Impact of Medicaid Pregnancy Dental Benefits on Prenatal Dental Utilization and Birth Outcomes*

Anwar Assamidanov† Xuechao Qian† Tim Bruckner†
Maria Steenland‡ Richard Manski‡ Brandy Lipton†

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Abstract

Despite elevated risks for oral health problems, more than half of pregnant women do not visit the dentist at least once during pregnancy. The Medicaid program covers more than 40% of US births and represents an important source of pregnancy dental coverage. We examine the effects of state-level pregnancy dental benefits using a difference-in-differences approach and data from the 2012-2019 Pregnancy Risk Assessment and Monitoring System (PRAMS). We find that providing dental coverage to pregnant Medicaid recipients increases dental cleaning rates by 7.16 percentage points, or 29% relative to baseline. We also examine linked birth certificate data given evidence that poor oral health during pregnancy is associated with adverse pregnancy and birth outcomes. We find evidence of reductions in small for gestational age and very low birth weight, though results are somewhat sensitive to specification and data source. An analysis of mechanisms suggests that Medicaid dental benefits increase rates of pregnancy dental insurance, increase receipt of dental counseling, and improve self-reported general health status.

JEL Codes: I13, I14, I18, J13

Keywords: Medicaid, Dental coverage, Pregnancy, Birth outcomes

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†UC Irvine Joe C. Wen School of Population & Public Health

‡University of Maryland

1 Introduction

Poor oral health during pregnancy may have long term implications for the oral and overall health of expectant mothers and their children (Dye et al., 2011; Ide & Papapanou, 2013; Jeffcoat et al., 2014; Chaffee et al., 2014; Iheozor-Ejiofor et al., 2017; Nasseh et al., 2017). Oral health problems can cause pain that interferes with eating, speaking, and overall quality of life (Naito et al., 2006; CDC, 2024a). Moreover, poor oral health has been linked to systemic health conditions including cardiovascular disease (Oliveira et al., 2010; Sanz et al., 2020), diabetes (Díaz-Romero et al., 2005; Chee et al., 2013; Nasseh et al., 2017), respiratory conditions (Manger et al., 2017), and adverse pregnancy and birth outcomes (Jeffcoat et al., 2014; Puertas et al., 2018). Despite elevated risks for oral health problems during pregnancy and the availability of effective interventions to address these issues, more than half of pregnant people do not visit the dentist at least once during pregnancy (Kranz & Estrada-Darley, 2022; Lee et al., 2022b), including more than one-third who report experiencing dental problems (Lee et al., 2022b).

Medicaid finances more than 40% of US births and therefore represents an important lever for improving maternal and infant health outcomes (KFF, 2023). Federal law requires coverage of certain services such as hospital and prenatal care, but there is no federally-set minimum coverage requirement for pregnancy dental services. All states currently offer emergency dental services to pregnant enrollees (i.e., tooth extractions), and most states offer some additional non-emergency services (for State Health Policy, 2022). Coverage of preventive and restorative services such as dental cleanings and fillings has varied over time with at least 12 states adding these benefits since 2012.[1] As an optional benefit, states may also elect to reduce pregnancy dental benefits given budgetary challenges or changes in leadership. State-level changes in pregnancy dental benefits provide an opportunity to study how Medicaid program benefit design influences maternal health behaviors and perinatal outcomes.

In this paper, we examine the effects of Medicaid pregnancy dental benefits using 2012-2019 data from the Pregnancy Risk Assessment Monitoring System (PRAMS). Our main analysis uses a stacked difference-in-differences approach to account for variation in policy timing and an enhanced dataset compiled via direct state data release requests. We match the month and year of policy implementation with birth dates to define policy exposure. Our primary outcome is reported receipt of a dental cleaning during pregnancy. Given evidence that poor oral health is associated with worse birth outcomes, we also use linked birth certificate data to examine preterm birth, small for gestational age (10th percentile), low birth weight (under 2500 grams), and very low birth weight (under 1500 grams).

We find that exposure to Medicaid dental benefits during pregnancy significantly

[1] Based on authors' review of multiple sources.

increases dental cleaning rates by 7.2 percentage points, representing about a 29% increase relative to the baseline rate (25%). We also find suggestive evidence of reductions in adverse birth outcomes, including statistically significant reductions in small for gestational age (1.2 percentage point decrease) and very low birth weight (0.5 percentage point decrease). Results using aggregate monthly state-level data from CDC Wonder are qualitatively consistent, though we find a statistically significant reduction in low birth weight (3% reduction) and a non-significant reduction in very low birth weight. Subgroup analyses suggest that most groups experience an increase in dental cleanings with few statistically significant differences.

To account for possible correlation in exposure to pregnancy and pre-conception Medicaid dental benefits, we consider two extensions to our main model. First, we control for exposure to non-pregnancy dental benefits in the year before conception. Second, since pregnancy Medicaid eligibility limits are often substantially higher than eligibility limits for other adults, we replicate our main analysis after excluding women most likely to qualify for non-pregnancy Medicaid coverage. Our estimates for the impacts of pregnancy dental benefits on dental cleanings during pregnancy are very consistent across these specifications. We also continue to observe evidence of reductions in adverse birth outcomes, though in some instances estimates are attenuated. Interestingly, non-pregnancy dental benefits are associated with borderline significant reductions in small for gestational age and preterm birth suggesting a possible role for earlier treatment of oral health problems.

Event study analyses generally do not indicate a violation of the parallel trends assumption for most outcomes. Results are also generally robust across multiple sensitivity checks such as varying the event window in stacked difference-in-differences models, including births during the COVID-19 pandemic, estimating two-way-fixed effects models, excluding each treatment state in turn, and alternative ways of defining the sample. However, in some instances, results for some birth outcomes lose statistical significance.

In terms of mechanisms, we find that Medicaid pregnancy dental benefits increase rates of dental insurance by 13.5 percentage points. Furthermore, women who gain pregnancy dental benefits are more likely to report receiving counseling on how to care for their teeth and gums. We also investigate potential spillovers to broader maternal health behaviors and find no evidence of changes in prenatal care use or maternal smoking.

A number of quasi-experimental analyses have examined the effects of Medicaid dental benefits, finding increases in dental visits and improvements in oral health (see for example, Choi (2011); Decker & Lipton (2015); Semprini et al. (2024)), reductions in emergency department visits (Singhal et al., 2015; Elani et al., 2020a; Ranade et al., 2025), and supply-side responses (Buchmueller et al., 2016; Huh, 2021). While less

extensive, research has also examined the impacts of other optional Medicaid benefits such as routine vision, smoking cessation, and abortion services (Lipton & Decker, 2015; Kostova et al., 2018; Kim et al., 2025). Despite the importance of dental care during pregnancy, quasi-experimental evidence examining Medicaid pregnancy dental benefits is limited. We are only aware of one analysis that focuses on a single state (Naavaal & Harless, 2022). Moreover, we are not aware of any prior research examining impacts on birth outcomes. We provide new evidence on this question using rigorous methods and multi-state policy variation, conducting a battery of sensitivity tests, examining birth outcomes using the PRAMS and CDC Wonder data, and identifying potential mechanisms.

More broadly, research has shown that expanding Medicaid eligibility and program generosity increase coverage and prenatal care use during pregnancy with mixed evidence on infant health outcomes (Currie & Gruber, 1996; Howell, 2001; Sonchak, 2015; Wherry et al., 2017; Wherry, 2018; Saygili & Bayindir, 2024). This paper contributes to this line of research by focusing on access to a specific type of prenatal care.

2 Background and Mechanisms

2.1 Pregnancy and Oral Health

In a national consensus statement, the Oral Health Care During Pregnancy Expert Workgroup recommended that pregnant people receive prenatal dental care, but pregnant people are less likely to visit the dentist (44%) than reproductive-age people who are not pregnant (65%) (CareQuest Institute for Oral Health, 2023). Moreover, non-Hispanic Black women are less likely to visit the dentist during pregnancy than non-Hispanic White women, and Medicaid-enrolled pregnant people are less likely to visit the dentist than those with private insurance (Lee et al., 2022b).

Oral health problems are common among pregnant people (CDC, 2024b). Hormone fluctuations during pregnancy increase the risk of developing gingivitis, a mild form of gum disease affecting up to three-quarters of pregnant people (Figuero et al., 2013; CDC, 2024b). If left untreated, gingivitis can progress to periodontitis, causing damage to the gums and bone that may lead to tooth loss. Pregnant people are also more susceptible to tooth decay given changes in eating and oral hygiene habits (e.g., reduced tooth brushing and flossing) (Boggess et al., 2010; Hunter & Yount, 2011). Poor oral hygiene and the presence of gum disease during early pregnancy are highly predictive of gum disease in later pregnancy (Gil-Montoya et al., 2023). Moreover, intervention studies suggest nonsurgical periodontal therapy is highly effective in resolving symptoms among pregnant people (Bobetsis et al., 2020; Kaur et al., 2014; Michalowicz et al., 2006).

Poor oral health during pregnancy may increase inflammation, worsening systemic

health and negatively affecting the fetal environment (Figuero et al., 2020; Horton et al., 2008; Madianos et al., 2013; Offenbacher et al., 2006). Furthermore, periodontal pathogens have been identified in the placenta and amniotic fluid, allowing for the possibility of direct impacts of maternal oral infection on infant health (Bobetsis et al., 2020). Despite a large body of research examining these impacts, evidence on the relationship between maternal oral health and infant health outcomes remains mixed and uncertain.

Most observational studies find that maternal periodontal disease is associated with higher risks of preterm delivery and low birth weight (de Oliveira et al., 2021; Lee et al., 2022c; Uwambaye et al., 2021; Castaño-Suárez et al., 2024). Moreover, there is some evidence that receiving routine dental care during pregnancy is associated with outcome improvements (Lee et al., 2025). Magnitudes vary with some research indicating that the odds of preterm birth are as much as two to six times higher among women with periodontitis compared to those without, while other findings are significant but more modest (Lee et al., 2022c; Uwambaye et al., 2021; de Oliveira et al., 2021). Retrospective cohort studies using linked medical and dental claims also indicate that treatment for periodontal disease at baseline precedes lower healthcare costs, including a large, 74% reduction in spending on atypical pregnancy care (Nasseh et al., 2017; Jeffcoat et al., 2014).

By contrast, results from randomized controlled trials (RCTs) examining the impacts of periodontal intervention during pregnancy are mixed. A recent systematic review and meta-analysis concluded that periodontal intervention was associated with reductions in the inflammatory marker C-reactive protein and preterm deliveries with no significant impacts on other birth outcomes (Orlandi et al., 2022). Overall, periodontal intervention reduced the risk of preterm birth by 23% (Orlandi et al., 2022). However, high-quality multi-center RCT evidence has generally failed to find an impact (Bobetsis et al., 2020; Michalowicz et al., 2006). Periodontal interventions generally occurred during the second or third trimester of pregnancy in this research. We are not aware of RCT evidence where the intervention occurred before conception or during the first trimester, which leaves open the possibility that earlier treatment may be more effective. Furthermore, impacts may differ by population characteristics including socioeconomic status and geographic region. Our analysis complements existing evidence by examining a larger, geographically dispersed, Medicaid-insured population and focusing on policy impacts. We also assess the potential impacts of exposure to pre-conception Medicaid dental benefits in an extension to our main analysis.

2.2 Medicaid Dental Benefits

Medicaid is the single largest health insurer in the United States covering 70.5 million people as of June 2025 (KFF, 2025). All states must provide preventive and restorative dental services to enrollees up to age 20 under the Early and Periodic, Screening, Diagnostic, and Treatment benefit (Centers for Medicare & Medicaid Services, 2024). However, dental services for adults ages 21 and older are an optional benefit provided at the state's discretion.[2] States may also opt to provide different dental benefit packages to pregnant and non-pregnant adults. Overall, many states provide more generous dental benefits during pregnancy (for State Health Policy, 2022).

Recent correlational research suggests that Medicaid dental coverage is associated with increases in dental care utilization among pregnant people (Robison et al., 2021; Lee et al., 2022a). One cross-sectional analysis found that Medicaid-enrolled pregnant people with no Medicaid dental coverage were less likely to have a dental cleaning during pregnancy (27%) when compared to those with limited benefits (e.g., fewer than 100 services or an annual spending cap of less than $1,000) (37%) and extensive benefits (e.g., at least 100 services and an annual spending cap of at least $1,000) (45%) (Lee et al., 2022a). The only quasi-experimental analysis we are aware of examined Virginia's 2015 addition of a comprehensive Medicaid pregnancy dental benefit and found that reports of receiving a dental cleaning increased among Medicaid-enrolled pregnant people relative to privately insured pregnant people before and after the policy's implementation (Naavaal & Harless, 2022). However, this research focused on a single state and included limited pre-policy implementation data. While not examining Medicaid dental benefits directly, one analysis found that Medicaid eligibility expansions to pregnant people and infants during their first year of life were associated with a significant reduction in permanent tooth loss on reaching young adulthood for non-Hispanic Black cohorts (Lipton et al., 2016). These findings are suggestive of potential improvements in access to dental care among pregnant populations and children and also provide support for the notion of longer run oral health improvements following early life interventions.

While evidence on the impacts of Medicaid pregnancy dental benefits remains somewhat limited, there is a large body of research on dental benefits for non-pregnant adults. Quasi-experimental estimates of the impacts of Medicaid dental benefits on dental visits range from 6-14 percentage points, (see for example, Choi (2011); Decker & Lipton (2015); Abdus & Decker (2019); Lipton (2021)). Moreover, other researchers have found that Medicaid dental benefits reduce out-of-pocket spending on dental care (Abdus & Decker, 2019), reduce emergency department visits for oral conditions (Singhal et al.,

[2]Federal law generally requires that managed care enrollees have access to at least the same level of benefits as people enrolled in the state's fee-for-service program, including optional benefits (MACPAC, 2025). Therefore, state-required dental benefits would be likely to increase dental coverage rates among both fee-for-service and managed care enrollees.

2015; Elani et al., 2021, 2020a; Ranade et al., 2025), and that they induce a supply-side response with dentists increasing their acceptance of Medicaid patients and relocating to counties with larger Medicaid-insured populations (Buchmueller et al., 2016; Huh, 2021). Finally, Medicaid adult dental benefits have been shown to have spillover effects on children's dental care use with effects that appeared to be concentrated among those with parents who visited a dentist (Lipton, 2021; Hill et al., 2022).

2.3 Mechanisms

The primary mechanism for an impact of Medicaid pregnancy dental benefits on dental visits is via a reduction in out-of-pocket costs for pregnant enrollees. According to published fee schedules, the average cost of a dental cleaning ranges from $90 to $120, and composite fillings typically range from $100 to over $1,000 per tooth (Carefree Dental, 2021; American Dental Care Network, 2024). In states that provide Medicaid dental benefits, enrollee cost-sharing amounts are typically small, often between $1 and $3, representing a substantial reduction in enrollee costs for dental services (Kaiser Family Foundation, 2025). Estimates suggest that providing Medicaid dental benefits to non-pregnant adults results in a reduction in annual out-of-pocket costs of $18.88 on average and $179.28 among those with a dental visit (Abdus & Decker, 2019). In addition, Medicaid dental benefits for non-pregnant adults reduce reports of needing but not receiving dental care due to cost by more than 12 percentage points (Decker & Lipton, 2015).

While we cannot directly observe out-of-pocket costs in PRAMS, we find that Medicaid pregnancy dental benefits increase dental insurance rates by 13.5 percentage points. This result suggests both that pregnant enrollees are aware that they have Medicaid dental benefits and that many would not otherwise have another source of private dental insurance. Given low cost sharing in Medicaid, enrollees are likely to experience a large reduction in out-of-pocket costs for dental services when pregnancy dental benefits are offered. Furthermore, out-of-pocket costs would likely decline for some enrollees who would have otherwise had private dental insurance and gained Medicaid dental coverage, though we are not able to measure the scope of changes in dental coverage sources.

Medicaid pregnancy dental benefits could also raise awareness of the importance of oral health during pregnancy through outreach or beneficiary communication. However, we do not find evidence of this possibility in the PRAMS.

In addition to demand-side effects, providing Medicaid dental benefits could also have supply side impacts because of changing patient mix and lower Medicaid reimbursement rates relative to private dental insurance (Gupta & Yarbrough, 2017). Research indicates that when states offer Medicaid dental benefits, dentists are more likely to participate

in Medicaid and provide more services to Medicaid-insured patients (Buchmueller et al., 2016). Furthermore, Medicaid dental benefits induce dentists to relocate to counties with higher Medicaid-eligible populations (Huh, 2021). Therefore, existing evidence indicates a positive supply-side response to accommodate increased demand when states add Medicaid dental benefits.

Our finding that Medicaid pregnancy dental benefits increase dental visits raises the possibility of improvements in oral health among pregnant women. In addition to an increase in dental cleaning rates, we also find a significant 5.8 percentage point increase in reports of receiving advice on how to care for teeth and gums. Thus, Medicaid pregnancy dental benefits may improve oral health both via care received during a dental visit and also through improvements in caring for teeth and gums at home. Previous research focusing on non-pregnant Medicaid enrollees indicates that Medicaid dental benefits reduce untreated tooth decay by about 9.5 percentage points (Decker & Lipton, 2015). Moreover, researchers found that the Affordable Care Act's Medicaid expansion reduced untreated tooth decay by 16.8 percentage points in expansion states that offered dental benefits (Elani et al., 2021).

There are biologically plausible pathways through which treating oral health problems could improve birth outcomes (e.g., via reducing inflammation and exposure to oral bacteria), although the evidence to date is mixed, as described. While we are limited in our ability to examine this pathway in the PRAMS, recent research suggests that dental benefits for non-pregnant adults are associated with improvements in general reported health status, which may serve as a proxy for systemic health (Wehby et al., 2025). We also confirm this finding among reproductive-aged women using data from the Behavioral Risk Factor Surveillance System.

In addition to possible impacts on maternal systemic health and the fetal environment, pregnancy dental benefits could have indirect impacts on infant health by inducing changes to maternal health behaviors. Other types of prenatal care use could increase if dentists counsel pregnant patients on current guidelines for obstetric visits. Conversely, dental visits may crowd out other prenatal care use given time and work constraints. We examine the effects of pregnancy dental benefits on the Kotelchuk index, a measure of prenatal care adequacy, and find no evidence of an effect. Pregnancy dental benefits could also affect other types of health behaviors if dentists counsel pregnant women on dietary or smoking habits, via an income effect, or moral hazard. Given the adverse consequences of smoking during pregnancy, we assess whether pregnancy dental visits affect smoking prevalence and also find no evidence of an impact. However, we note that there is evidence that Medicaid eligibility expansions to pregnant women during the 1980s and 1990s increased smoking behavior (Dave et al., 2019). We study a more recent time period and the addition of a specific type of coverage, which may explain this difference.

Overall, our analysis of mechanisms indicates that an increase in dental insurance rates and associated reductions in out-of-pocket costs is likely the primary driver of increased dental visits. In terms of improvements in birth outcomes, our analysis suggests that pregnancy dental benefits are associated with increased rates of counseling on caring for teeth and gums at home, which may complement in-office care in improving oral health. We also find that Medicaid dental benefits improve self-reported general health status among reproductive-age women, which may proxy for improvements in systemic health.

3 Data

The data for this study is drawn from the Pregnancy Risk Assessment Monitoring System (PRAMS), a state-based surveillance system managed by the Centers for Disease Control and Prevention (CDC) in collaboration with state health departments. PRAMS collects comprehensive, population-based data on maternal experiences before, during, and shortly after pregnancy, with an emphasis on maternal health behaviors and access to care. The survey samples a state-representative subset of women who have recently given birth, sampling between 1,000 and 3,000 individuals annually from each participating site (typically a state). The dataset includes self-reported measures of dental care access during pregnancy and linked birth certificate information on birth outcomes.

PRAMS data availability varies by year and state, as the CDC only releases data for a given state-year if the site meets a minimum weighted response rate threshold (typically 50%). Additionally, even when a state meets the threshold, its data may not be publicly released unless the site opts to make it available. To ensure more complete coverage, we submitted site-specific data requests to obtain restricted-use PRAMS data for states not included in the standard release files. As a result, our dataset includes restricted-use data from Colorado (2014), Tennessee (2017-2018), South Carolina (2012-2019), Mississippi (2016-2017), Virginia (2012-2014) and West Virginia (2019). In these cases, South Carolina met response thresholds but did not publicly release their data, while others fell below the CDC's cutoff in certain years, though typically maintained response rates above 40%. Including these restricted-use files enhances the scope and representativeness of our analysis by reducing bias due to selective state participation.

Our primary outcome is an indicator of having received a dental cleaning at any time during the most recent pregnancy. Furthermore, we investigate four main birth outcomes, including small for gestational age (at or below 10^{th} percentile), preterm birth (before 37 weeks gestation), low birth weight (under 2500 grams), and very low birth weight (under 1500 grams). The PRAMS also provides a rich set of individual and socioeconomic characteristics at the individual level, allowing us to control for potential factors that may influence dental care utilization and pregnancy health.

Our main analysis uses PRAMS data from 2012 to 2019. We begin our analysis in 2012 because this is the first year when the question about dental cleanings during pregnancy is included in the survey. We end our analysis in 2019 to avoid confounding due to the COVID-19 pandemic given evidence of depressed healthcare utilization, interruptions to prenatal care, and infant health impacts (Ferrara et al., 2023; Lee, 2024; Karasek et al., 2025). However we include data through 2021 in a sensitivity analysis. Information about birth outcomes is available in all years from 2012-2021. We also examine related outcomes as possible mechanisms including dental insurance (2012-2015), awareness of the importance of oral health during pregnancy (2012-2015), receipt of counseling on caring for teeth and gums (2012-2015), the Kotelchuk index of prenatal care adequacy (2012-2019), and smoking during pregnancy (2012-2019). While several of these outcomes are only available during 2012-2015, all treatment states in our main analysis implemented policies during this period, allowing us to generate estimates based on meaningful policy variation.

We focus on individuals aged 21 and older who were enrolled in Medicaid during pregnancy. Medicaid enrollment is identified primarily from the source of payment for delivery on the birth certificate; for records with missing payer information, we supplement with self-reported Medicaid coverage from PRAMS. This restriction allows us to target populations most likely to be affected by Medicaid dental policy changes since all Medicaid enrollees up to age 20 receive dental coverage under the Early and Periodic, Screening, Diagnostic, and Treatment benefit (Centers for Medicare & Medicaid Services, 2024).

Our primary policy indicator is equal to one for dates of birth during or following the month of policy implementation and zero otherwise. This indicator represents any exposure to Medicaid dental benefits during pregnancy. However, our event study analysis allows us to examine whether treatment effects grow with increasing exposure. Following prior research on non-pregnant adults (Decker & Lipton, 2015; Abdus & Decker, 2019; Elani et al., 2020b), we consider states that provide at least one preventive or restorative service to pregnant women as having pregnancy dental coverage. Since states that provide any preventive or restorative services generally cover dental cleanings including all treatment states in our analysis, this measure is arguably most appropriate for examining dental cleaning rates.

We documented state policies during 2012–2021 by cross-verifying information from multiple sources, including KFF's Medicaid Benefits database (KFF, 2025), MACPAC reports and compendia (Medicaid et al., 2021), NASHP's state tracker (for State Health Policy, 2022), state Medicaid provider manuals, and State Plan Amendments in the CMS SPA portal (for Medicare & Medicaid Services, 2025). Other research has used the American Dental Association's classification, which splits non-emergency adult dental

coverage into limited (typically fewer than 100 procedures or an annual expenditure cap below $1,000) and extensive (at least 100 procedures or a cap of $1,000 or more) (Wehby et al., 2019; Lyu et al., 2020; Wehby et al., 2022). While we explored using this definition in our analysis, states classified as offering limited coverage in other sources did not always meet our minimum criteria of covering at least one preventive or restorative service for pregnant women.

Table 1 presents descriptive statistics summarizing characteristics of the study population stratified by Medicaid pregnancy dental benefit adoption status. For treatment states, we also stratify estimates by pre- and post-policy implementation. The 'pre-policy' period is defined as all births occurring prior to the effective month and year when pregnancy dental benefits were introduced in a given treatment state (i.e., no exposure), while the 'post-policy' period includes all births occurring after implementation (i.e., any exposure).

(Table 1 here)

About 27% and 31% of women reported receiving a dental cleaning pre- and post-policy implementation in treatment states compared with about 25% in control states. In treatment states pre policy, about 9% of births were classified as low birth weight, 1.6% as very low birthweight, 11% as preterm, and 11% as small for gestational age. These baseline rates were relatively similar to those in control states. While treatment state rates of low birth weight and very low birth weight were relatively similar pre- and post-policy implementation, rates of preterm birth declined by about 2 percentage points and small for gestational age declined by a more modest 0.5 percentage points. The average maternal age ranged from 27 to 28 years across groups, and more than half had less than a college education. The sample was racially and ethnically diverse, with some differences between the treatment and control states (e.g., 42% were non-Hispanic white in treatment states at baseline vs. 51% in control states). More than one-third were married, and nearly three-quarters resided in urban areas. There were some differences between the treatment and control states in terms of state-level policy and healthcare variables. Most notably, dentist supply was somewhat lower and Medicaid managed care penetration rates were substantially higher in control states (60% vs. 25% in treatment states at baseline).

In addition to PRAMS, we draw on data from CDC Wonder and the Behavioral Risk Factor Surveillance System (BRFSS). CDC Wonder provides aggregated monthly state data on birth outcomes from the National Vital Statistics System, representing the universe of U.S. births. We use CDC Wonder to examine rates of low birth weight, very low birth weight, and preterm birth, defined as the number of affected live births per 100 total live births.[3] These outcomes parallel those analyzed in PRAMS and serve as

[3]Small for gestational age was not available in the CDC Wonder data

population-level counterparts that allow us to verify that our findings are not driven by changes in sample composition or survey participation rates.

BRFSS is a nationally representative, state-based telephone survey administered by the CDC that collects information on health-related behaviors, chronic conditions, and preventive service use among U.S. adults. Since PRAMS does not consistently collect measures of general health status during pregnancy, we use BRFSS data to assess changes in self-reported general health among reproductive-aged women, defined as reporting "good," "very good," or "excellent" health (versus "fair" or "poor"). We focus on reproductive-aged women rather than pregnant women given larger sample sizes and more reliable estimates in BRFSS. Since BRFSS has only begun collecting information on Medicaid enrollment in recent years, we restrict our attention to women with household incomes below the Medicaid eligibility limit in their state of residence during the year of their interview. This supplemental analysis provides complementary evidence on the impacts of dental benefits on systemic health and well-being, a potential mechanism for effects on birth outcomes.

4 Empirical Strategy

4.1 Stacked Difference-in-differences Approach

This study employs a stacked difference-in-differences (DiD) design, following recent methodological guidance from Wing et al. (2024). In this approach, we define a series of "sub-experiments," each centered around a unique policy adoption date. For each sub-experiment, the treatment group comprises states implementing pregnancy dental benefits on a given date, and the control group consists of states that did not adopt similar benefits within the event window. This design decomposes staggered adoption into a set of two-by-two DiD comparisons, mitigating the bias that can arise in two-way fixed effects models with heterogeneous treatment timing (De Chaisemartin & d'Haultfoeuille, 2020; Goodman-Bacon, 2021; Sun & Abraham, 2021).

We adopt this approach for several reasons articulated by Wing et al. (2024). First, our setting includes a moderate number of treated states, which facilitates clean sub-experiment construction. Second, policy adoption is monotonic—states added but did not remove dental benefits during the study period—making treatment assignment consistent over time. Third, our main PRAMS data are repeated cross-sections that require survey weights to produce representative estimates. The stacked DiD approach accommodates survey weights and does not require panel tracking of individuals. Taken together, these features make stacked DiD an appropriate choice for our empirical setting.

As Figure 1 shows, five PRAMS states—including Colorado, Illinois, South Carolina, Utah, and Virginia—began offering pregnancy dental benefits during the study period

(shown in green). Twenty-six PRAMS states maintained pre-existing benefits (shown in blue), and nine states did not offer pregnancy dental benefits throughout the entire study period (shown in red). Two states that had not adopted pregnancy dental benefits by 2019 did so after 2019 (West Virginia in 2021 and Delaware in 2020). States shown in gray either did not participate in PRAMS or had data suppressed due to sample sizes falling below reporting thresholds during the study period. We also exclude the 26 states with pre-existing dental benefits to avoid confounding arising from continually evolving trends in these "already treated" units, consistent with best practices in stacked DiD designs (Wing et al., 2024).

Table 2 summarizes the states included in each sub-experiment used in our primary analysis. We define event windows of up to 36 months before and after policy adoption. Because PRAMS data begin in 2012 and several policy adoptions occur in 2014, sub-experiments generally have shorter pre-policy periods than post-policy periods. However, this approach allows enough time for supply- and demand-side effects to evolve post-policy implementation. For example, Utah's policy adoption in October 2013 forms one sub-experiment with the event window spanning January 2012 through October 2016. The nine states that did not offer pregnancy dental benefits during this window serve as controls. We also consider alternative event windows of 18, 24, and 48 months in sensitivity analyses.

(Figure 1 here)

(Table 2 here)

4.2 Estimation

To estimate the overall treatment effect, we run separate two-by-two DiD models within each sub-experiment (Table 2), comparing outcomes before and after policy adoption in treated states to changes in control states during the same period. These sub-experiment estimates are then aggregated using stacked weights, which correct for bias due to imbalances in the weighting of treatment and control trends across sub-experiments (Wing et al., 2024) . We estimate the following stacked difference-in-differences model:

$$Y_{istd} = \mu_{sd} + \omega_1 \text{PregDental}_{istd} + \mathbf{X}_{istd}\boldsymbol{\beta} + \lambda_t + \epsilon_{istd} \tag{1}$$

Where Y_{istd} denotes the outcome of interest (e.g., dental cleaning or birth outcome) for individual i in state s, time t, and sub-experiment d. PregDental_{istd} is a binary indicator equal to one if a respondent had any exposure to pregnancy dental benefits during their pregnancy and zero otherwise. $\mathbf{X}_{istd}$ is a vector of individual- and state-level control variables, μ_{sd} represents state-by-sub-experiment fixed effects, and λ_t represents

birth quarter-by-year fixed effects. State-by-sub-experiment fixed effects control for time-invariant state-level differences within each policy comparison group and birth quarter-by-year fixed effects account for common outcome trends between treatment and control states. Individual-level controls include education, age in years, race and ethnicity, marital status, household income, an indicator for having either pre-pregnancy hypertension or diabetes, and urban versus rural residence.[4] Pre-pregnancy hypertension and diabetes proxy for a mother's health status before conception. State-by-year controls account for time-varying economic and healthcare characteristics, including the fertility rate (CDC Vital Statistics), Medicaid managed care penetration (Centers for Medicare & Medicaid Services), Medicaid eligibility thresholds for pregnant adults (KFF), federally qualified health centers per capita (Health Resources and Services Administration), unemployment rate (Bureau of Labor Statistics), an indicator for the Affordable Care Act's Medicaid expansion (KFF), and number of dentists per capita (Area Health Resources File, Area Health Resources File). Standard errors are clustered at the state level and estimates incorporate PRAMS survey weights at the individual level to ensure population representativeness.

We also estimate event study models to evaluate outcome pre-trends and the evolution of post-policy implementation effects. These models are specified as follows:

$$Y_{istd} = \mu_{sd} + \sum_{\tau=-\kappa_a}^{-2} \alpha_\tau \cdot 1(TSE_{std} = \tau) + \sum_{\sigma=0}^{\kappa_b} \delta_\sigma \cdot 1(TSE_{std} = \sigma) + \mathbf{X}_{istd}\boldsymbol{\beta} + \lambda_t + \epsilon_{istd} \quad (2)$$

where TSE_{std} denotes the number of months since policy implementation in state s within sub-experiment d, with α_τ and δ_σ capturing pre-policy and post-policy event-time effects, respectively. All other variables are defined as before. Our event study specification aligns birth year and month with the timing of Medicaid dental benefit implementation in each state and groups the pre- and post-treatment periods into three-month intervals. We include eight pre- and post-policy implementation indicators (i.e., covering up to 22 months or more both preceding and following policy changes). The three-month period directly preceding any exposure to Medicaid dental benefits serves as the reference category. This structure allows for a detailed examination of how outcomes evolve over time. The model differentiates between partial policy exposure, observed in the initial post-policy intervals, and full policy exposure, captured in later periods. Given typical gestation lengths, δ_4 and subsequent post-policy indicators capture full policy exposure, with exposure increasing across δ_1 through δ_3. By aligning events temporally within states, this approach provides a clearer understanding of the timing,

[4]PRAMS provides income in brackets. We use the midpoint of a respondent's income bracket in regressions.

stabilization, and persistence of policy impacts, offering insights into both short-term effects and longer-term trends.

Equation (2) tests the plausibility of the parallel trends assumption, which is critical to a causal interpretation of our estimates. Significant coefficient estimates for the pre-period(α_τ), or estimates that exhibit an apparent increasing or decreasing trend, would cast doubt on causality. The post-policy coefficients δ_σ capture the dynamic effects of the policy, and in our context, whether impacts differ according to partial vs. full exposure during pregnancy.

For our supplementary analyses using CDC Wonder and BRFSS, we adapt the same stacked DiD and event study framework to reflect differences in data structure. For CDC Wonder, we estimate Equation (1) and Equation (2) at the state-by-month level, weighting by the number of live births in each cell. For BRFSS, we restrict the sample to reproductive-aged women (18–44 years) with incomes below the Medicaid income eligibility limit in their state of residence during the year of their interview. We estimate analogous models using annual individual-level data except we replace the indicator for Medicaid pregnancy dental benefits with an indicator for Medicaid dental benefits for non-pregnant adults and birth-quarter-by-year fixed effects with year fixed effects.

In an extension to our main analysis, we account for potential confounding due to exposure to Medicaid dental benefits before conception in two ways. First, we adapt Equation (1) by including a control for non-pregnancy dental benefits in the year prior to conception. Second, we replicate our main analysis excluding women with family incomes under 138% of the federal poverty level (FPL), the maximum income eligibility limit for non-pregnant adults across the states included in our analysis. Since we only observe income during the calendar year prior to the PRAMS interview, there is a mismatch in the timing of eligibility for pre-pregnancy Medicaid and income measurement. However, we anticipate that women with incomes above 138% FPL during pregnancy would be substantially less likely to have been eligible for Medicaid before conception. Therefore, the results of this analysis may better isolate the impacts of Medicaid dental benefits exposure during pregnancy specifically.

We conduct several additional robustness checks to assess the stability of our findings. First, while our primary analysis focuses on individuals enrolled in Medicaid during pregnancy—those directly exposed to Medicaid pregnancy dental benefits—we replicate our results for alternative samples, including all women, women with less than a bachelor's degree and those with a bachelor's degree or higher, and women with household incomes up to $50,000 and with incomes of $75,000 or more. Results for all women and lower-education or lower-income subgroups provide intent-to-treat estimates, mitigating concerns about selection into Medicaid when pregnancy dental benefits are offered, while estimates for higher-education and higher-income subgroups are expected to be smaller

because women in these groups are less likely to be Medicaid eligible. Second, we extend our analysis period through 2021 and re-estimate our models including two additional policy changes (Delaware and West Virginia). For these extended analyses, we add state-level and pregnancy-period COVID-19 controls—including case and death rates, business closure stringency, the Oxford Government Response Index, and indicators for stay-at-home and elective-procedure restrictions—to account for pandemic-related disruptions in care. Third, we vary the length of the event window to 18, 24, and 48 months to assess whether results are sensitive to the duration of the pre- and post-policy observation periods used in the stacked DiD design. Fourth, we conduct leave-one-out analyses, sequentially excluding each treated state to ensure that no single sub-experiment drives the overall results. Finally, our primary measure of Medicaid enrollment is based on payer information from the birth certificate only supplementing with self-report Medicaid enrollment when birth certificate information is missing. We replicate our analyses using both self-reported and birth certificate-based Medicaid enrollment information and also excluding all self-report Medicaid enrollment to evaluate the robustness of results to alternative exposure definitions.

5 Results

5.1 Effects of Medicaid Pregnancy Dental Benefits on Dental Cleanings

We estimate that Medicaid pregnancy dental benefits increase the probability of having received a dental cleaning during pregnancy by 7.16 percentage points (Table 3, Column (1)). Given the baseline mean of 24.6%, this estimate represents a 29.1% relative increase. Results for dental cleanings are similar across specifications with and without individual and state-by-year controls, ranging from 6.58 (26.7% increase) to 8.06 (32.8% increase) percentage points (Appendix Table A.1).

(Table 3 here)

Figure 2 provides event study estimates of the impact of Medicaid pregnancy dental benefits on prenatal dental cleaning rates. Before policy implementation, most estimates are relatively small in magnitude and statistically insignificant with no clear trend. After policy implementation, all estimates are positive with significant increases becoming evident between 7 and 9 months post adoption. This timing aligns with a greater duration of exposure to pregnancy dental benefits, albeit not complete exposure. However, while not statistically significant, the fact that initial estimates for up to 3 months and 4 to 6 months of exposure are positive with confidence intervals that overlap subsequent

estimates is suggestive that even partial exposure may have some impacts. By the later post-policy months, the effect plateaus at a consistently higher rate of dental cleaning compared to pre-policy levels, indicating a lasting shift in healthcare-seeking behavior among Medicaid-enrolled pregnant individuals.

(Figure 2 here)

We examine heterogeneity in policy impacts across demographic subgroups by estimating stratified versions of Equation (1) by age, race and ethnicity, marital status, and education and find broadly consistent increases in prenatal dental cleaning following Medicaid pregnancy dental benefit expansions (Figure 3). Estimated effects were somewhat larger among non-Hispanic Black individuals, married individuals, those aged 26–34, and those with higher education levels, but most 95% confidence intervals overlapped, with the exception of age group. Specifically, individuals aged 26–34 experienced significantly greater increases in dental cleaning rates compared to those aged 21–25. We note, however, that we may have lacked power to detect significant differences for some smaller subgroups including Hispanic, non-Hispanic Black, and ages 35 and older.

(Figure 3 here)

5.2 Effects of Medicaid Pregnancy Dental Benefits on Birth Outcomes

Table 3 (Columns (2) to (5)) presents our main findings for the birth outcomes. Notably, Medicaid dental benefits significantly reduce the likelihood of a newborn being small for gestational age by 1.19 percentage points, representing a 9.52% decrease relative to the baseline mean of 12.5%. Additionally, we observe a statistically significant reduction in very low birth weight by 0.47 percentage points, representing a 28% decline relative to the baseline mean (1.7%) . Estimated impacts on preterm birth (-0.90 percentage points) and low birth weight (0.50 percentage points) are not statistically significant.

Figure 4 illustrates event study plots for each birth outcome. Before policy implementation, estimates for most outcomes largely hover near zero with overlapping confidence intervals, suggesting parallel trends between treated and control states. One exception is that the estimates for low birth weight deviate from zero prior to policy adoption, however, pre-period point estimates for low birth weight are all negative with a relatively flat trend that remains similar in the post period. Post-policy implementation, we consistently observe negative effects for small for gestational age, preterm birth, and very low birth weight. While average treatment effect estimates for preterm birth are imprecise, the event study plots reveal consistent post-policy reductions, suggesting a

potential impact not captured in the average effect estimates. In contrast, there is no consistent evidence of impact on low birth weight.

(Figure 4 here)

We assess potential heterogeneity in the effects of Medicaid pregnancy dental benefit expansions on birth outcomes across demographic subgroups. These estimates are somewhat noisy, particularly for the lower-prevalence outcomes. Focusing on small for gestational age and very low birthweight where we found evidence of significant declines overall, 95% confidence intervals generally overlapped across subgroups with some exceptions. In particular, we estimated larger declines in small for gestational age among women ages 26-34 and married women (Figure A.1). These patterns were consistent with estimates for dental cleanings.

To assess whether the impacts observed in PRAMS are reflected at the population level, we replicate our main birth outcome analyses using aggregated data from CDC Wonder natality files (see Table 4 and Figure A.2). We use the same years, treatment, and control states as in our main analysis. These analyses show qualitatively similar patterns: Medicaid pregnancy dental benefits are associated with a statistically significant 3% decline in low birth weight relative to baseline. Estimated effects for preterm birth (-2.25%) and very low birth weight (-0.11%) are negative in sign but imprecisely estimated. Event study plots likewise reveal no evidence of differential pre-trends and a sustained post-policy decline in low birth weight. Although the point estimates for preterm birth lack statistical precision, the dynamic effects exhibit a clear downward shift after implementation. Overall, the CDC Wonder analyses yield patterns that closely align with the PRAMS results, reinforcing that the observed improvements likely reflect population-level effects.

5.3 Extensions and Mechanisms

Table 5 examines the joint effects of pregnancy and pre-conception Medicaid dental benefits on prenatal dental cleanings and birth outcomes. Since some states may begin offering non-pregnancy and pregnancy dental coverage around the same time, this analysis serves to (1) reduce potential confounding from exposure to pre-conception Medicaid dental benefits, and (2) assess whether exposure to pre-conception Medicaid dental benefits plays a role in dental care utilization during pregnancy and subsequent birth outcomes. On the one hand, women who recently visited a dentist before conception may be less likely to visit again during pregnancy. On the other hand, women who have established care with a dental provider and received counseling on recommended dental care may be more likely to continue dental visits during pregnancy. As shown in Table 5, we estimate that pregnancy dental benefits significantly increase dental visits

by 7.34 percentage points, which is very similar to our main estimate shown in Table 3. The point estimate for pre-conception dental benefits is small in magnitude and not statistically significant, indicating that these benefits may not have substantial impacts on care-seeking during pregnancy.

In terms of birth outcomes, we estimate that pregnancy dental benefits significantly reduce very low birth weight by about 0.42 percentage points (Table 5), which is again very similar to our main estimate shown in Table 3. The point estimate for small for gestational age remains negative but is attenuated and no longer statistically significant when we control for exposure to pre-conception Medicaid dental benefits. Interestingly, pre-conception dental benefits are associated with reductions in small for gestational age (1.47 percentage point decrease) and preterm birth (1.51 percentage point decrease), each significant at the 10% level. While somewhat imprecise, these findings suggest that care received both before and during pregnancy may potentially contribute to improvements in birth outcomes.

(Table 5 here)

In a complementary analysis, we replicate our main results excluding women most likely to have been eligible for pre-conception Medicaid (Table 6). This analysis is intended to test whether the observed effects persist among women likely exposed to Medicaid dental benefits for the first time during pregnancy. Consistent with our main analysis, we find that Medicaid pregnancy dental benefits are associated with a statistically significant increase in prenatal dental cleanings (6.75 percentage points) and significant reductions in small-for-gestational-age birth (1.31 percentage points, $p<0.10$)) and very low birth weight (0.70 percentage points). The effect on preterm birth remains negative but is not statistically significant.

Taken together, Medicaid pregnancy dental benefits are associated with meaningful increases in dental cleanings during pregnancy that do not appear to be driven by pre-conception exposure to Medicaid dental coverage. While some estimates are imprecise, we continue to find evidence that pregnancy dental benefits are associated with improvements in birth outcomes, though our results also suggest that pre-conception Medicaid dental coverage may complement these effects.

(Table 6 here)

Table 7 examines potential mechanisms through which Medicaid pregnancy dental benefits may influence birth outcomes. We find that policy adoption is associated with statistically significant increases in the likelihood of having dental insurance coverage (13.5 percentage points) and receiving advice from a provider on how to care for teeth and gums (5.8 percentage points). These findings indicate that women are aware of Medicaid

dental insurance and indicate a likely decline in out-of-pocket costs for dental services, supporting the observed increase in dental visits. Moreover, receipt of counseling may improve oral healthcare behaviors at home, complementing in-office care in improving oral health. However, while the point estimate is positive (1.2 percentage points), we do not estimate a significant change in reporting that oral health during pregnancy is important.

When examining broader maternal health behaviors, we find no evidence that Medicaid pregnancy dental benefits affect the likelihood of receiving adequate prenatal care, as measured by the Kotelchuck Index, or on maternal smoking during or after pregnancy.

(Table 7 here)

We turn to the BRFSS to assess possible improvements in systemic health that could improve the fetal environment. We estimate that adult Medicaid dental coverage is associated with a 1.3 percentage point increase in the probability of reporting that general health status is good, very good, or excellent (vs. fair or poor) among Medicaid income-eligible reproductive-age women, and an event study analysis suggests that this estimated impact is consistent with the parallel trends assumption (Figure A.3). Given the absence of a comparable general health measure in PRAMS, this complementary analysis supports the broader argument that increased access to dental care under Medicaid may enhance overall well-being among low-income women.

5.4 Robustness Checks

To evaluate the robustness of our findings, we conduct a range of supplementary analyses presented in the appendix. Estimates for dental cleanings are very similar to our main results when we use a two-way fixed effects specification (Tables A.1 and A.2). Point estimates for the birth outcomes remain negative and are of a similar magnitude as in our main results, but are generally less precise. .While our main analysis excludes data for 2020 and 2021, event study estimates that include the pandemic period continue to display patterns consistent with our main results (Figures A.4, A.5 and Table A.3). Event window sensitivity checks indicate that estimates are relatively stable across windows, with more precise birth outcome effects at 48 months and consistently robust dental cleaning effects (Table A.4). We also replicate our results when including all women who self-report Medicaid coverage in the sample in addition to those with Medicaid as a payer on the birth certificate (Table A.5). We find a significant increase in dental cleanings of a similar magnitude as our main findings and also continue to estimate a borderline significant reduction in very low birth weight. However, the estimate for small for gestational age is no long statistically significant. Leave-one-out tests confirm that no single treated state

drives the results (Table A.6). Finally, we examine alternative intent-to-treat samples based on education and income (Table 8). We estimate statistically significant increases in dental cleanings for most groups, except for those with incomes of at least $75,000. As expected, estimates are smaller in magnitude than when we restrict to Medicaid enrollees as in our main analysis. Furthermore, point estimates are larger among groups more likely to be Medicaid eligible (i.e., lower education and lower income). Estimates for birth outcomes are generally imprecise, which is also not surprising given that they are lower frequency and our main point estimates are relatively small in magnitude in absolute terms.

(Table 8 here)

6 Conclusion

In this paper, we find robust evidence that Medicaid pregnancy dental benefits increase access to preventive dental care during pregnancy. Our main estimate (7 percentage point increase) is much smaller than that from research using the PRAMS to examine Virginia's addition of a comprehensive dental benefit (17 percentage point increase) (Naavaal & Harless, 2022). Moreover, we find significant increases in dental cleanings within the first year of policy implementation whereas the previous analysis indicated that effects only became significant four years after Virginia's 2015 policy change. While both papers use the PRAMS, our analyses depart in several ways such as the inclusion of control states, multiple treatment states, and differences in controls for time trends and time-varying state-level factors.

By contrast, our estimates align with similar analyses of Medicaid dental benefits among non-pregnant adults, which indicate increases in annual dental visit rates ranging from 6–14 percentage points (Decker & Lipton, 2015; Abdus & Decker, 2019; Lipton, 2021). The relative magnitude of our estimates compared with those for non-pregnant adults is consistent with several hypotheses. On one hand, effects may be smaller among pregnant individuals because coverage applies for a short duration, limiting the time available to seek care, and because some pregnant patients and providers remain cautious about receiving or delivering dental procedures during pregnancy. On the other hand, pregnancy represents a period of heightened motivation and frequent contact with the healthcare system, which could amplify responsiveness once financial barriers are removed. The balance of these offsetting mechanisms likely explains why our estimates fall within—but toward the lower end of—the range observed in broader adult populations. Benefit adoption also significantly increased the share of pregnant individuals reporting dental insurance coverage, which likely facilitated greater utilization of dental services. These gains were broadly distributed across sociodemographic groups, suggesting that

effects are not confined to a single subgroup.

We also find suggestive evidence that pregnancy dental benefits may reduce adverse birth outcomes including small for gestational age and very low birth weight. Our main estimates—a 9.5% reduction in small-for-gestational-age births and a 28% decline in very low birth weight—are relatively large in magnitude, but consistent with the upper range of effects documented in related clinical and observational studies. While clinical evidence is mixed, periodontal intervention during pregnancy has been found to reduce preterm birth by 15-25% in some studies (Iheozor-Ejiofor et al., 2017; Puertas et al., 2018; Castaño-Suárez et al., 2024). Moreover, one analysis of linked medical and dental claims found that periodontal intervention preceded a 74% reduction in spending on atypical pregnancy care (Jeffcoat et al., 2014), again suggesting the potential for relatively large-scale impacts.

Parallel evidence from quasi-experimental studies of Medicaid eligibility expansions demonstrates that increasing coverage during pregnancy may improve prenatal care access and can lead to measurable improvements in infant health, though evidence is mixed (Currie & Gruber, 1996; Howell, 2001; Sonchak, 2015; Saygili & Bayindir, 2024). In terms of research indicating gains, Currie & Gruber (1996) find that Medicaid eligibility expansions during the 1980s reduced infant mortality by roughly 8%, while Howell (2001) document that state-level expansions of pregnancy-related Medicaid eligibility in the 1990s increased prenatal care use and reduced the likelihood of low birth weight among low-income women. More recent evidence from a border-county difference-in-differences study of Arkansas's ACA Medicaid expansion shows a 1.4–percentage-point decline in preterm birth (about a 20% relative reduction) and a 1.8–percentage-point decline in low birth weight (about a 40% relative reduction) among White infants relative to neighboring Texas (Saygili & Bayindir, 2024). Our estimated 9.5% reduction in small-for-gestational-age births and 28% decline in very low birth weight fall within this documented range of impacts.

In our analysis of mechanisms, we find increases in dental insurance coverage and provider dental care advice, both of which are likely to facilitate earlier or more consistent dental care during pregnancy. We find no evidence that the observed effects are driven by changes in prenatal care adequacy or maternal smoking behavior. Instead, the pattern of findings points to direct oral–systemic health mechanisms—such as reductions in periodontal inflammation and systemic bacterial load—which have been documented as risk factors for adverse pregnancy outcomes. We find some support for the notion that access to dental care can improve systemic health among a similar population of reproductive-age women in our analysis of the BRFSS where we estimate that Medicaid dental benefits are associated with a modest but significant improvement in general reported health status. This finding is also consistent with established linkages between

improved oral health and systemic health, including inflammation and chronic disease risk (Oliveira et al., 2010; Sanz et al., 2020; Chee et al., 2013; Manger et al., 2017).

These findings should be viewed within the broader policy environment in which Medicaid operates. Recent federal legislation and budgetary adjustments—including changes to Medicaid financing—underscore how state-level benefits can be affected by broader economic conditions and federal policy decisions. In times of budget tightening, optional services like dental coverage may be among the first to face cuts or reduced support.

Overall, our findings provide evidence that pregnancy dental benefits induce meaningful increases in dental care use among a population with a high prevalence of oral health problems and a low rate of dental visits. We also find suggestive evidence that dental benefits may improve birth outcomes. While most states currently provide some form of a pregnancy dental benefit, mounting pressure on state Medicaid budgets may prompt reconsideration of optional coverage. As policymakers consider future modifications to Medicaid, this research could inform decisions on whether or not to maintain or expand coverage of dental services for pregnant populations.

References

Abdus, S., & Decker, S. L. (2019). Association between Medicaid adult nonemergency dental benefits and dental services use and expenditures. *The Journal of the American Dental Association*, *150*(1), 24–33.
URL https://www.sciencedirect.com/science/article/pii/S000281771830552X

American Dental Care Network (2024). Fee schedule 2024. Accessed: October 12, 2025.
URL https://americandentalcareinc.com/wp-content/uploads/2023/12/ADC_FeeSchedule_2024-updated.pdf

Bobetsis, Y. A., Graziani, F., Gürsoy, M., & Madianos, P. N. (2020). Periodontal disease and adverse pregnancy outcomes. *Periodontology 2000*, *83*(1), 154–174.

Boggess, K. A., Urlaub, D. M., Massey, K. E., Moos, M.-K., Matheson, M. B., & Lorenz, C. (2010). Oral Hygiene Practices and Dental Service Utilization Among Pregnant Women. *The Journal of the American Dental Association*, *141*(5), 553–561.
URL https://www.sciencedirect.com/science/article/pii/S0002817714615294

Buchmueller, T., Miller, S., & Vujicic, M. (2016). How Do Providers Respond to Changes in Public Health Insurance Coverage? Evidence from Adult Medicaid Dental Benefits. *American Economic Journal: Economic Policy*, *8*(4), 70–102.
URL https://www.aeaweb.org/articles?id=10.1257/pol.20150004

Carefree Dental (2021). How much is dental cleaning without insurance? Survey of more than 600 dental practitioners reporting average cost of $90–$120.
URL https://www.carefreedental.com/resources/14-dental-plans/276-how-much-is-dental-cleaning-without-insurance

CareQuest Institute for Oral Health (2023). The role of medicaid adult dental benefits during pregnancy and postpartum. Accessed June 13, 2025.
URL https://www.carequest.org

Castaño-Suárez, L., Paternina-Mejía, G. Y., Vásquez-Olmos, L. D., Rodríguez-Medina, C., & Botero, J. E. (2024). Linking periodontitis to adverse pregnancy outcomes: a comprehensive review and meta-analysis. *Current Oral Health Reports*, *11*(2), 125–137.

CDC (2024a). Oral Health Facts.
URL https://www.cdc.gov/oral-health/data-research/facts-stats/index.html

CDC (2024b). Talking to Pregnant Women about Oral Health.
URL https://www.cdc.gov/oral-health/hcp/conversation-tips/talking-to-pregnant-women-about-oral-health.html

Centers for Medicare & Medicaid Services (2024). Early and periodic screening, diagnostic, and treatment. https://www.medicaid.gov/medicaid/benefits/early-and-periodic-screening-diagnostic-and-treatment. Accessed: September 23, 2025.

Chaffee, B., Gansky, S., Weintraub, J., Featherstone, J., & Ramos-Gomez, F. (2014). Maternal Oral Bacterial Levels Predict Early Childhood Caries Development. *Journal of Dental Research*, *93*(3), 238–244. Publisher: SAGE Publications Inc.
URL https://doi.org/10.1177/0022034513517713

Chee, B., Park, B., & Bartold, M. P. (2013). Periodontitis and type II diabetes: a two-way relationship. *JBI Evidence Implementation*, *11*(4), 317.
URL https://journals.lww.com/ijebh/fulltext/2013/12000/Periodontitis_and_type_II_diabetes__a_two_way.9.aspx

Choi, M. K. (2011). The impact of Medicaid insurance coverage on dental service use. *Journal of Health Economics*, *30*(5), 1020–1031.
URL https://www.sciencedirect.com/science/article/pii/S016762961100110X

Currie, J., & Gruber, J. (1996). Saving Babies: The Efficacy and Cost of Recent Changes in the Medicaid Eligibility of Pregnant Women. *Journal of Political Economy*, *104*(6), 1263–1296. Publisher: University of Chicago Press.
URL https://www.jstor.org/stable/2138939

Dave, D. M., Kaestner, R., & Wehby, G. L. (2019). Does public insurance coverage for pregnant women affect prenatal health behaviors? *Journal of Population Economics*, *32*(2), 419–453.

De Chaisemartin, C., & d'Haultfoeuille, X. (2020). Two-way fixed effects estimators with heterogeneous treatment effects. *American economic review*, *110*(9), 2964–2996.

de Oliveira, L. J., Cademartori, M. G., Schuch, H. S., Barros, F. C., Silveira, M. F., Correa, M. B., & Demarco, F. F. (2021). Periodontal disease and preterm birth: Findings from the 2015 pelotas birth cohort study. *Oral diseases*, *27*(6), 1519–1527.

Decker, S. L., & Lipton, B. J. (2015). Do Medicaid benefit expansions have teeth? The effect of Medicaid adult dental coverage on the use of dental services and oral health. *Journal of Health Economics*, *44*, 212–225.
URL https://www.sciencedirect.com/science/article/pii/S0167629615001010

Dye, B. A., Vargas, C. M., Lee, J. J., Magder, L., & Tinanoff, N. (2011). Assessing the Relationship Between Children's Oral Health Status and That of Their Mothers. *The*

Journal of the American Dental Association, *142*(2), 173–183.
URL https://www.sciencedirect.com/science/article/pii/S0002817714614987

Díaz-Romero, R. M., Casanova-Román, G., Beltrán-Zuñiga, M., Belmont-Padilla, J., Méndez, J. D., & Ávila Rosas, H. (2005). Oral Infections and Glycemic Control in Pregnant Type 2 Diabetics. *Archives of Medical Research*, *36*(1), 42–48.
URL https://www.sciencedirect.com/science/article/pii/S0188440905000032

Elani, H. W., Kawachi, I., & Sommers, B. D. (2020a). Changes in emergency department dental visits after medicaid expansion. *Health Services Research*, *55*(3), 367–374.

Elani, H. W., Kawachi, I., & Sommers, B. D. (2021). Dental outcomes after medicaid insurance coverage expansion under the affordable care act. *JAMA Network Open*, *4*(9), e2124144–e2124144.
URL https://doi.org/10.1001/jamanetworkopen.2021.24144

Elani, H. W., Sommers, B. D., & Kawachi, I. (2020b). Changes in coverage and access to dental care five years after aca medicaid expansion: Study examines changes in coverage and access to dental care five years after the aca medicaid expansion. *Health Affairs*, *39*(11), 1900–1908.

Ferrara, A., Greenberg, M., Zhu, Y., Avalos, L. A., Ngo, A., Shan, J., Hedderson, M. M., & Quesenberry, C. P. (2023). Prenatal health care outcomes before and during the covid-19 pandemic among pregnant individuals and their newborns in an integrated us health system. *JAMA Network Open*, *6*(7), e2324011–e2324011.

Figuero, E., Carrillo-de Albornoz, A., Martín, C., Tobías, A., & Herrera, D. (2013). Effect of pregnancy on gingival inflammation in systemically healthy women: a systematic review. *Journal of Clinical Periodontology*, *40*(5), 457–473. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/jcpe.12053.
URL https://onlinelibrary.wiley.com/doi/abs/10.1111/jcpe.12053

Figuero, E., Han, Y. W., & Furuichi, Y. (2020). Periodontal diseases and adverse pregnancy outcomes: Mechanisms. *Periodontology 2000*, *83*(1), 175–188.

for Medicare & Medicaid Services, C. (2025). Medicaid state plan amendments (spa) portal. https://www.medicaid.gov/medicaid/medicaid-state-plan-amendments. Accessed October 11, 2025.

for State Health Policy, N. A. (2022). State medicaid coverage of dental services for general adult and pregnant populations. https://nashp.org/state-tracker/state-medicaid-coverage-of-dental-services-for-general-adult-and-pregnant-populations/. Updated October 20, 2022. Accessed October 11, 2025.

Gil-Montoya, J. A., Rivero-Blanco, T., Leon-Rios, X., Exposito-Ruiz, M., Pérez-Castillo, I., & Aguilar-Cordero, M. J. (2023). Oral and general health conditions involved in periodontal status during pregnancy: a prospective cohort study. *Archives of Gynecology and Obstetrics*, *308*(6), 1765–1773.
URL https://doi.org/10.1007/s00404-022-06843-3

Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics*, *225*(2), 254–277.
URL https://www.sciencedirect.com/science/article/pii/S0304407621001445

Gupta, N., & Yarbrough, C. (2017). Medicaid fee-for-service reimbursement rates for child and adult dental care services for all states, 2016.

Hill, C. M., Jones, M. P., & Chi, D. L. (2022). Effects of Adult Medicaid Dental Benefits Elimination on Child Dental Care Use. *Medical Care*, *60*(8), 579.
URL https://journals.lww.com/lww-medicalcare/fulltext/2022/08000/Effects_of_Adult_Medicaid_Dental_Benefits.5.aspx

Horton, A. L., Boggess, K. A., Moss, K. L., Jared, H. L., Beck, J., & Offenbacher, S. (2008). Periodontal disease early in pregnancy is associated with maternal systemic inflammation among african american women. *Journal of periodontology*, *79*(7), 1127–1132.

Howell, E. M. (2001). The impact of the medicaid expansions for pregnant women: a synthesis of the evidence. *Medical care research and review*, *58*(1), 3–30.

Huh, J. (2021). Medicaid and provider supply. *Journal of Public Economics*, *200*, 104430.

Hunter, L. P., & Yount, S. M. (2011). Oral Health and Oral Health Care Practices Among Low-Income Pregnant Women. *Journal of Midwifery & Women's Health*, *56*(2), 103–109. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1542-2011.2011.00041.x.
URL https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1542-2011.2011.00041.x

Ide, M., & Papapanou, P. N. (2013). Epidemiology of association between maternal periodontal disease and adverse pregnancy outcomes – systematic review. *Journal of Clinical Periodontology*, *40*(s14), S181–S194. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/jcpe.12063.
URL https://onlinelibrary.wiley.com/doi/abs/10.1111/jcpe.12063

Iheozor-Ejiofor, Z., Middleton, P., Esposito, M., & Glenny, A. M. (2017). Treating periodontal disease for preventing adverse birth outcomes in pregnant women. *The*

Cochrane Database of Systematic Reviews, *6*(6), CD005297.
URL https://doi.org/10.1002/14651858.CD005297.pub3

Jeffcoat, M. K., Jeffcoat, R. L., Gladowski, P. A., Bramson, J. B., & Blum, J. J. (2014). Impact of Periodontal Therapy on General Health: Evidence from Insurance Data for Five Systemic Conditions. *American Journal of Preventive Medicine*, *47*(2), 166–174.
URL https://www.sciencedirect.com/science/article/pii/S0749379714001536

Kaiser Family Foundation (2025). Medicaid benefits: Dental services. Indicator showing Medicaid enrollee cost-sharing of $1–$3 per visit.
URL https://www.kff.org/medicaid/state-indicator/dental-services/

Karasek, D., Collin, D. F., Hamad, R., Jackson, K., & Gemmill, A. (2025). Perinatal health and healthcare utilisation during the covid-19 pandemic: A nationwide interrupted time series analysis. *Paediatric and Perinatal Epidemiology*, *39*(4), 373–384.

Kaur, M., Geisinger, M. L., Geurs, N. C., Griffin, R., Vassilopoulos, P. J., Vermeulen, L., Haigh, S., & Reddy, M. S. (2014). Effect of Intensive Oral Hygiene Regimen During Pregnancy on Periodontal Health, Cytokine Levels, and Pregnancy Outcomes: A Pilot Study. *Journal of Periodontology*, *85*(12), 1684–1692. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1902/jop.2014.140248.
URL https://onlinelibrary.wiley.com/doi/abs/10.1902/jop.2014.140248

KFF (2023). Births Financed by Medicaid.
URL https://www.kff.org/medicaid/state-indicator/births-financed-by-medicaid/

KFF (2025). Medicaid benefits: Dental services (state health facts). https://www.kff.org/medicaid/state-indicator/dental-services/. Accessed October 11, 2025.

KFF (2025). Medicaid enrollment and unwinding tracker. https://www.kff.org/medicaid/medicaid-enrollment-and-unwinding-tracker/. Accessed: October 2025.

Kim, T., Ellison, J., Steinberg, J. R., & Boudreaux, M. H. (2025). Abortion rate increased and birth rate decreased after introduction of medicaid abortion coverage in illinois: Article examines abortion rates and birth rates after the introduction of medicaid abortion coverage in illinois. *Health Affairs*, *44*(2), 224–233.

Kostova, D., Xu, X., Babb, S., McMenamin, S. B., & King, B. A. (2018). Does state medicaid coverage of smoking cessation treatments affect quitting? *Health services research*, *53*(6), 4725–4746.

Kranz, A. M., & Estrada-Darley, I. (2022). Racial/Ethnic Differences in Receipt of Dental Cleanings During Pregnancy. *Women's Health Issues*, *32*(6), 615–622.
URL https://www.sciencedirect.com/science/article/pii/S1049386722000767

Lee, H., Hong, N., & Janevic, T. (2025). Prenatal dental visits, perceived benefits of oral health, and preterm birth outcome, 2009–2021. *JDR Clinical and Translational Research*. Advance online publication.
URL https://doi.org/10.1177/23800844251318698

Lee, H., Marsteller, J. A., & Wenzel, J. (2022a). Dental care utilization during pregnancy by Medicaid dental coverage in 26 states: Pregnancy risk assessment monitoring system 2014–2015. *Journal of Public Health Dentistry*, *82*(1), 61–71. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/jphd.12483.
URL https://onlinelibrary.wiley.com/doi/abs/10.1111/jphd.12483

Lee, H., Tranby, E., & Shi, L. (2022b). Dental Visits during Pregnancy: Pregnancy Risk Assessment Monitoring System Analysis 2012–2015. *JDR Clinical & Translational Research*, *7*(4), 379–388. Publisher: SAGE Publications Inc.
URL https://doi.org/10.1177/23800844211028541

Lee, J. (2024). Correlates of and disparities in cancellations or delays of prenatal visits during the covid-19 pandemic: emphasis on racial/ethnic minorities and persons with low socioeconomic status. *Journal of Racial and Ethnic Health Disparities*, *11*(3), 1564–1577.

Lee, Y.-L., Hu, H.-Y., Chou, S.-Y., Lin, C.-L., Cheng, F.-S., Yu, C.-Y., & Chu, D. (2022c). Periodontal disease and preterm delivery: a nationwide population-based cohort study of taiwan. *Scientific reports*, *12*(1), 3297.

Lipton, B. J. (2021). Adult Medicaid benefit generosity and receipt of recommended health services among low-income children: The spillover effects of Medicaid adult dental coverage expansions. *Journal of Health Economics*, *75*, 102404.
URL https://www.sciencedirect.com/science/article/pii/S016762962031050X

Lipton, B. J., & Decker, S. L. (2015). The effect of health insurance coverage on medical care utilization and health outcomes: evidence from medicaid adult vision benefits. *Journal of health economics*, *44*, 320–332.

Lipton, B. J., Wherry, L. R., Miller, S., Kenney, G. M., & Decker, S. (2016). Previous Medicaid Expansion May Have Had Lasting Positive Effects On Oral Health Of Non-Hispanic Black Children. *Health Affairs*, *35*(12), 2249–2258. Publisher: Health Affairs.
URL https://www.healthaffairs.org/doi/full/10.1377/hlthaff.2016.0865

Lyu, W., Shane, D. M., & Wehby, G. L. (2020). Effects of the Recent Medicaid Expansions on Dental Preventive Services and Treatments. *Medical Care*, *58*(8), 749. URL https://journals.lww.com/lww-medicalcare/fulltext/2020/08000/effects_of_the_recent_medicaid_expansions_on.13.aspx

MACPAC (2025). Mandatory and optional benefits. https://www.macpac.gov/subtopic/mandatory-and-optional-benefits/. Accessed: October 2025.

Madianos, P. N., Bobetsis, Y. A., & Offenbacher, S. (2013). Adverse pregnancy outcomes (apo s) and periodontal disease: pathogenic mechanisms. *Journal of clinical periodontology*, *40*, S170–S180.

Manger, D., Walshaw, M., Fitzgerald, R., Doughty, J., Wanyonyi, K. L., White, S., & Gallagher, J. E. (2017). Evidence summary: the relationship between oral health and pulmonary disease. *British Dental Journal*, *222*(7), 527–533. Publisher: Nature Publishing Group.
URL https://www.nature.com/articles/sj.bdj.2017.315

Medicaid, Payment, C., & Commission, A. (2021). Medicaid coverage of adult dental services. https://www.macpac.gov/publication/medicaid-coverage-of-adult-dental-services/. See also PDF compendium: https://www.macpac.gov/wp-content/uploads/2021/01/Medicaid-Coverage-of-Adult-Dental-Services.pdf, Accessed October 11, 2025.

Michalowicz, B. S., Hodges, J. S., DiAngelis, A. J., Lupo, V. R., Novak, M. J., Ferguson, J. E., Buchanan, W., Bofill, J., Papapanou, P. N., Mitchell, D. A., et al. (2006). Treatment of periodontal disease and the risk of preterm birth. *New England Journal of Medicine*, *355*(18), 1885–1894.

Naavaal, S., & Harless, D. W. (2022). Comprehensive pregnancy dental benefits improved dental coverage and increased dental care utilization among Medicaid-enrolled pregnant women in Virginia. *Frontiers in Oral Health*, *3*. Publisher: Frontiers.
URL https://www.frontiersin.org/journals/oral-health/articles/10.3389/froh.2022.989659/full

Naito, M., Yuasa, H., Nomura, Y., Nakayama, T., Hamajima, N., & Hanada, N. (2006). Oral health status and health-related quality of life: a systematic review. *Journal of Oral Science*, *48*(1), 1–7.

Nasseh, K., Vujicic, M., & Glick, M. (2017). The Relationship between Periodontal Interventions and Healthcare Costs and Utilization. Evidence from an Integrated Dental, Medical, and Pharmacy Commercial Claims Database. *Health Economics*,

26(4), 519–527. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1002/hec.3316.
URL https://onlinelibrary.wiley.com/doi/abs/10.1002/hec.3316

Offenbacher, S., Lin, D., Strauss, R., McKaig, R., Irving, J., Barros, S. P., Moss, K., Barrow, D. A., Hefti, A., & Beck, J. D. (2006). Effects of periodontal therapy during pregnancy on periodontal status, biologic parameters, and pregnancy outcomes: a pilot study. *Journal of periodontology*, *77*(12), 2011–2024.

Oliveira, C. d., Watt, R., & Hamer, M. (2010). Toothbrushing, inflammation, and risk of cardiovascular disease: results from Scottish Health Survey. *BMJ*, *340*, c2451. Publisher: British Medical Journal Publishing Group Section: Research.
URL https://www.bmj.com/content/340/bmj.c2451

Orlandi, M., Munoz Aguilera, E., Marletta, D., Petrie, A., Suvan, J., & D'Aiuto, F. (2022). Impact of the treatment of periodontitis on systemic health and quality of life: A systematic review. *Journal of clinical periodontology*, *49*, 314–327.

Puertas, A., Magan-Fernandez, A., Blanc, V., Revelles, L., O'Valle, F., Pozo, E., León, R., & Mesa, F. (2018). Association of periodontitis with preterm birth and low birth weight: a comprehensive review. *The Journal of Maternal-Fetal & Neonatal Medicine*, *31*(5), 597–602. Publisher: Taylor & Francis.
URL https://www.tandfonline.com/doi/full/10.1080/14767058.2017.1293023

Ranade, A., Hsia, R. Y., & Singhal, A. (2025). Policy changes in medicaid dental benefits and emergency department dental visits. *JAMA internal medicine*, *185*(5), 602–604.

Robison, V., Bauman, B., D'Angelo, D. V., Espinoza, L., Thornton-Evans, G., & Lin, M. (2021). The Impact of Dental Insurance and Medical Insurance on Dental Care Utilization During Pregnancy. *Maternal and Child Health Journal*, *25*(5), 832–840.
URL https://doi.org/10.1007/s10995-020-03094-z

Sanz, M., Marco del Castillo, A., Jepsen, S., Gonzalez-Juanatey, J. R., D'Aiuto, F., Bouchard, P., Chapple, I., Dietrich, T., Gotsman, I., Graziani, F., Herrera, D., Loos, B., Madianos, P., Michel, J.-B., Perel, P., Pieske, B., Shapira, L., Shechter, M., Tonetti, M., Vlachopoulos, C., & Wimmer, G. (2020). Periodontitis and cardiovascular diseases: Consensus report. *Journal of Clinical Periodontology*, *47*(3), 268–288. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/jcpe.13189.
URL https://onlinelibrary.wiley.com/doi/abs/10.1111/jcpe.13189

Saygili, M., & Bayindir, E. E. (2024). Association of medicaid expansion with birth outcomes: evidence from a natural experiment in texas. *BMC Public Health*, *24*(1), 1486.

Semprini, J., Reynolds, J., Zahnd, W. E., & Wehby, G. (2024). Eliminating medicaid dental benefits and early-stage oral cancer diagnoses. *Cancer Medicine*, *13*(4), e7061.

Singhal, A., Caplan, D. J., Jones, M. P., Momany, E. T., Kuthy, R. A., Buresh, C. T., Isman, R., & Damiano, P. C. (2015). Eliminating Medicaid Adult Dental Coverage In California Led To Increased Dental Emergency Visits And Associated Costs. *Health Affairs*, *34*(5), 749–756. Publisher: Health Affairs.
URL https://www.healthaffairs.org/doi/full/10.1377/hlthaff.2014.1358

Sonchak, L. (2015). Medicaid reimbursement, prenatal care and infant health. *Journal of health economics*, *44*, 10–24.

Sun, L., & Abraham, S. (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of econometrics*, *225*(2), 175–199.

Uwambaye, P., Munyanshongore, C., Rulisa, S., Shiau, H., Nuhu, A., & Kerr, M. S. (2021). Assessing the association between periodontitis and premature birth: a case-control study. *BMC pregnancy and childbirth*, *21*(1), 204.

Wehby, G. L., Lyu, W., Reynolds, J., & Levy, S. M. (2025). Effects of expanding medicaid dental coverage on general health status of low-income adults. *Medical care*, (pp. 10–1097).

Wehby, G. L., Lyu, W., & Shane, D. (2022). Racial And Ethnic Disparities In Dental Services Use Declined After Medicaid Adult Dental Coverage Expansions. *Health Affairs*, *41*(1), 44–52. Publisher: Health Affairs.
URL https://www.healthaffairs.org/doi/full/10.1377/hlthaff.2021.01191

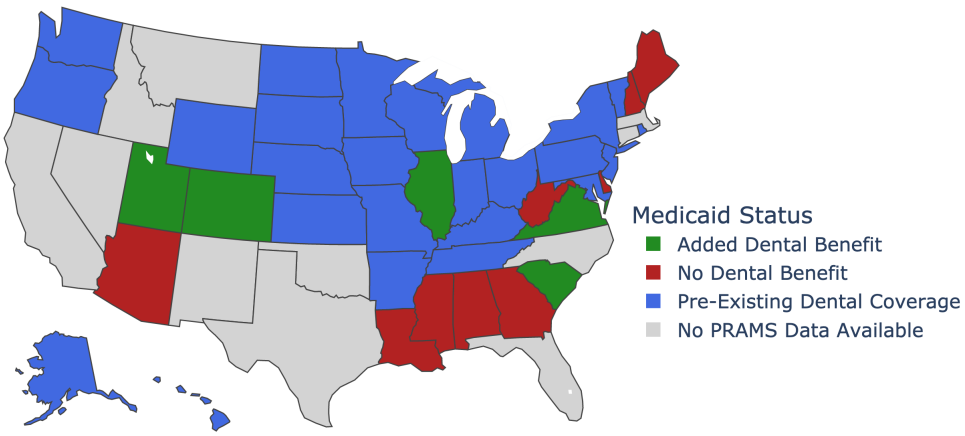
Wehby, G. L., Lyu, W., & Shane, D. M. (2019). The Impact of the ACA Medicaid Expansions on Dental Visits by Dental Coverage Generosity and Dentist Supply. *Medical Care*, *57*(10), 781.
URL https://journals.lww.com/lww-medicalcare/fulltext/2019/10000/the_impact_of_the_aca_medicaid_expansions_on.6.aspx

Wherry, L. R. (2018). State medicaid expansions for parents led to increased coverage and prenatal care utilization among pregnant mothers. *Health Services Research*, *53*(5), 3569–3591.

Wherry, L. R., Fabi, R., Schickedanz, A., & Saloner, B. (2017). State and federal coverage for pregnant immigrants: prenatal care increased, no change detected for infant health. *Health Affairs*, *36*(4), 607–615.

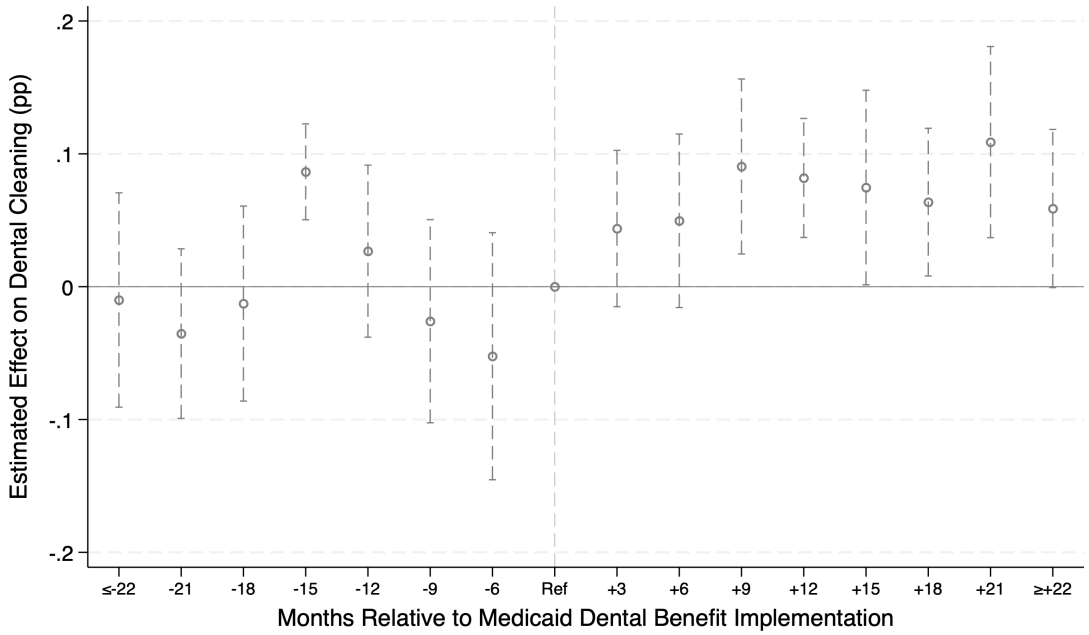
Wing, C., Freedman, S. M., & Hollingsworth, A. (2024). Stacked Difference-in-Differences.
URL https://www.nber.org/papers/w32054

Figure 1: State Variation in Medicaid Pregnancy Dental Benefits, 2012–2019



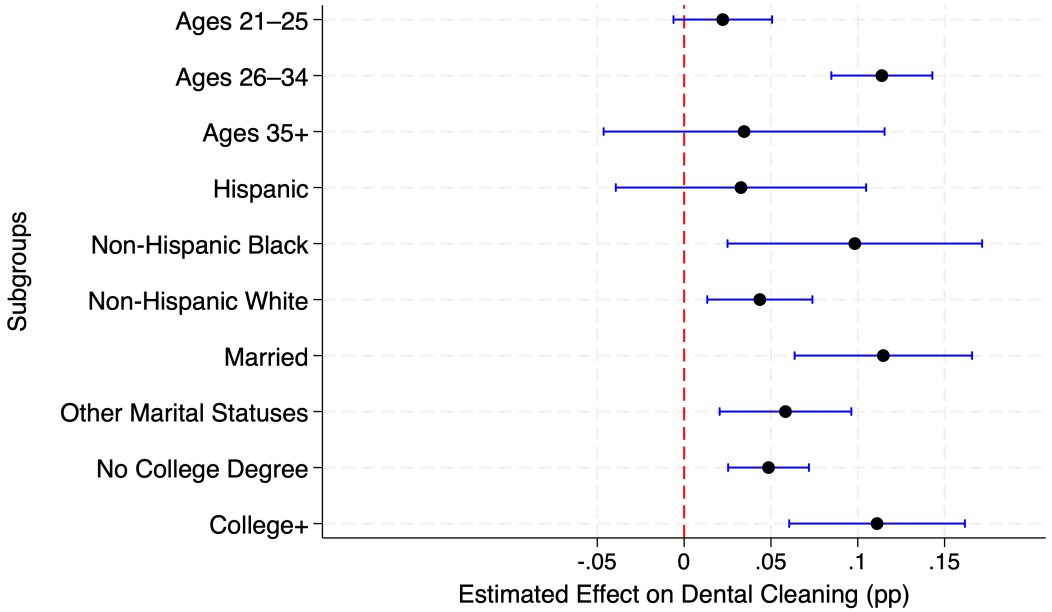
Notes: Figure shows state-level variation in Medicaid pregnancy dental benefit status from 2012–2019, based on the Pregnancy Risk Assessment Monitoring System (PRAMS) and state Medicaid policy reports. States shown in green added pregnancy dental benefits during the study period, blue states maintained pre-existing benefits, and red states did not offer pregnancy dental benefits. States shown in gray did not contribute sufficient PRAMS data or fell below reporting thresholds for inclusion during the study period.

Figure 2: Effect of Medicaid Pregnancy Dental Benefits on Dental Cleaning: Event Study Estimates



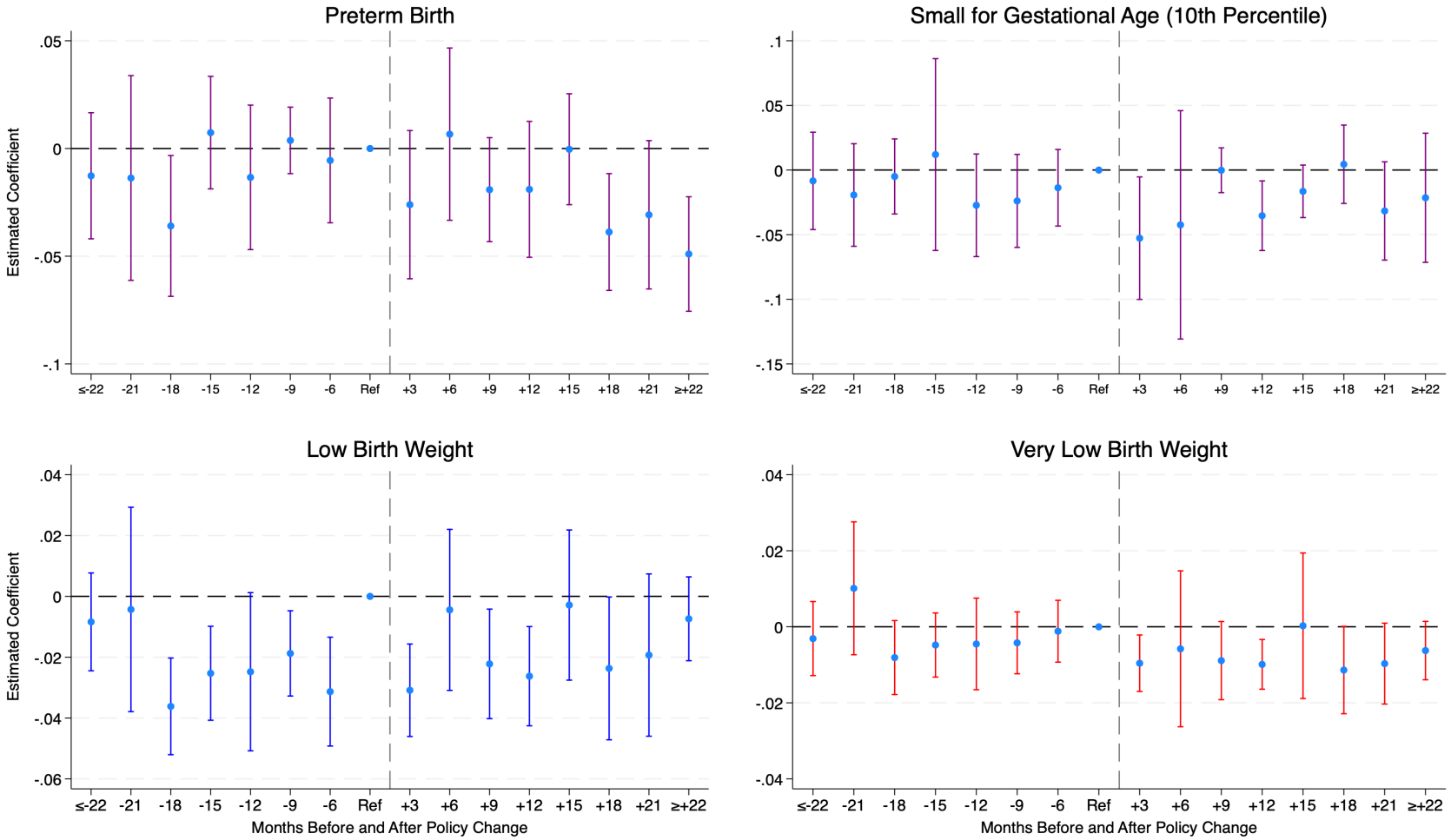
Notes: The figure displays event study estimates of the effect of Medicaid pregnancy dental benefit expansions on prenatal dental cleaning rates, using a stacked difference-in-differences approach. The x-axis represents time in months before and after policy adoption, and the y-axis shows the estimated coefficients. Confidence intervals are indicated by the vertical lines around the point estimates. The reference group is set to 0–3 months before policy implementation, and the estimates test the parallel trends assumption while capturing dynamic treatment effects.

Figure 3: Heterogeneous Effects of Medicaid Pregnancy Dental Benefits on Dental Cleaning by Subgroup



Notes: Figure presents heterogeneous effects of Medicaid pregnancy dental benefits on prenatal dental cleaning rates across demographic subgroups: maternal age (21–25, 26–34, 35+), race/ethnicity (Hispanic, Non-Hispanic Black, Non-Hispanic White), marital status (married vs. other), and education (no college degree vs. college+). Each point shows the estimated coefficient from a subgroup-specific stacked difference-in-differences regression, with horizontal bars representing 95% confidence intervals. The vertical red line at zero represents no effect.

Figure 4: Event Study Estimates: Effect of Medicaid Pregnancy Dental Benefits on Birth Outcomes



Notes: The figure displays event study estimates of the effect of Medicaid pregnancy dental benefit expansions on key birth outcomes, including low birth weight, very low birth weight, preterm birth, and small for gestational age (10th percentile), using a stacked difference-in-differences approach. Each panel corresponds to a separate outcome variable. The x-axis represents time in months before and after policy adoption, and the y-axis shows the estimated coefficients. Confidence intervals are indicated by the vertical lines around the point estimates. The reference group is set to 0–3 months before policy implementation, and the estimates test the parallel trends assumption while capturing dynamic treatment effects.

Table 1: Summary Statistics by State Medicaid Dental Policy Adoption and Pre/Post Policy Period

	No Dental Benefit	**Added Dental Benefit**	
	(1)	Pre (2)	Post (3)
Dental Care Utilization			
Received Dental Cleaning	0.253	0.271	0.304
Birth Outcomes			
Preterm Birth	0.115	0.107	0.09
Small for Gestational Age (10th Percentile)	0.122	0.112	0.109
Low Birth Weight	0.105	0.091	0.091
Very Low Birth Weight	0.017	0.016	0.016
Demographics			
Age of Mother	27.24	27.63	28.09
Less than High School	0.208	0.211	0.203
High School Graduate (GED)	0.391	0.345	0.349
Some College or Associate Degree	0.322	0.341	0.339
Bachelor's Degree or Higher	0.079	0.103	0.109
Non-Hispanic White	0.484	0.413	0.371
Non-Hispanic Black	0.318	0.261	0.235
Hispanic	0.109	0.281	0.293
Non-Hispanic Other	0.076	0.019	0.069
Married	0.345	0.402	0.418
Urban Areas	0.723	0.692	0.758
Household Income (Midpoint)	19304.57	18738.94	21771.1
Pre-pregnancy Risk	0.075	0.072	0.07
State Controls			
Medicaid Eligibility Limit for Pregnant Women	2.12	1.99	2.07
ACA Medicaid Expansion	0.04	0	0.345
Dentists per Capita	48.03	61.12	63.74
Unemployment Rate	7.44	8.76	6.32
Fertility Rate	62.3	63.37	62.53
Managed Care Organization	59.23	25.65	38.57
Health Centers per Capita	4.46	3.49	3.46

Notes: Table reports survey-weighted means of maternal, demographic, and state-level characteristics by Medicaid pregnancy dental benefit status and period. "No Dental Benefit" refers to control states that did not adopt pregnancy dental benefits during the study period. "Pre" and "Post" refer to births occurring before and after the effective date of benefit implementation in treatment states. Data are drawn from the Pregnancy Risk Assessment Monitoring System (PRAMS), 2012–2019.

Table 2: Sub-experiments of Medicaid dental benefit expansions for pregnant individuals

Sub-experiment Date	**Event Window**	**Treatment States**	**Control States**
10/2013	01/2012–10/2016	UT	DE, GA, ME, TN, WV, NH, AL, LA, MS
04/2014	01/2012–04/2017	CO	DE, GA, ME, TN, WV, NH, AL, LA, MS
07/2014	01/2012–07/2017	IL	DE, GA, ME, TN, WV, NH, AL, LA, MS
12/2014	01/2012–12/2017	SC	DE, GA, ME, TN, WV, NH, AL, LA, MS
03/2015	01/2012–03/2018	VA	DE, GA, ME, TN, WV, NH, AL, LA, MS

Notes: This table summarizes the sub-experiments used in the stacked difference-in-differences design. Each sub-experiment corresponds to a treatment state's Medicaid pregnancy dental benefit adoption date and compares it to a set of control states that did not adopt similar benefits during the event window. This structure decomposes staggered policy timing into two-by-two contrasts and supports aggregation across states and adoption cohorts. Event windows span up to 36 months before and after policy implementation, allowing for estimation of dynamic effects and assessment of pre-trends.

Table 3: Effect of Medicaid Pregnancy Dental Benefits on Dental Cleaning and Birth Outcomes

	Dental Cleaning	Small for Gestational Age (P10)	Preterm Birth	Low Birth Weight	Very Low Birth Weight
Pregnancy Dental Benefit	0.0716***	-0.0119**	-0.00900	0.00503	-0.00470***
	(0.0138)	(0.00518)	(0.00633)	(0.00321)	(0.00147)
Baseline Mean	0.246	0.125	0.112	0.103	0.017
Observations	67068	61317	64282	67132	67132
R-squared	0.038	0.015	0.025	0.023	0.010

Notes: This table reports estimates of the effect of Medicaid pregnancy dental benefits on prenatal dental cleaning and key birth outcomes. Each column represents results from a separate regression estimated using a stacked difference-in-differences framework that accounts for staggered policy adoption. Covariates include maternal age, race/ethnicity, education, marital status, household income, urban/rural residence, and pre-pregnancy risk factors, along with state-level controls such as Medicaid eligibility limits, managed care penetration, and broader socioeconomic indicators. All models include state and birth quarter-by-year fixed effects and incorporate PRAMS survey weights to ensure population representativeness. Standard errors are clustered at the state level. Statistical significance is denoted by *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

Table 4: Effect of Medicaid Pregnancy Dental Benefits on Birth Outcomes (CDC Wonder Data)

	Very Low Birthweight	Low Birthweight	Preterm Birth
Pregnancy Dental Benefit	-0.113	-3.410***	-2.249
	(0.614)	(1.245)	(1.513)
Baseline Mean	20.735	107.745	117.477
Observations	2090	2906	2906
R-squared	0.523	0.647	0.697

Notes: This table reports estimates of the effect of Medicaid pregnancy dental benefits on birth outcomes using aggregated CDC Wonder natality data. Outcomes are measured as rates per 1,000 live births. Estimates are derived from a stacked difference-in-differences framework that accounts for staggered policy adoption. Models include state and birth quarter-by-year fixed effects and control for state-level socioeconomic conditions and health infrastructure variables. Standard errors are clustered at the state level. Statistical significance is denoted by *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

Table 5: Effect of Medicaid Pregnancy Dental Benefits and Adult Medicaid Expansions on Dental Cleaning and Birth Outcomes

	Dental Cleaning	Small for Gestational Age (P10)	Preterm Birth	Low Birth Weight	Very Low Birth Weight
Pregnancy Dental Benefit	0.0734***	-0.00347	-0.000311	0.00301	-0.00422**
	(0.0269)	(0.00817)	(0.00559)	(0.00430)	(0.00187)
Non-Pregnant Medicaid Expansion	-0.00308	-0.0147*	-0.0151*	0.00349	-0.000819
	(0.0271)	(0.00858)	(0.00803)	(0.00492)	(0.00260)
Observations	67068	61317	64282	67132	67132
R-squared	0.038	0.015	0.025	0.023	0.010

Notes: This table reports estimates of the effects of Medicaid pregnancy dental benefit adoption and non-pregnancy adult Medicaid expansions on prenatal dental cleaning and key birth outcomes. Each column presents results from a separate regression estimated using a stacked difference-in-differences framework that accounts for staggered policy adoption. Models include maternal demographic covariates, household income, state-level socioeconomic conditions, and healthcare infrastructure characteristics. All models incorporate PRAMS survey weights and include state and birth quarter-by-year fixed effects. Standard errors are clustered at the state level. Statistical significance is denoted by *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

Table 6: Effect of Medicaid Pregnancy Dental Benefits on Dental Cleaning and Birth Outcomes Among Women Less Likely to Qualify for Pre-Conception Medicaid

	Dental Cleaning	Small for Gestational Age (P10)	Preterm Birth	Low Birth Weight	Very Low Birth Weight
Pregnancy Dental Benefit	0.0675***	-0.0131*	-0.0144	-0.00276	-0.00696***
	(0.0168)	(0.00672)	(0.00984)	(0.00580)	(0.00249)
Baseline Mean	0.282	0.109	0.101	0.086	0.014
Observations	40476	37192	38908	40485	40485
R-squared	0.030	0.020	0.031	0.026	0.014

Notes: This table reports estimates of the effect of Medicaid pregnancy dental benefits on prenatal dental cleaning and key birth outcomes among women less likely to qualify for pre-conception Medicaid. The analysis excludes women with family incomes under 138% of the federal poverty level, corresponding to those most likely eligible for Medicaid prior to pregnancy. Each column presents results from a separate regression estimated using a stacked difference-in-differences framework that accounts for staggered policy adoption. Models control for maternal demographics (age, race/ethnicity, education, marital status, and urban/rural residence), household income, and pre-pregnancy risk factors, as well as state-level socioeconomic conditions, Medicaid eligibility limits, managed care penetration, and healthcare infrastructure characteristics. All models include state and birth quarter-by-year fixed effects and incorporate PRAMS survey weights. Standard errors are clustered at the state level. Statistical significance is denoted by *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

Table 7: Effect of Medicaid Pregnancy Dental Benefits on Prenatal Care, Dental Coverage, and Smoking Behaviors

	Adequate Prenatal Care (Kotelchuck)	Has Dental Insurance	Knows Dental Care is Important	Received Dental Care Advice	Maternal Smoking (Any)	Smoking Last 3 Months of Pregnancy	Non-Smoking After Pregnancy
Pregnancy Dental Benefit	-0.000125	0.135***	0.0115	0.0578**	0.0130	0.0147	0.00275
	(0.0169)	(0.0260)	(0.0200)	(0.0215)	(0.0148)	(0.0146)	(0.0115)
Observations	62819	47533	48269	48298	66003	66507	66479
R-squared	0.038	0.113	0.042	0.031	0.171	0.174	0.170

Notes: This table reports estimates of the effects of Medicaid pregnancy dental benefits on prenatal care adequacy, dental insurance coverage, oral health awareness, provider dental advice, and maternal smoking behaviors. Each column presents results from a separate regression estimated using a stacked difference-in-differences framework that accounts for staggered policy adoption. Models control for maternal demographics (age, race/ethnicity, education, marital status, and urban/rural residence), household income, and pre-pregnancy risk factors, as well as state-level socioeconomic conditions, Medicaid eligibility limits, managed care penetration, and healthcare infrastructure characteristics. All models include state and birth quarter-by-year fixed effects and incorporate PRAMS survey weights. Standard errors are clustered at the state level. Statistical significance is denoted by *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

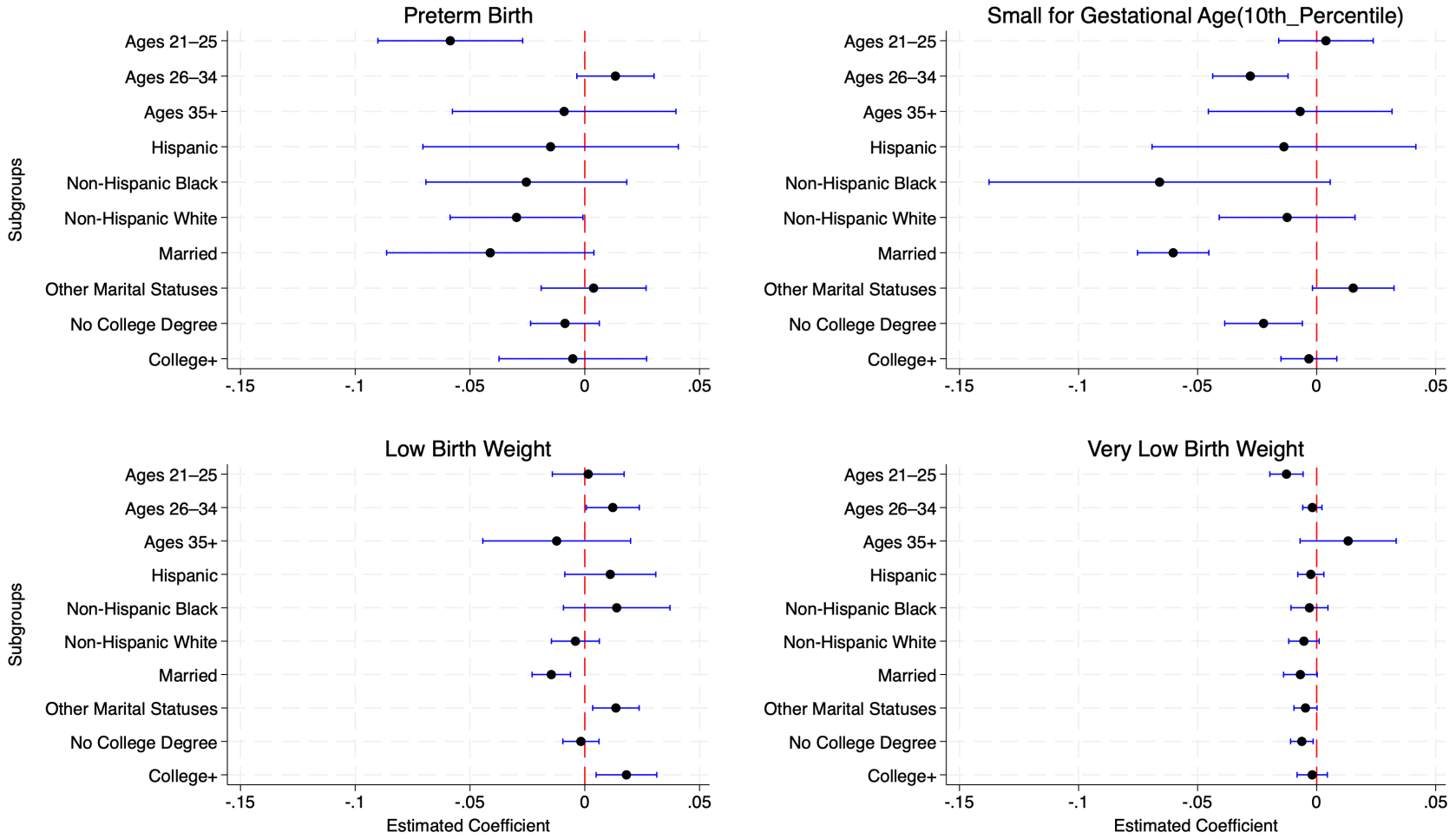
Table 8: Intent-to-Treat Estimates: Effect of Medicaid Pregnancy Dental Benefits

	All Sample	Low Education ($\leq$ Associate)	High Education ($\geq$ Bachelor's)	Income $\leq$ \$50k	Income $\geq$ \$75k
Panel A: Dental Cleaning					
Pregnancy Dental Benefit	0.0420***	0.0572***	0.0362**	0.0423**	0.0262
	(0.0110)	(0.0124)	(0.0117)	(0.0151)	(0.0194)
Observations	148811	54838	93973	84565	35374
R-squared	0.161	0.050	0.135	0.042	0.043
Panel B: Small for Gestational Age (P10)					
Pregnancy Dental Benefit	-0.00113	0.00442	-0.00342	-0.00421	-0.00280
	(0.00539)	(0.0107)	(0.00822)	(0.00766)	(0.0137)
Observations	135413	50555	84858	77389	31858
R-squared	0.013	0.013	0.009	0.013	0.012
Panel C: Preterm Birth					
Pregnancy Dental Benefit	0.00116	-0.00853	0.00640	-0.00497	0.00439
	(0.00817)	(0.00984)	(0.00986)	(0.00739)	(0.00585)
Observations	143090	52829	90261	81203	34210
R-squared	0.018	0.021	0.015	0.020	0.013
Panel D: Low Birth Weight					
Pregnancy Dental Benefit	-0.00180	-0.0121**	0.00387	-0.00510*	-0.00282
	(0.00248)	(0.00394)	(0.00362)	(0.00250)	(0.00466)
Observations	148846	54871	93975	84553	35367
R-squared	0.020	0.017	0.019	0.018	0.010
Panel E: Very Low Birth Weight					
Pregnancy Dental Benefit	0.000368	-0.00189	0.00178	-0.000717	0.00276
	(0.00160)	(0.00138)	(0.00213)	(0.00262)	(0.00179)
Observations	148846	54871	93975	84553	35367
R-squared	0.007	0.008	0.007	0.007	0.008

Notes: This table reports intent-to-treat estimates of the effect of Medicaid pregnancy dental benefits on prenatal dental cleaning and birth outcomes, stratified by education and income subgroups. Low education is defined as an associate degree or less; high education is defined as a bachelor's degree or higher. Income categories are based on midpoint estimates of self-reported household income brackets. Estimates are derived using a stacked difference-in-differences framework that accounts for staggered policy adoption. All models include individual demographic covariates, state-level socioeconomic controls, state and birth quarter-by-year fixed effects, and incorporate PRAMS survey weights to ensure population representativeness. Standard errors are clustered at the state level. Statistical significance is denoted by *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

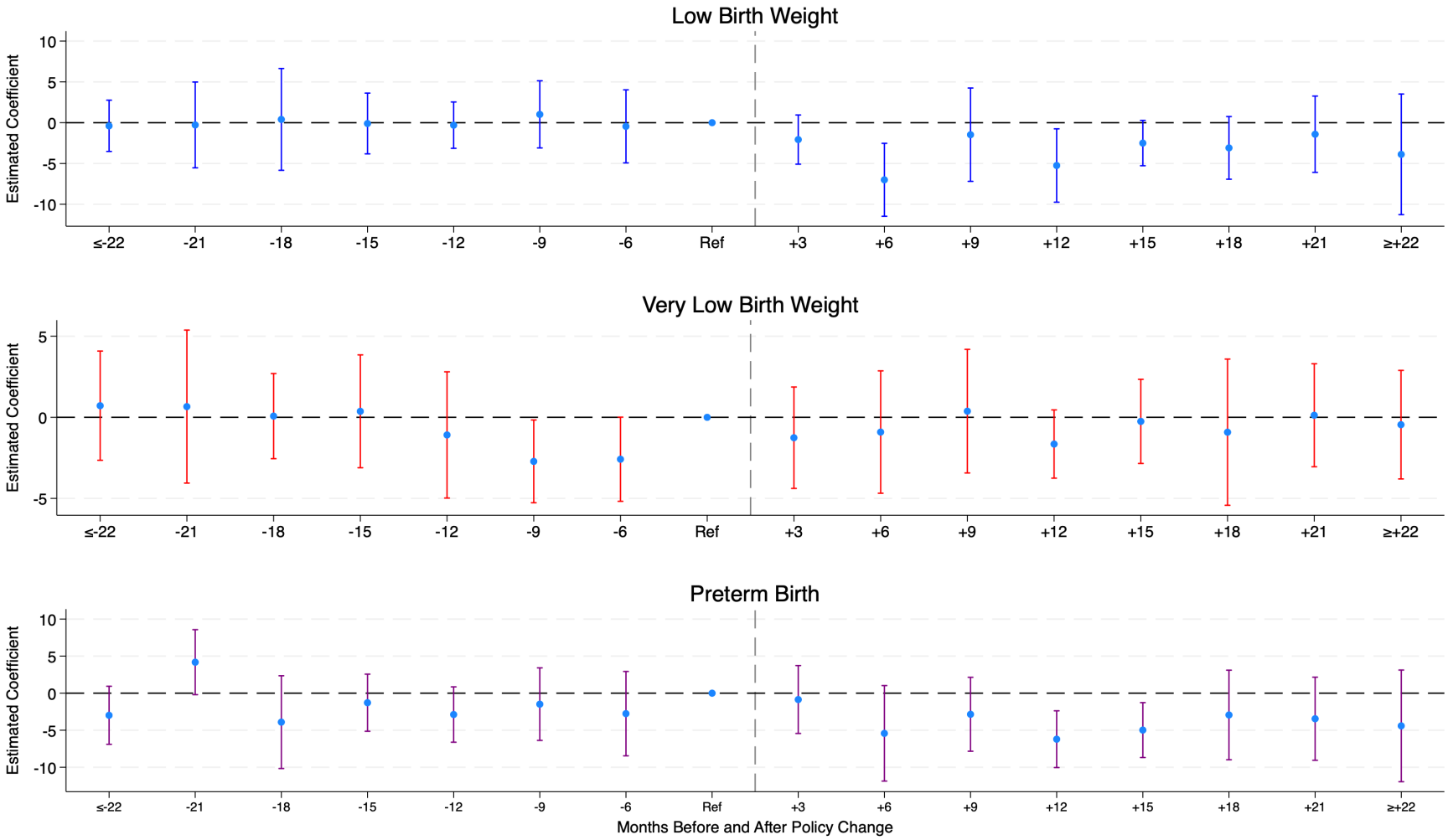
Appendix

Figure A.1: Heterogeneous Effects of Medicaid Pregnancy Dental Benefits on Birth Outcomes by Subgroup



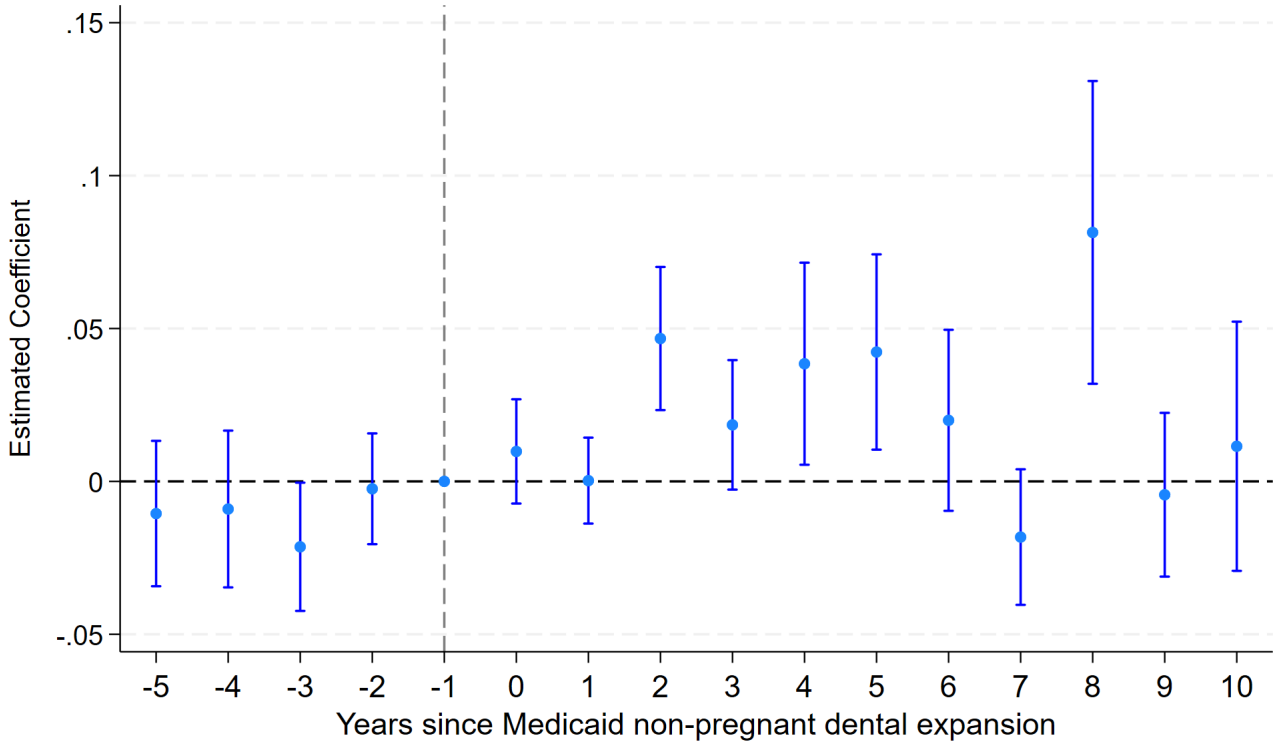
Notes: This figure presents heterogeneous effects of Medicaid pregnancy dental benefits on four birth outcomes—low birthweight, very low birthweight, preterm birth, and small for gestational age (10th percentile). Estimates are shown for demographic subgroups, including maternal age (21–25, 26–34, 35+), race/ethnicity (Hispanic, Non-Hispanic Black, Non-Hispanic White), marital status (married vs. other), and education (no college degree vs. college+). Each point represents the estimated coefficient from a separate subgroup regression, and the horizontal bars indicate 95% confidence intervals. The vertical red line at zero represents no effect.

Figure A.2: Event Study Estimates of Medicaid Pregnancy Dental Benefit Effects on Birth Outcomes Using CDC WONDER Data



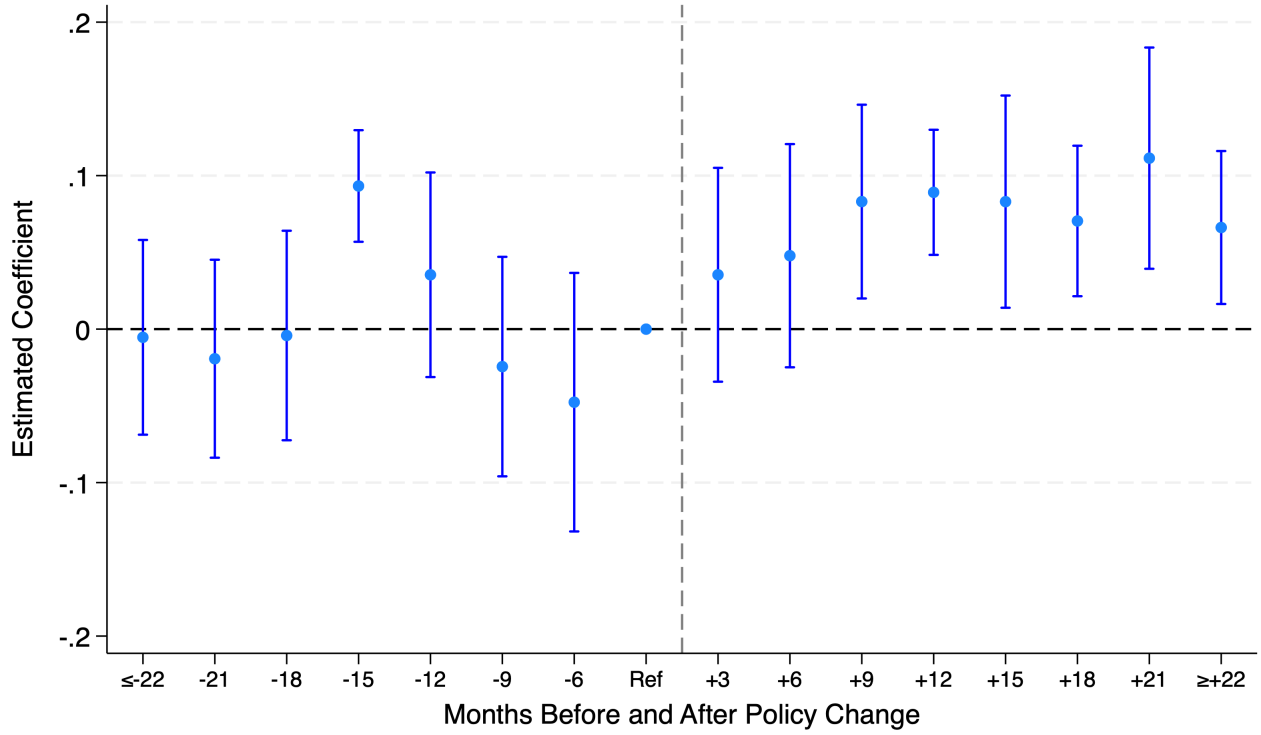
Notes: Each panel displays event study estimates from separate regressions estimated using a stacked difference-in-differences framework, evaluating the effect of Medicaid pregnancy dental benefit implementation on low birth weight, very low birth weight, and preterm birth rates (per 1,000 live births) using CDC WONDER natality data. The x-axis represents months relative to policy implementation, with the reference period set to 0–3 months before adoption. Models control for state-level covariates including fertility rate, managed care penetration, health center availability, unemployment rate, dentist supply, ACA expansion status, and pregnancy hotline availability. All models include state and year fixed effects, and standard errors are clustered at the state level. The shaded vertical line indicates the timing of policy implementation.

Figure A.3: Event Study Estimates: Effect of Medicaid Adult Dental Expansions on Self-Reported General Health



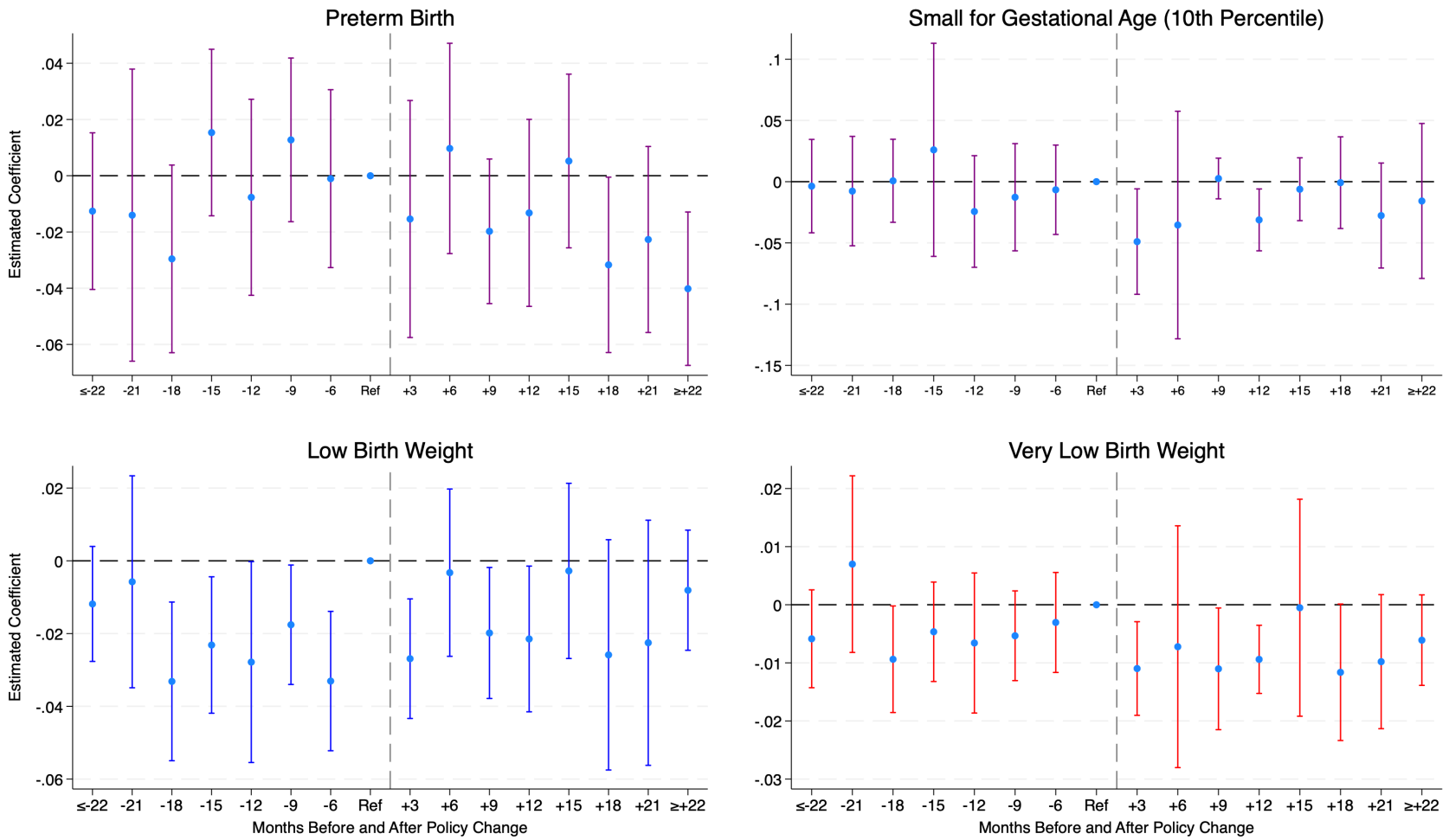
Notes: The figure presents event study estimates of the effect of adult Medicaid dental expansions on self-reported general health among non-pregnant reproductive-age women using BRFSS data. The x-axis indicates event time in years relative to policy implementation (year 0), and the y-axis shows estimated coefficients for each year. Each point reflects the estimated effect for a given year, with vertical bars representing 95% confidence intervals. The vertical dashed line marks the timing of the policy implementation. The average post-expansion effect is 0.013 (SE = 0.006), indicating a statistically significant increase in the probability of reporting "feeling good or better."

Figure A.4: Effect of Medicaid Pregnancy Dental Benefits on Dental Cleaning: Event Study Estimates (Including Post-COVID-19 Period)



Notes: The figure displays event study estimates of the effect of Medicaid pregnancy dental benefit expansions on prenatal dental cleaning rates, estimated using a stacked difference-in-differences framework with data extending through the post-COVID-19 period. Models control for maternal demographics (age, race/ethnicity, education, marital status, urban/rural residence, pre-pregnancy risk factors, and household income), state-level socioeconomic and healthcare characteristics (Medicaid eligibility limits, ACA expansion, managed care penetration, dentist supply, unemployment rate, health centers per capita, and fertility rate), and COVID-19–related measures (case and death rates, business closures, stay-at-home orders, elective care restrictions, and overall government response index). The x-axis represents months relative to policy adoption, and the y-axis shows estimated coefficients with 95% confidence intervals. The reference group is 0–3 months before policy implementation. These estimates test the parallel trends assumption and capture dynamic treatment effects over time.

Figure A.5: Event Study Estimates: Effect of Medicaid Pregnancy Dental Benefits on Birth Outcomes (Including Post-COVID-19 Period)



Notes: The figure presents event study estimates of the effect of Medicaid pregnancy dental benefits on key birth outcomes—including low birth weight, very low birth weight, preterm birth, and small for gestational age (10th percentile)—estimated using a stacked difference-in-differences framework with data extending through the post-COVID-19 period. Each panel corresponds to a separate outcome, with the x-axis representing months relative to policy implementation and the y-axis showing estimated coefficients with 95% confidence intervals. Models control for maternal demographic characteristics, state-level socioeconomic and healthcare factors, and COVID-19–related measures (case and death rates.

Table A.1: Effect of Medicaid Pregnancy Dental Benefits on Dental Cleaning (Stacked DID)

	(1)	(2)	(3)	(4)
Pregnancy Dental Benefit	0.0658***	0.0806***	0.0737***	0.0716***
	(0.0160)	(0.0127)	(0.0148)	(0.0138)
State	YES	YES	YES	YES
Year	YES	YES	YES	YES
Demographics		YES	YES	YES
Contextual Factors			YES	YES
Health Resources				YES
Observations	68840	67068	67068	67068
R-squared	0.016	0.037	0.038	0.038

Notes: The table reports estimates of the effect of Medicaid pregnancy dental benefits on prenatal dental cleaning using a stacked difference-in-differences design. Each column corresponds to a separate regression that sequentially adds controls for maternal demographics, state-level socioeconomic characteristics, and healthcare resource availability. All models include state and birth quarter-by-year fixed effects and apply PRAMS survey weights to ensure population representativeness. Robust standard errors clustered at the state level are reported in parentheses. Statistical significance is denoted as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.2: Effect of Medicaid Pregnancy Dental Benefits on Dental Cleaning and Birth Outcomes (TWFE)

	Dental Cleaning	Small for Gestational Age (P10)	Preterm Birth	Low Birth Weight	Very Low Birth Weight
Pregnancy Dental Benefit	0.0815***	-0.0119	-0.0189	-0.0107**	-0.00380
	(0.0194)	(0.00846)	(0.0112)	(0.00368)	(0.00309)
Baseline Mean	0.244	0.122	0.117	0.104	0.017
Observations	28758	26555	27781	28786	28786
R-squared	0.034	0.012	0.025	0.020	0.009

Notes: The table presents estimates of the effect of Medicaid pregnancy dental benefits on dental cleaning during pregnancy and key birth outcomes using a traditional two-way fixed effects specification. Each column corresponds to results from a separate regression, with robust standard errors clustered at the state level shown in parentheses. The baseline mean is the average rate of each outcome in states without Medicaid pregnancy dental benefits. Covariates include maternal age, race/ethnicity, education, marital status, urban/rural residence, and pre-pregnancy risk factors, along with state-level controls such as Medicaid eligibility limits, managed care penetration, and broader contextual factors. All models include state and birth quarter-by-year fixed effects to account for unobserved heterogeneity across states and over time. Statistical significance is denoted as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.3: Effect of Medicaid Pregnancy Dental Benefits on Prenatal Dental Cleaning and Birth Outcomes (Including Post-COVID-19 Period)

	Dental Cleaning	Small for Gestational Age (P10)	Preterm Birth	Low Birth Weight	Very Low Birth Weight
Pregnancy Dental Benefit	0.0663***	-0.0149***	-0.00758	0.00693**	-0.00427**
	(0.0151)	(0.00506)	(0.00551)	(0.00304)	(0.00164)
Baseline Mean	0.242	0.123	0.114	0.105	0.017
Observations	95582	87430	91572	95653	95653
R-squared	0.039	0.014	0.026	0.023	0.010

Notes: The table presents estimates of the effect of Medicaid pregnancy dental benefits on prenatal dental cleaning and key birth outcomes using data that include the post-COVID-19 period. Each column reports results from a separate regression controlling for maternal demographics (age, race/ethnicity, education, marital status, urban/rural residence, pre-pregnancy risk factors), and state-level socioeconomic and healthcare characteristics (Medicaid eligibility limits, managed care penetration, dentist supply, unemployment rate, health centers per capita, and fertility rate). Models also adjust for COVID-19–related factors, including case and death rates, business closures, stay-at-home orders, elective care restrictions, and the government response index. All models include state and birth quarter-by-year fixed effects and apply PRAMS survey weights to ensure population representativeness. Robust standard errors clustered at the state level are shown in parentheses. Statistical significance is denoted as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.4: Stacked DiD Estimates by Event Window Length: Effect of Medicaid Pregnancy Dental Benefits

	Dental Cleaning	SGA (P10)	Preterm Birth	Low Birth Weight	Very Low Birth Weight
18-Month Window					
Pregnancy Dental Benefit	0.0730***	-0.00994	-0.000909	0.00373	-0.00238
	(0.0166)	(0.00753)	(0.00815)	(0.00484)	(0.00177)
Observations	40175	37807	39721	40185	40185
R-squared	0.041	0.019	0.025	0.023	0.008
24-Month Window					
Pregnancy Dental Benefit	0.0795***	-0.00935	-0.00428	0.00337	-0.00288*
	(0.0143)	(0.00669)	(0.00688)	(0.00390)	(0.00156)
Observations	50895	47481	49860	50914	50914
R-squared	0.040	0.016	0.025	0.023	0.009
48-Month Window					
Pregnancy Dental Benefit	0.0743***	-0.0111**	-0.0101**	-0.00223	-0.00542***
	(0.0105)	(0.00472)	(0.00492)	(0.00382)	(0.00118)
Observations	81552	73725	77216	81645	81645
R-squared	0.035	0.014	0.027	0.022	0.010

Notes: The table presents stacked difference-in-differences (SDiD) estimates of the effect of Medicaid pregnancy dental benefits on prenatal dental cleaning and birth outcomes using alternative event window lengths of 18, 24, and 48 months. Each panel corresponds to a distinct specification defining the pre- and post-policy observation periods used to construct the stacked DiD estimators. All models control for maternal demographic characteristics (age, race/ethnicity, education, marital status, urban/rural residence, and pre-pregnancy risk factors) and state-level socioeconomic and healthcare variables (Medicaid eligibility limits, managed care penetration, dentist supply, unemployment rate, fertility rate, and health centers per capita). Models include state-by-sub-experiment and birth quarter-by-year fixed effects and are weighted using PRAMS survey weights. Robust standard errors clustered at the state level are reported in parentheses. Statistical significance is denoted as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.5: Effect of Medicaid Pregnancy Dental Benefits on Dental Cleaning and Birth Outcomes (Self-Reported + Birth Certificate Medicaid)

	Dental Cleaning	Small for Gestational Age (P10)	Preterm Birth	Low Birth Weight	Very Low Birth Weight
Pregnancy Dental Benefit	0.0673***	0.000789	-0.00350	0.00880**	-0.00325*
	(0.0133)	(0.00439)	(0.00664)	(0.00426)	(0.00165)
Baseline Mean	0.253	0.122	0.111	0.101	0.016
Observations	74233	67809	71136	74292	74292
R-squared	0.036	0.014	0.022	0.021	0.009

Notes: The table presents stacked difference-in-differences estimates of the effect of Medicaid pregnancy dental benefits on prenatal dental cleaning and birth outcomes using a combined sample that includes both self-reported Medicaid coverage and Medicaid coverage reported on the birth certificate. Each column corresponds to results from a separate regression controlling for maternal demographic characteristics (age, race/ethnicity, education, marital status, urban/rural residence, and pre-pregnancy risk factors) and state-level socioeconomic and healthcare characteristics (Medicaid eligibility limits, managed care penetration, dentist supply, unemployment rate, fertility rate, and health centers per capita). All models include state-by-sub-experiment and birth quarter-by-year fixed effects and apply PRAMS survey weights to ensure population representativeness. Robust standard errors clustered at the state level are reported in parentheses. Statistical significance is denoted as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.6: Leave-One-Out Estimates: Effect of Medicaid Pregnancy Dental Benefits

	Full Sample	Excl. UT	Excl. IL	Excl. CO	Excl. VA	Excl. SC
Panel A: Dental Cleaning						
Pregnancy Dental Benefit	0.0716***	0.0812***	0.0437*	0.0654***	0.0764***	0.0716***
	(0.0138)	(0.00959)	(0.0231)	(0.0173)	(0.0161)	(0.0138)
Observations	67068	65470	64822	65030	66180	67068
R-squared	0.038	0.035	0.043	0.039	0.038	0.038
Panel B: Small for Gestational Age (P10)						
Pregnancy Dental Benefit	-0.0119**	-0.0148***	-0.00295	-0.0108	-0.0162***	-0.0119**
	(0.00518)	(0.00522)	(0.00728)	(0.00677)	(0.00572)	(0.00518)
Observations	61317	59778	59168	59391	60476	61317
R-squared	0.015	0.015	0.015	0.015	0.014	0.015
Panel C: Preterm Birth						
Pregnancy Dental Benefit	-0.00900	-0.00937	-0.0178*	-0.0104*	-0.0169***	-0.00900
	(0.00633)	(0.00736)	(0.00927)	(0.00602)	(0.00464)	(0.00633)
Observations	64282	62684	62039	62246	63393	64282
R-squared	0.025	0.025	0.026	0.026	0.023	0.025
Panel D: Low Birth Weight						
Pregnancy Dental Benefit	0.00503	0.00443	0.00470	0.00606*	0.00604	0.00503
	(0.00321)	(0.00327)	(0.00450)	(0.00357)	(0.00393)	(0.00321)
Observations	67132	65534	64886	65097	66241	67132
R-squared	0.023	0.023	0.022	0.023	0.023	0.023
Panel E: Very Low Birth Weight						
Pregnancy Dental Benefit	-0.00470***	-0.00559***	-0.00609**	-0.00337**	-0.00397**	-0.00470***
	(0.00147)	(0.00147)	(0.00252)	(0.00145)	(0.00157)	(0.00147)
Observations	67132	65534	64886	65097	66241	67132
R-squared	0.010	0.010	0.010	0.010	0.010	0.010

Notes: The table presents leave-one-out stacked difference-in-differences estimates of the effect of Medicaid pregnancy dental benefits on prenatal dental cleaning and birth outcomes. Each column excludes one treated state (Utah, Illinois, Colorado, Virginia, or South Carolina) from the estimation sample to assess the influence of individual states on overall results. Models control for maternal demographic characteristics (age, race/ethnicity, education, marital status, urban/rural residence, and pre-pregnancy risk factors) and state-level socioeconomic and healthcare characteristics (Medicaid eligibility limits, managed care penetration, dentist supply, unemployment rate, fertility rate, and health centers per capita). All specifications include state-by-sub-experiment and birth quarter-by-year fixed effects and apply PRAMS survey weights. Robust standard errors clustered at the state level are reported in parentheses. Statistical significance is denoted as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.7: Balance Test: Covariate Differences by Medicaid Pregnancy Dental Benefit Status

	Hispanic	Non-Hispanic Black	Non-Hispanic White	Non-Hispanic Other	Ages 21–25	Ages 26–34	Ages 35 and Over	Married	Other Marital Status	Urban Areas	Rural Areas
Pregnancy Dental Benefit	-0.0404**	-0.00877	0.0227	0.0264	0.0661***	-0.0801***	0.0141*	-0.0174	0.0174	-0.0250*	0.0250*
	(0.0197)	(0.00721)	(0.0488)	(0.0565)	(0.0230)	(0.0211)	(0.00790)	(0.0124)	(0.0124)	(0.0146)	(0.0146)
Observations	67141	67141	67141	67141	67141	67141	67141	67141	67141	67141	67141
R-squared	0.099	0.118	0.130	0.415	0.015	0.009	0.012	0.030	0.030	0.113	0.113
	Low Education	High Education	Low Income	Low Middle Income	Middle Income	Upper Income	High Income	Other Income	Prepregnancy Risk	No Risk	Missing Risk Info
Pregnancy Dental Benefit	0.0280	-0.0280	-0.00710	0.0312**	-0.0330*	0.0291***	-0.000825	0.0291***	-0.0177	0.00323	0.0144
	(0.0332)	(0.0332)	(0.0167)	(0.0126)	(0.0176)	(0.00728)	(0.00285)	(0.00728)	(0.0137)	(0.00552)	(0.0123)
Observations	67141	67141	67141	67141	67141	67141	67141	67141	67141	67141	67141
R-squared	0.011	0.011	0.074	0.017	0.040	0.034	0.006	0.034	0.450	0.018	0.832

Notes: The table presents results from balance tests based on stacked difference-in-differences models comparing baseline demographic and socioeconomic characteristics between states with and without Medicaid pregnancy dental benefits. Each coefficient represents the estimated difference in the specified covariate associated with dental benefit adoption, from separate regressions controlling for state-level socioeconomic and healthcare factors. All models include state and year fixed effects. Robust standard errors clustered at the state level are reported in parentheses. Statistical significance is denoted as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.