.9	1788	8.1	
Other or unknown	88,644	34,338	38.7	8816	9.9	
<i>Education Level</i>						
High school or less	52,083	11,639	22.3	4321	8.3	<0.0001
High school grad/GED	92,255	28,097	30.5	6891	7.5	
Some college, no degree	60,477	20,858	34.5	4591	7.6	
Bachelors or more	51,698	19,867	38.4	6098	11.8	
Other or unknown	5395	1783	33.0	554	10.3	
<i>Primary payer</i>						
Public	19,544	4357	22.3	1349	6.9	<0.0001
Private	19,025	5949	31.3	2196	11.5	
Uninsured or self-pay	1579	322	20.4	207	13.1	
Other or unknown	221,760		0.0	18,703	8.4	
<i>Marital status</i>						
Married	93,825	29,435	31.4	8165	8.7	0.1067
Single/other	168,083	52,809	31.4	14,290	8.5	
<i>Kessner Index for Care</i>						
Inadequate	229,322	72,374	31.6	18,904	8.2	<0.0001
Adequate	17,703	4884	27.6	2187	12.4	
Other or unknown	14,883	4986	33.5	1364	9.2	
<b>State Level</b>						
<i>Punitive policy</i>						
Yes	159,622	19,539	12.2	13,773	8.6	0.25
No	102,286	62,705	61.3	8682	8.5	
<i>Reporting policy</i>						
Yes	139,659	32,210	23.1	11,513	8.2	<0.0001
No	122,249	50,034	40.9	10,942	9.0	
<i>Priority treatment</i>						
Yes	125,488	35,392	28.2	10,988	8.8	0.0033
No	136,420	46,852	34.3	11,467	8.4	
<i>State</i>						
Alabama	17,568	4857	27.6	1046	6.0	<0.0001
Alaska	32,960	12,005	36.4	3058	9.3	
Arkansas	24,238	4875	20.1	1513	6.2	
Colorado	29,962	8923	29.8	3647	12.2	
Florida	10,067	4060	40.3	988	9.8	
Georgia	12,673	3776	29.8	1381	10.9	
Illinois	2915	1317	45.2	277	9.5	
Michigan	6086	2873	47.2	661	10.9	
New Mexico	810	344	42.5	54	6.7	
New York	20,876	7447	35.7	2490	11.9	
North Dakota	6087	1815	29.8	362	5.9	
Oklahoma	49,260	14,464	29.4	3249	6.6	
Continued						

	None	Alcohol Consumption				p-value
		Pre-Pregnancy		Last 3 months		
		n	%	n	%	
South Carolina	23,064	5741	24.9	1786	7.7	
Washington	11,429	4804	42.0	884	7.7	
West Virginia	13,913	4943	35.5	1059	7.6	
Total	261,908	82,244	100.00	21,396	100.00	

**Table 1.** Characteristics of pregnant women in sample (PRAMS 1990–2015).

DID Estimate					
	Adjusted % Change	Standard Error	95% CI		p-value
Punitive Laws (Child Welfare Involvement)	1.54	1.50	-1.47	- 4.55	0.31

**Table 2.** Pregnancy drinking net % change after policy implementation.

asking individuals about their pregnancy drinking behavior in the last three months. Moreover, there was no data available regarding pregnancy drinking rates in the early trimesters of pregnancy, even though the first trimester of pregnancy is the most important risk period for effects on the fetus when it comes to maternal alcohol consumption<sup>16</sup>. Considering that there have been sharp increases in alcohol consumption rates during the pandemic, future studies would benefit from gathering longitudinal data on these variables for further investigation.

## Conclusions

We found no evidence to support the effectiveness of punitive policies targeting alcohol consumption among pregnant women. Given the prevalence of alcohol use among women of reproductive age, there is a pressing need to enhance treatment accessibility, dismantle unwarranted stigma and obstacles, and implement more effective policies to prevent alcohol consumption during pregnancy. It appears that punitive state measures may not effectively deter prenatal alcohol use and could instead be correlated with unnecessary parental rights termination, while pregnant women may face persecution for child abuse without receiving the necessary support to overcome their alcohol use disorder. This approach could ultimately victimize rather than address the underlying issues. Our results underscore the importance of reassessing and potentially revising these policies to better address the health outcomes of mothers and children. Previous research suggests that policies targeting prenatal alcohol consumption could benefit from adopting non-punitive strategies that prioritize education, access to healthcare, and equitable treatment.

## Data availability

PRAMS data is available by request/approval to conduct original research and analysis. All data requests regarding access to the data should be made to the PRAMS Data Governance Board directly.

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### Author contributions

Analyzed the data and wrote the draft: S.S.O., I.K.; Revised the manuscript: B.K., M.M.A., J.P., E.C.P.; Designed the research proposal and revised the manuscript: B.K., I.K.; all authors read and approved the final manuscript.

### Declarations

### Competing interests

The authors declare no competing interests.

### Additional information

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