Political Determinants of Population Health: The Case of Donald Trump's Election, Trump's Campaign Rallies and U.S. States' Prioritization of Carceral Spending

By

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DISSERTATION

Submitted in partial satisfaction of the requirements for the degree of

DOCTOR OF PHILOSOPHY

In

Sociology

In the

OFFICE OF GRADUATE STUDIES

of the

UNIVERSITY OF CALIFORNIA

DAVIS

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2024

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Abstract

Between 80% and 90% of the modifiable contributors to population health are social determinants of health: health-related behaviors, socio-economic factors, and environmental factors, in other words, the conditions in which people are born, grow, live, work and age. (Hood et al. 2016; Magnan 2017). These circumstances are, at least in part, political constructions (Rodriguez 2019). At the macro-level, political factors include the character, ideology, and policies of political regimes and governing political parties (Beckfield and Krieger 2009; Rodriguez 2019; Torche and Rauf 2021). Yet even in the absence of policy implementation, politics influences health (Brown, Solazzo, and Gorman 2021; Gemmill et al. 2019; Lauderdale 2006; Morey et al. 2021; Samari et al. 2020; Torche and Sirois 2019). In this dissertation I study the link between three political determinants of population health in the U.S. and infant health and mortality: Donald Trump's election in November 2016, Trump's 2015-2016 presidential campaign rallies, and U.S. states' prioritization of carceral spending from 1980-2008.

In the first dissertation chapter, I investigate whether rates of and disparities in adverse birth outcomes between racialized and nativity groups changed after Donald Trump's November 2016 election, a period characterized by an increase in xenophobic and racist messages, policies, and actions in the U.S. Using data from 15,568,710 U.S. births between November 2012 and November 2018, we find that adverse birth outcomes increased after Trump's election among U.S.- and foreign-born mothers racialized as Black, Hispanic, and Asian & Pacific Islander, compared to the period encompassing the two Obama presidencies. Results for Whites suggest no change or a slight decrease in adverse outcomes following Trump's election, yet this finding was not robust to checks for seasonality. Black-White, Hispanic-White, and API-White disparities in

adverse birth outcomes widened among both U.S.- and foreign-born mothers after Trump's election. Findings suggest that Trump's election was a racist and xenophobic macro-level political. In the second dissertation chapter, I provide estimates for the causal effect of Donald Trump's presidential campaign rallies on infant health by using a staggered difference-in-difference research design using data of geocoded Trump rallies linked to monthly, county-level data from U.S. birth records collected between June 2014 and November 2017. I find that Trump rallies led to increases in very low birthweight among infants born to foreign-born Hispanic birthing parents and in low birthweight among infants born to foreign-born Asian and Pacific Islander birthing parents. This effect was not observed among U.S.-born women or foreign-born White and Black women. These ethnicity and race-specific health effects suggest that Trump's presidential rallies constituted a significant stressor for Hispanic and API foreign-born groups residing in the U.S. Further, this study underscores a significant finding: political events, and not just policy changes, have adverse effects on human health.

In the third dissertation chapter, I examine the association between a state prioritization of carceral spending over welfare expenditure and Black and White death rates in 42 U.S. states between 1980 and 2008. Using fixed-effects models and controlling for confounders, I find that U.S. states' fiscal prioritization of carceral systems to the exclusion of health and support is associated with an increased number of both Black and White deaths. The association between a states' carceral prioritization and Black death is larger than its association with White death, meaning that penal states increase racial inequality in mortality. Further, these negative consequences are concentrated in the South for both groups and in the West for White groups. My findings suggest that a penal-welfare regime that prioritizes punitive control over welfare support is a racializing tool used by

U.S. states harms population health and disproportionately harms the health of Black groups living in the South.

Acknowledgements

I would like to express my deepest gratitude to my advisor and chair of my dissertation committee, Dr. Erin Hamilton. Without her support, and countless hours of revisions and meetings this would not have been possible. Thank you for pushing me to think critically, explore questions, data, and methods that challenge me, and for providing guiding support along the way. I am deeply indebted to Dr. Caitlin Patler, from whom I learned how to think and ask sociological questions that address pressing social inequalities. Special thanks to Dr. Florencia Torche for encouraging my scholarship and providing critical feedback. Finally, I could not have dreamed of pursuing this degree had it not been for my family and friends who never doubted I would be able to accomplish this -even when I did. Vero and Alberto, thank you for providing me with a home in which to read, work, and discuss my ideas. Kitty and Tomas, I am grateful for the stability you provided to start this journey. To my Davis and Sacramento friends, Yao, Chendong, Angelita, Elizabeth, because you made this journey exciting and provided care and advice when I most needed it. To my family, Chanty, Adri, and Mama, this dissertation is for you. Thank you all.

Chapter 1: Adverse infant health outcomes increased after the 2016 presidential election among non-White U.S.-born and foreign-born mothers

Introduction

Macro-level political events are societal-level events such as wars, strikes, protests, and presidential elections, that impact entire populations and can improve or harm population health through multiple social determinants of health (Rodriguez 2019; Torche and Rauf 2021; Williams and Medlock 2017). By altering the distribution of public goods and services, as well as the collective norms and boundaries of national identity, macro-level political events link national politics and population health in enduring ways (O'Campo and Dunn 2012; Rodriguez 2019; Torche and Rauf 2021). The health impacts of macro-level political events often vary along pre-existing and intersecting axes of inequality, such as by race, class, and nativity (Aquino, Brand, and Torche 2022; Torche, Fletcher, and Brand 2024). When macro-level political events are economically disruptive and/or restrict rights, they can disproportionately harm groups that are already disadvantaged or marginalized within a social system—groups that are denied sufficient resources and power to shield themselves from harm, while maintaining or enhancing health for more privileged groups. These impacts, in turn, can widen pre-existing health disparities (Brown et al. 2019).

As macro-level political events, elections can impact health both through policy implementation as well as through signals of inclusion or threat communicated through the candidate's persona, campaign platform, and/or rhetoric (Gemmill et al. 2019; Morey et al. 2021; Rodriguez 2019; Torche and Rauf 2021). Throughout his campaign and presidency, Donald Trump mobilized White Supremacist rhetoric and committed to a variety of social policies that would disproportionately

and negatively impact groups racialized as non-White in the United States (Blow 2017; Bobo 2017; Clayton, Moore, and Jones-Eversley 2021; Gray 2017; Woolhandler et al. 2021).[1] Trump also targeted immigrant communities, promising and later delivering on the promise to restrict immigration into the United States, limit the rights of immigrants already living in the United States, and increase government power to detain and deport immigrants from within the United States. Many observers commented that Trump's anti-immigration platform was used to communicate a general message of White Supremacy, such as when he characterized Mexicans as rapists and Muslims as terrorists (Anbinder 2019; Arce 2019; Reilly 2016). We therefore posit that the 2016 U.S. presidential election was a *racist and xenophobic* macro-level political event, that is, a national event that may have been especially harmful for the health of racially marginalized U.S.-born and immigrant groups (Albright and Hurd 2020; Chavez et al. 2019; Gemmill et al. 2019; Morey et al. 2021; Williams and Medlock 2017).

In this study, we investigate whether and to what extent adverse infant health outcomes changed in the two-year period following the Trump election, and if they did so differentially across groups defined by racialized and nativity groups. We focus on adverse birth outcomes because they are sensitive to changes in public policies and environmental stressors (Redd et al. 2022; Torche 2011). Furthermore, infant health is a critical indicator of current and future population health and has been linked to multiple measures of wellbeing across the life course (Behrman and Butler 2007). Using data from 15,568,710 U.S. birth records collected between November 2012 and November 2018 (National Center for Health Statistics 2021), we compare birth outcomes for U.S.-

[1] We use the term "racialized" to refer to people grouped in different race categories, following the insights of critical race theory, which seeks to avoid reifying "race" as a biological or natural category and to highlight the processes through which racial inequality is created and maintained (Gonzalez-Sobrino and Goss 2019; Omi and Winant 2015).

and foreign-born mothers[2] across four major racialized groups: Non-Hispanic Black (hereafter "Black"), Hispanic,[3] Non-Hispanic Asian Pacific Islander (hereafter "API"), and Non-Hispanic White (hereafter "White"). We also investigate whether mothers' socio-economic characteristics and prenatal care use mediated changes to adverse birth outcomes following Trump's election.

Our analyses reveal four major findings. First, adverse health outcomes for infants born to mothers racialized as non-White increased after Trump's election, with infants born to U.S.- and foreign-born mothers racialized as Black and Hispanic experiencing the largest increases. Results for Whites suggest no change or a slight decrease in adverse outcomes following Trump's election, yet this finding was not robust to checks for seasonality. Second, Black-White, Hispanic-White, and API-White gaps in adverse health outcomes grew after Trump's election. Third, some changes in adverse health outcomes after Trump's election varied by nativity. Among foreign-born mothers racialized as Black, there was a smaller increase in preterm births than among U.S.-born mothers racialized as Black, while foreign-born mothers racialized as White had larger decreases in low birthweight births than U.S.-born mothers racialized as White. Among mothers racialized as Hispanic and API there were larger increases in preterm births among foreign-born following the Trump election when compared to their U.S.-born counterparts. Finally, compositional changes in the socio-economic characteristics of mothers and prenatal care use after Trump's election explain some but not all of the association between Trump's election and changes in birth outcomes.

[2] Not all birthing parents identify as "mothers." Here, we follow the terminology used in our primary data source, the U.S. birth records data files (National Center for Health Statistics 2021).
[3] We use the term "Hispanic" (rather than Latina/o, Latinx, or another term) because it is the terminology used in the birth records data files. Birth records follow the 1997 U.S. Census Bureau's classification of ethnicity consisting of two categories: Hispanic or Latino, and Not Hispanic or Latino. Hispanic individuals may be of any race, and members of any race may be either Hispanic or Non-Hispanic. We use "Latina/o" when it reflects the authors' usage.

Background

Structural Racism as a Fundamental Cause of Health

Structural racism is a fundamental cause of health, producing persistent racial inequality in health (Bailey et al. 2017; Phelan and Link 2015; Williams and Mohammed 2009). Bailey et al. (2017) define structural racism as the totality of ways in which societies foster racial discrimination through mutually reinforcing systems such as housing, education, employment, earnings, benefits, financial systems, media, health care, and criminal justice. Structural racism harms the health of groups racialized as non-White by constraining opportunities for obtaining health-promoting resources and by disproportionately exposing these groups to harms (Clouston and Link 2021; R. Williams and Williams-Morris 2000). Structural racism is reflected in residential segregation, voter suppression, racial violence, and criminalizing immigration policies, which affect health via an array of "pathways of embodiment," such as economic and social deprivation, excess exposure to toxins, hazards, and pathogens, stress, and social trauma (Hardeman et al. 2022; Hing 2019; Homan and Brown 2022; Homan, Brown, and King 2021; Jahn et al. 2021; Krieger 2014). Structural racism creates political environments that fundamentally shape the economic, legal, institutional, and symbolic environment and therefore influence population health via multiple pathways (Phelan and Link 2015). These patterns and practices in turn reinforce discriminatory beliefs, values, and actions. Stress and harm from racist interpersonal exchanges, such as the threat or experience of a humiliating or violent encounter with law enforcement officers, community members, or strangers, creates physiological strain on an individual's body, contributing to wear and tear on the cardiovascular, metabolic, and immune systems (for a summary of research see R. Williams & Williams-Morris, 2000).

Existing theory and research make clear that structural racism is harmful for racially minoritized groups, but its impact on White health has received less scholarly attention. Some research finds that structural privileges may indirectly contribute to adverse health outcomes, such as in the case of the White population's preferential access to opioid prescriptions (Woolhandler et al. 2021). In contrast, there is evidence that contemporary White health may continue to benefit from links to historical, racist institutions, such as chattel slavery, which simultaneously deprived Black people of basic rights and enabled White populations to extract resources and accumulate intergenerational wealth (Gabriel et al. 2021). We assess changes to health among infants born to mothers racialized as White and non-White in the two years following the Trump election, an event implicitly and explicitly tied to racist and xenophobic rhetoric and actions.

Racialized Disparities in Infant Health

One area in which racialized health disparities have stubbornly persisted is infant health. Low birthweight and preterm birth—two leading risk factors for infant morbidity and mortality (Behrman and Butler 2007)—are twice as likely to occur among mothers racialized as Black compared to mothers racialized as White (Womack 2018). There is substantial evidence that racism impacts birth outcomes (Hobel and Culhane 2003; Culhane and Elo 2005; McEwen and McEwen 2017; Giscombé and Lobel 2005). A systematic review of 15 studies found a significant relationship between racial discrimination and low birthweight and preterm birth among non-White mothers (Alhusen et al. 2016). Mothers who experience a racist event during pregnancy develop psychological and physical symptoms of distress over and above more general stressors (Alhusen et al. 2016; Jahn et al. 2021; Klonoff and Landrine 1999).

Lifelong exposure to racism can increase susceptibility to stress during pregnancy, regardless of the source of in-utero distress (McEwen and McEwen 2017). The "weathering framework" suggests that women racialized as Black experience health decrements due to the cumulative impact of repeated experience with social, economic, and political exclusion, which impacts the health of their infants (Geronimus 1992; Geronimus et al. 2006; Goosby and Heidbrink 2013). An added stressful event could thus cause greater harm to those already impacted by multiple long-term disadvantages (Curtis et al. 2022; Geronimus et al. 2006).

Infant health can also be influenced by political factors, such as political ideology and macro-level events that disproportionately harm or protect racialized communities. For example, Torche & Rauf (2021) find that Democratic presidents have a beneficial effect on infant health outcomes in the U.S., with stronger effects for infants born to Black mothers compared to infants born to White mothers, likely because of distinct ideological commitments to social and economic issues of the U.S. Democratic and Republican political parties. In another case, Lauderdale et al. (2006) found the terrorist attacks of 9/11 caused increases in adverse birth outcomes among infants born to women with Arab-sounding names in California following the attack and the corresponding response from the US government to crack down on US- and foreign-born Arab and Muslim communities in the U.S.

Anti-immigration Policies and Legal Status as a Fundamental Cause of Health

Critical race scholars have argued that the rise of restrictive immigration policy in the U.S. is a racist response to demographic change, with negative consequences for racialized minority groups (Browne et al. 2023; Rodríguez-Muñiz 2021; Romero 2008). (Anti-) immigration policies and rhetoric are a manifestation of xenophobia linked to multiple health outcomes through multiple

risk factors (Amuedo-Dorantes, Churchill, and Song 2022; Castañeda et al. 2015; Gomez Cervantes and Menjívar 2020; Martinez et al. 2015; Potochnick, Chen, and Perreira 2017; Viruell-Fuentes, Miranda, and Abdulrahim 2012; Watson 2014). Immigration policies and xenophobic rhetoric exert a disproportionate burden on racial/ethnic minorities through stigmatization, and/or by withholding social and political rights from people who hold certain legal statuses, with spillover impacts to entire racialized communities, regardless of legal status (Asad and Clair 2018). One study found an association between the 2017 Muslim ban and preterm births among infants of mothers from banned countries, another documented lower birthweight among infants born to immigrant women racialized as Latina following the passage of an anti-immigrant bill in Arizona in 2010, and yet another found a greater risk of low birthweight among infants born to mothers racialized as Latina following an immigration raid in Iowa in 2008 (Novak, Geronimus, and Martinez-Cardoso 2017; Samari et al. 2020; Torche and Sirois 2019).

Racist Macro-level Events: The Case of Trump's Election

Presidential elections are an important case of macro-level political events that have been linked to racially stratified health outcomes (Albright and Hurd 2020; Chavez et al. 2019; Gemmill et al. 2019; Malat, Timberlake, and Williams 2011; Morey et al. 2021; Rodriguez 2019; Torche and Rauf 2021). One study found that the socially-conservative ideology of Republican U.S. presidents was associated with slower declines in infant mortality rates and accounted for approximately half of the White-Black infant mortality gap in the U.S. between 1965 and 2010 (Rodriguez 2019). Health effects materialized one year following the presidential election, a lag the authors attribute to timing of policy implementation by new presidential administrations. But elections can also have anticipatory effects on infant health, even before the elected official assumes office and

passes or implements new policy, perhaps especially if the president engages in particularly threatening, racist, or xenophobic language (Gemmill et al. 2019; Morey et al. 2021).

President Trump's election created a uniquely hostile sociopolitical context for groups marginalized by racism and xenophobia (American Immigration Council 2017; Clayton, Moore, and Jones-Eversley 2021; Finnigan and Barabak 2018; Gonyea 2015; Time 2015). Throughout his campaign and presidency, Donald Trump mobilized White Supremacist rhetoric and committed to a variety of social policies that disproportionately and negatively impact groups racialized as non-White in the United States (Blow 2017; Bobo 2017; Clayton et al. 2021). For example, he campaigned to "Make America Great Again," idealizing a past of formal White dominance (Gabriel et al. 2021), and portrayed White nationalists who marched through Charlottesville in 2017 as "people that were very fine" (Gray 2017). As president, Trump's policies disproportionately harmed people racialized as non-White, for example, by upending federal oversight of local police forces implicated in civil rights abuses and rolling back the Affordable Care Act and Medicaid coverage (Balko 2019; Rosenberg 2019; Woolhandler et al. 2021).

Trump's campaign and presidency may also have enhanced implicit bias and enabled discriminatory behavior in society at large. Trump's campaign, election, and social media activism have been linked to aggravated racist attitudes among ordinary citizens (Newman et al. 2021), increased hate crimes (Feinberg, Branton, and Martinez-Ebers 2022), and intensified racially biased behavior by law enforcement (Grosjean, Masera, and Yousaf 2023). Feinberg et al. (2022) find that counties that hosted a Trump campaign rally experienced a large increase in hate crimes in the month after hosting a rally, compared to counties that did not host a rally. Studies also linked Trump's election to distress, anxious symptoms, web searches for "depression," "anxiety,"

"therapy," and antidepressant medications, and poorer self-rated health among individuals with targeted social identities, such as people racialized as Black, Latino, and Muslim, and sexual minorities (Albright and Hurd 2020; Krupenkin et al. 2019; McCann and Jones-Correa 2021; Patler et al. 2019; Rogers et al. 2017). Two studies have examined the association between Trump's election and adverse birth outcomes among Latinas; both found that adverse birth outcomes increased among Latina mothers after the election (Gemmill et al. 2019; Gutierrez and Dollar 2023). No studies have examined changes in birth outcomes across women in different racialized groups.

In addition to creating substantial stress, a racist and xenophobic macro-level political event like the Trump election could also prompt behavioral adaptations to avoid or reduce risk. Two potential responses are fertility adjustments and changes to health care-seeking behaviors (Dehejia and Lleras-Muney 2004; Torche and Villarreal 2014). If fertility responses are heterogeneous across the population, they may induce changes to birth outcomes by altering the composition of those giving birth at a particular moment in time. Indeed, one study documented an increase in the utilization of long-acting reversible contraceptive (LARC) methods among women during the 30 business days after the 2016 presidential election (Pace et al. 2019). Our study examines whether changes in the composition of birthing mothers, as well as in mothers' prenatal care use, following Trump's election were associated with changes in adverse birth outcomes.

Research Questions

We assess whether and to what extent adverse birth outcomes changed after President Trump's 2016 election among infants born in the United States to U.S.- and foreign-born mothers across four racialized groups. Our analyses are guided by the following questions:

Research Question 1: Did adverse birth outcomes change within racialized groups following Trump's election?

Research Question 2: Did gaps in adverse birth outcomes between groups racialized as White and Non-White change following Trump's election?

Research Question 3: Within racialized groups, did adverse birth outcomes change by mother's nativity following Trump's election?

Research Question 4: Were compositional changes in the socio-economic status and prenatal care usage of mothers associated with changes in adverse birth outcomes following Trump's election?

Data and Methods

Data

We analyze U.S. birth records from the National Vital Statistics System, comprising all births occurring and registered in the 50 U.S. states and U.S. territories from November 2012 to November 2018 (National Center for Health Statistics 2021). Birth certificates include the mother's country of birth and self-reported racial/ethnic identification, as well as information about the infant's health at birth. We restrict the analysis to singleton births with plausible weeks of gestation (22-44 weeks) and birthweight (>500 grams). Our analytical sample includes 15,568,710 births in the United States to mothers racialized as White, Black, Hispanic, and API between November 2012 and November 2018.

Variables

Outcomes: The outcomes of interest are low birthweight (defined as birthweight of less than 2,500 grams) and preterm birth (defined as births born before 37 weeks of gestation).[4] These outcomes are linked to morbidity, mortality, and multiple measures of well-being across the life course (Behrman and Butler 2007; Boardman et al. 2002; Case, Fertig, and Paxson 2005; Morenoff 2003). Preterm birth and low birthweight are highly correlated. Preterm delivery is one of the predominant causes of low birthweight, with two-thirds of low-weight infants born preterm (Dunkel Schetter 2011). However, birthweight is also determined by the rate of fetal growth, meaning that births carried to term can also be born low weight. Because both outcomes have been linked to environmental stressors, including political events (Torche and Sirois 2019), racism (Alhusen et al. 2016), and public policy (Redd et al. 2022), we include both outcomes in our study, following prior studies of macro-level events and birth outcomes (Torche and Rauf 2021).

Mother's race and ethnicity: We use the mother's self-reported racial and ethnic identification. Self-identification into race and ethnic groups is the outcome of a socially-constructed decision made in response to a given set of categories, themselves determined by history, culture, political agendas, and social scientific imperatives (Zuberi and Bonilla-Silva 2008). These categories are not biological or genetic but reflect social and cultural experiences as well as ancestry (OMB 2017; Roth 2016). We study adverse birth outcomes among four racialized groups: White, Black, Hispanic, and API. Hispanic is defined following the 1997 U.S. Census Bureau's classification, which divides ethnicity into Hispanic or Latino and Not Hispanic or Latino. Hispanic individuals may be of any race, and members of any race may be either Hispanic or non-Hispanic.

[4] We use the variable "gestational age at birth" provided by the National Vital Statistics System to measure preterm birth. Gestational age is measured in completed weeks based on the obstetric estimate of gestation at delivery. If ultrasound is not performed or is unknown, gestational age is determined by the last menstrual period recalled by the mother.

Nativity: To measure nativity, we use the mother's country of birth, recoded into two categories: U.S.-born (birthplace=United States and its territories) and foreign-born (birthplace=outside of the U.S. and its territories).

Covariates: Infant's characteristics include sex at birth (0=female, 1=male), parity (first, second, third-or-higher birth), and Medicaid birth (0=birth not paid with Medicaid, 1=birth paid with Medicaid). Mother's characteristics include whether the mother was married (0=not married, 1= married), highest level of education (1= Less than High School (HS), 2= HS, but less than Bachelor's degree, 3= Bachelor's degree or higher), and age at the time of child's birth (in years). We also control for the adequacy of prenatal care, using the APNCU INDEX, which combines information on the initiation of prenatal care and the number of prenatal care visits into an index (0=inadequate, 1=intermediate, 3= adequate, 4= intensive) (Kotelchuck 1994).

Analysis

The association between the 2016 election and birth outcomes could be affected by changes in the composition of mothers if the election affected who had births during this period and how those mothers accessed health care. To address this possibility, we compare models with and without compositional covariates. The first model includes only year fixed effects and the second adds controls for child and mother characteristics (Elo, Vang, and Culhane 2014; Hummer 1996; Hummer, Biegler, and De 1999; Reichman et al. 2008).

We estimate ordinary least square regressions with year fixed effects, expressed as follows:

$$Equation\ 1:\ BO_{ik} = \beta_0 + \beta_1(Trump) + \beta_2(Race) + \beta_3(Nativity) + \boldsymbol{\beta_4(Trump\ X\ Race\ X\ Nativity)} + YearFixedEffects + \varepsilon_{ik}$$

$$Equation\ 2:\ BO_{ik} = \beta_0 + \beta_1(Trump) + \beta_2(Race) + \beta_3(Nativity) + \boldsymbol{\beta_4(Trump\ X\ Race\ X\ Nativity)} + (Mother_{ik}\ X\ Race) + (Child_{ik}\ X\ Race) + YearFixedEffects + \varepsilon_{ik}$$

BO $_{ik}$ identifies the birth outcome of interest (low birthweight and preterm birth) of infant *i* born in month *k.* Both equations include two variables to assess the association with Trump's election and adverse birth outcomes. First, we include a dummy variable for the election ("Trump"), wherein 0= infants born in the four years prior to Trump's election (between November 2012 and October 2016) and 1=infants born after Trump's election (November 2016 through November 2018). Second, to test whether birth outcomes changed differently among race/ethnicity and nativity groups following Trump's election, we incorporate an interaction term between the post-election period and racialized and nativity groups ($\beta_4(Trump\ X\ Race\ X\ Nativity)$).

The pre-period encompasses President Obama's second term, which constituted the macro-political environment (as related to the presidential administration) which Trump's election disrupted (Gemmill et al. 2019). We focus on the first two years after Trump's election and include births that were exposed in-utero to his election (those born in the first 9 months following November 2016) as well as births born up to November 2018.

One issue with estimating changes in birth outcomes after Trump's election is that changes could be due to other temporal shocks or trends. We include year fixed effects to control for year-specific characteristics or shocks that are common to all groups of mothers. In alternative specifications, we estimate the models using continuous and a quadratic month of birth terms, and the results are consistent (see Figure S2 & S3 in Supplementary Material).

Another issue relates to identifying the appropriate post period. The period between November 2016 and February 2017 combines the end of Obama's presidency with the post-Trump election period. Our main models define the post period as beginning at the election, rather than the inauguration and include Obama's lame duck presidential period. To test whether the inclusion of these months changes the findings, we estimate models excluding the post-election, pre-inauguration period and find substantively similar results to our main models (see Section 3: Alternative model).

In Model 2, we additionally include "Mother" variables that represent covariates associated with the mother and "Child" variables that represent covariates associated with the child. Following Graetz, Boen, and Esposito (2022), we interact all covariates in Model 2 (Equation 2) with the four racialized group categories. Because any racial health disparity is the result of historic and contemporary projects of racism, control variables that differ in their exposure and effects across racialized categories are more appropriately considered mediators rather than confounders. Indeed, systemic racism likely affects every socio-economic variable included in typical social scientific regression analysis of adverse birth outcomes. Fully interacted models therefore account for how multiple and mutually reinforcing racialized systems shape health because they allow mediator variables to vary in their associations with the outcome across groups.

Results

We start by providing a descriptive analysis of trends in low birthweight and preterm births over the November 2012 to November 2018 period for each group of mothers. We show unadjusted monthly proportions of low birthweight (Figure 1) and preterm birth (Figure 2) as well as a line representing the linear time trend in the pre- and post-Trump periods. A visual assessment of the data suggests that all groups of mothers experienced a change in trends in adverse birth outcomes

in November 2016. Furthermore, and consistent with our hypotheses regarding the racialized harms of Trump's election, except for U.S.-born API mothers, for all other groups of non-White mothers, the election corresponds with an increase in the slope of the trend line. For example, among U.S.- and foreign-born Hispanic mothers, the monthly rate of preterm births declined in the pre-Trump period but increased in the post-Trump period (Figure 2).

[Figure 1 & Figure 2 about here]

Table 1 shows the means of all variables in our analysis for each group of mothers, comparing the pre- and post-Trump periods using two-tailed tests. We highlight five findings from this table. First, within each nativity group, infants born to mothers racialized as Black have the highest rates of low birthweight and preterm births in both time periods, followed by mothers racialized as Hispanic, API, and White, respectively. Second, within each racialized group, infants born to U.S.-born mothers have higher rates of adverse birth outcomes than infants born to foreign-born mothers, with an especially large nativity gap for mothers racialized as Black. Third, we observe greater social disadvantage for mothers racialized as Black and Hispanic. For example, Medicaid births were most common among mothers racialized as Black and Hispanic, and least common among mothers racialized as White, regardless of nativity. In addition, mothers racialized as White and API, and especially foreign-born mothers racialized as White and API, were more likely to be married and have a higher level of education (Bachelor's degree or higher) than mothers racialized as Black and Hispanic. Fourth, comparing mothers' characteristics between the pre- and post-Trump period reveals that among most groups, mothers were older, more likely to be married, more educated, and more likely to have a third-or-higher order birth after Trump's election. There was also an increase in inadequate and intensive prenatal care usage in the post-Trump period, relative to the pre-period. Finally, Table 1 reveals a significant difference between the pre- and

post-Trump periods in both birth outcomes for nearly every group of mothers. Among U.S.-born mothers racialized as White, Black, Hispanic, and API, and foreign-born mothers racialized as Hispanic and API, there was an increase in the rate of low birthweight births after Trump's election. Among all women, there was an increase in the rate of preterm births after the 2016 election, compared to the pre-election period.

[Table 1 about here]

Changes to Adverse Birth Outcomes After Trump's Election

Figure 3 shows the predicted percent low birthweight and preterm births before and after Trump's election for each group of mothers, controlling only for year fixed effects (see Tables S1 & S2, Model 1, in Supplementary Analysis for full parameter estimates). For U.S.- and foreign-born mothers racialized as Black, Hispanic, and API, the rate of low birthweight rose from the pre- to post-Trump period, net of annual trends. Births to mothers racialized as Black experienced the largest absolute increases in low birthweight: among U.S-born mothers racialized as Black, the rate of low birthweight rose from 13.27% to 13.89%, and among foreign-born mothers racialized as Black, the rate of low birthweight rose from 8.6% to 8.8%, from the pre- to the post-Trump period. Comparatively, mothers racialized as White experienced a decrease in adverse birth outcomes net of annual trends: the rate of low birthweight declined from 6.67% to 6.60% for U.S.-born White mothers, and from 6.10% to 5.87% for foreign-born White mothers, from the pre- to the post-Trump period. Preterm births also rose among U.S.-born mothers racialized as Black and Hispanic and among foreign-born mothers racialized as Hispanic and API from the pre-Trump to the post-Trump period.

[Figure 3 about here]

Figure 4 transforms the results from Figure 3 into the predicted average change, expressed as percentage point difference, in adverse birth outcomes after Trump's election controlling first for year fixed effects (Model 1) and then incorporating mother and child characteristics (Model 2) (see Tables S1 & S2 in Supplementary Analysis for full parameter estimates from Models 1 & 2. See also Figure S1 in Supplementary Analysis for predicted rates net of all control variables included in Model 2). Model 2 reveals that adjusting for racialized compositional changes reduces the degree of change in adverse outcomes after Trump's election, meaning that compositional changes likely account for some of the higher rate of adverse outcomes after Trump's election. Overall, adjustment for compositional changes attenuates the change in birth outcomes across groups by between 6-40%. For example, for infants born to U.S.-born Black mothers, the unadjusted model (M1) predicts that preterm births increased by .5 percentage points in the first two years of Trump's election, while the adjusted model (M2) predicts an increase of .3 percentage points. Thus, the inclusion of control variables reduces the change in preterm births in the first two years following Trump's election among U.S.-born Blacks by .2 percentage points, or 40%.

[Figure 4 about here]

Racialized Health Gaps Before and After Trump's Election

We now turn to an examination of the gaps in adverse infant health outcomes. Table 2 summarizes the White-Black, White-Hispanic, and White-API (absolute) differences in the predicted rates of adverse birth outcomes pre- and post-Trump's election for U.S.- and foreign-born mothers. The table also shows tests of whether the racial gaps differ between the pre- and post-Trump election periods (i.e., the contrasts, or tests of second difference). In Table S3 in the Supplementary

Analysis, we present the same information for relative differences, which follow the same pattern as absolute differences. We present gaps relative to mothers racialized as White, given the role of structural racism in privileging White people and harming people racialized as non-White, and the corresponding research expectation that Trump's election, as a racialized macro-level political event, would widen racial disparities.

[Table 2 about here]

Table 2 shows that the racial gaps in adverse outcomes significantly increased for nearly all group comparisons during the post-Trump period. Beginning with Model 1, for example, U.S.-born Black mothers experienced low birthweight births 6.60 percentage points more often than White mothers prior to Trump's election, a gap that increased to 7.29 percentage points after the election (a 0.69 percentage point increase, equivalent to about 10% (0.69/6.6*100)). White-Hispanic gaps in adverse birth outcomes also grew after Trump's election, among both U.S.- and foreign-born mothers. Prior to the election, U.S.-born Hispanic mothers experienced low birthweight births 0.71 percentage points more often than U.S.-born White mothers, whereas after the election, the White-Hispanic gap increased to 1.15 percentage points (a 0.44 percentage point increase or by 62% (0.44/0.71*100)). Foreign-born Hispanic mothers experienced 0.14 percentage points more low birthweight births than foreign-born White mothers prior to the election, a gap that increased to 0.62 percentage points, a 0.48 percentage point increase equivalent to about 300% (0.48/0.14*100) after the election. White-API gaps among U.S.- and foreign-born mothers also increased significantly for low birthweight births: the predicted probability of low birthweight births was 1.69 percentage points higher for U.S.-born mothers racialized as API than for White mothers in the pre-election period, a gap that increased to 2.47 percentage points after the election, equivalent to 0.78 percentage points or by 46% (0.78/1.69*100). Among low birthweight births to foreign-

born mothers, the API-White gap was 1.89 percentage points in the pre-election period and increased to 2.63 percentage points after the election, or by 0.62 percentage points equivalent to 39% (0.62/1.89*100).

The inclusion of compositional controls in Model 2 reduces the magnitude of the change in the racial gaps in birth outcomes. For example, the Black-White gap reduces from 0.69 to 0.5 percentage points from Model 1 to Model 2, suggesting that the inclusion of control variables decreases the predicted Black-White gap in the post-Trump period by .19 percentage points, that is, by about 27% (0.19/0.69*100). However, all significant racial gaps from Model 1 remain robust in Model 2, suggesting that measured compositional changes in mothers giving birth do not fully explain why racialized gaps increased after the election.

Nativity Differences in Adverse Birth Outcomes After Trump's Election

Our third research question asked whether adverse birth outcomes changed similarly or differently across mother's nativity following Trump's election. Figure 5 summarizes the difference in the change in adverse birth outcomes associated with Trump's election between U.S.-born mothers and foreign-born mothers within each racialized group, expressed as percentage point difference. For most groups, changes to adverse birth outcomes in the post-election period were roughly similar by nativity status within racialized groups, with a few exceptions. Foreign-born mothers racialized as White had larger decreases in low birthweight births following Trump's election, compared to their U.S.-born counterpoints (-0.17 and -0.22 percentage points in Models 1 and 2, respectively). Among mothers racialized as Black there was a smaller increase in preterm births among foreign-born mothers than among U.S.-born mothers (-0.43 percentage points in Model 1 and -0.47 percentage points in Model 2). This suggests that foreign-born nativity may have had a

protective effect for mothers racialized as White and Black following the Trump election, above and beyond compositional changes. Among mothers racialized as Hispanic, preterm births increased more among foreign-born than among U.S.-born mothers, but only in Model 2 (0.23 percentage points in Model 2). Among mothers racialized as API, there was also a larger increase in preterm births among foreign-born mothers following the Trump election when compared to U.S.-born API mothers (0.44 percentage points in Model 1). These findings suggest that for API & Hispanic mothers, Trump's election was more harmful for foreign-born mothers than for their U.S.-born counterparts, with compositional characteristics likely explaining much of the observed effect.

[Figure 5 about here]

Robustness Checks

The changes in birth outcomes we observe after Trump's election could be driven by other temporal processes, including temporal autocorrelation and/or long-term trends. Our main models account for time trends with year fixed effects, which control for observed and unobserved year-specific characteristics or shocks that are common to all groups of mothers. We also implement two alternative de-trending strategies, adding to our model (a) a continuous month of birth control (see Figure S2 in Supplementary Material), and (b) a quadratic month of birth control (see Figure S3 in Supplementary Material). We also include a month-lagged dependent variable to control for auto-correlation (see Figure S4 in Supplementary Material). These approaches yield substantively similar results for Black, Hispanic, and API mothers, indicating that the observed increases in adverse birth outcomes among mothers racialized as non-White following Trump's election are not likely the result of time trends. For mothers racialized as White, however, the supplemental models do not indicate a significant change in adverse birth outcomes following Trump's election.

This suggests that the observed decreases in low birthweight and preterm births after Trump's election for mothers racialized as White in the main models may be the consequence of time trends rather than a change coinciding with the 2016 election.

Discussion

Donald Trump's rise to the presidency was fueled by racist and xenophobic rhetoric that manifested in policies once he became president (Clayton et al. 2021; Gabriel et al. 2021; Manza and Crowley 2018; Woolhandler et al. 2021). Trump's campaign and election have been linked to aggravated racist attitudes among ordinary citizens (Newman et al. 2021), increased hate crimes (Feinberg et al. 2022), intensified racially biased behavior by law enforcement (Grosjean et al. 2023), and heightened psychological distress and anxiety among Latinx pregnant mothers (Fox 2022; Wiley et al. 2023). Because macro-level political events like elections can impact infant health differently across existing axes of stratification (Aquino et al. 2022), we assessed whether the Trump election was associated with an exacerbation of inequities in adverse birth outcomes by racialized groups and nativity. We examined 15,568,710 U.S. birth records collected between November 2012 and November 2018 to estimate whether rates of adverse birth outcomes and racialized gaps in adverse birth outcomes changed following Trump's election among infants born in the United States.

We find that rates of low birthweight and preterm births increased for Black, Hispanic, and API mothers in the first two-years following Trump's 2016 election. We observe these results in descriptive analysis of trends and in models that control for time trends and mother and child characteristics that may have changed after Trump's election. In the first two-years following Trump's election, the rate of low birthweight among U.S.-born mothers racialized as Black rose

from 13.27% to 13.89% (see Figure 3). Foreign-born mothers racialized as Black and U.S.- and foreign-born mothers racialized as Hispanic and API also experienced increases in low birthweight births after Trump's election. The likelihood of preterm births also increased after the election among foreign-born mothers racialized as Hispanic and API, as well as among U.S.-born mothers racialized as Black and Hispanic.

These changes are substantial at the population level. For example, there were 610,136 infants born to U.S.-born Black mothers in the post-Trump period. Our analyses suggests that without Trump's election, 3,783 fewer infants (= 610,136 *0.0062) would have been born with low birthweight to U.S.-born women racialized as Black.[5] This effect is substantial when benchmarked against other research on disruptive events that can impact infant health. For example, birthing parents who were exposed to wildfires that burned at least five thousand acres in the county of birth during the second or third trimester are about 0.2 percent more likely to give birth to low birthweight infants, compared to infants born to mothers in the same county but conceived earlier or later relative to the wildfire (Rauscher and Cao 2024). In our study, the 0.62% observed change to low birthweight experienced by infants born to U.S.-born mothers racialized as Black in the first two years after Trump's election is approximately three times larger than that of the wildfires.

Existing theory and research have not fully grappled with how racism impacts the health of groups that experience structural privilege. The literature makes clear that structural racism is harmful for racially minoritized groups, but less is known about its impact on White health (Curtis et al. 2022; Hardeman et al. 2022; Homan and Brown 2022; Homan et al. 2021; Jahn et al. 2021; Krieger 2014;

[5] We apply the percentage point increase in low birthweight births among U.S.-born Black mothers (0.62 percentage points) to the number of births born to U.S.-born Black mothers in the post-Trump period (610,136x.0062=3,783).

Louie and DeAngelis 2024). We found that rates of adverse birth outcomes decreased during the post-election period among infants born to White mothers, suggesting that racist macro-level political events, like Trump's election, could benefit people racialized as White. However, robustness checks using various de-trending strategies render inconsistent results, suggesting that changes in adverse health outcomes among infants born to mothers racialized as White could be the consequence of time trends, rather than the election. More research is needed to investigate the connections between structural racism and the health of populations racialized as White.

As a result of the disproportionate changes among mothers racialized as non-White, racial disparities in adverse birth outcomes increased in the post-Trump period. For example, the White-Black gaps in low birthweight increased by 0.69 percentage points and 0.46 percentage points among U.S. and foreign-born mothers, respectively. White-Hispanic gaps in adverse birth outcomes also grew after Trump's election among U.S. and foreign-born mothers: for low birthweight, the White-Hispanic gap increased by 0.44 percentage points among U.S.-born mothers and by 0.4 percentage points among foreign-born mothers. White-API gaps also increased; for low birthweight, the White-API gap increased by 0.78 percentage points for U.S.-born and by 0.62 percentage points for foreign-born mothers.

We also examined changes to adverse infant health outcomes by mother's nativity, given Trump's xenophobic rhetoric and anti-immigrant policies (Gemmill et al. 2019). Our findings show that among most racialized groups, US- and foreign-born mothers experienced similar changes to adverse infant health outcomes after Trump's election. These findings align with the idea that structural racism and (anti-) immigration policies and rhetoric are fundamental determinants of

health that impact both U.S.- and foreign-born community health and access to health institutions through multiple pathways (Bailey et al. 2017; Gomez Cervantes and Menjívar 2020; Novak et al. 2017; Patler and Gonzalez 2020). Yet we find some evidence of differential changes to birth outcomes between nativity within racialized groups. After Trump's election, foreign-born mothers racialized as White had larger decreases in low birthweight births than U.S.-born mothers racialized as White. In addition, among mothers racialized as Black, foreign-born mothers experienced a smaller increase in preterm births when compared to U.S.-born Black mothers after Trump's election. These findings suggest that foreign-born nativity may have had a protective effect for mothers racialized as White and Black following the Trump election. However, infants born to foreign-born Black women still experience higher rates of adverse birth outcomes than any other foreign- or U.S.-born group of any other racialized group, even after controlling for other racialized determinants of health, providing additional, strong evidence that structural racism uniquely harms the health of Black infants, regardless of nativity (Curtis et al. 2022; Giscombé and Lobel 2005; Grady 2006).

Our study also assessed the roles of changes to the socio-economic composition of birthing mothers and prenatal care usage as possible pathways between Trump's election and adverse birth outcomes. We find that changes in the socio-economic composition of women giving birth and in prenatal care usage reduce the degree of change in adverse outcomes and attenuate some of the increases observed in the the White- non-White gaps after Trump's election. Mothers giving birth after Trump's election were older, more likely to be married, and more likely to have completed college, and the births were more likely to be third-or-higher-order parity. A shift towards older women may account for some of the association between the Trump election and infant health,

insofar as age is a risk factor for adverse birth outcomes. We also observe that mothers birthing after Trump's election were more likely to have received inadequate or intensive prenatal care, both of which are associated with increased risk for adverse birth outcomes. These findings suggests that changes to who gave birth and the care they received are likely on the pathway linking Trump's election to adverse birth outcomes. However, the post-election period remained robust to the inclusion of these controls, suggesting that they do not fully account for the observed changes to adverse health outcomes and corresponding racialized health gaps.

Our study also contributes new information about the timing of the impacts of presidential elections on birth outcomes. Prior studies found that Trump's election increased preterm births among infants born to women racialized as Latina who were exposed to the election in-utero (Gemmill et al. 2019; Gutierrez and Dollar 2023), suggesting that stress is a key pathway through which macro-level political events like Trump's election affect health. Other research has documented a lag in the impact of presidential elections on birth outcomes, a time patterning that scholars attribute to lags in policy implementation by presidential administrations. Our study, which includes in-utero exposure and births born in the first two years after Trump's election, suggests that a combination of stress and policy impacts explain the changes in birth outcomes among non-White mothers that occurred after Trump's election. Indeed, Trump took action on his blatantly racist campaign promises both immediately and throughout his presidency: In his first 100 days in office alone, Trump signed 28 executive orders, including the 2017 Muslim travel ban and efforts to strip federal funding from "sanctuary cities" that protect immigrants, among many other policies (ACLU 2017; Beck 2017; Trump 2017). Overall, Trump implemented nearly 1,100

actions to restrict immigrant admissions and rights throughout his presidency (Immigration Policy Tracking Project 2023).

Our results should not be interpreted as direct evidence of a causal impact of the election itself, as we cannot rule out the possibility that other events occurring around the same time as Trump's election account for the observed changes in adverse birth outcomes among non-White mothers. Indeed, multiple national, overt racist events occurred during Trump's presidency, such as the August 2017 Unite the Right riot at the University of Virginia, broadly considered a White Supremacist event. Exposure to (and protection from) interpersonal and population-level experiences of racial discrimination are known predictors of infant health (Alhusen et al. 2016; Krieger et al. 2013). Still, our results provide evidence that Trump's election and its aftermath may have caused harm to racialized minority mothers, worsening pre-existing racialized health disparities. Our findings align with other research documenting that Trump's election increased distress among individuals whose social identities Trump targeted rhetorically and through his policies, such as groups racialized as Black and Latino, Muslims, and sexual minorities, among others (Albright and Hurd 2020; Fox 2022; Grosjean et al. 2023; Krupenkin et al. 2019; McCann and Jones-Correa 2021; Patler et al. 2019; Rogers et al. 2017; Wiley et al. 2023)

Future research should seek to examine whether the impacts of the post-election period may be further stratified among mothers, such as among foreign-born mothers by legal status, time in the United States, and region, state, or county of residency (Grosjean et al. 2023; Teitler, Hutto, and Reichman 2012). Indeed, undocumented immigrant mothers may experience heightened distress due to fear of law enforcement, which could worsen their own health and/or their infants' health

outcomes (Novak et al. 2017; Patler et al. 2019; Ro, Bruckner, and Duquette-Rury 2020; Torche and Sirois 2019). Data collection efforts that can estimate mothers' legal status without increasing their legal vulnerability could help us better understand the links between immigration status and health. The impacts of Trump's election may also vary across geography. Existing research has found evidence of increased racial bias in policing in counties where Trump held rallies during his 2015-2016 campaign, which may have led to heightened distress among non-White mothers who are most likely to experience racialized policing practices (Grosjean et al. 2023). Analysis assessing the association between Trump's election and racialized changes in adverse birth outcomes by county, state, or region of residency could illuminate potential mechanisms linking Trump's rise to power, racism, and infant health.

While our study is limited in its ability to identify causal effects and mechanisms, our analysis is consistent with the idea that population health is shaped by population-level experiences of macro-level political events, including those that perpetuate or entrench structural racism (Krieger 2014). Structural racism, the organized social system in which the dominant racialized group—those racialized as White—categorizes and ranks people into social groups to devalue, disempower, and differentially allocate social resources and opportunities, is the root cause of racial health inequities (Bailey et al. 2017; Williams, Lawrence, and Davis 2019). Our results suggest that Trump's rise to power was a racist and xenophobic macro-level political event that was associated with increased racial inequalities in population health. Our study therefore shows that racial disparities in health can change rapidly and substantially following macro-level political events when those events are racialized and/or xenophobic. In this case, Trump's election appears to have affected

the life chances of even the newest members of U.S. society: infants born in the two years after he took office. The legacy of these health harms could be long lasting and dire.

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Table 1. Descriptive Statistics for Mothers by Racialized Group, Nativity, & Pre-Post Trump Period, November 2012-November 2018

	White USB		*White FB*		*Black USB*		*Black FB*		*Hispanic USB*		*Hispanic FB*		*API USB*		*API FB*	
	Pre Trump	*Post Trump*	*Pre Trump*	*Post Trump*	*Pre Trump*	*Post Trump*	*Pre Trump*	*Post Trump*	*Pre Trump*	*Post Trump*	*Pre Trump*	*Post Trump*	*Pre Trump*	*Post Trump*	*Pre Trump*	*Post Trump*
Main outcomes																
Low birthweight (%)	6.6	6.7*	6	6	13.2	14*	10	8.9*	7.3	7.9*	6.2	6.6*	8.3	9.2*	7.9	8.6*
Preterm births (%)	9.8	10.1*	8.5	8.8*	16.2	17.1*	10	12.7*	10.9	11.9*	10.7	11.8*	10.6	11.0*	9.3	10.1*
Child characteristics																
Male (%)	51.3	51.3	51.5	51.6	50.7	50.7	50.8	50.7	51.1	51	51.1	51	51.4	51.2	51.7	51.6
Parity (%																
One	45.3	44*	44.8	43*	42.6	41.2*	37.3	35.8*	44.4	44*	30.2	31.7*	47.7	48.7*	48.2	47.7*
Two	32.7	32.9*	32.8	32.7	27.9	28.1*	30.1	29.9	29.8	29.7	29.7	30.2*	31.2	31.7*	36.4	36.5
Three or more	22.0	23*	22.4	24.3*	29.4	30.8*	32.6	34.3*	25.8	26.3*	40.2	38.1*	21.1	19.6*	15.4	15.8*
Medicaid birth (%)	29.8	29.1*	31.4	34*	69.3	68.9*	50.9	52.9*	58.7	59.7*	60.3	55.8*	30	24.4*	26.6	28.3*
Mother characteristics																
Married (%)	69.8	70.2*	87.8	87.9	21.3	21.5*	65.8	68.1*	42.1	42.6*	51.6	52.4*	65.7	73.6*	89.4	90.3*
Highest educational level (%)																
Less than HS	7.8	7.2*	7.2	8*	17.6	14.4*	15.7	15.3*	20.4	18.5*	45.1	39.8*	7.6	4.4*	8.9	10*
HS but less than BA	52.1	50.9*	39.8	39*	69.6	71.5*	53.8	52.6*	66.2	66.4*	44.4	46.8*	44.1	37.1*	30.3	28*
BA or higher	40.1	41.9*	53.1	53	12.8	14.1*	30.6	32.2*	13.4	15.1*	10.5	13.4*	48.3	58.4*	60.8	62*
Mother's age	28.2	28.5*	30.4	30.7*	25.4	26.0*	30.4	30.9*	25.4	25.7*	28.7	28.9*	29.0	30.2*	31.1	31.0*
Adequacy of prenatal care (%																
Inadequate	14	13.1*	19.5	20.5*	28.8	27*	34	34.7*	20.5	21.7*	25.3	28.1*	17.1	15.5*	17.6	18.8*
Intermediate	15.7	14.8*	17.8	16.9*	15.7	15.1*	16.4	15.1*	18.4	17.5*	17.5	16.7*	19.0	18.1*	17.9	16.6*
Adequate	47.6	48.7*	43.1	43.1	33.6	34.7*	32.4	32.3	41.1	40.6*	38	36.6*	43.7	45.3*	44.4	44.4
Intensive	22.7	23.4*	19.7	19.4*	22	23.2*	17.3	17.8*	19.9	20.3*	19.2	18.7*	20.2	21.2*	20.0	20.2
N	5,432,905	2,575,182	383,096	179,488	1236,355	610,136	231,370	132,703	1,382,810	551,687	1,281,326	509,709	166,947	50,812	600,150	244,034

Notes: USB=U.S.-born, FB=Foreign-born. Pre-Trump = November 2012-October 2016, Post-Trump = November 2016-November 2018. *Indicates a statistically significant difference between Pre-& Post-Trump periods at p<.05, within each racialized-nativity group of mothers.

Source: National Center for Health Statistics. (Total N=15,568,710)

Table 2: Between-Racialized-Group Differences in Predicted Adverse Birth Outcomes in the Post-Trump Election Period compared to the Pre-Trump period for U.S.- & Foreign-born Mothers

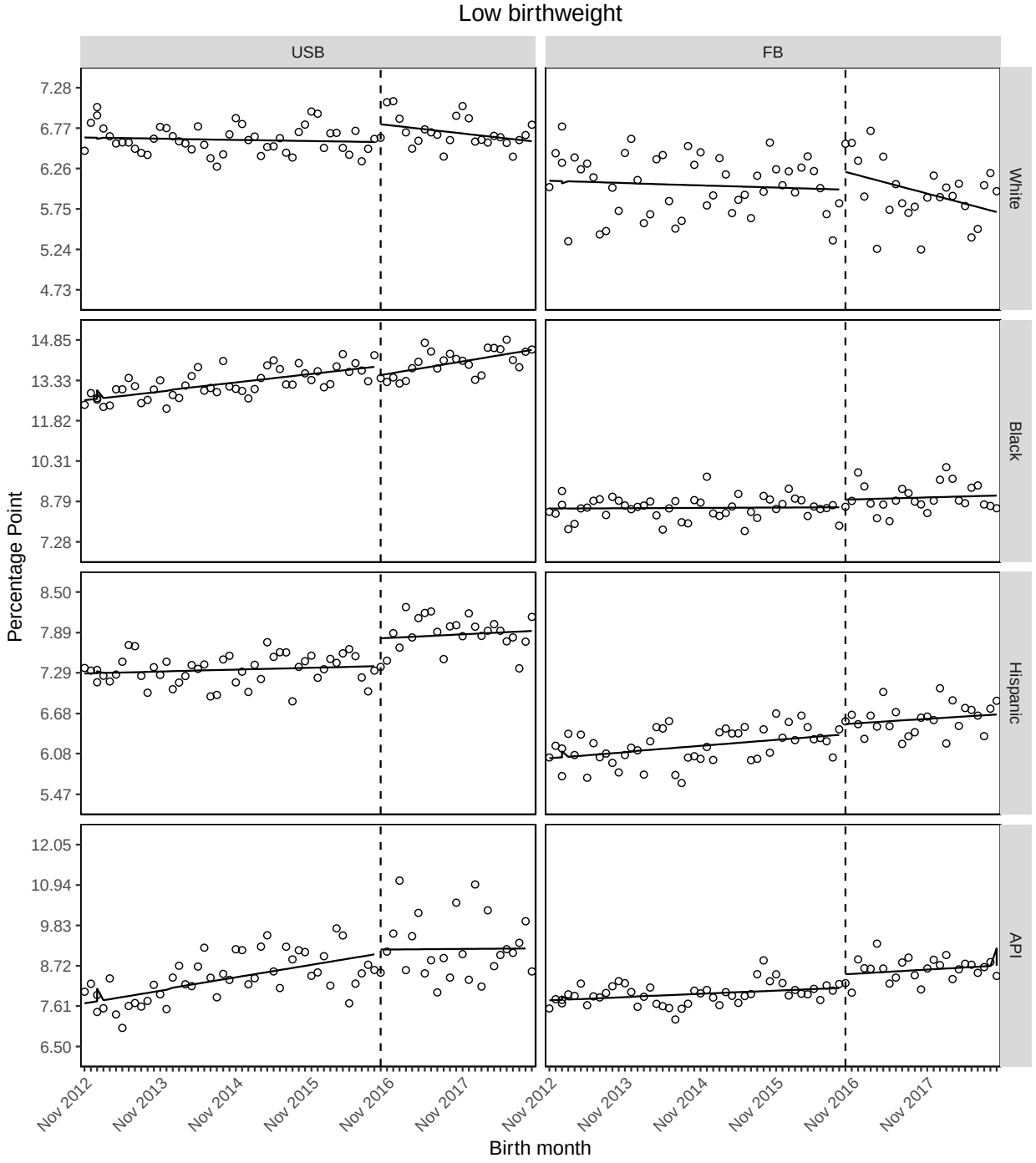
	Model 1				Model 2			
Outcome Variable	**Racialized group disparity (post-pre)**	**Percentage point difference between pre and post**	**95% CI**	**p-value**	**Racialized group disparity (post-pre)**	**Percentage point difference between pre and post**	**95% CI**	**p-value**
Low birthweight								
	USB				**USB**			
	Black-White				**Black-White**			
	(7.29 – 6.60)	0.69*	[0.60, 0.78]	0.00	(5.21 – 4.70)	0.50*	[0.52, 0.70]	0.00
	Hispanic-White				**Hispanic-White**			
	(1.15 – 0.71)	0.44*	[0.35, 0.53]	0.00	(0.67 – 0.27)	0.40*	[0.31, 0.49]	0.00
	API-White				**API-White**			
	(2.47 – 1.69)	0.78*	[0.52, 0.93]	0.00	(1.87 – 1.25)	0.62*	[0.36, 0.88]	0.00
	FB				**FB**			
	Black-White				**Black-White**			
	(2.96 – 2.50)	0.46*	[0.24, 0.70]	0.00	(1.77 – 1.33)	0.44*	[0.22, 0.67]	0.00
	Hispanic-White				**Hispanic-White**			
	(0.62 – 0.14)	0.48*	[0.31, 0.66]	0.00	(-0.10 - -0.64)	0.54*	[0.37, 0.71]	0.00
	API-White				**API-White**			
	(2.63 – 1.89)	0.74*	[0.55, 0.93]	0.00	(2.09 – 1.26)	0.80*	[0.54, 0.99]	0.00
Preterm births								
	USB				**USB**			
	Black-White				**Black-White**			
	(7.08 - 6.37)	0.71*	[0.54, 0.76]	0.00	(4.13 - 3.57)	0.56*	[0.46, 0.66]	0.00
	Hispanic-White				**Hispanic-White**			
	(1.86 - 1.12)	0.74*	[0.63, 0.85]	0.00	(1.24 - 0.56)	0.68*	[0.58, 0.79]	0.01
	API-White				**API-White**			
	(0.97 - 0.84)	0.13	[-0.19, 0.44]	0.42	(1.45 - 1.13)	0.33*	[0.03, 0.63]	0.03
	FB				**FB**			
	Black-White				**Black-White**			
	(3.89 - 3.69)	0.20	[-0.07, 0.47]	0.15	(2.09 - 2.01)	0.07	[0.07, 0.34]	0.58
	Hispanic-White				**Hispanic-White**			
	(2.95 - 2.17)	0.78*	[0.58, 0.98]	0.00	(1.31 - 0.40)	0.91*	[0.71, 1.10]	0.00
	API-White				**API-White**			
	(1.32 - 0.72)	0.60*	[0.37, 0.83]	0.00	(1.81 - 1.17)	0.63*	[0.42, 0.86]	0.00

Notes: USB=U.S.-born, FB=Foreign-born. Pre-Trump = November 2012-October 2016, Post-Trump = November 2016-November 2018. Model 1 controls for year fixed effects. Model 2 adds controls for infant sex assigned at birth, parity, if Medicaid paid for birth, mother's marital status, mother's highest level of education attained, mother's age at time of birth of child, and adequacy of prenatal care.
*p<.05, two-tailed tests

The racialized group disparity column shows the change in the percentage point difference between non-White mothers' predicted probability of adverse birth outcomes compared to mothers racialized as White in the post-Trump period, relative to the same health gap in the pre-Trump period.

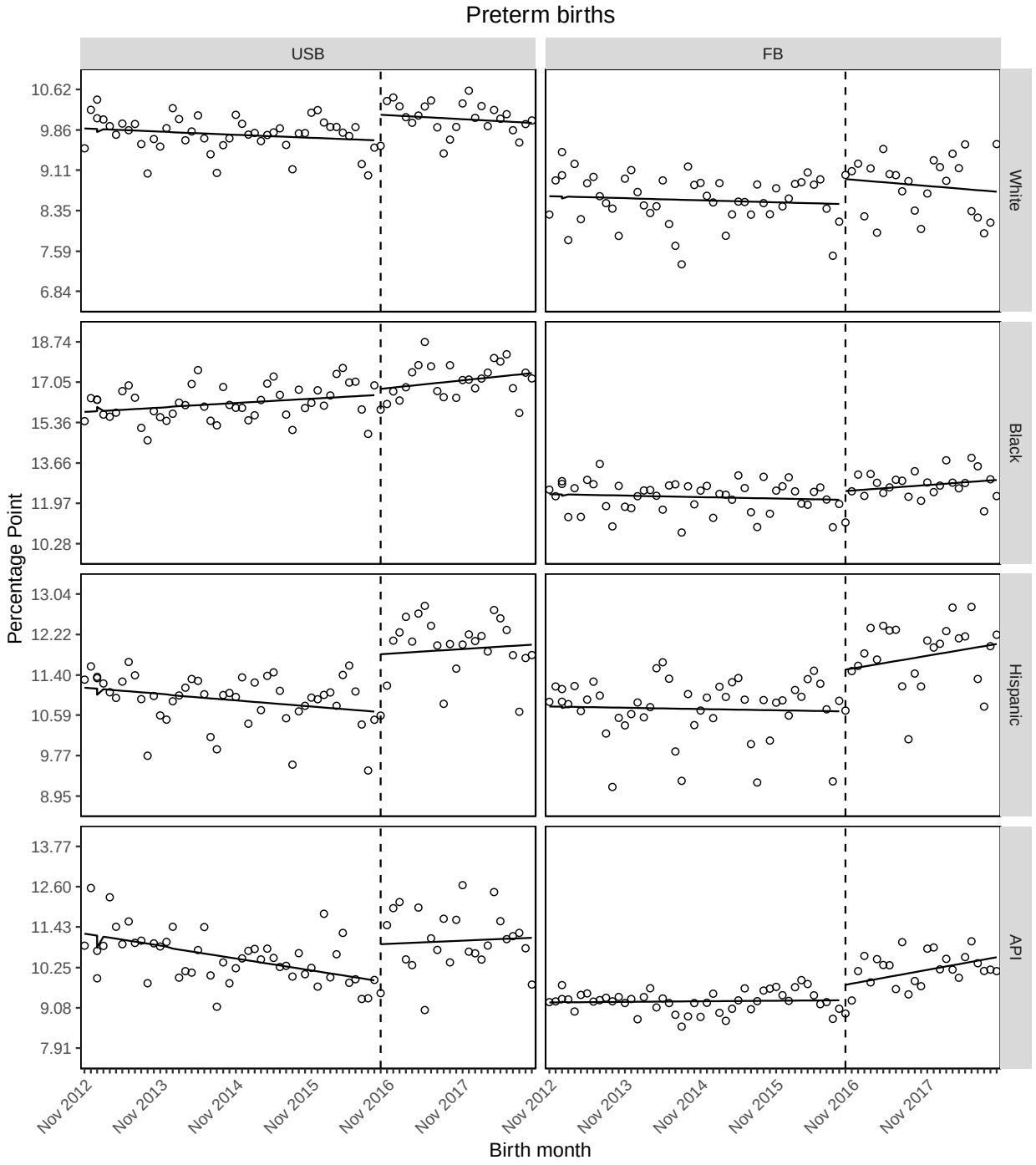
Source: National Center for Health Statistics (November 2012-November 2018); N=15,568,710.

Figure 1: Percentage of Low Birthweight by Mothers' Racialized Groups & Nativity.



Notes: USB=U.S.-born, FB=Foreign-born. Pre-Trump = November 2012-October 2016, Post-Trump = November 2016-November 2018. Hollow circles are average observed outcomes for each month. Solid lines are linear time trends in the pre & post-Trump periods.
Source: National Center for Health Statistics (November 2012-November 2018); N=15,568,710.

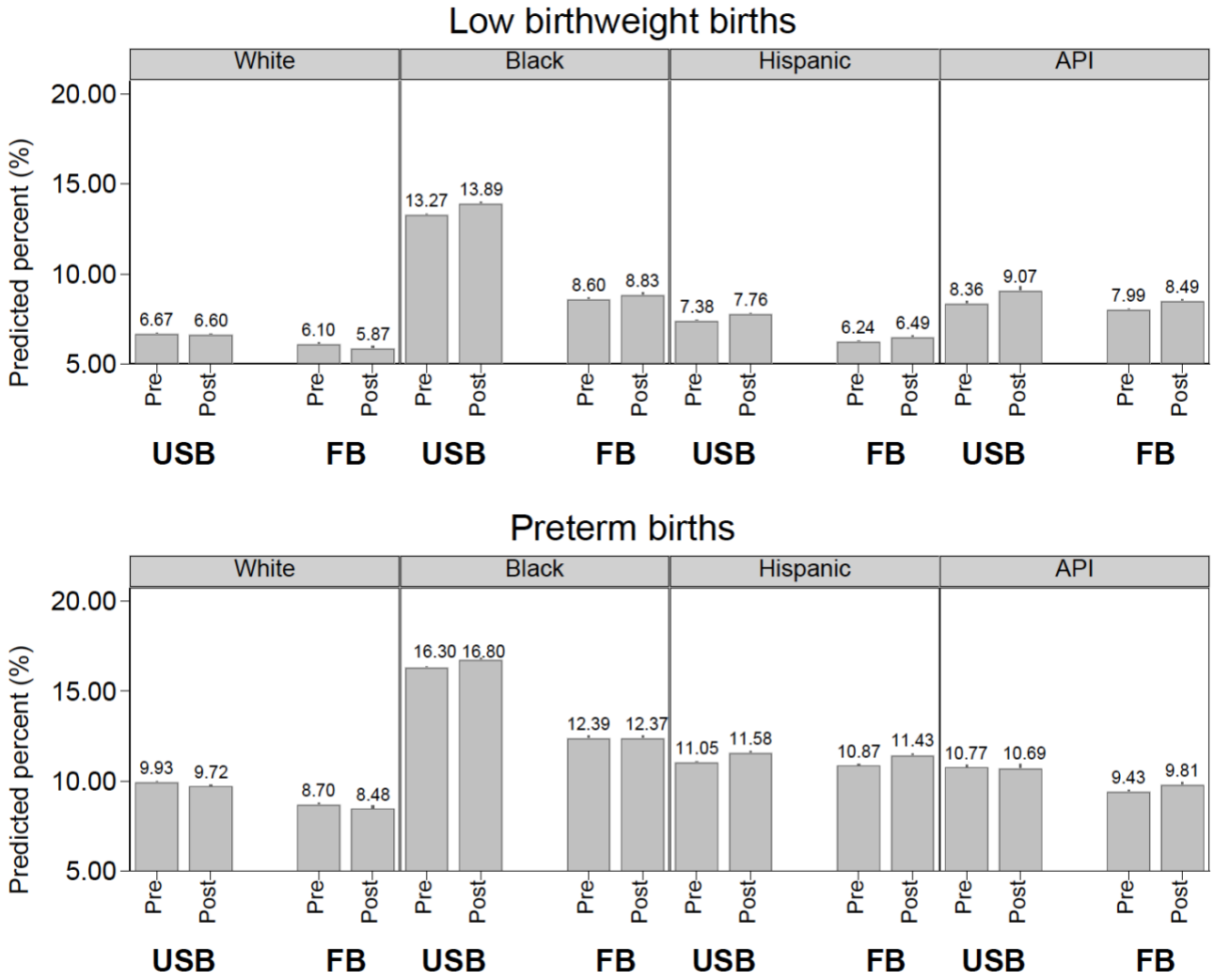
Figure 2: Percentage of Preterm Births by Mothers' Racialized Groups & Nativity.



Notes: USB=U.S.-born, FB=Foreign-born. Pre-Trump = November 2012-October 2016, Post-Trump = November 2016-November 2018. Hollow circles are average observed outcomes for each month. Solid lines are linear time trends in the pre & post-Trump periods.

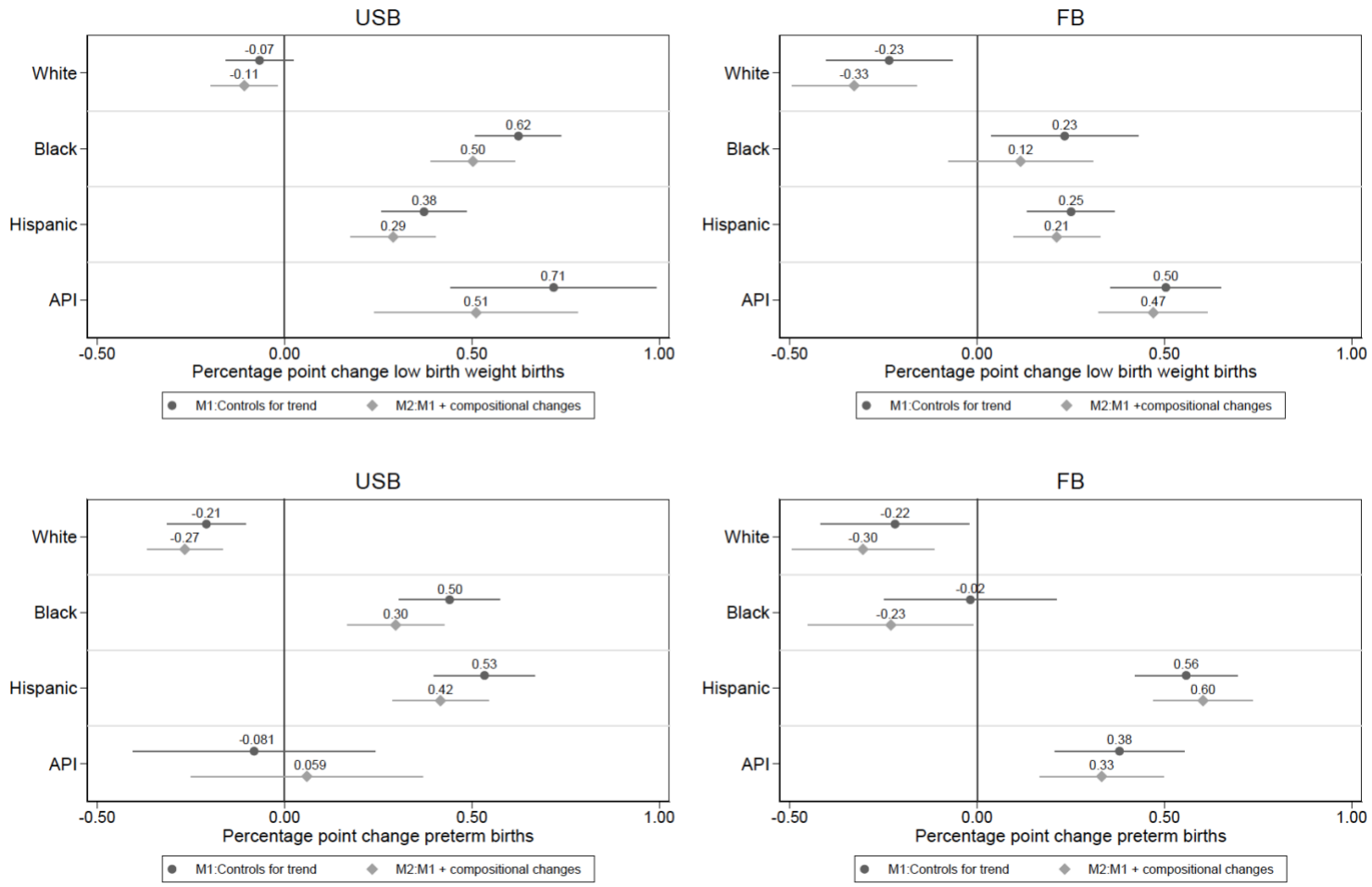
Source: National Center for Health Statistics (November 2012-November 2018); N=15,568,710

Figure 3: Predicted Percent of Adverse Birth Outcomes by Mothers' Racialized Group & Nativity, Pre- & Post-Trump's Election



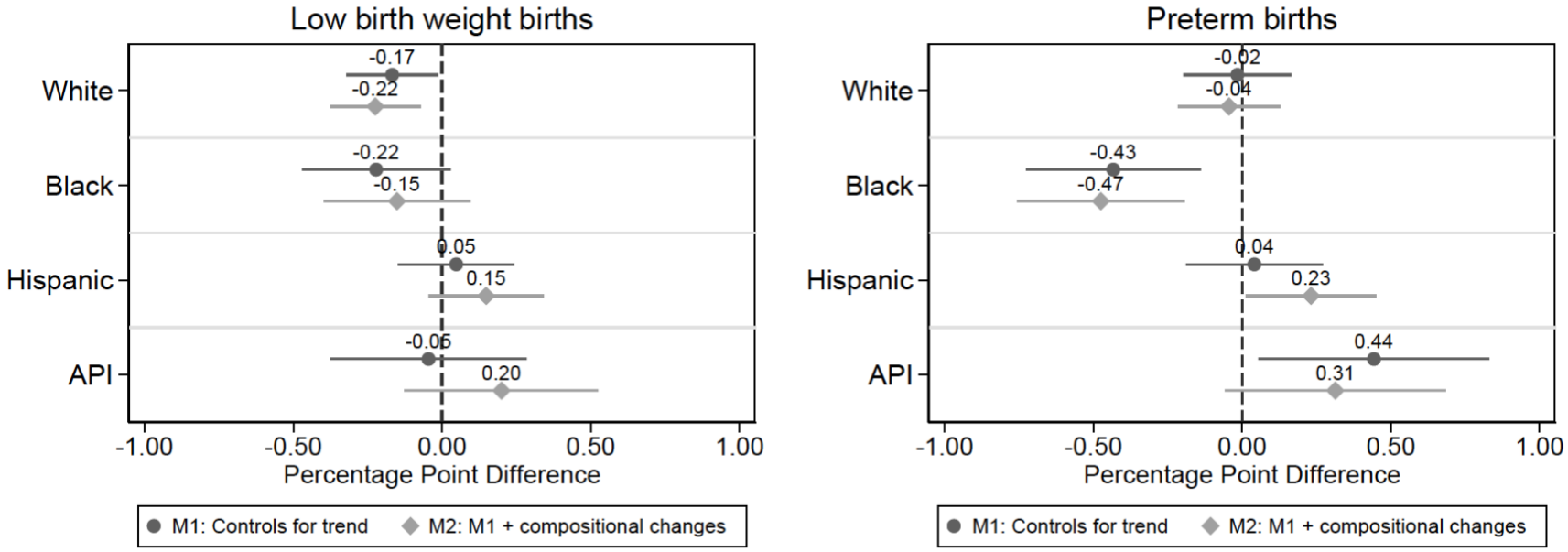
Notes: USB=U.S.-born, FB=Foreign-born. Pre-Trump = November 2012-October 2016, Post-Trump = November 2016-November 2018. Estimates based on Model 1 shown in Supplementary Analysis Table S1 & Table S2. Model controls for year fixed effects.
Source: National Center for Health Statistics (November 2012-November 2018); N=15,568,710.

Figure 4: Predicted Percentage Point Change in Adverse Birth Outcomes after Trump's election, by Racialized Groups* of *Mothers & Nativity



Notes: USB=U.S.-born, FB=Foreign-born. Pre-Trump = November 2012-October 2016, Post-Trump = November 2016-November 2018.
Solid markers show parameter estimates; horizontal bars show 95 percent confidence intervals.
Model 1 controls for year fixed effects. Model 2 adds controls for infant sex assigned at birth, parity, if Medicaid paid for birth, mother's marital status, mother's highest level of education attained, mother's age at time of birth of child, and adequacy of prenatal care.
Source: National Center for Health Statistics (November 2012-November 2018); N=15,568,710

Figure 5: Percentage Point Difference in the Change of Predicted Rates of Adverse Birth Outcomes after Trump's Election for U.S.-born Mothers Compared to Foreign-born Mothers within each Racialized Group



Notes: USB=U.S.-born, FB=Foreign-born. Pre-Trump = November 2012-October 2016, Post-Trump = November 2016-November 2018.
Solid markers show nativity difference in the predicted percent of adverse birth outcome compared to U.S.-born mothers within each racialized group; horizontal bars show 95 percent confidence intervals.
Model 1 controls for year fixed effects. Model 2 adds controls for infant sex assigned at birth, parity, if Medicaid paid for birth, mother's marital status, mother's highest level of education attained, mother's age at time of birth of child, and adequacy of prenatal care.
Source: National Center for Health Statistics (November 2012-November 2018); N=15,568,710.

Supplementary Analysis

SECTION 1: TABLES

Table S1: Regression of Probability of Low Birthweight Births in the U.S. November 2012-November 2018

	(1) Low Birthweight		(2) Low Birthweight	
	Coef.	SE	Coef.	SE
Racialized Group (Ref: White)				
Black	0.066***	(0.000)	0.045***	(0.001)
Hispanic	0.007***	(0.000)	-0.004***	(0.001)
API	0.017***	(0.001)	-0.007***	(0.002)
Trump, post-election period (Ref: Pre-Trump period)	-0.001	(0.000)	-0.001*	(0.000)
Black X Trump, post-election period	0.007***	(0.000)	0.006***	(0.000)
Hispanic X Trump, post-election period	0.004***	(0.000)	0.004***	(0.000)
API X Trump, post-election period	0.008***	(0.001)	0.006***	(0.001)
Foreign-born	-0.006***	(0.000)	-0.006***	(0.000)
Black X Foreign-born	-0.041***	(0.001)	-0.034***	(0.001)
Hispanic X Foreign-born	-0.006***	(0.001)	-0.009***	(0.001)
API X Foreign-born	0.002*	(0.001)	0.000	(0.001)
Trump, post-election period X Foreign-born	-0.002*	(0.001)	-0.002**	(0.001)
Black X Trump, post-election period X Foreign-born	-0.002+	(0.001)	-0.002	(0.001)
Hispanic X Trump, post-election period X Foreign-born	-0.006***	(0.001)	-0.009***	(0.001)
API X Trump, post-election period X Foreign-born	0.002*	(0.001)	0.000	(0.001)
Male			-0.012***	(0.000)
Male X Black			-0.014***	(0.000)
Male X Hispanic			0.005***	(0.000)
Male X API			0.001+	(0.001)
Parity (Ref: 1st child)				
Parity =2			-0.015***	(0.000)
Parity =3			-0.012***	(0.000)
Parity =2 X Black			-0.007***	(0.000)
Parity =2 X Hispanic			-0.001**	(0.000)
Parity =2 X API			-0.006***	(0.001)
Parity =3 X Black			-0.001	(0.001)
Parity =3 X Hispanic			-0.003***	(0.000)
Parity =3 X API			-0.009***	(0.001)
Medicaid birth			0.011***	(0.000)
Medicaid Birth X Black			-0.005***	(0.000)
Medicaid Birth X Hispanic			-0.012***	(0.000)
Medicaid Birth X API			-0.013***	(0.001)
Married			-0.015***	(0.000)
Married X Black			-0.007***	(0.001)
Married X Hispanic			0.008***	(0.000)
Married X API			0.009***	(0.001)
Mother's Education (Ref: Less than HS)				
HS but less than BA			-0.021***	(0.000)

Table S1 (continued): Regression of Probability of Low Birthweight Births in the U.S. November 2012-November 2018

BA or higher			-0.030***	(0.000)
HS but less than BA X Black			0.003***	(0.001)
HS but less than BA X Hispanic			0.015***	(0.000)
HS but less than BA X API			0.014***	(0.001)
BA or higher X Black			-0.005***	(0.001)
BA or higher X Hispanic			0.017***	(0.001)
BA or higher X API			0.018***	(0.001)
Mother's age			0.002***	(0.000)
Mother's age X Black			0.000***	(0.000)
Mother's age X Hispanic			-0.001***	(0.000)
Mother's age X API			-0.000+	(0.000)
Adequacy of pre-natal care (Ref: inadequate)				
Adequacy of pre-natal care = intermediate			-0.041***	(0.000)
Adequacy of pre-natal care = adequate			-0.044***	(0.000)
Adequacy of pre-natal care = intensive			0.051***	(0.000)
Adequacy of pre-natal care = intermediate X Black			-0.002**	(0.001)
Adequacy of pre-natal care = intermediate X Hispanic			0.011***	(0.001)
Adequacy of pre-natal care = intermediate X API			0.004***	(0.001)
Adequacy of pre-natal care = adequate X Black			-0.000	(0.001)
Adequacy of pre-natal care = adequate X Hispanic			0.015***	(0.000)
Adequacy of pre-natal care = adequate X API			0.013***	(0.001)
Adequacy of pre-natal care = intensive X Black			0.031***	(0.001)
Adequacy of pre-natal care = intensive X Hispanic			0.013***	(0.001)
Adequacy of pre-natal care = intensive X API			0.030***	(0.001)
Year of birth (Ref: 2012)				
Year of birth = 2013	0.000	(0.000)	0.000	(0.000)
Year of birth = 2014	0.000	(0.000)	0.002***	(0.000)
Year of birth = 2015	0.001**	(0.000)	0.003***	(0.000)
Year of birth = 2016	0.002***	(0.000)	0.003***	(0.000)
Year of birth = 2017	0.002***	(0.001)	0.004***	(0.001)
Year of birth = 2018	0.002***	(0.001)	0.003***	(0.001)
Constant	0.065***	(0.000)	0.072***	(0.001)
Observations	15,568,710		15,568,710	
R-squared	0.007		0.034	

Notes: Standard errors in parenthesis. *** p<0.001, ** p<0.01, * p<0.05
Source: National Center for Health Statistics (November 2012-November 2018). (N=15,568,710)

Table S2: Regression of Probability of Preterm Births in the U.S. November 2012- November 2018

	(3) Pre-Term Births		(2) Pre-Term Births	
	Coef.	SE	Coef.	SE
Racialized Group (Ref: White)				
Black	0.064***	(0.000)	0.047***	(0.001)
Hispanic	0.011***	(0.000)	0.011***	(0.001)
API	0.008***	(0.001)	0.009***	(0.002)
Trump, post-election period (Ref: Pre-Trump period)	-0.002***	(0.001)	-0.003***	(0.001)
Black X Trump, post-election period	0.006***	(0.001)	0.006***	(0.001)
Hispanic X Trump, post-election period	0.007***	(0.001)	0.007***	(0.001)
API X Trump, post-election period	0.001	(0.002)	0.003*	(0.002)
Foreign-born	-0.012***	(0.001)	-0.009***	(0.001)
Black X Foreign-born	-0.027***	(0.001)	-0.016***	(0.001)
Hispanic X Foreign-born	0.010***	(0.001)	-0.002*	(0.001)
API X Foreign-born	-0.001	(0.001)	0.000	(0.001)
Trump, post-election period X Foreign-born	-0.000	(0.001)	-0.000	(0.001)
Black X Trump, post-election period X Foreign-born	-0.004**	(0.001)	-0.005***	(0.001)
Hispanic X Trump, post-election period X Foreign-born	0.010***	(0.001)	-0.002*	(0.001)
API X Trump, post-election period X Foreign-born	-0.001	(0.001)	0.000	(0.001)
Male			0.008***	(0.000)
Male X Black			-0.004***	(0.000)
Male X Hispanic			0.003***	(0.000)
Male X API			0.005***	(0.001)
Parity (Ref: 1st child)				
Parity =2			-0.003***	(0.000)
Parity =3			0.010***	(0.000)
Parity =2 X Black			0.009***	(0.001)
Parity =2 X Hispanic			0.005***	(0.000)
Parity =2 X API			-0.000	(0.001)
Parity =3 X Black			0.021***	(0.001)
Parity =3 X Hispanic			0.006***	(0.001)
Parity =3 X API			0.005***	(0.001)
Medicaid birth			0.008***	(0.000)
Medicaid Birth X Black			-0.005***	(0.001)
Medicaid Birth X Hispanic			-0.013***	(0.000)
Medicaid Birth X API			-0.013***	(0.001)
Married			-0.017***	(0.000)
Married X Black			-0.007***	(0.001)
Married X Hispanic			0.004***	(0.000)
Married X API			-0.007***	(0.001)
Mother's Education (Ref: Less than HS)				
HS but less than BA			-0.020***	(0.000)
BA or higher			-0.029***	(0.000)
HS but less than BA X Black			-0.008***	(0.001)
HS but less than BA X Hispanic			0.005***	(0.001)

Table S2 (continued): Regression of Probability of Preterm Births in the U.S. November 2012- November 2018

HS but less than BA X API			-0.004***	(0.001)
BA or higher X Black			-0.017***	(0.001)
BA or higher X Hispanic			0.006***	(0.001)
BA or higher X API			-0.014***	(0.001)
Mother's age			0.001***	(0.000)
Mother's age X Black			-0.000	(0.000)
Mother's age X Hispanic			-0.001***	(0.000)
Mother's age X API			0.000**	(0.000)
Adequacy of pre-natal care (Ref: inadequate)				
Adequacy of pre-natal care = intermediate			-0.082***	(0.000)
Adequacy of pre-natal care = adequate			-0.078***	(0.000)
Adequacy of pre-natal care = intensive			0.129***	(0.000)
Adequacy of pre-natal care = intermediate X Black			-0.019***	(0.001)
Adequacy of pre-natal care = intermediate X Hispanic			-0.000	(0.001)
Adequacy of pre-natal care = intermediate X API			0.007***	(0.001)
Adequacy of pre-natal care = adequate X Black			-0.013***	(0.001)
Adequacy of pre-natal care = adequate X Hispanic			0.006***	(0.001)
Adequacy of pre-natal care = adequate X API			0.013***	(0.001)
Adequacy of pre-natal care = intensive X Black			0.043***	(0.001)
Adequacy of pre-natal care = intensive X Hispanic			0.028***	(0.001)
Adequacy of pre-natal care = intensive X API			0.013***	(0.001)
Year of birth (Ref: 2012)				
Year of birth = 2013	-0.002***	(0.001)	-0.002***	(0.000)
Year of birth = 2014	-0.001**	(0.001)	0.002**	(0.000)
Year of birth = 2015	-0.002***	(0.001)	0.001*	(0.000)
Year of birth = 2016	-0.001*	(0.001)	0.002**	(0.001)
Year of birth = 2017	0.004***	(0.001)	0.005***	(0.001)
Year of birth = 2018	0.004***	(0.001)	0.006***	(0.001)
Constant	0.099***	(0.000)	0.103***	(0.001)
Observations	15,568,710		15,568,710	
R-squared	0.005		0.090	

Notes: Standard errors in parenthesis. *** p<0.001, ** p<0.01, * p<0.05

Source: National Center for Health Statistics (November 2012-November 2018). (N=15,568,710)

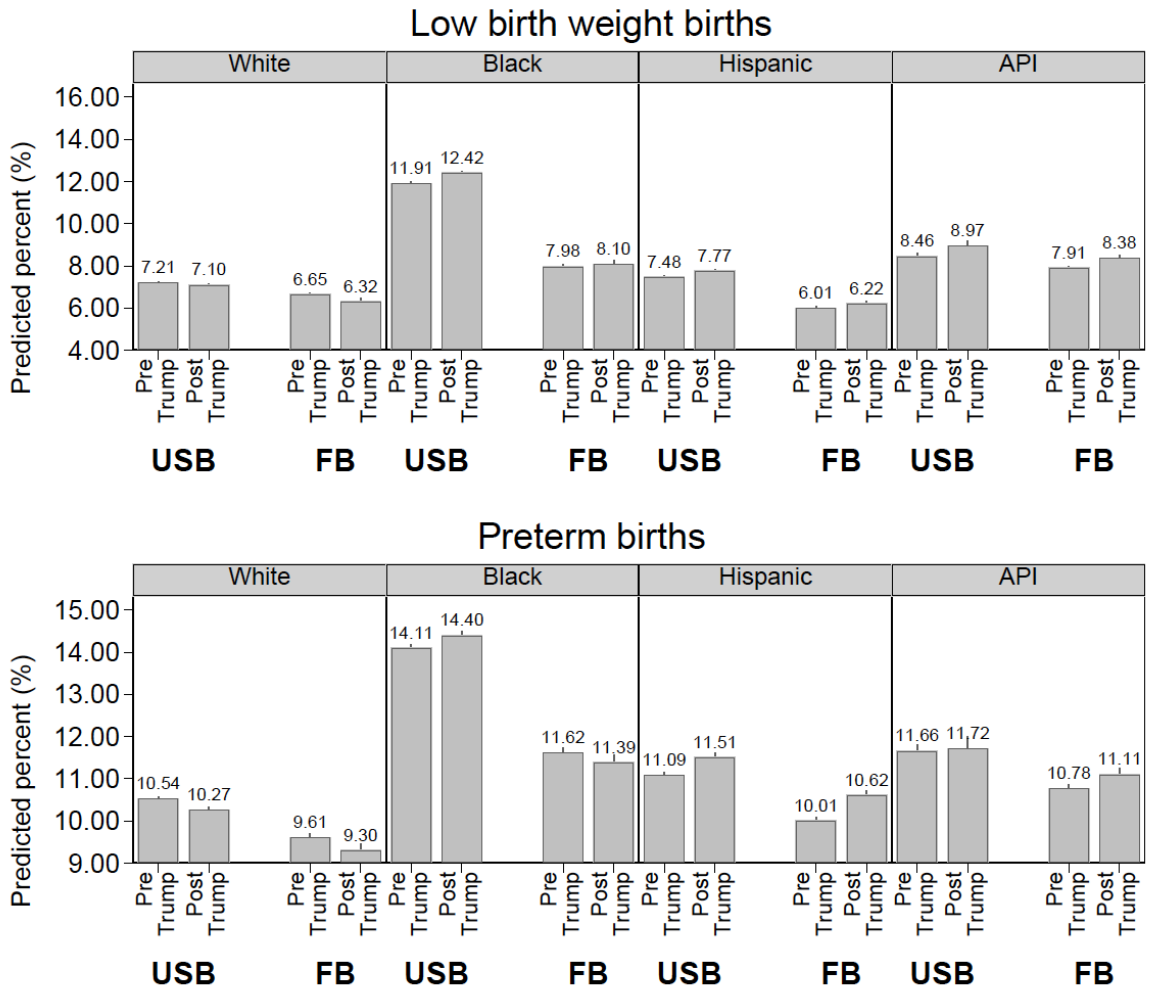
Table S3: Between-Racialized-Group Differences in Predicted Adverse Birth Outcomes from Pre- to Post-Trump's Election for U.S.- & Foreign-born Mothers

		Model 1					Model 2					
Outcome Variable	**Absolute Racialized group disparity**	**Absolute Difference**	**95% CI**	**p-value**	**Relative Racialized group disparity**	**Relative Difference**	**Absolute Racialized group disparity**	**Absolute Difference**	**95% CI**	**p-value**	**Relative Racialized group disparity**	**Relative Difference**
Low birthweight	**USB**						**USB**					
	Black-White (7.29 - 6.60)	0.69*	[0.60, 0.78]	0	**Black-White** (2.10 - 1.99)	0.12*	**Black-White** (5.21 - 4.70)	0.50*	[0.52, 0.70]	0	**Black-White** (1.75-1.65)	0.10*
	Hispanic-White (1.15 - 0.71)	0.44*	[0.35, 0.53]	0	**Hispanic-White** (1.18 - 1.11)	0.07*	**Hispanic-White** (0.67 - 0.27)	0.40*	[0.31, 0.49]	0	**Hispanic-White** (10.9-1.04)	0.60*
	API-White (2.47 - 1.69)	0.78*	[0.52, 0.93]	0	**API-White** (1.37 - 1.25)	0.12*	**API-White** (1.87 - 1.25)	0.62*	[0.36, 0.88]	0	**API-White** (1.26-1.17)	0.09*
	FB						**FB**					
	Black-White (2.96 - 2.50)	0.46*	[0.24, 0.70]	0	**Black-White** (1.50 - 1.41)	0.09*	**Black-White** (1.77 - 1.33)	0.44*	[0.22, 0.67]	0	**Black-White** (1.28-1.20)	0.08*
	Hispanic-White (0.62 - 0.14)	0.48*	[0.31, 0.66]	0	**Hispanic-White** (1.06 - 1.02)	0.04*	**Hispanic-White** (-0.10 - - 0.64)	0.54*	[0.37, 0.71]	0	**Hispanic-White** (0.98-0.90)	0.08*
	API-White (2.63 - 1.89)	0.74*	[0.55, 0.93]	0	**API-White** (1.45 - 1.31)	0.14*	**API-White** (2.09 - 1.26)	0.80*	[0.54, 0.99]	0	**API-White** (1.32-1.19)	0.14*
Preterm births	**USB**						**USB**					
	Black-White (7.08 - 6.37)	0.71*	[0.54, 0.76]	0	**Black-White** (1.73-1.64)	0.09*	**Black-White** (4.13 - 3.57)	0.56*	[0.46, 0.66]	0	**Black-White** (1.40-1.34)	0.06*
	Hispanic-White (1.86 - 1.12)	0.74*	[0.63, 0.85]	0	**Hispanic-White** (1.19-1.11)	0.08*	**Hispanic-White** (1.24 - 0.56)	0.68*	[0.58, 0.79]	0.01	**Hispanic-White** (1.12-1.05)	0.07*
	API-White (0.97 - 0.84)	0.13	[-0.19, 0.44]	0.42	**API-White** (1.10-1.08)	0.02	**API-White** (1.45 - 1.13)	0.33*	[0.03, 0.63]	0.03	**API-White** (1.11-1.11)	0.00
	FB						**FB**					
	Black-White (3.89 - 3.69)	0.2	[-0.07, 0.47]	0.15	**Black-White** (1.46-1.42)	0.03	**Black-White** (2.09 - 2.01)	0.07	[0.07, 0.34]	0.58	**Black-White** (1.22-1.21)	0.01
	Hispanic-White (2.95 - 2.17)	0.78*	[0.58, 0.98]	0	**Hispanic-White** (1.35-1.25)	0.10*	**Hispanic-White** (1.31 - 0.40)	0.91*	[0.71, 1.10]	0	**Hispanic-White** (1.14-1.04)	0.10*
	API-White (1.32 - 0.72)		[0.37, 0.83]	0	**API-White** (1.16-1.08)	0.07*	**API-White** (1.81 - 1.17)	0.63*	[0.42, 0.86]	0	**API-White** (1.19-1.12)	0.07*

Notes: Analysis based on singleton births. Model 1 controls for year fixed effects. Model 2 adds controls for infant sex assigned at birth, parity, if Medicaid paid for birth, mother's marital status, mother's highest level of education attained, mother's age at time of birth of child, and adequacy of pre-natal care.
*p<.05, two-tailed tests
Racialized group disparity column shows the percentage point difference between non-White mothers' predicted probability (%) of adverse birth outcome compared to mothers racialized as White in the post-Trump period – pre-Trump period.
Relative Racialized group disparity columns show the change in the rate-ratio of adverse birth outcomes between groups racialized as non-White and groups racialized as White.
Source: National Center for Health Statistics (November 2012-November 2018). (N=15,568,710)

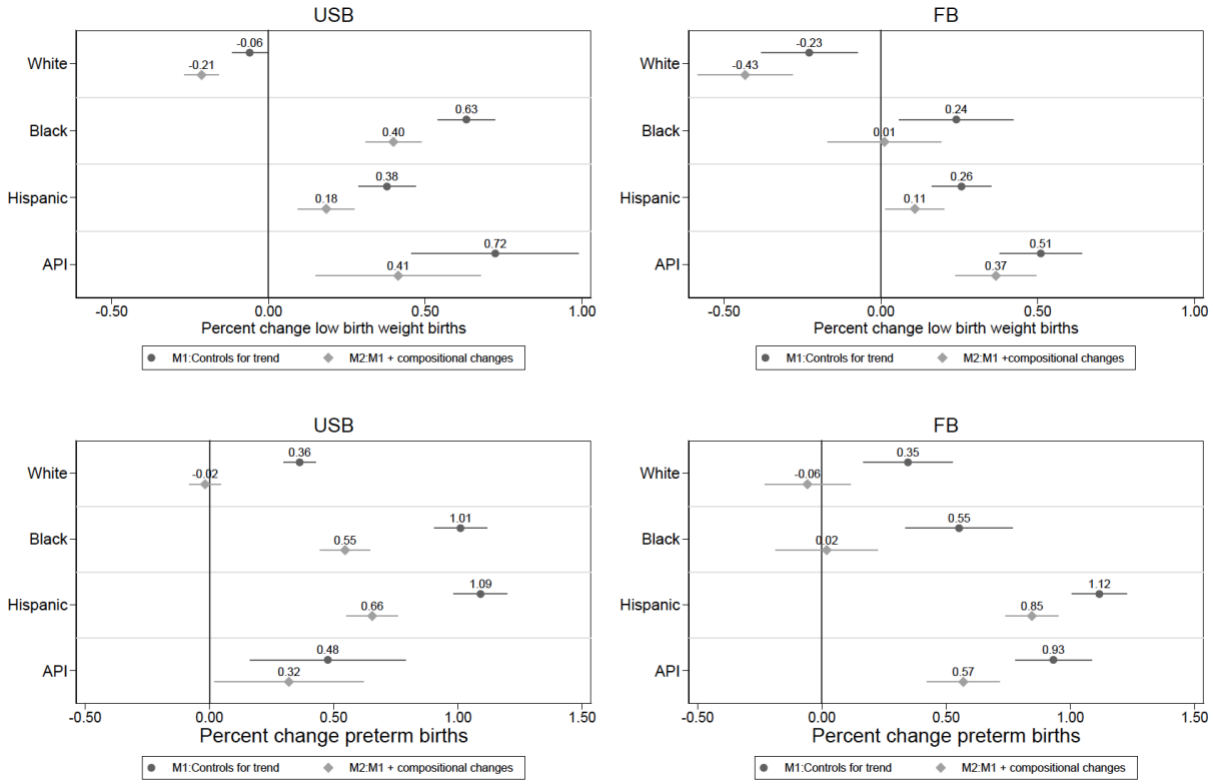
SECTION 2: FIGURES

Figure S1: Predicted Percent of Adverse Birth Outcomes by Mothers' Racialized Groups & Nativity, Pre- & Post-Trump's Election



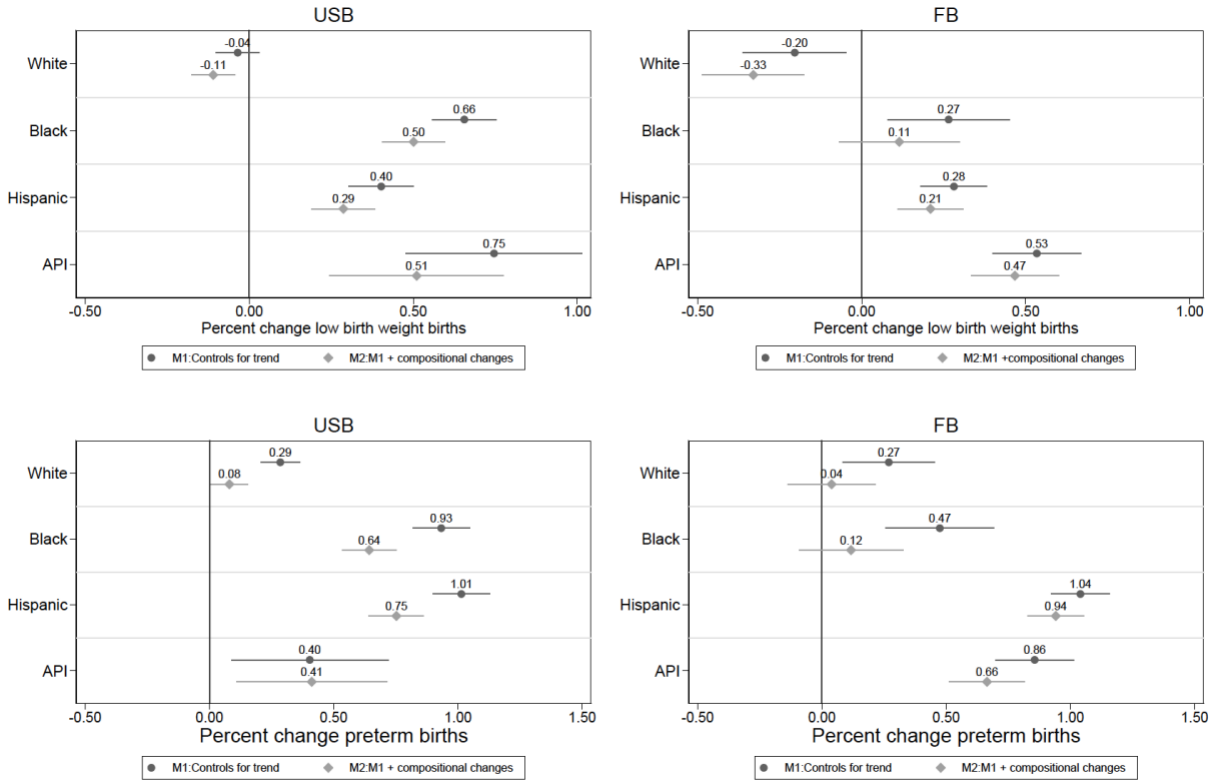
Notes: USB=U.S.-born, FB=Foreign-born.
Estimates based on Model 2 shown in Table S1 & S2. Analysis based on singleton births. Model 2 controls for year fixed effects, and infant sex assigned at birth, parity, if Medicaid paid for birth, mother's marital status, mother's highest level of education attained, mother's age at time of birth of child, and adequacy of pre-natal care.
Source: National Center for Health Statistics (November 2012-November 2018). (N=15,568,710)

Figure S2: Predicted Percent Change in Adverse Birth Outcomes after Trump's election, by Mothers' Racialized Groups & Nativity



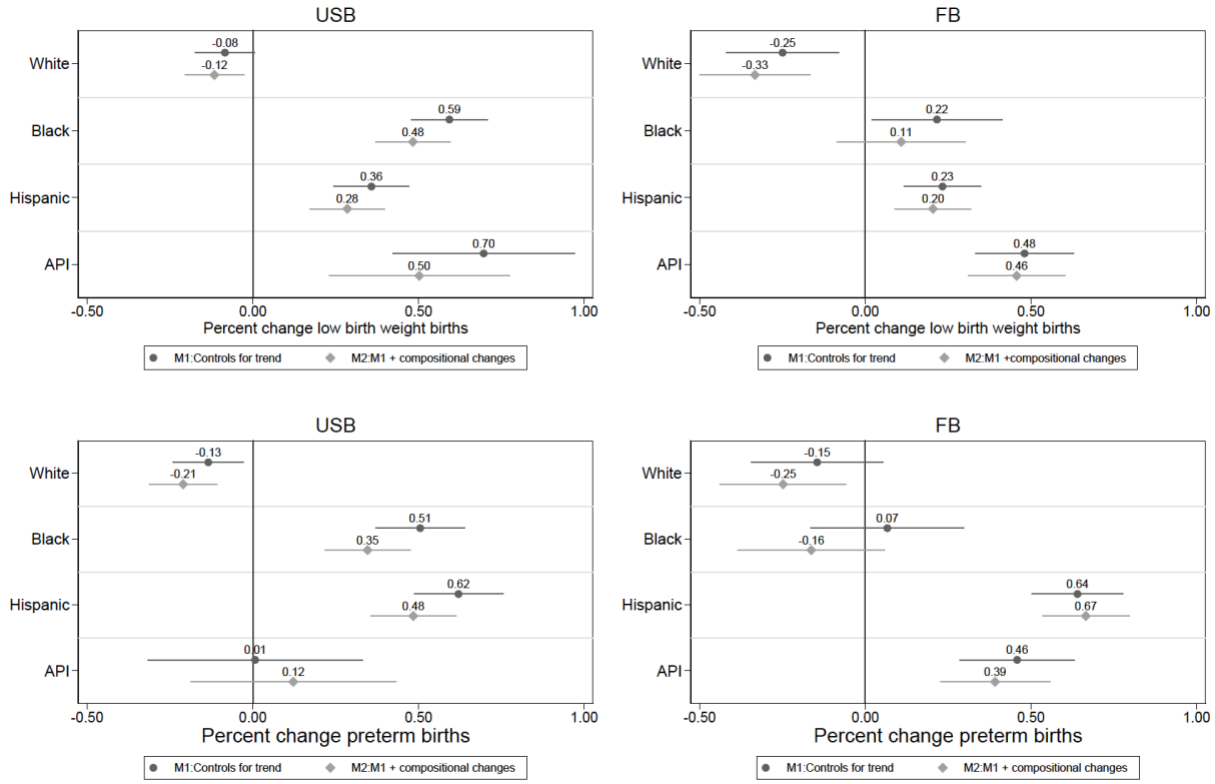
Notes: Markers show parameter estimates; horizontal bars show 95 percent confidence intervals.
Analysis based on singleton births. Model 1 controls for continuous month of birth. Model 2 adds controls for infant sex assigned at birth, parity, if Medicaid paid for birth, mother's marital status, mother's highest level of education attained, mother's age at time of birth of child, and adequacy of pre-natal care.
Source: National Center for Health Statistics (November 2012-November 2018). (N=15,568,710)

Figure S3: Predicted Percent Change in Adverse Birth Outcomes after Trump's election, by Mothers' Racialized Groups & Nativity



Notes: Markers show parameter estimates; horizontal bars show 95 percent confidence intervals.
Analysis based on singleton births. Model 1 controls for quadratic month of birth. Model 2 adds controls for infant sex assigned at birth, parity, if Medicaid paid for birth, mother's marital status, mother's highest level of education attained, mother's age at time of birth of child, and adequacy of pre-natal care.
Source: National Center for Health Statistics (November 2012-November 2018). (N=15,568,710)

Figure S4: Predicted Percent Change in Adverse Birth Outcomes after Trump's election, by Mothers' Racialized Groups & Nativity



Notes: Markers show parameter estimates; horizontal bars show 95 percent confidence intervals.
Analysis based on singleton births. Model 1 controls for year fixed effects and lagged dependent variable (t-1 month). Model 2 adds controls for infant sex assigned at birth, parity, if Medicaid paid for birth, mother's marital status, mother's highest level of education attained, mother's age at time of birth of child, and adequacy of pre-natal care.
Source: National Center for Health Statistics (November 2012-November 2018). (N=15,568,710)

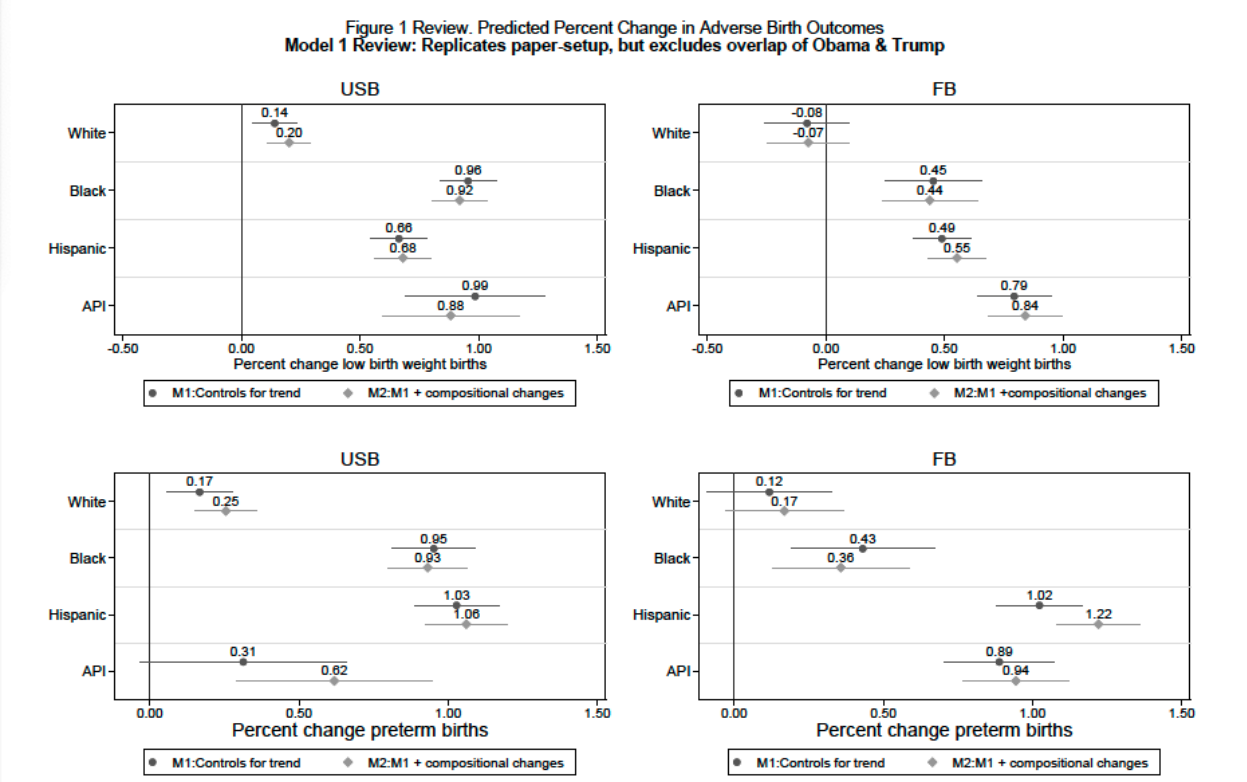
SECTION 3: ALTERNATIVE MODEL

The period between November 2016 and February 2017 combines the end of Obama's (lame duck) presidency through the end of January 2016 with the post-Trump election period. To test whether the inclusion of these months changes the findings we ran a model that excluded the post-election, pre-inauguration period and find substantively similar results.

We conducted the analysis on the population of births excluding births occurring after the election but before the inauguration, defining the pre & post-period as follows:

a. Pre-period: infants born before Trump's election (Nov 2012 until October 2016);
b. Post-period: infants born after Trump's inauguration to the presidency (February 2017 to Nov 2018).

As in the original analysis, we ran two models. First, we included year fixed effects to account for yearly changes, or shocks to birth outcomes, common to all groups of mothers, as a method to control for time trends (M1). Second, we included mother and child characteristics as co-variates (M2).



Notes: USB=U.S.-born, FB=Foreign-born. Pre-Trump = November 2012-October 2016, Post-Trump = Februaru 2017-November 2018.
Solid markers show nativity difference in the predicted percent of adverse birth outcome compared to U.S.-born mothers within each racialized group; horizontal bars show 95 percent confidence intervals.
Model 1 controls for year fixed effects. Model 2 adds controls for infant sex assigned at birth, parity, if Medicaid paid for birth, mother's marital status, mother's highest level of education attained, mother's age at time of birth of child, and adequacy of prenatal care.
Source: National Center for Health Statistics (November 2012-November 2018); N=15,568,710.

The figure shows that U.S.-born White, Black, Hispanic, and API mothers, as well as foreign-born Black, Hispanic, and API mothers, experienced an increase in low birth weight and preterm births after Trump's inauguration as compared to before the election. Models in which we implemented two alternative de-trending strategies (a continuous month of birth control and a quadratic month of birth control) yield similar results for all groups and outcomes except for U.S.-born White mothers low birth weight. Ask authors for results. This suggests that changes in low birthweight among mothers racialized as White (but not Black, Hispanic, or API) after Trump's inauguration might be the consequence of time trends rather than a response to the 2017 inauguration (or the election).

The results from the main analysis, which includes births after the election in the post-period, suggest that adverse births outcomes changed after November 2016 for most groups. Here we see a continuation of the same trends when excluding the post-election births. The predicted percent change of adverse birth outcomes in the first two years of Trump's presidency in the main models of the paper, which include the November 2016-January 2017 period, are smaller than the changes in the post-period when we exclude the months between November 2016 and January 2017. For example, in the model that excludes this period (see Figure 1 Review above), the predicted average percentage point change in low birthweight births among infants born to U.S.-born Black mothers was .96 percentage points. In the main models of the paper, which include the November 2016 to January 2017 period, the predicted change was .62 percentage points. Arguably, we are presenting more conservative estimates of the association between the Trump election and infant health in the paper when compared to the models that exclude November 2016 to January 2017 months.

Chapter 2: Trump rallies increased adverse birth outcomes among infants born to foreign-born Hispanic, and Asian and Pacific Islander birthing parents.

Introduction

Macro-level political events, like elections, have been linked to birth outcomes among infants born to birthing parents pertaining to different race, class, and nativity groups (Gemmill et al., 2019; Rodriguez, 2019; Torche & Rauf, 2021). A growing body of research suggests two potential mechanisms linking elections and health: (1) the implementation of actual policies that protect or endanger population health (Rodriguez, 2019; Torche & Rauf, 2021), and (2) by influencing the collective norms & boundaries of national identity (Brown et al., 2021; Morey et al., 2021). However, few studies have examined the latter "symbolic mechanism" directly in the context of elections, since once a President is elected disentangling the symbolic mechanism from a policy effect is challenging.

In this paper, I examine the case of Donald Trump's 2015-16 election campaign. I assess whether adverse birth outcomes increased following a Trump presidential rally[6], and if they did so differentially across groups defined by racial categories and nativity. Unlike elections, presidential campaign rallies do not change policy outcomes and are therefore an ideal case for studying the association between a symbolic political event and health. Adverse birth outcomes are extremely sensitive to environmental stressors experienced by the birthing parent during their pregnancy (Dunkel Schetter, 2011). They have been linked to socio-political stressors that incited racist and xenophobic attitudes and behaviors, such as the discussion of anti-immigrant laws, and the terrorist attacks of 9/11(Lauderdale, 2006; Torche & Sirois, 2019). Donald Trump's 2016 political rise was

[6] Jansen (2011) defines a political rally as a type of political mobilization of ordinarily marginalized social sectors into publicly visible and contentious political action. In this paper I focus on Donald Trump's presidential rallies held between 2015-2016.

driven by racist and xenophobic rhetoric that was matched by policies once he assumed the presidency (Clayton et al., 2021; Gabriel et al., 2021; Manza & Crowley, 2018; Woolhandler et al., 2021). Trump's campaign and election have been linked to aggravated racist attitudes among ordinary citizens (Newman et al., 2021), increased hate crimes (Feinberg et al., 2022), and intensified racially biased behavior by law enforcement (Grosjean et al., 2023). One study also found that Trump's election increased adverse birth outcomes among births to women racialized as Latina in the 9-month period beginning in November 2016 (Gemmill et al., 2019; Langer et al., 2022).

In this chapter, I provide estimates for the causal effect of Trump's campaign on infant health by using a staggered difference-in-difference research design in conjunction with data of geocoded Trump rallies linked to monthly, county-level data from restricted U.S. birth records collected between June 2014 and November 2017 -one year prior to Trump's first presidential campaign rally and one year after his last (National Center for Health Statistics, 2021). I find that in the counties where Trump held rallies in-utero exposure to a Trump rally led to increases in very low birthweight among infants born to foreign-born Hispanic birthing parents and in low birthweight among infants born to foreign-born Black and Asian & Pacific Islander (API) birthing parents in the 9 months following a Trump rally. I do not find this association for Hillary Clinton rallies. I also do not find an association between Trump rallies and infant health among native-born groups of any race, and foreign-born White and Black groups. Further, I do not find this effect to spillover to counties that shared a border with counties where Trump rallies were held. I do however find the effects to extend in time to births born 12 and 24 months after a Trump rally was held. My results suggest that Trump's presidential campaign harmed the health of infants born to foreign-

born Hispanic and API birthing parents who likely experienced this event as one signaling a proliferation of racial and xenophobic prejudice and behaviors.

Literature Review

Politics & health

Between 80% and 90% of the modifiable contributors to population health are social determinants of health: health-related behaviors, socio-economic factors, and environmental factors, in other words, the conditions in which people are born, grow, live, work and age. (Hood et al., 2016; Magnan, 2017). These circumstances are, at least in part, political constructions (Rodriguez, 2019).

At the macro-level, political factors and health are linked via multiple pathways that include the character, ideology, and policies of political regimes and governing political parties (Beckfield & Krieger, 2009; Rodriguez, 2019; Torche & Rauf, 2021). Research has found that government policies shape infant health through redistributive policies that reduce inequality and through the expansion of political and economic rights (Hamilton et al., 2021; Hoynes et al., 2011, 2011; Krieger et al., 2013). Targeted policies, such as the Supplemental Program for Women Infants and Children (WIC), and the Earned Income Tax Credit (EITC) improve infant health (Hoynes et al., 2011, 2015). The enactment of civil rights legislation in 1964 reduced Black infant death rates (Krieger et al., 2013). While the 2012 Deferred Action for Childhood Arrivals (DACA) program that granted work authorization and protection from deportation to more than 800,000 young undocumented immigrants, improved infant health among infants born to Mexican immigrant birthing parents (Hamilton et al., 2021).

Research also suggests that politics influences health, even in the absence of policy implementation (Brown et al., 2021; Gemmill et al., 2019; Lauderdale, 2006; Morey et al., 2021;

Samari et al., 2020; Torche & Sirois, 2019). For example, Brown et al. (2021) find that Barak Obama's presidential election led to an improvement in mental health among Black men in the U.S. in the 30 days immediately following the election, likely before he implemented any policies. Morey et al. (2021) find that English-speaking Latinx people living in states in which Trump won the majority of the vote experienced higher than expected poor mental health days in November 2016 and February 2017, before he assumed the presidency. Each of these studies documented changes to health prior to the likely implementation of policies.

Beyond elections, researchers have studied other types of socio-political events that support racist and xenophobic sociopolitical climates and have linked these to worsening infant health outcomes. Lauderdale et al. (2006) found the terrorist attacks of 9/11 caused worse birth outcomes among children born to women with Arab-sounding names in California in the months following compared to the months preceding the attack (Lauderdale, 2006). One study found an association between the 2017 Muslim ban and preterm births among infants born in the U.S. to birthing parents from banned countries, and another documented lower birthweight among infants born to immigrant women racialized as Latina following the signing -rather than the implementation- of an anti-immigrant bill in Arizona in 2010 (Samari et al., 2020; Torche & Sirois, 2019). The immediate health changes observed after socio-political events that change racist and xenophobic climates, suggest that racist and xenophobic massages impact health. This paper contributes to this line of research by estimating whether adverse infant health outcomes changed in counties where a Trump presidential rally was held.

Racist and xenophobic political rhetoric and health: pathways of influence

The literature suggests at least 3 ways that racist and xenophobic political rhetoric can harm health; through discrimination & threat thereof, through emboldening groups to express hostility and by triggering coping behaviors among targeted groups (Aronson et al., 2013; Bracco et al., 2022; Cardoso et al., 2021; Flores, 2015; López-Hinojosa et al., 2024; Mann-Jackson et al., 2018; Williams et al., 2019; Yanagizawa-Drott, 2014). All these modifications may happen simultaneously, i.e. political messages might activate cultural, behavioral, and institutional pathways. Research in Europe and the U.S. suggests that anti-immigrant and racist discourse in politics spills over into social hostility towards immigrant and non-White groups, especially in the schoolyard (Bracco et al., 2022; Southern Poverty Law Center, 2016). Threat-invoking rhetoric by state or local politicians has also been found to precede and influence subnational mobilizations against immigrants (Karapin, 1999). Multiple studies have also linked an increase in handgun sales and hate crimes to political events, including Trump rallies, the discussion of restrictionist immigration ordinances, and the election of far-right mayors (Feinberg et al., 2022; Flores, 2015; Romarri, 2019; Rushin & Edwards, 2018). These findings suggest that anti-immigrant and White-supremacist rhetoric may increase the use of violence or threat thereof and extralegal methods by raising perceived threat among groups who perpetrate violence. For example, Yanagizawa-Drott (2014) finds that 10% of the overall violence Tutsi members faced during the Rwandan genocide can be causally linked to the broadcast of a popular radio station that led the propaganda efforts of Hutu members of the government against Tutsi groups.

Stigmatized groups also react to political rhetoric and the hostile psycho-social environment it fosters by changing behaviors that impact health adversely, such as reducing or avoiding the use of healthcare services and public assistance altogether (Lopez et al., 2017; López-Hinojosa et al., 2024; Toomey et al., 2014; Vargas & Pirog, 2016; Watson, 2014; White et al., 2014). Studies

have found that restrictive rhetoric erodes immigrants' trust in programs and their sense of deservingness of benefits which impacts their willingness to engage in health-seeking resources (Cardoso et al., 2021; López-Hinojosa et al., 2024; Mann-Jackson et al., 2018; Perreira & Pedroza, 2019).

Presidential campaigns as triggers

Presidential campaign rallies are designed to attract the attention of voters and local news media. In them, candidates attempt to alert people of the impending election and the stakes involved, encourage people to participate by voting or joining the campaign efforts, and persuade citizens to vote for the candidate (Jones, 1998). Unlike elections, campaign rallies do not directly shape policy outcomes. Rather, they serve an important symbolic function. However, campaign rallies have not yet been systematically examined as determinants of health outcomes.

There is evidence that some presidential campaign rallies impacted citizens and state actors' behaviors and attitudes, especially among people who lived and worked in the counties where a rally was held (Feinberg et al., 2022; Grosjean et al., 2023; Herr, 2002; Newman et al., 2021; Snyder & Yousaf, 2020). Research finds that certain campaign rallies, like Harry Truman's, Bill Clinton's and Donald Trump's, significantly increased voting intention and turnout, while others like Dewey, Truman's contender, Bob Dole's, Bill Clinton's opponent, and Hillary Clinton's, Trump's competitor, did not (Heersink & Peterson, 2017; Herr, 2002; Snyder & Yousaf, 2020). These researchers suggest that campaign rallies may be a more important tool for candidates with a highly partisan and more aggressive communication style. Yet, no existing studies systematically linked campaign rallies to health outcomes.

Trump's campaign rallies were different from those of his opponents and other recent presidential candidates. Donald Trump mobilized White Supremacist rhetoric and committed to a variety of social policies that would disproportionately and negatively impact groups racialized as non-White in the United States (Blow, 2017; Bobo, 2017; Clayton et al., 2021; Gray, 2017; Woolhandler et al., 2021).[7] His anti-immigrant and racist statements became a foundational element of the presidential campaign rallies he held between 2015 and 2016 in the U.S. (Anbinder, 2019; Arce, 2019; Reilly, 2016).

As a direct result of Trump's campaign rallies, hate crimes increased and racially biased behavior by law enforcement intensified in counties where a Trump rally occurred (Feinberg et al., 2022; Grosjean et al., 2023). Feinberg et al. (2022) find that counties that hosted a rally experienced an increase in hate crimes between 70% and 134% in the month after hosting a rally, compared to counties that did not host a rally. Grosjean et al. (2023) find that compared to stops of Black drivers in the 60 day period before a Trump rally occurred, the probability that a stopped driver was Black increased by 5.74% immediately after a Trump rally occurred, with this effect lasting up to 60 days after the rally. This research suggests that exposure to Trump's political message intensified racial bias with tangible consequences in the localities where his rallies occurred.

This paper extends research that investigates campaign rallies as symbolic triggers by assessing whether a Trump rally increased adverse birth outcomes in the county it was held. While several studies have linked elections to health changes, including Donald Trump's presidency (Gemmill et al., 2019; Torche & Rauf, 2021), what remains unclear is whether presidential candidates can

[7] I use the term "racialized" to refer to people grouped in different race categories, following the insights of critical race theory, which seeks to avoid reifying "race" as a biological or natural category, and to highlight the processes through which racial inequality is created and maintained (Gonzalez-Sobrino & Goss, 2019; Omi & Winant, 2015).

influence population health even before being elected. Given that Trump's rhetoric targeted both immigrants and U.S.-born- racialized minorities, I assess whether Trump rallies impacted birth outcomes among both immigrants and ethno-racial minorities.

Data and research methods

The data on adverse birth outcomes come from restricted U.S. birth records from the National Vital Statistics System, comprising all births occurring and registered in the 50 U.S. states and the District of Columbia from June 2014 and November 2017 (National Center for Health Statistics, 2021). I restrict the data to singleton births with plausible values for gestational age (between 22 and 44 weeks of gestation) and birthweight (above 500 grams) born to birthing parents who are between 15 and 50 years old, and who are racialized as White, Black, Hispanic, and API.

I link U.S. birth records to a geo-coded data set of every Trump rally for the 2015–2016 presidential campaign, made available by Grosjean et al. (2023). There were a total of 324 Trump presidential campaign rallies held in 142 counties; 98 counties had exactly one rally and 36 had two or more rallies.

I create a panel dataset with aggregate monthly, county-level data from U.S. birth records linked to the Trump rally data, where counties are based on birthing parent's residence. The county-month panel dataset includes a total of 2,782 counties (i=2,782, 142 treated and 2,640 never treated counties) between June 2014 and November 2017 (t=42 months).

The "treatment" of interest is a Trump campaign rally in the birthing parent's county of residence, which is defined by the month the rally occurred. I operationalize the Trump campaign rally treatment as a one-time, irreversible, binary event. I code the month of the

treatment to be the month that the first Trump rally occurred in a county. Thus, for the 36 counties that experienced more than one rally, the first date a Trump rally occurred is considered their treatment. Treatment timing is staggered, and counties are treated at various times between June 2015 and November 2016 (see Figure 1). I estimate the effect of a Trump rally for two time periods: (1) Republican party presidential primaries period ("primary period"), which I define from June 2015 -the first month Trump announced his presidential campaign- until June 2016, one month prior to the announcement of Donald Trump as the officially nominated Republican presidential candidate and (2) General election period from July 2016-November 2016.

[Figure 1 about here]

Outcomes: The outcomes of interest are very low birthweight (defined as birthweight of less than 1,500 grams) and low birthweight (defined as birthweight of less than 2,500 grams). These outcomes are linked to increased morbidity, mortality, and multiple measures of well-being across the life course (Behrman & Butler, 2007; Boardman et al., 2002; Case et al., 2005; Morenoff, 2003).

Mother's race and ethnicity: I study adverse birth outcomes among four racialized groups: Non-Hispanic White (White, hereafter), Non-Hispanic Black (Black, hereafter), Hispanic, and Non-Hispanic Asian and Pacific Islanders (API, hereafter). Hispanic is defined following the 1997 U.S. Census Bureau's classification, which divides ethnicity into Hispanic or Latino and Not Hispanic or Latino. Hispanic individuals may be of any race, and members of any race may be either Hispanic or non-Hispanic.

Nativity: To measure nativity, I use the mother's country of birth, recoded into two categories: U.S.-born (birthplace=United States and its territories) and foreign-born (birthplace=outside of the U.S. and its territories).

Covariates

To establish if counties that hosted a Trump rally had different characteristics from those that did not, I present descriptive statistics using the variables listed in Table 1.

[Table 1 about here]

A. Main identification strategy

Descriptive statistics for counties where a Trump rally occurred compared to those where a Trump rally never occurred are given in Table 2. The final column of the table presents results of two-tailed tests of means between counties where a Trump rally occurred and those without a Trump rally, calculated using chi-squared tests for binary variables and t-tests for continuous variables. The tests of means show that Trump rallies occurred in counties that were systematically different from those where Trump rallies did not happen. Compared to counties where a county did not host a presidential Trump rally (94.9% of counties), Trump rally counties (5.1% of counties) had a lower proportion of birthing parents with a high school degree, birthing parent's mean age was also higher in counties that hosted a Trump rally compared to those that did not (mean of 28.60 years compared to 27.30), a higher proportion of birthing mothers who were married (59.78% compared to 58.89%), they had a lower mean number of births (1.89 compared to 1.96), a lower proportion of Medicaid births (42.06% compared to 46.20%), and a higher proportion of births experienced an intensive prenatal care (23.69% compared to 21.48%). In terms of county characteristics, counties that hosted a Trump rally had a lower share of people

who voted Republican in the 2012 election (48.17% compared to 59.18%), a lower poverty rate (14.09% compared to 16.15%), a higher mean median household income ($57,503 compared to $49,109), a lower unemployment rate (4.90% compared to 5.40%), as well as a larger population (663,918 compared to 85,682 residents), and a larger proportion of the 3 non-White groups included in this analysis. These results suggest that Trump rallies were not randomly assigned to counties.

[Table 2 about here]

My main analytical strategy relies on within-county variation over time, using Trump rally counties as their own control units. The validity of my identification strategy rests on the premise that, for any given county, the month in which a presidential rally occurred is as good as randomly assigned. This means that the month in which a presidential rally occurred is independent of unobservable factors influencing birth weight and length of gestation. Although this assumption is untestable, I provide suggestive evidence supporting its validity. Changes in the composition of mothers in the 9 months after a rally occurs, especially in covariates that are determinants of low birth weight, suggest that these changes in time in counties that held Trump rallies may be the mechanisms explaining the changes observed, and not the hosting of a Trump rally. To address this concern, I assess the association between presidential rally occurrence and observable characteristics of the birthing parent, such as age, whether the birthing parent had a high school degree or lower, whether they were married, the racialized & nativity group of the birthing parent. I also assess its association with the characteristics of the infant, such as the likelihood of a male -compared to a female birth-, whether the birth was paid by medicaid, and whether the quality of prenatal care was inadequate (1= inadequate, 0= all other categories), and intensive (1=intensive, 0= all other categories). I consider the following linear probability model:

$$Y_{ict} = \alpha + \beta_1 Presidential\ Rally_{ct} + \beta_c + \beta_{ct} + \varepsilon_{ict}$$

Where Y_{ict} is an indicator for an observable characteristic of the birthing parent or birth, and $Presidential\ Rally_{ct}$ is equal to one if birth in a county "c" was exposed to the presidential rally in the 9 months following the presidential rally "t", in other words was likely in-utero when the rally occurred (and is equal to zero otherwise). County fixed effects are represented by β_c and county-specific linear time trends are represented by β_{ct}. The results for the Trump presidential rallies, reported in Table 1 in the Annex, suggest that the month of occurrence of Trump's presidential rallies can be thought of as randomly assigned. It is hard to imagine a scenario in which Trump presidential rallies are essentially uncorrelated with observable characteristics of the birthing parent that are also determinants of birthweight and gestational length but would be correlated with unobserved determinants of these outcomes.

B. Event Study of Trump Rallies

If the timing of a Trump rally is as good as randomly assigned, then identifying the treatment effect of pre-natal exposure to Trump presidential rallies can proceed following the logic of a randomized control trial. First, I conduct a simple event study that compares birth outcomes in counties where a Trump rally occurred in the 9-months immediately before and after a Trump rally was held compared to counties where a Trump rally had not yet happened. These average treatment effects in the treated (ATTs) are estimated for each month relative to the first treated month across all treated counties. The event-study plots contains pre-treatment estimates that can be used to evaluate the parallel trends assumption, as well as treatment effect estimates in the post-treatment period.

To estimate the ATTs, I use the difference-in-differences (DID) estimator proposed by Callaway & Sant'Anna (2021), which differs from the canonical DID setup. In the canonical DID, the causal effect is evaluated by contrasting two time periods and two groups: in the first period no one is treated, and in the second period some units are treated (the treated group) and some units are not (the control group). If, in the absence of treatment, the average outcome for treated and control groups would have followed parallel paths over time, one can estimate the average treatment effect for the treated (ATT) by comparing the average change in the outcomes experienced by the treated group to the average change in the outcomes experienced by the control group. In the current study, there are more than two time periods because there is variation in treatment timing. The Callaway & Sant'Anna method estimates a consistent and unbiased time-dynamic ATT in settings that involve staggered treatment timing and heterogeneous effects by using not-yet treated counties as control units. It extends the canonical DID by computing disaggregated treatment effects for each cohort of treated counties that share the same treatment timing. For example, it calculates an average treatment effect for all counties that were treated in June 2015 by comparing the average change in the outcomes experienced by the counties treated in June 2015 to the average change in the outcomes that did not yet experience a Trump rally. It does the same for the cohort of counties treated in July 2015, August 2015, up to the last treated cohort counties. These disaggregated parameters are called "the group-time average treatment effect" (ATT(g,t)), i.e., the average treatment effect for group g at time t, where a "group" is defined by the time period when units are first treated. When all units are treated, one is only able to identify the group-time average treatment effect for time periods before the last treated group "effectively" starts their treatment, in other words, one cannot

identify the ATT(g,t) for the last treated cohort (because of a lack of a control group). Formally, this can be expressed as:

$$ATT(g,t) = \mathrm{E}\left[Y_t - Y_{g-1} \middle| G = g\right] - \mathrm{E}\left[Y_t - Y_{g-1} \middle| C = 1\right]$$

Here g represents groups, which is all counties treated in a particular month or the control group, while t represents months. If the control group is defined as the not-yet treated counties the treatment effect in group g at time t is identified by the difference between expected change in the outcomes variable from the previous period in the treatment groups and the expected change in the outcomes variable from the previous period in the not-yet treated group. Since there are many groups of treated counties there are many ATT(gt)s that can be aggregated into various estimations of different treatment effect parameters with respect to group, calendar time, or event time.

C. Difference-in-Difference Estimates

To further explore the effect of pre-natal exposure to a Trump rally on birth weight, I the average treatment effect for all groups in the entire 9 months period ("time-dynamic ATT"). This measure is crucial for this analysis since changes in adverse birth outcomes experienced by births exposed in-utero to Trump's campaign are more likely to reflect an acute stress directly tied to this event.

D. Placebo Treatment

One way of assessing the plausibility that Trump rallies in particular caused increases in adverse birth outcomes among infants is to conduct a placebo test using the same model set-up but changing each date a Trump rally was held to the same date, but one year prior to its occurrence. Another way of assessing the plausibility that Trump rallies in particular caused increases in

adverse birth outcomes among infants, and not the presidential campaign more broadly, is to assess whether Hillary Clinton's presidential campaign rallies -the other major contender from the Democratic Party in the 2016 election- had a causal effect on infant health.

E. Alternative specifications

While the restricting the effect of a Trump rally to the counties that held them makes for a more plausible test that the occurrence of a Trump rally was likely associated with observed changes to birth outcomes, I also test whether the effect "spills over" to adjacent counties, i.e. those that share a border with Trump rally counties. As an alternative set of models, I also extend the post-period from 9-months to 12-months and 24-months. The one year-period plausibly captures the indirect effect that Trump's rallies may have had on birth outcomes through changes that counties may have experienced as a consequence of the occurrence of a Trump rally. For example, Grosjean et al. (2023) found an increase in police stops that counties experienced in the following 60-day period after hosting a Trump rally. These changes experienced in the 2 months period after a Trump may impact birth outcomes.

Results

Trump rallies impact on adverse birth outcomes

I find evidence that supports the hypothesis that Trump's presidential campaign led to increases in very low birthweight among infants born to foreign-born Hispanic birthing parents and in low birthweight among infants born to foreign- API birthing parents in the 9 months following a Trump rally (see Figure 2).

[Figure 2 about here]

Figure 2 shows the aggregated treatment effect parameters that summarize the effect of Trump's rallies on adverse birth outcomes under the unconditional parallel trend's assumption for the 9-

months period following a Trump rally for the primary period and general election period. The ATT parameters are expressed as percentage point change in rates of low birth weight and very low birth weight. Infants born to foreign-born Hispanic birthing parents in the 9 months following a Trump rally experienced a statistically significant increase in very low birthweight of 0.55 percentage points [95% C.I.: 0.41 to 0.68 percentage points] during the Republican presidential primaries, and of 0.50 percentage points [95% C.I.: 0.29 to .71 percentage points] during the general election period. In the 9 months period prior to a Trump rally in counties that hosted a Trump, 0.79% of infants born to foreign-born Hispanic birthing parents were very low birthweight. Thus, during the republican primary election period hosting a Trump rally increased the probability of very low birthweight births among infants born to foreign-born Hispanic birthing parents by 169% (from 0.79% to 1.34%), and during the general election period by 163% (from 0.79% to 1.29%). Among infants born to foreign-born API birthing parents, low birth weight increased in the 9-months period after a Trump campaign rally by 1.91 percentage points [95% C.I.: 1.07 to 2.75 percentage points] during the republican primary election period. These empirical finding are consistent with the hypothesis that Donald Trump's campaign rallies were harmful to historically marginalized immigrant groups, but not to White groups.

Figure 3 shows event-study plots for the estimates of the treatment effect of Trump rallies on very low birthweight for infants born to foreign-born Hispanic birthing parents, and for low birthweight for infants born to foreign-born API birthing parents 9 months before and 9 months after a Trump rally occurred; 95% confidence intervals are plotted in light blue and light red. These ATTs are estimated for each month relative to the first treated month across all treated counties. The plot contains pre-treatment estimates that can be used to provide a preliminary

evaluation of the parallel trends assumption (blue lines), as well as treatment effect estimates in the post-treatment period.

[Figure 3 about here]

The parallel trends assumption appears to hold in the pre-treatment period for all groups and outcomes. All point-estimates in the pre-period overlap with zero and do not exhibit discernible pre-trends in the months prior to Trump's campaign (with the exception of one month among the foreign-born Black group). Additionally, this graph shows that Trump rally effects on adverse birth outcomes are concentrated in the 8th month after a Trump rally occurred for API birthing parents, and for Hispanic birthing parents in the 4th and 8th & 9th month after a Trump rally was held, in other words, likely concentrated in births that likely were exposed during their first and second trimester to a Trump rally.

Placebo Treatment

In order to assess whether the effects associated to a Trump rally are robust, I lagged the dates of Trump rallies by 12 months and estimate the causal effect on this placebo treatment for the two groups and outcomes I find effects for (see Figure 1 Appendix). There are no changes in the 9-months period after this Trump "placebo treatment" in the rates of low birth weight for infants born to foreign-born API birthing parents and for low birthweight for foreign-born Hispanic birthing parents.

Another way of assessing the plausibility of the Trump rally effect on adverse birth outcomes is by estimating whether a Hillary Clinton campaign rally was also associated with changes in adverse birth outcomes. Hillary Clinton's campaign rallies cannot be thought of as a true "placebo" to Trump rallies, since she was his primary contender and mentioned the Republican

party and Trump in her rally speeches. However, her rallies can be used to plausibly test whether it was Trump's presence in rally in a given county that likely impacted health or whether it was exposure to the polarization of the 2015-2016 election more broadly that impacted these results. Table 2 in the Appendix presents results from a two-way fixed effect regression that assesses the association between Hillary Clinton's campaign rallies and the characteristics of birthing parents and births in the 9-months period after a Hillary Clinton rally occurred. The results show an association between a Hillary Clinton rally occurrence and a decrease in the likelihood of a birth to a U.S.-born White and Black birthing parent. Figure 2 in the Appendix shows the aggregated treatment effect parameters that summarize the effect of a Hillary Clinton rally on adverse birth outcomes under the unconditional parallel trend's assumption for the 9-months period following a H. Clinton rally. The ATT parameters are expressed as percentage point change in rates of low birth weight and very low birth weight. I find an increase in the rate of very low birthweight among infants born to API foreign-born birthing mothers after a H. Clinton rally of 0.45 percentage points. Similar to the strategy used for Trump rallies, I check if these results are robust by lagging the Hillary Clinton's rallies by 12 months, in other words, creating a placebo treatment for H. Clinton rallies. I find that a decrease in the rate of very low birthweight for API birthing parents after a placebo H. Clinton rally, suggesting that H. Clinton results are not robust to this placebo treatement.

Alternative specifications

For Trump rally counties, I additionally tested whether the effect of a Trump rally spilled over to adjacent counties, counties that shared a border with the counties where Trump rallies were held and whether the effect lasted longer than 9 months, specifically, testing whether it lasted up to 12 and 24 months after a rally was held. Figure 4 in the Appendix shows the aggregated treatment

effect parameters that summarize the effect of a Trump rally on adverse birth outcome including counties that shared a border with counties where the rally was held. I find no evidence suggestive of geographic spillover. Figure 5 and Figure 6 in the Appendix show the aggregated treatment effect parameters that summarize the effect of a Trump rally on adverse birth outcomes for an extended 12 and 24 months period by the two election periods (primary and general election). This figure suggests that for the two primary effects, the increase in low birthweight among infants born to foreign-born API birthing parents and very low birthweight among infants born to foreign-born Hispanic birthing parents, is detectable after 12 and 24 months that a Trump rally occurred.

Conclusion & Discussion

This paper provides robust causal evidence on the effect of Trump's campaign on adverse birth outcomes, contributing to theoretical discussion of mechanisms linking political events and health. My results show that Trump's presidential campaign increased adverse infant health among infants born to foreign-born Hispanic, and API birthing parents. It extends research studying the link between socio-political events and health of groups before or in the absence of legislative and policy change (Brown et al., 2021; Gemmill et al., 2019; Lauderdale, 2006; Morey et al., 2021; Samari et al., 2020; Torche & Sirois, 2019). Presidential campaign rallies represent an ideal case for studying how politics influences health, beyond the implementation of policies and laws. Rallies are used by candidates and their teams to inform, encourage, and influence voters. Policies may be discussed and promised but cannot be implemented on the campaign trail. Rallies are, however, an important tool for influencing voter intention and turnout, and they have become an important campaign activity for many populist leaders worldwide who frequently resort to exploiting antipathies toward ethnic, racial, and religious

minorities for political gain (Bonikowski, 2016; Ivarsflaten, 2008; Jones, 1998; Snyder & Yousaf, 2020). This was the case for Donald Trump, whose anti-immigrant and racist statements became a foundational element of the presidential campaign rallies he held between 2015 and 2016 in the U.S. (Anbinder, 2019; Arce, 2019; Reilly, 2016). While several studies have linked elections to health changes, including Donald Trump's presidency, what remains unclear is whether presidential candidates can influence population health even before being elected.

The analysis reveals a consistent finding: In the counties where Trump held his campaign rallies, being exposed in-utero to a Trump rally them had a significant effect on infant health for children born to API, and Hispanic foreign-born birthing parents. In other words, this effect was not observed among U.S.-born women of any racialized group, nor foreign-born White or Black women. This is in line with other studies that have found that infant health worsens for children born to women who are explicitly targeted by major political events that fuel racist and xenophobic climates (Lauderdale, 2006; Torche & Sirois, 2019). Trump's general messages of White Supremacy were accompanied by explicit portrayals of immigrants as a threat or a menace, such as when he called Latinos "animals" and "invaders" (Anbinder, 2019; Scott, 2021).

I also tested whether in-utero exposure to a Hillary Clinton rally was associated with similar changes to birth outcomes. While this is not an ideal placebo test, since Hillary Clinton ran against Donald Trump, she mentioned him in her speeches, as did he, it is an important test of whether the 2015-2016 presidential campaign at large affected birth outcomes or if only Trump rallies had such an effect. While I find some evidence of an increase in very low birthweight

among infants born to foreign-born API birthing parents after a H. Clinton rally, this result is not robust to a placebo test in which I lag Clinton rallies by 12 months.

I also tested whether the Trump rally effect spilled over to counties that shared a border with the counties where Trump rallies were held and find no evidence suggestive of this. And lastly, I tested whether adverse birth outcomes in the counties where a Trump rally was held 12 and 24 months after a Trump rally occurred (births conceived after a Trump rally occurred), also increased. I find suggestive evidence that rates of low birthweight among infants born to foreign-born API birthing parents and very low birthweight among foreign-born Hispanic birthing parents increased in the 12-months and 24-months period. Although these results might be suggestive of complex mechanisms that may have been triggered by a Trump rally in those counties, it is hard to test for such mechanisms and link them to a Trump rally directly.

An important question that this chapter does not address is the mechanism(s) accounting for the negative effect of Trump rallies on infant health, and particularly among infants born to foreign-born Hispanic and API birthing parents. The literature suggests different pathways through which politics are linked to health. These include cultural, behavioral, and institutional mechanisms. Although an individual's awareness and internationalization of society's stereotypes are enough to produce psychologically and physically threatening situations that can affect health (Aronson et al., 2013; Pyke, 2010), research also finds that groups' behaviors and institutional changes may link politics and health (Flores, 2015; López-Hinojosa et al., 2024; Morey, 2018; Yanagizawa-Drott, 2014). One study found that English-speaking Latinx people living in Trump states experienced higher than expected poor mental health days in the first three months after Trump's election -between November 2016 and February 2017 (Morey et al.,

2021). Two other studies found an increase in hate crimes and racially biased behavior by law enforcement as a direct result of Trump's campaign rallies (Feinberg et al., 2022; Grosjean et al., 2023). Police brutality and violence influence health by increasing physical injuries, death, psychological stress, and economic and financial strain due to job loss, disability, and funeral bills (Alang et al., 2017). Prior literature has found health harms associated to detentions, arrests and deportations of immigrants, and also reductions in health care service use after such events (Lopez et al., 2017; López-Hinojosa et al., 2024; Toomey et al., 2014; Vargas & Pirog, 2016; Watson, 2014; White et al., 2014). Future work could assess whether in the following months after a Trump rally immigrant detentions and arrests increased, as well as whether a reduction in the use of healthcare services and public assistance followed Trump rallies, as the literature suggests that this might be one behavioral mechanism, common among immigrants, linking a more hostile climate to health harms.

The finding that Trump rallies led to increases in adverse birth outcomes among infants born to foreign-born API and Hispanic birthing parents suggests that it is not necessary for policy changes to occur for politics to have harmful health consequences. This finding is noteworthy given the current political moment. We are in the midst of a presidential election year with Trump on the ballot, again. His rallies have not been fundamentally different than in the past (New York Times, 2024). Even if Trump does not get elected for a second term, my findings suggest that the threat might be sufficient to alter birth outcomes among vulnerable populations.

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Tables & Figures

Figure 1: Donald Trump's Presidential Campaign Rallies

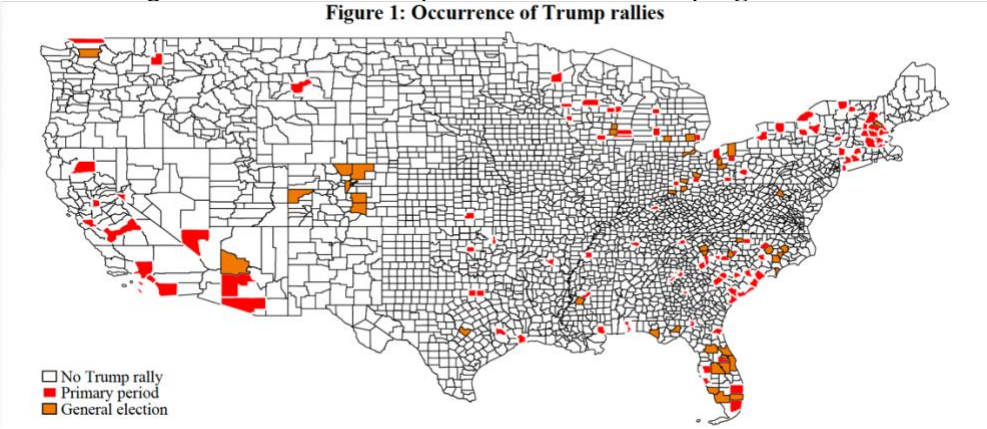
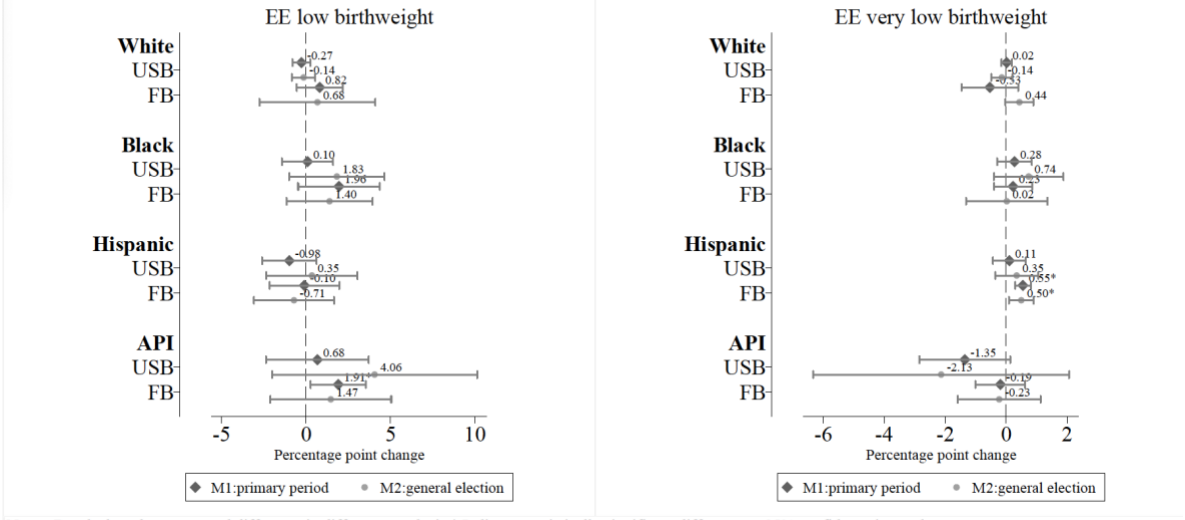


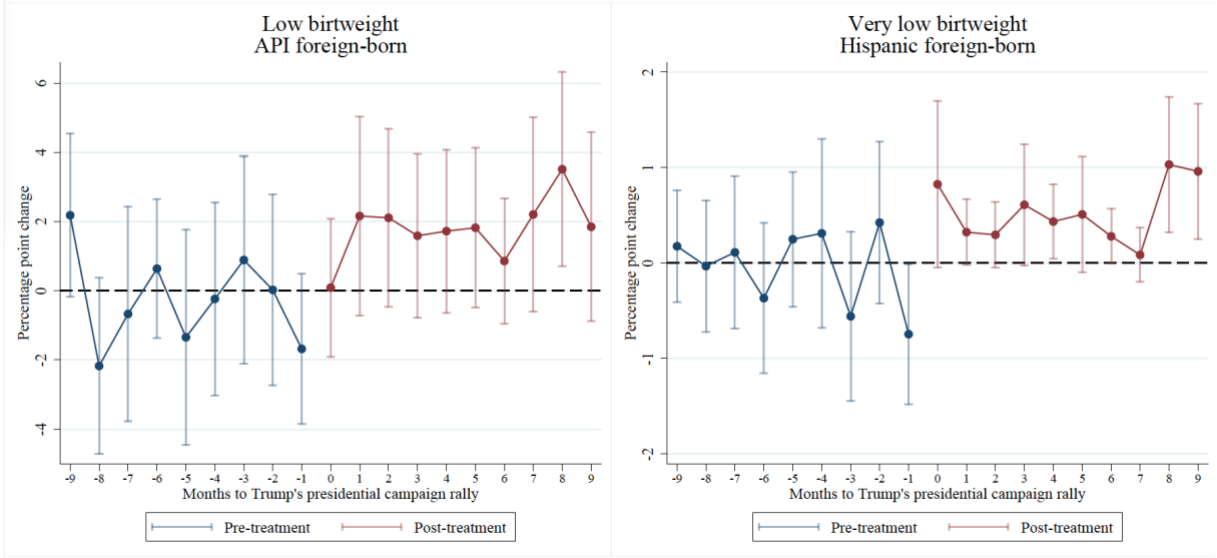
Figure 2. Effect estimates (EE) associated with exposure to a Trump rally for different groups of women defined by race/ethnicity and nativity



Notes: Results based on staggered difference in difference analysis.* Indicates statistically significant difference at 95% confidence interval.

Note: Figure 2 shows aggregated treatment effect parameters that summarize the effect of Trump rallies on adverse birth outcomes for the 9-months period after a Trump rally was held, under the unconditional parallel trends assumption. 95% confidence intervals shown in brackets. Estimates derived from the Callaway and Sant'Anna estimator (2021) using the Stata csdid package (Rios-Avila et al., 2023).

Figure 3. Event study for percent of low birthweight and very low birthweight



Notes: Treatment: Trump rally. Lines represent 95% confidence intervals. Blue coefficients represent pretreatment periods while red coefficients represent posttreatment periods

Note: Figure shows coefficients resulting from the estimation of the group-time average treatment effects for a 9-month pre & post-period window under the unconditional parallel trends assumption, using the difference-in-differences (DID) estimator proposed by Callaway & Sant'Anna (2021) using the Stata csdid package (Rios-Avila et al., 2023). Confidence Intervals (CIs) based on tests for the null hypothesis that the parameter estimate is different from zero at the 0.05 confidence level.

Source: National Center for Health Statistics (June 2014 to November 2017)

Table 1: County-level covariates

Variable	Definition	Source of Data
(1) Share voted Republican last presidential election (%)	Percent of voters in a county that voted Republican in the 2012 presidential election	(MIT Election Data And Science Lab, 2018)
(2) Poverty Rate (%)	Percent of county population that lives under the Federal Poverty Line	UC Census Bureau Historical Poverty Tables: People and Families -1959 to 2022
(3) Median Household Income (mean $)	Median household income for all individuals at the same address	Census Small Area Income and Poverty Estimates Program Datasets
(4) Unemployment Rate (%)	Number of unemployed people as a percentage of the labor force	Tables & Maps: U.S. Bureau of Labor Statistics. Labor force data by county
(5) Birthing parent's age (mean)	Age of birthing parent's	Restricted U.S. birth records from the National Vital Statistics System
(6) Birthing parents who are married (%)	Percent of birthing parents who are married	Restricted U.S. birth records from the National Vital Statistics System
(7) Number of births (mean)	Mean number of births in a county	Restricted U.S. birth records from the National Vital Statistics System
(8) Medicaid births (%)	Percent of births that used Medicaid coverage	Restricted U.S. birth records from the National Vital Statistics System
(9) Birthing parents with less than HS (%)	Percent of birthing parents who stated they had less than a high school degree	Restricted U.S. birth records from the National Vital Statistics System
(10) Quality of prenatal care (%)	Based on APNCU INDEX which combines information on initiation of prenatal care and number of prenatal care visits into an index (Kotelchuck 1994). The number of prenatal visits is compared to the expected number of visits for the period between when care began and the delivery date. Inadequate: received less than 50% of expected visits Intermediate: 50%-79% of expected visits Adequate: 80%-109% of expected visits Intensive: 110% or more	Restricted U.S. birth records from the National Vital Statistics System
(11) County population (mean)	Population estimate of total county population	County Population Totals: 2010-2020
(12) Racial composition of county population (%)	Percent of the population that is White, Black, Hispanic, and API	County Population by Characteristics: 2010-2020

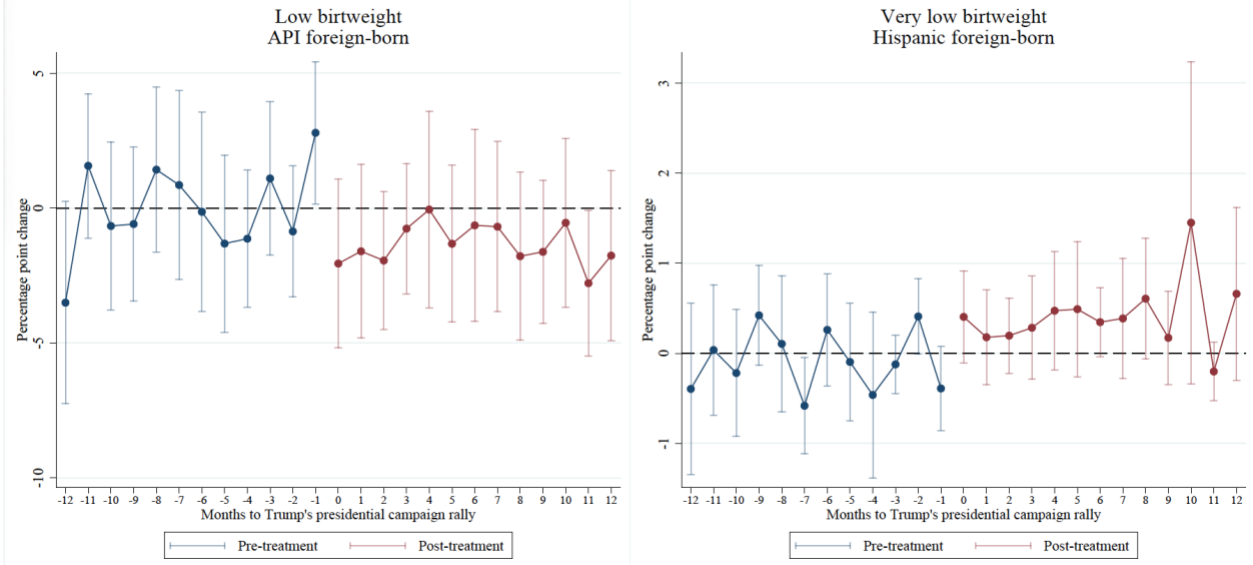
Table 2: Descriptive statistics for counties where a Trump rally occurred compared to those where a Trump rally never occurred

	Trump rally counties	Counties that never experienced a Trump rally	Test
N -county months	5,964 (5.1%)	110,880 (94.9%)	
Main outcomes			
Low birthweight births White USB (%)	5.15	5.69	<0.001
Low birthweight births White FB (%)	4.70	4.73	0.903
Low birthweight births Black USB (%)	11.72	11.68	0.898
Low birthweight births Black FB (%)	7.48	7.18	0.320
Low birthweight births Hispanic USB (%)	6.50	6.37	0.577
Low birthweight births Hispanic FB (%)	5.29	5.33	0.845
Low birthweight births API USB (%)	7.51	7.44	0.835
Low birthweight births API FB (%)	7.02	6.97	0.856
Very low birthweight births White USB (%)	0.69	0.78	0.009
Very low birthweight births White FB (%)	0.58	0.64	0.474
Very low birthweight births Black USB (%)	2.19	2.08	0.348
Very low birthweight births Black FB (%)	1.68	1.51	0.253
Very low birthweight births Hispanic USB (%)	0.96	0.91	0.626
Very low birthweight births Hispanic FB (%)	0.84	0.76	0.294
Very low birthweight births API USB (%)	0.99	0.95	0.760
Very low birthweight births API FB (%)	0.77	0.86	0.400
Mother & birth characteristics			
Mothers with less than HS (%)	12.32	14.32	<0.001
Mother's age (mean)	28.60	27.30	<0.001
Mothers who are married (%)	59.78	58.89	<0.001
Number of births (mean)	1.89	1.96	<0.001
Medicaid births (%)	42.06	46.20	<0.001
(mean) male	0.51	0.51	0.968
Inadequate quality of prenatal care (%)	17.25	17.81	<0.001
Intermediate quality of prenatal care (%)	15.49	15.24	0.098
Adequate quality of prenatal care (%)	43.57	45.47	<0.001
Intensive quality of prenatal care (%)	23.69	21.48	<0.001
County characteristics			
Share voted republican last presidential election (%)	48.17	59.18	<0.001
Poverty Rate (%)	14.09	16.15	<0.001
Median Household Income (mean)	57,503.00	49,109.26	<0.001
Unemployment Rate (%)	4.90	5.40	<0.001
Total county population (mean)	663,918.68	85,682.35	<0.001
Non-Hispanic White county population (%)	67.72	77.18	<0.001
Non-Hispanic Black county population (%)	13.86	9.45	<0.001
Hispanic county population (%)	12.02	8.98	<0.001
Non-Hispanic API county population (%)	4.43	2.75	<0.001

Note: Column "Test" presents p-values associated to tests that estimate whether Trump rally counties differed by characteristics using t-test for continuous variables and chi-squared test for categorical variables at 95% Confidence Interval

Supplementary Material

Figure 1 Appendix. Event study for percent of low birthweight and very low birthweight for placebo treatment

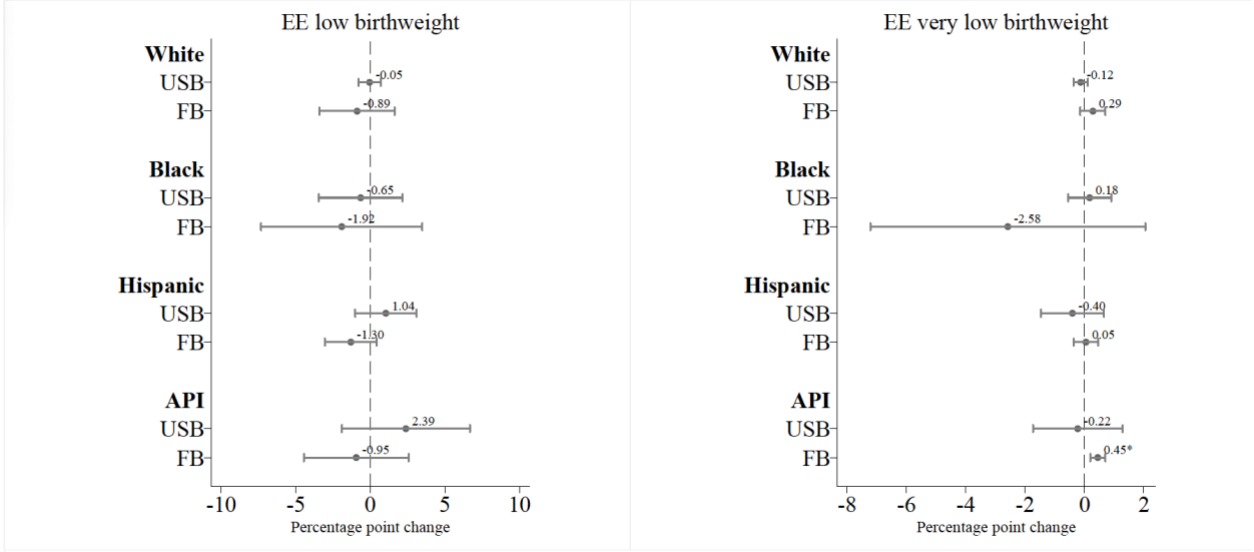


Notes: Placebo Treatment: Trump rally 12 months prior to the date rally was held. Lines represent 95% confidence intervals. Blue coefficients represent pretreatment periods while red coefficients rep

Note: Figure shows coefficients resulting from the estimation of the group-time average treatment effects for a 9-month pre & post-period window under the unconditional parallel trends assumption, using the difference-in-differences (DID) estimator proposed by Callaway & Sant'Anna (2021) using the Stata csdid package (Rios-Avila et al., 2023). Confidence Intervals (CIs) based on tests for the null hypothesis that the parameter estimate is different from zero at the 0.05 confidence level.

Source: National Center for Health Statistics (June 2014 to November 2017)

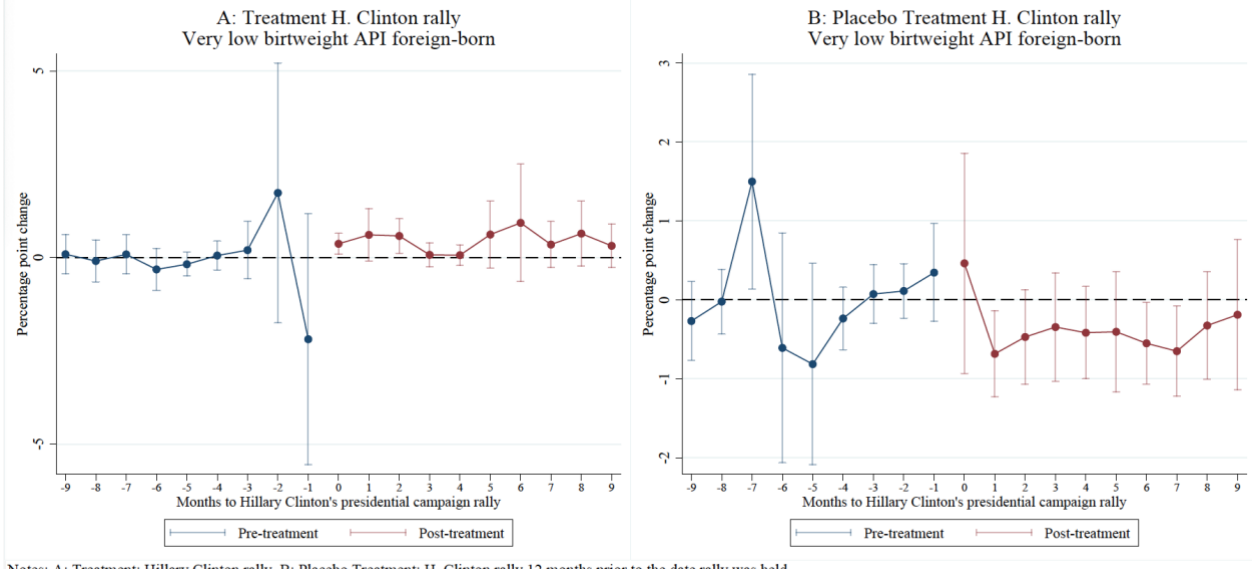
Figure 2 Appendix. Effect estimates (EE) associated with exposure to a Hillary Clinton rally for different groups of women defined by race/ethnicity and nativity



Notes: Results based on staggered difference in difference analysis.* Indicates statistically significant difference at 95% confidence interval.

Note: Figure shows aggregated treatment effect parameters that summarize the effect of H. Clinton rallies on adverse birth outcomes for the 9-months period after a H. Clinton rally was held, under the unconditional parallel trends assumption. 95% confidence intervals shown in brackets. Estimates derived from the Callaway and Sant'Anna estimator (2021) using the Stata csdid package (Rios-Avila et al., 2023).

Figure 3. Event study for percent of low birthweight and very low birthweight

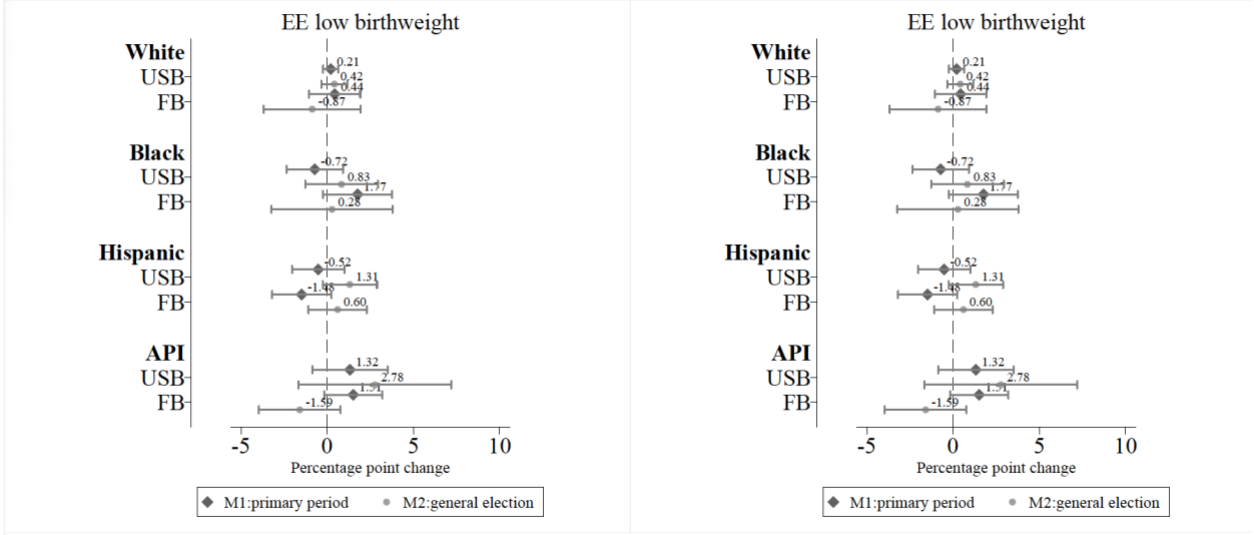


Notes: A: Treatment: Hillary Clinton rally. B: Placebo Treatment: H. Clinton rally 12 months prior to the date rally was held.
Lines represent 95% confidence intervals. Blue coefficients represent pretreatment periods while red coefficients represent posttreatment periods

Note: Figure shows coefficients resulting from the estimation of the group-time average treatment effects for a 9-month pre & post-period window under the unconditional parallel trends assumption, using the difference-in-differences (DID) estimator proposed by Callaway & Sant'Anna (2021) using the Stata csdid package (Rios-Avila et al., 2023). Confidence Intervals (CIs) based on tests for the null hypothesis that the parameter estimate is different from zero at the 0.05 confidence level.

Source: National Center for Health Statistics (June 2014 to November 2017)

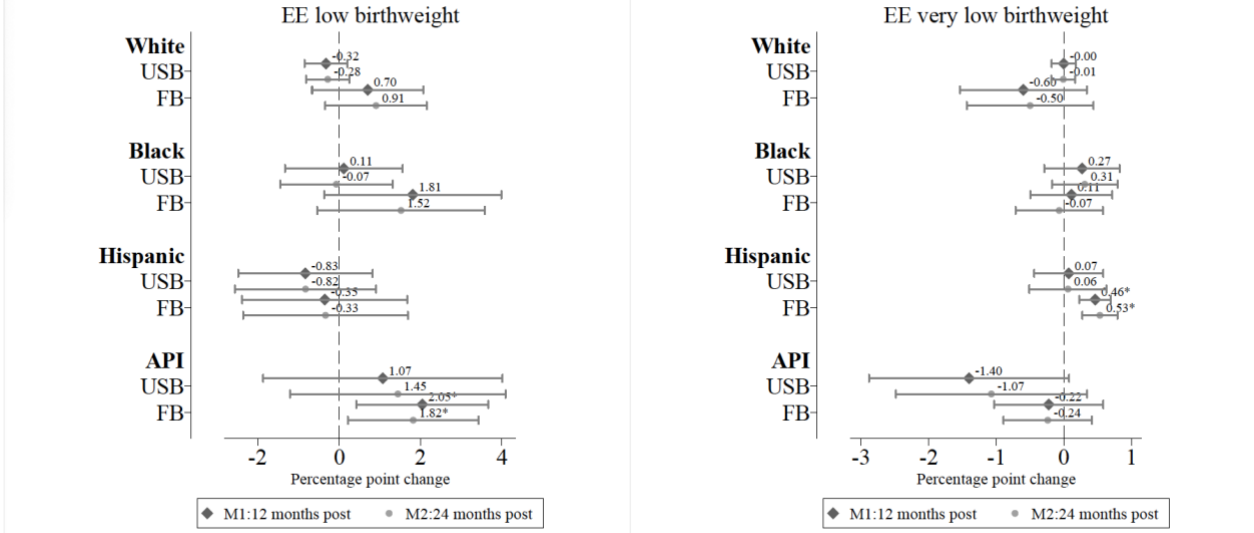
Figure 4 Appendix. Geographic spillover effect estimates (EE) associated with exposure to a Trump rally for different groups of women defined by race/ethnicity and nativity



Notes: Results based on staggered difference in difference analysis including adjacent counties to Trump rally counties.
*Indicates statistically significant difference at 95% confidence interval.

Note: Figure shows aggregated treatment effect parameters that summarize the effect of Trump rallies on adverse birth outcomes for the 9-months period after a Trump rally was held, under the unconditional parallel trends assumption, including adjacent counties to Trump rally counties. 95% confidence intervals shown in brackets. Estimates derived from the Callaway and Sant'Anna estimator (2021) using the Stata csdid package (Rios-Avila et al., 2023).

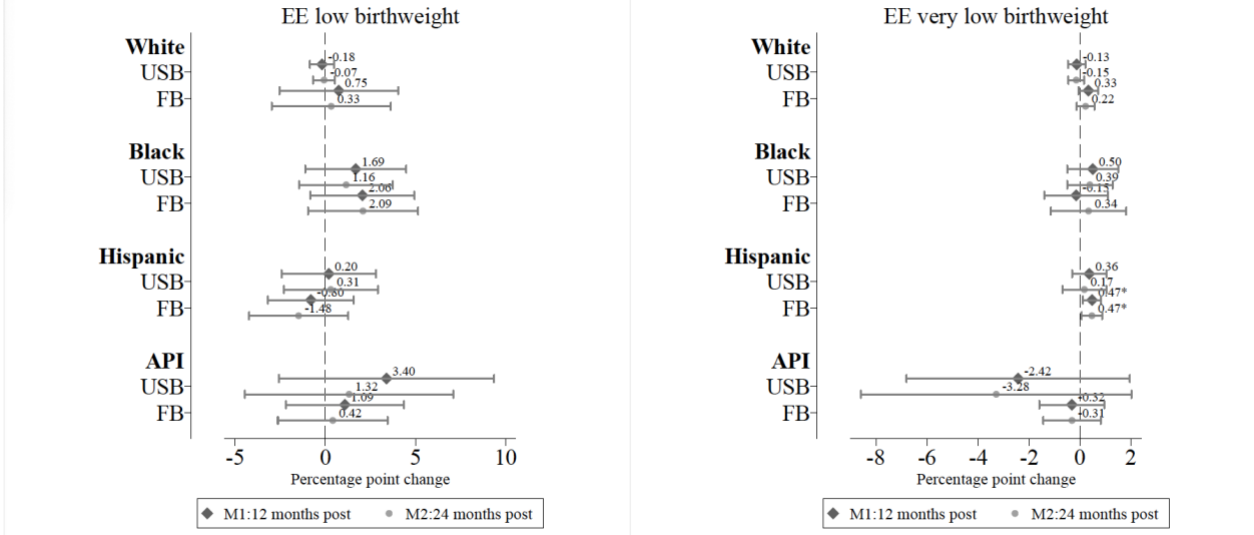
Figure 5 Appendix. Effect estimates (EE) for 12 & 24 months post-period associated with exposure to a Trump rally during primary period for different groups of women defined by race/ethnicity and nativity



Notes: Results based on staggered difference in difference.* Indicates statistically significant difference at 95% confidence interval.

Note: Figure shows aggregated treatment effect parameters that summarize the effect of Trump rallies on adverse birth outcomes for a 12 and 24 months period after a Trump rally was held, under the unconditional parallel trends assumption, including adjacent counties to Trump rally counties. 95% confidence intervals shown in brackets. Estimates derived from the Callaway and Sant'Anna estimator (2021) using the Stata csdid package (Rios-Avila et al., 2023).

Figure 6 Appendix. Effect estimates (EE) for 12 & 24 months post-period associated with exposure to a Trump rally during general election for different groups of women defined by race/ethnicity and nativity



Notes: Results based on staggered difference in difference.* Indicates statistically significant difference at 95% confidence interval.

Note: Figure shows aggregated treatment effect parameters that summarize the effect of Trump rallies on adverse birth outcomes for a 12 and 24 months period after a Trump rally was held, under the unconditional parallel trends assumption, including adjacent counties to Trump rally counties. 95% confidence intervals shown in brackets. Estimates derived from the Callaway and Sant'Anna estimator (2021) using the Stata csdid package (Rios-Avila et al., 2023).

Table 1 Appendix: FE Regression of birthing parent and infant characteristics in the U.S. for the 9-months post-Trump rally period June 2014-November 2017

	Characteristics of birthing parent											Characteristics of infant			
	Age	HS or less	Married	White USB	White FB	Black USB	Black FB	Hispanic USB	Hispanic FB	API USB	API FB	Male	medicaid paid	inadequate pre-natal care	intensive pre-natal care
9 months post-period	0.020	-0.000	0.002	0.000	0.001	-0.002	-0.000	-0.000	0.002	-0.001	0.001	0.000	0.006	-0.012	-0.000
	(0.015)	(0.002)	(0.003)	(0.002)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.009)	(0.013)	(0.003)
	[0.188]	[0.904]	[0.477]	[0.953]	[0.089]	[0.087]	[0.482]	[0.489]	[0.096]	[0.071]	[0.349]	[0.559]	[0.534]	[0.341]	[0.928]
Constant	19.790***	0.359***	0.429***	0.766***	0.019**	0.015	-0.025***	-0.387***	0.377***	0.258***	-0.023*	0.542***	-3.405***	6.696***	-1.434**
	(0.324)	(0.030)	(0.041)	(0.036)	(0.007)	(0.015)	(0.004)	(0.015)	(0.014)	(0.021)	(0.009)	(0.021)	(0.217)	(0.320)	(0.111)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.005]	[0.316]	[0.000]	[0.000]	[0.000]	[0.000]	[0.012]	[0.000]	[0.000]	[0.000]	[0.000]
N	6319739	6152017	5868011	6319739	6319739	6319739	6319739	6319739	6319739	6319739	6319739	6319739	6319739	6319739	6319739

Table reports predicted value from multivariable linear regression with standard errors in parentheses, and p-values in brackets. Regression includes county fixed effects and county-specific linear time trends.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2 Appendix: FE Regression of birthing parent and infant characteristics in the U.S. for the 9-months post-Hillary Clinton rally period June 2014-November 2017

	Characteristics of birthing parent											Characteristics of infant			
	Age	HS or less	Married	White USB	White FB	Black USB	Black FB	Hispanic USB	Hispanic FB	API USB	API FB	Male	medicaid paid	inadequate pre-natal care	intensive pre-natal care
9 months post-period	0.004	0.003	-0.000	-0.004*	0.001	-0.003*	0.001	0.000	0.001	-0.000	0.004	0.000	-0.004	0.002	-0.002
	(0.013)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)	(0.001)	(0.006)	(0.005)	(0.004)
	[0.787]	[0.187]	[0.902]	[0.029]	[0.156]	[0.042]	[0.078]	[0.855]	[0.479]	[0.369]	[0.118]	[0.967]	[0.542]	[0.711]	[0.591]
Constant	14.736***	0.391***	0.116	0.231***	-0.002	0.048***	-0.001	0.058	0.572***	0.073***	0.021*	0.518***	-0.793***	1.472**	0.234***
	(0.398)	(0.032)	(0.060)	(0.029)	(0.007)	(0.011)	(0.005)	(0.033)	(0.029)	(0.007)	(0.010)	(0.037)	(0.045)	(0.108)	(0.039)
	[0.000]	[0.000]	[0.069]	[0.000]	[0.779]	[0.000]	[0.784]	[0.090]	[0.000]	[0.000]	[0.045]	[0.000]	[0.000]	[0.000]	[0.000]
N	2208022	2187501	2067860	2208022	2208022	2208022	2208022	2208022	2208022	2208022	2208022	2208022	2208022	2208022	2208022

Table reports predicted value from multivariable linear regression with standard errors in parentheses, and p-values in brackets. Regression includes county fixed effects and county-specific linear time trends.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Chapter 3: U.S. states' prioritization of carceral spending and Black & White Death

Introduction

Since the 1970s the U.S. has expanded to what Wacquant refers to as the "penal state", through the growth of mass incarceration, criminal justice supervision, and police surveillance, and simultaneously retracted its welfare state resulting in disproportionate criminalization, imprisonment, and marginalization of poor and Black populations (Alexander, 2020; L. J. D. Wacquant, 2009). Has the upsizing of the criminal legal system and simultaneous atrophy of welfare provision affected population health? While a large body of research makes clear that police, courts, jails, and prisons are harmful for health, how these in combination with a receding welfare state shape health, has been less explored (Alang et al., 2017; Beckfield & Krieger, 2009; Dumont et al., 2012; Edwards et al., 2019). Described as a political project aimed at producing and entrenching marginality (L. J. D. Wacquant, 2009), there is limited empirical investigation into the population-level health consequences of exposure to a penal-welfare regime that prioritizes punitive control over welfare support. In this study, I investigate the link between U.S. state prioritization of carceral spending over spending on social services and Black and White mortality.

Mortality is an objective indicator of a basic human right: a long and healthy life (Elo 2009). In the U.S., improvements in life expectancy and reductions in Black-White mortality gaps have recently reversed (Crimmins & Zhang, 2019; Jackman & Shauman, 2019). Age-adjusted mortality rates for almost all leading causes of death, except cancer, increased in the U.S. for the first time from 2014 to 2015 by 1.2%, and in the last decade of the 20th Century, Black-White

gaps in mortality returned to levels as high as in the first decade of the 20th century (Jackman & Shauman, 2019; Murphy et al., 2017). To understand this shift, researchers have focused on the institutional determinants of mortality underscoring how policy domains that include, but are not limited to health, shape mortality (Beckfield & Bambra, 2016; Garcia et al., 2021; Karas Montez, 2020; Krieger et al., 2014; Rodriguez, 2019; Tan et al., 2022). States are key geographic, legal, political, social, and administrative units that influence health and where health-related policies are designed and implemented (Becket & Western, 2001; Brown & Homan, 2024; P. A. Homan & Brown, 2022; Montez et al., 2016, 2017). This study builds on the institutional approach and on studies focusing on the role of states as polities that shape health. I examine diverging trends in U.S. states' Black and White mortality and the association between mortality and two policy tools that have been subject to significant state and local control: the welfare and penal systems. In keeping with the institutional approach, I examine these as constituting one macro-level determinant of mortality: a policy regime that is characterized by the growth and glorification of punishment and the replacement of welfare by the obligation of work, in short, a penal state (L. Wacquant et al., 2011). By estimating the association between penal states spending and Black and White death in 42 U.S. states between 1980 and 2008, this study contributes a unique analysis of how states' development of such a penal-welfare regime contributes to racial inequities in health.

I also examine whether the association between a states' prioritization of carceral spending and Black and White mortality varies by region in the U.S. Racial mortality trends have diverged systematically between regions in the U.S. and research offers as explanation dissimilarities in sociodemographic, behavioral, environmental, and institutional factors, and legacies of racism

(Arias et al. 2022; Fenelon 2013; Montez et al. 2021; Wei et al. 2012). Finally, I ask whether different kinds of penal and welfare spending are associated differentially with White and Black mortality rates, to explore the question of whether there are characteristics of this new penal-welfare regime that affect the health of Black and White individuals.

I measure the association between states fiscal commitment to carceral systems over health and social systems and Black and White mortality linking data from 1980 to 2008 on annual total per-capita state spending, including expenditures on a county, municipal, town, special district, and school district level, and CDC Public-use Compressed Mortality Files. Using fixed-effects models and controlling for confounders, I find that U.S. states' fiscal prioritization of carceral systems to the exclusion of health and support is associated with an increased number of Black and White deaths per 100,000 population. Additionally, I find that the association between carceral prioritization and Black death is larger than White death. Further, I find that the association between a states' prioritization of carceral spending and Black and White mortality is concentrated in the South, and for White mortality also in the Western region. And, lastly for most spending categories I find no statistically significant association with Black and White mortality rates, with the exception of welfare cash assistance and mass transportation systems. My findings suggest that a penal-welfare regime that prioritizes punitive control over welfare support is a racializing tool available to U.S. states that harms overall population health, and disproportionately the health of Black groups living in the South.

Literature Review

Mortality: trends and explanations

In the last century, the U.S. made significant progress in improving life expectancy, which increased from 47.3 years in 1900 to 78.8 years in 2015, and it made vast strides in reducing

Black-White mortality gaps (Crimmins & Zhang, 2019; Jackman & Shauman, 2019).Yet recently these trends have stagnated and reversed. Mortality improvements in the U.S. have systematically lagged behind peer countries since the 1980s and there has been no average life expectancy gain since 2010 (Montez et al., 2021). As a result, in 2008, the United States had the shortest life expectancy for both women (80.6) and men (75.6) compared to other OECD countries (Avendano & Kawachi, 2014).Black-White life expectancy gaps have consistently reduced in the last century, such that the 13-year gap between Black and Whites in 1930 was reduced to 3.6 years in 2017 (Arias & Xu, 2019).Yet, due to the exceptionally high COVID-19 death rates borne by Black individuals, the Black-White life expectancy gap is projected to increase by 40%, to over 5 years in 2020 (Andrasfay & Goldman, 2021).But even in the absence of the COVID-19 pandemic, the best-ever Black age-adjusted mortality -which occurred in 2014- was equivalent to White mortality rates from nearly 20 years earlier, that is from 1994 (Wrigley-Field, 2020). In other words, racial inequality remains persistent and extreme in the U.S.

Mortality trends have also been uneven across geography within the U.S. The highest mortality rates are clustered in the South, particularly in the Central-South region (Ezzati et al., 2008). The concentration of diverging mortality trends in regions is a relatively recent phenomena, beginning around 1965 (Arias et al., 2022; Fenelon, 2013; Montez et al., 2021; Wei et al., 2012). While in 1965 the states with the highest mortality were not particularly concentrated in space, by the 2000s, the gaps in adult mortality between Southern states and better-off states in the Northeast, Midwest and West had widened considerably (Arias et al., 2022; Wei et al., 2012). These large differences reflect differences in sociodemographic, behavioral, environmental, and

institutional factors (Murray et al., 2006). Scholars have also highlighted the role of the South's contentious racist history in explaining racial health inequities (Baker, 2022; Gabriel et al., 2021; Tomaskovic-Devey & Roscigno, 1996). For example, one study found that areas in the South with higher rates of past enslavement are associated negatively with contemporary white opioid mortality, such that counties that had enslaved population, had lower levels of white opioid deaths today than those that had no population enslaved (Gabriel et al., 2021). This study suggests that (historical) institutions of racial control offer a protective benefit within the white population. Together they suggest that regional variation in racial mortality trends is significant.

More recently, studies have concentrated on the institutional determinants of mortality, focusing on how the clustering of particular kinds of policies into 'policy regimes' and policy domains not typically considered in welfare-state analysis, such as penal and educational systems and the expansion of political rights, have implications for mortality (Karas Montez, 2020; Krieger et al., 2014; Rodriguez, 2019). For example, one study estimated that U.S. life expectancy would be 2.8 years longer for women and 2.1 years longer for men if all U.S. states with more liberal policies compared to those with conservative policies (Montez et al., 2020). This political-institutional approach underscores how policy domains that include, but are not limited to welfare and health, cluster together to form "policy regimes" that shape improvements, persistence, and reversals of racial mortality gaps.

Penal expansion and welfare retrenchment

In the post-civil rights era, the U.S. has seen both an expansion of prisons, courts, and police and a rolling back of the social safety net (Alexander, 2020; L. J. D. Wacquant, 2009). The U.S. has

the highest rate of incarceration in the world with 714 incarcerated individuals per 100,000 population in 2021.The U.S. concentrates over one-fifth of the world population that is held in penal institutions, a total of 2.09 million (Fair & Walmsley, 2022). An estimated 1 in 69 adult U.S. residents were under community supervision (probation or parole) at the end of 2021 (Kaeble, 2023). Policing and carceral systems have received disproportionate fiscal resources in the U.S. State and local government spending on police increased by 179% between 1979 and 2019, while corrections expenditures increased by 374% in the same period, surpassing spending growths in education, and housing (Urban Institute, 2020). Increases in carceral and police spending have occurred in parallel to divestments from public safety net spending as a consequence of two broad welfare reforms (Duarte et al., 2020). In 1980, program eligibility rules were restricted and benefit levels were lowered, such that spending on means-tested programs like Food Stamps, Medicaid, and social insurance programs were reduced by 13.8%, 2.8%, and 4.6%, respectively (O'Connor, 1998). Then, in 1990 President Clinton passed a series of welfare bills with the 1996 Personal Responsibility and Opportunity Reconciliation Act as its most sweeping reform. This Act placed time limits on the receipt of cash grants to families and children whose income is not adequate to meet their basic needs, and forced recipients to work and meet even greater obligations in order to be eligible for benefits (O'Connor, 1998).

Loic Wacquant's theory of the 'penal state' connects the sudden growth and glorification of punishment and the replacement of welfare by the obligation of work (Squires & Lea, 2012; L. J. D. Wacquant, 2009). Wacquant traces its origin to U.S. state managers' decisions to address social insecurities, like poverty and unemployment, and argues that it is not a reaction to rising crime rates. While the U.S. held 21 prisoners for every 10,000 crimes committed in 1997, by

1993 it locked up 125 prisoners for every 10,000 crimes, holding crime constant (Wacquant et al., 2011). The marginalized who are not in prison face a state that has made welfare, protection, and insurance rights conditional on job-seeking at low wages (L. Wacquant, 2010). This in conjunction with a prison system that has been stripped of its rehabilitative pretension form a single "organizational mesh" flung at the same 'clientele,' producing and entrenching their marginality. The clientele is composed of individuals who have been disadvantaged by three systems of inequality: class, race, and place. Indeed, the social and racial selectivity of jails and prisons is striking. In 2014, incarcerated people had a median annual income of $19,185 prior to their incarceration -41% less than non-incarcerated people of similar age-, and in 2020 Black adults were imprisoned at five times the rate than While adults (Nellis, 2021; Rabuy & Kopf, 2015). The size and funding of the police force has also been higher in areas where a larger proportion of the population is Black and with higher levels of racial segregation and economic inequality (Beck & Goldstein, 2018; McCarty et al., 2012). Public aid for the poor programs is also significantly more stringent in states where Black recipients make up a higher percentage of the population (Fellowes & Rowe, 2004; Orr, 1976; Soss et al., 2001).

There is a well-established link between the upsizing of the criminal justice wing and the loss of political, social, and legal rights and benefits to those branded as "felons" with spillover effects to their families' and communities' health and economic wellbeing (Alang et al., 2017; Comfort, 2007; Kohler-Hausmann, 2018; Pager, 2008; Pager & Shepherd, 2008; Pettit & Gutierrez, 2018; Thacher, 2008; Travis et al., 2014, 2014). Penal institutions are particularly harmful for Black peoples' health (Alang et al., 2017; Dumont et al., 2012; Edwards et al., 2019). Research has linked interpersonal police and carceral contact to disproportionate death and morbidity, such as

physical injuries, mental health disorders, diabetes, asthma, hypertension, and HIV, among victims of police contact and/or incarcerated people, who are disproportionately Black (Alang et al., 2017; Dumont et al., 2012; Edwards et al., 2019). Indirect exposure to carceral systems has also been linked to health, such that highly public anti-Black violence, highly police surveilled environments, and states with racialized felony disenfranchisement, have substantial negative effects on adverse infant health, mental health, self-rated health, diabetes and obesity, particularly among Black populations (Bor et al., 2018; Curtis et al., 2022; P. A. Homan & Brown, 2022; Jahn et al., 2021; Sewell, 2017). Indeed, the carceral state undermines both the health of those directly in contact with police, courts, prisons, and jails and those indirectly 'targeted' through witnessing police brutality, hearing stories of friends who have experienced it, and having to worry about becoming a victim of the criminal justice system.

While research has shown how consequential direct and indirect exposure to the criminal wing of the state is for health and that different penal institutions matter to health -police, courts, jails, and prisons-, we lack a measurement that captures exposure to multiple penal institutions. Further, police, courts, and prisons are only one component of a much larger penal state. While millions of families and individuals are exposed to the criminal justice system, many individuals also engage with the penal state, through hospitals, shelters, ambulances, and welfare offices. Yet, studies have not focused enough on how this broader landscape of social, medical, and other agencies of the welfare state together with the criminal justice system set the life options of the most vulnerable populations.

Welfare provisions, and health disparities

A separate body of research has investigated the health implications of welfare regimes for health inequity and although most studies suggest more generosity dampens inequities, some studies find negative or mixed results (for a review see Beckfield & Krieger, 2009). For example, studies conducted in Canada and Brazil found that enhancement of the generosity of welfare state provisions in health reduce income and wealth-based mortality inequities (James et al., 2007; Victora et al., 2000). Yet, other studies find partial or no association (Korda et al., 2007; Leon et al., 1992). For example, one study found that the establishment of a universal health care system in Australia was simultaneously associated with increased relative, but decreased absolute socio-economic inequalities in avoidable mortality (Korda et al., 2007). Another study found the establishment of welfare-state health systems did not reduce class inequality in infant mortality in Sweden and England (Leon et al., 1992). Studies linking welfare-state policies outside the health domain to health inequality are also inconclusive, albeit most suggest a reduction of inequalities because of welfare state policies expansion. For the U.S., one study found socioeconomic inequities in premature and infant death to decrease following the 1960s War on Poverty, the enactment of Civil Rights legislation, and the growth of the U.S. welfare state, yet gains to be subsequently reversed in the 1980s coinciding with the rolling back of welfare state provisions in the U.S. (Krieger et al., 2008). Although this and other studies suggest that social policies can reduce socio-economic inequities in infant and maternal mortality (Burström, 2003; Fritzell et al., 2007), other studies find that different degrees of welfare-state provision do not change health inequities (Cavelaars et al., 1998; Lahelma et al., 2002). In summary, although overall this literature suggests that the generosity of welfare states is

important for population health, the strength of this relationship for reducing socio-economic inequities in health is inconclusive.

Scholarship has noted two important limitations of the welfare regime approach to health; it has ignored heterogeneity in the consequences of welfare regimes on health across sub-groups and places within countries, and it has not paid enough attention to the kind of welfare state characteristics that matter to health (Lundberg, 2008; Pega et al., 2013). In the U.S., racial gaps in mortality remain persistent and extreme and are uneven across regions, states and counties (Ezzati et al., 2008; Fenelon, 2013; Wrigley-Field, 2020). Heterogeneity in government spending by states and counties is also characteristic of the U.S, given its federal structure that gives states and localities the power to provide their residents with public goods and services with varying abilities to fund those services (An et al., 2018). Recent studies have found important heterogeneity in the effect of welfare spending on health by kinds of goods and services, groups and places analyzed (Cardona et al., 2021; Melton-Fant, 2023). For example, one study found that investments in building infrastructure for urban counties was associated with subsequently higher life expectancy, while for rural counties, spending in social services, such as education and public health increased life expectancy (Cardona et al., 2021). Melton-Fant (2023) found that among Black adults, counties with lower corrections spending, lower waste management spending, and higher highway spending had significantly higher Black mortality. Yet among White adults, counties with lower natural resource spending and higher police spending had higher White mortality. This research suggests that closer attention needs to be paid to the places where government spending is occurring, the kind of goods and services they are investing in, and whether their consequences for health vary across racial groups.

The power of U.S. states

Government spending and penal state development must be understood in the context of federalism. Compared to other national contexts, the U.S. is characterized by localism and a relatively weak and fragmented national government, and within its federalist system, states serve as basic units of political power and implementation (Schram et al., 2010). State governments have the power to make laws on all subjects that are not granted to the federal government nor denied to the states in the U.S. Constitution, which include education, family, criminal, welfare, and public assistance or health insurance (Kincaid, 1998). U.S. states determine the institutional forms of policies, benefit levels, and spending patterns of programs, and they make distinct choices on economic development, deciding which sectors to invest in and how to go about that investment (Howard, 1999; Leicht & Jenkins, 2017; Soss et al., 2001).). Policies are sometimes conceived and tested in states and make their way up to the national level, transforming U.S. states into "democratic laboratories" (Karch, 2007). Even policies enacted at the federal level can vary substantially across states due to state-level differences in implementation (Karch & Rose, 2019; Soss et al., 2001).

Although state-level politics have always played a key role in creating, shaping, and implementing policy, since the 1970s states' political power has increased as the outcome of the delegation of policymaking authority from federal to state levels, and the enactment of state preemption laws that have curtailed local authority (Peterson, 1995; Soss et al., 2001). Simultaneously, U.S. states have moved to the center of partisan battles over the direction of public policy, with parties implementing highly divergent policy agendas on a state level, such

that an individual's tax burden, right to obtain an abortion, and other relationships to government are increasingly determined by their state of residence (Grumbach, 2018).

As polities, states have been studied as salient settings for understanding how differences in institutional arrangements shape socio-economic and racial inequalities (Baker, 2022; Jenkins et al., 2006; Montez et al., 2020). Numerous policy tools, including housing, education, labor market, welfare and imprisonment policies have been under substantial state control (Bruch et al., 2019). State-level politics play a key role in shaping the amount and form of public aid for the poor, because U.S. states get to set the rules to determine who can receive welfare, what types of clients are exempted from new welfare work requirements, and the value of cash benefits (Fellowes & Rowe, 2004; Gordon, 1999; Soss et al., 2001; Weil & Finegold, 2002). In terms of criminal justice, each state and the federal government have their own criminal legal system, and very few crimes are under exclusive federal jurisdiction. State constitutions and laws define the criminal justice system within each state and delegate the authority and responsibility for criminal justice to various jurisdictions, officials, and institutions. Further, the majority of correctional spending typically comes from state governments, and local spending only accounts for one third of total correctional spending (Wagner & Rabuy, 2017).

A novel body of literature finds that state contexts and policies may have different consequences for population subgroups' health (P. A. Homan & Brown, 2022; Komro et al., 2016; Montez et al., 2016, 2017; Torche & Sirois, 2019). One study finds that U.S. state policies affect mortality of low-educated adults more so than their higher educated peers (Montez et al., 2019). Another finds that Black women who resided in states with overall higher levels of structural racism had

worse self-rated health than black women who were exposed to low levels of state-level structural racism (P. Homan et al., 2021). The present study contributes to this literature with an examination of diverging trends in U.S. states' Black and White mortality and its association with two policy tools that have been subject to significant state and local control: the welfare and penal system.

Research Question, Methods, and Analytical Strategy

Research Questions

Since the 1980s, as part of a punitive policy development, the U.S. has seen the emergence of a novel kind of penal-welfare regime in which U.S. states have prioritized punitive control over welfare support (Becket & Western, 2001; L. J. D. Wacquant, 2009). Given the health-harming racialized effects associated with penal institutions, I ask: Is the association between U.S. states' prioritization of carceral spending over health and welfare systems different for Black than for White mortality? Given that racial mortality trends have diverged systematically between regions in the U.S. due to dissimilarities in sociodemographic, behavioral, environmental, and institutional factors, and legacies of racism, I also ask whether the association between a states' carceral prioritization and Black and White mortality varies by regions in the U.S. Finally, I ask whether different kinds of penal and welfare spending are associated differentially with White and Black mortality rates, to explore the fundamental question of whether there are characteristics of this new penal-welfare regime that affect the health of Black and White individuals.

Data and Variables

For the main independent variable, the measure of the penal state, I use the Urban Institute's State and Local Finance Data, which makes available state and local spending and debt from

1977 through 2021 primarily from the US Census Bureau's Census of Governments and its associated annual survey. The Census Bureau's Annual Survey of State Government Finances is the only source of nationwide, comprehensive statistics on revenue, expenditure, debt, and assets for the 50 states (US Census Bureau, 2022). The Census Bureau relies on each state's internal account reports and financial statements yet re-categorizes each government's original data within a standard framework based on the common functional nature of particular activities or transactions to allow summation across activities and direct comparisons between states (United States Bureau of the Census, 1992). Finance information for each state (revenues, expenditures or debt) is aggregated for all state and subordinate levels of government. (That is, the sum of state, county, municipal, town, special district, and school district finances for the selected variable.) Because states differ in terms of which level of government collects each type of revenues or provides each service, meaningful comparisons across states are only possible at this level of aggregation. The data can be downloaded from the "State and Local" finance information from the Urban Institute website at https://state-local-finance-data.taxpolicycenter.org/pages.cfm.

I link annual spending data aggregated at the state level to the Public-use Compressed Mortality Files (CMF), which is a county-level national mortality and population database spanning the years 1968-2016 produced by the National Center for Health Statistics (NCHS), at the Centers for Disease Control and Prevention (CDC, 2022). The number of deaths, crude death rates, and age-adjusted death rates can be obtained by state for White, Black, and 'other' races. The data can be downloaded from the CDC Wonder dataset website at https://wonder.cdc.gov/ucd-icd10.html. The linked data base on historical finances of state governments and CMF includes

1,400 state-year observations from 1980 to 2008 (28x50). I exclude from the analysis age-adjusted death rates that the CDC marks as “unreliable,” which is when the death count is less than 20 for a given state-year. Fifteen percent (15.82%) of all age-adjusted mortality rates are marked as "unreliable." Because this means that some states do not have a standardized mortality ratio for every year for the 28 year period of interest for the analysis, I exclude states that had less than 30 observations on the dependent variables. The final sample includes 1,134 state-year observations in a total of 42 states.

The main outcome variable is the age-adjusted death rate among Blacks and Whites, which the CDC calculates. Age-adjusted death rates are weighted averages of the age-specific death rates, where the weights represent a fixed population by age (CDC, 2022). The rates of almost all causes of death vary by age. Age adjustment is a technique for "removing" the effects of age from crude rates, to allow meaningful comparisons across populations with different underlying age structures, which is crucial for this analysis that compares Black and White mortality rates between states.

The main independent variable, the measure of the penal state, is the Carceral Resource Index (CRI) was developed by the Health in Justice Action Lab at the Northeastern University School of Law to measure city governments’ fiscal commitment to carceral systems (Health in Justice Action Lab, 2023). It contrasts spending investments in systems of punishment and controls relative to spending on health and supportive systems. This measure is available for each year since 1980 until 2020. It includes spending on police and correctional facilities for measuring ‘carceral spending’. For measuring social support and health spending it includes spending on

hospitals, the provision of services through government health programs, parks and recreation, housing and community development programs, utility assistance (sewerage, water, electricity, gas, and public mass transport system), and both welfare cash-transfer and in-kind benefits. The benefit of also including health and social costs in developing this index—as opposed to solely quantifying each city's reliance on carceral systems—is that it attenuates the risk of establishing false equivalencies between localities that are purely carceral versus those with more egalitarian priorities (Skaathun et al., 2022). Although CRI has been applied to city government spending priorities, the majority of correctional spending comes from state governments; sub-state spending only accounts for one-third of total correctional spending in the U.S. (Wagner & Rabuy, 2017). I aggregate all sub-state spending (from county, municipal, town, special district, and school district finances) to the state level and add state spending data to calculate a novel CRI for states. State-level spending is calculated in a per capita dollar amount, adjusted by inflation. I calculate CRI as:

[(health +support)—carceral]/total budget]*-1

In this CRI, the index values range from -1 to 1, with -1 representing a jurisdiction's total fiscal prioritization of health and support systems to the exclusion of carceral expenditures and 1 representing total fiscal prioritization of carceral systems to the exclusion of health and support. A CRI of 0 represents equal fiscal prioritization. Because the US Census reports states' finances by the "functional nature" of activities, I included all reported state spending 'functions' that had a direct association with health, with criminal justice, and welfare in the index, following the Health in Justice Action Lab at the Northeastern University School of Law operationalization. For a detailed explanation of the construction of the CRI index for this paper and its comparison

with the one proposed by the Action Lab, see Table 1 in supplementary analysis. I lag the CRI index by one year to capture the penal state prior to the death of an individual.

Covariates: Models control for the following state characteristics that vary on annual basis: average personal income, the proportion of the population that is black, the percent of the population under the federal poverty line, the total annual per capita expenditure, the unemployment rate, and the governor's party in the last election.

Variable	Definition	Source of Data
(1) Average personal income (mean $)	Mean personal income	Census Bureau's Annual Survey of State Government Finances
(2) Proportion Black	Proportion of state population that is Black	Census Bureau's Annual Survey of State Government Finances
(3) Poverty rate	Percent of the state population under the federal poverty line	Current Population Survey Historical Poverty Tables
(4) Total spending	Total annual per capita expenditure of each state	Census Bureau's Annual Survey of State Government Finances
(5) Unemployment rate	Percent of the state population that those who did not have, were available for work, and made specific efforts to find a job	Local Area Unemployment Statistics (LAUS) program of the Bureau of Labor Statistics (BLS)
(6) Governor's party	The party of the elected governor in the last election	Kaplan, Jacob. United States Governors 1775-2020. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2021-01-16. https://doi.org/10.3886/E102000V3

People with higher income and racially privileged groups often demand more services from governments, and these are also two health-protective factors that may impact mortality. The percent of state residents under the poverty line may be correlated with higher mortality rates. I include total annual per capita expenditure for each state to account for differences that might arise between states given different levels of general spending. Unemployment rates are included given unemployment's cyclical association with mortality (Stevens et al., 2015). The governor's party is included to control for state politics. Research has found state ideology to influence imprisonment policies, particularly Black imprisonment rates (Becket & Western, 2001; Jacobs & Carmichael, 2001; Yates & Fording, 2005).

I also included fixed effects for each state, which accounts for any time-invariant characteristics of the state that may correlate with fiscal priorities and mortality rates, for example, economic resources, historical background, or geography. This is a way of "cleaning" the estimates from bias resulting from unobserved heterogeneity across states. I also add year fixed effects to the model to account for bias resulting from unobserved heterogeneity across years.

Analytical strategy

I used linear regression models with state and year fixed effects to assess the association between CRI and age-adjusted Black and White mortality rates, adjusted by co-variates. To measure if fiscal prioritization of carceral systems to the exclusion of health and support are associated with Black and White mortality rates, I estimate predicted age-adjusted Black and White mortality rates at different levels of the CRI after adjusting for the fixed effect regression model.

For the question of whether a states' fiscal prioritization of carceral spending to the exclusion of health and support are associated with Black and White mortality, I model race stratified fixed-effects linear probability models as follows:

$$Equation\ 1:\ Y(Death)_{st} = \beta_1 CRI_{st} + \Sigma_s State + \Sigma_t Year + X'_{st} + e$$

Y(Death) is the mean of the outcome of interest (here, age-adjusted mortality rates) in state s and year t, $\beta_1$captures the association between the carceral resource index and mortality -the main association of interest. I control for state fixed effects ($\Sigma_s State$) and year-fixed effects ($\Sigma_t Year$). X is a vector of time-varying state-level covariates. The term "e" is an idiosyncratic error term. The fixed-effects formulation estimates a single parameter capturing a continuous change in mortality associated with a state's prioritization of carceral spending.

For the question of whether the association between prioritization of carceral spending and Black and White mortality varies by geographic region, I model the same race stratified fixed-effects linear probability models stratified by four census defined regions: Northeast, Midwest, West, and South.

For the questions of whether different kinds of penal and welfare spending are associated differentially with White and Black mortality rates, I model race stratified fixed-effects linear probability models as follows:

$$Equation\ 2\text{: } Y(Death)_{st} = \beta_1 corrections_{st} + \beta_2 police_{st} + \beta_3 welfare\ cash\ assistance_{st} + \beta_4 health_{st} + \beta_6 hospitals_{st} + \beta_7 parks\ \&\ rec_{st} + + \beta_8 transport_{st} + \Sigma_s State + \Sigma_t Year + X'_{st} + e$$

Y(Death) is the mean of the outcome of interest (here, age-adjusted mortality rates) in state s and year t, $\beta_1 to \beta_8$ captures the association between the different kinds of spending that the carceral resource index is composed of and mortality. These are all lagged by one year prior to the death of an individual. I control for state fixed effects ($\Sigma_s State$) and year-fixed effects ($\Sigma_t Year$). X is a vector of time-varying state-level covariates . "e" is an idiosyncratic error term. The fixed-effects formulation estimates a single parameter capturing a continuous change in mortality associated with a states' kind of spending.

Results

Trends in time and space

Table 1 displays descriptive statistics for the 42 states included in this analysis between 1980 and 2008. These tables reveal several patterns. First, southern states had the highest Black and White mortality rates throughout with an average of 710 Black deaths and 446 White deaths per 100,000 population. The Western States had the lowest Black and White deaths (569 and 393,

respectively). Second, there is important variation in Black and White death overtime in all states with both rates decreasing over this entire period (See Figures 1 & 2). While Black mortality decreases more than White mortality over this period, Black-White mortality gaps persist, such that White mortality rates are lower than Black rates over this entire period. For example, Massachusetts experienced one of the steepest declines in Black mortality, from 690.6 Black deaths per 100,000 population in 1980 to 334.9 Black deaths per 100,000 population in 2008, but White mortality remained lower each year, from 475.4 White deaths per 100,000 population in 1980 to 293.7 White deaths per 100,000 population in 2008. Thus, while the Black-White gap shrank, it did not disappear or reverse.

--Figure 1 about here—

--Figure 2 about here—

Third, for all states the CRI increases over time, which means that state prioritization of carceral spending over health and welfare becomes more salient over time (see Figure 3).

--Figure 3 about here—

There is considerable state and regional variation in the CRI: Over the entire period it is on average the highest among the Northeastern and Western states, such that on average the CRI was -.48 for all Northeastern states and -.483 among the Western states, compared to an average CRI index of -.54 among Southern states and -.55 among Midwestern states. Note that -1 represents a state with full prioritization of welfare spending and +1 a state with full prioritization of carceral spending.

--Table 1 about here—

Fourth, among Southern states average personal income is the lowest, while the percent of people living under the federal poverty line, and unemployment rates are the highest and the proportion of Black residents is the highest. Finally, total per-capita state-level spending is the highest among Western states at $10,423 annual per capita spending and the lowest among the Southern states at $7,567 per-capita spending.

Prioritization of carceral spending and Black and White mortality

Figure 4 displays the predicted state-level average age-adjusted Black and White mortality rate by different levels of CRI, based on the fixed effects adjusted regression models using Equation 1. I find states with higher CRI scores (prioritize carceral systems to the exclusion of health and social support), have higher Black and White mortality rates than states with lower CRI scores (prioritize health and support over carceral systems), after adjusting for covariates, time, and state fixed effects (regression results available in Table 2).

--Figure 4 about here—

While both White and Black death rates are higher in states that prioritize carceral spending, an increase in one point in the carceral resource index is associated with and added 134.04 Black deaths per 100,000 population, and with 50.92 more White deaths per 100,000 population (see Model 2 in Table 2). There is no state that experienced such an increase in the carceral resource

index. Yet, states can be used as cases to illustrate the association between the prioritization of carceral spending and mortality rates. For example, Minnesota's CRI increased from -.67 in 1980 to -.4 in 2008, resulting in a .27 rise in the CRI. The model predicts that this increase alone was plausibly associated with an increased 36.1 Black deaths (.27x134.04) and 13.7 White deaths (.27x50.92) per 100,000 population.

--Table 2 about here --

Regional variation in the association between prioritization of carceral spending and Black and White mortality

Figure 5 displays the predicted state age-adjusted Black and White mortality rates by different levels of the CRI for four regions in the U.S., based on the fixed effects adjusted regression models using Equation 1 stratified by regions (regression results available in Table 2 in supplementary analysis). I find that only in the Southern region, states with a higher CRI score, who prioritize investments in carceral systems over health and social support, have a higher Black mortality rate than states with lower CRI scores, after adjusting for covariates, time and state fixed effects. In the South, an increase in one point in the CRI is associated with an added 136.24 Black deaths per 100,000 population (see Model 5 in Table 2 in supplementary analysis). For example, in Oklahoma the CRI score increased from-.62 in 1980 to -.28 in 2008, in other words by .34. The model suggests that the expansion of the penal state in Oklahoma might plausibly be associated with an increased 6.81 Black deaths per 100,000 population between 1980 and 2008 (.05x136.24). I find no statistically significant association between the state CRI score and Black mortality rates for any other region in the U.S.

--Figure 5 about here—

I find that in the Southern and Western regions, states with higher CRI scores have higher White mortality rates than states with lower CRI scores, after adjusting for covariates, time and state fixed effects. In the South, on average for all states an increase in one point in the CRI is associated with an added 39.28 White deaths per 100,000 population, and in the western region the association is of 62.16 (see Model 6 for the South and Model 8 for the West in Table 2 in supplementary analysis). I use Oklahoma in the South and California in the West as cases to illustrate the association. Oklahoma experienced a CRI increase of .34, from -.62 in 1980 to -.28 in 2008, while California's CRI increased from -.58 in 1980 to -.38 in 2008, in other words a .2 increase. The models suggest that Oklahoma's expansion of the penal state added 13.35 White deaths per 100,000 (.34x39.28) and California added 12.43 (.2x62.16). Together, these results suggest that there is considerable regional variation in the association between a U.S. states' prioritization of carceral spending and Black and White mortality rates.

Characteristics of a penal-welfare regime

Finally, I turn to examine whether different kinds of penal and welfare spending are associated differentially with White and Black mortality rates. Figure 6 summarizes the predicted average change in Black and White mortality rates associated with an increase in one dollar in each of the spending categories, based on the fixed effects adjusted regression models using Equation 2 (regression results available in Table 3 in supplementary analysis). For most spending categories, once disaggregated, I find no statistically significant association with Black and White mortality rates, with the exception of welfare cash assistance and mass transportation systems, after

adjusting for covariates, time, and state fixed effects. I find that an increase in one dollar in welfare cash assistance is associated with an increase in White mortality of .05 White deaths per 100,000 population. I also find that a one-dollar increase in mass transportation systems, which include the operation, maintenance, and construction of subways, surface rails, and buses, is associated with a decrease in Black mortality by .21 Black deaths per 100,000 population and by .08 White deaths per 100,000 population.

--Figure 6 about here—

Discussion and Conclusion

In this paper, I measured the association between state fiscal commitment to carceral systems over health and social support and Black and White mortality in the U.S. This analysis extends research on the impact of penal institutions and welfare regimes on mortality (Beckfield & Krieger, 2009; Edwards et al., 2019), by examining how a unique penal-welfare regime that prioritizes punitive control over welfare support at the state-level is associated with Black and White death. I examine heterogeneity in this association by region in the U.S. and explore the question of whether there is a particular kind of characteristic of the penal-welfare regime that matters more to mortality.

Linking data from 1980 to 2008 on annual total per-capita state spending, and CDC Public-use Compressed Mortality Files, using fixed-effects models and controlling for confounders, I find that U.S. states' fiscal prioritization of carceral systems to the exclusion of health and social support is associated with an increased number of Black and White deaths per 100,000 population. Additionally, I also find that the association between a states' carceral prioritization and Black death rates is larger than its association with White death rates. The health harming

effects persist after accounting for socio-demographic trends that may confound the association between a states' prioritization of carceral spending and mortality. Further, the fact that over this entire period Black and White mortality rates decrease -and do so more steeply for Black- further suggests that the expansion of a penal state is an important determinant of mortality.

The mortality implications of a state's prioritization of carceral spending are substantial in terms of the populations affected, resulting in considerable added deaths for White and Black groups in the U.S., and disproportionately so for Blacks. This has significant social implications. Deaths inflict a heavy burden on the survivors. Loved ones suffer social, emotional, and often, economic burdens, as well as decrements in physical and mental health (Stroebe et al., 2007). Further, losses, especially off-time losses, may trigger adverse social consequences that disrupt life course trajectories well after the losses occur, such as increase the risk for residential instability and homelessness (Berman et al., 2015; Smith, 2015). Thus, the loss of a loved one can fuel cumulative disadvantage over time. Further, because the death of family member(s) is more common among Black than White Americans from childhood through mid-life, this may be an underappreciated layer of racial inequality in the U.S. that could contribute to intergenerational transmission of health disadvantage (Umberson et al., 2017).

Stratified models by region in the U.S. show that the association between a states' prioritization of carceral spending and Black and White mortality is concentrated in the South, and for White mortality also in the Western region. This regional variation suggests that there are characteristics in the South that make exposure to a growing penal state more detrimental for White and Black groups compared to other places, and in the West for White groups. Studies

suggest that sociodemographic, behavioral, environmental, and institutional factors, such as the entrenched presence of institutions of racial subjugation and oppression may explain the South's health disadvantage (Baker 2022; Gabriel et al. 2021; Tomaskovic-Devey and Roscigno 1996). Studies exploring such characteristics may be able to explain why a penal-welfare regime that prioritizes carceral punishment over social support has been especially detrimental for the health of Black and White individuals in the South -and in the West for Whites. Future studies are needed.

I also examined whether different kinds of penal and welfare spending are associated differentially with White and Black mortality rates and found only welfare cash assistance to be associated with White mortality and mass transportation systems to be associated with Black and White mortality. While an extra dollar spent on welfare cash assistance is associated with an increase in White mortality, investing in mass transportation systems is associated with a decrease in Black and White mortality. Yet, for most of the spending categories I find no statistically significant association with mortality. This null finding coupled with the findings that suggest that a states' prioritization of carceral spending affects mortality, is consistent with Wacquant's theory that it is the new penal-welfare regime that simultaneously glorifies punishment and shrinks welfare that produces and entrenches harm, and not the development of one or the other separately (L. J. D. Wacquant, 2009).

Against the backdrop of prior literature examining the health effects of penal institutions, and their disproportionate effect among Black groups (Alang et al. 2017; Dumont et al. 2012; Edwards et al. 2019), my finding show that Black mortality rates increase in states that prioritize

carceral spending over health and welfare. A key contribution of my study is in demonstrating that it is the simultaneous exposure to a growing carceral system, and a decreasing welfare state that have implications for the health of Black and White groups in the U.S. Unless U.S. states shift their budget priorities, there is no reason for these patterns to change in the future.

These studies results should not be interpreted as direct evidence of a causal impact of a penal-welfare regime on health, since I am unable to parse out the specific mechanisms accounting for this association. While I account for some potential mediators, I cannot rule out that these are on the causal pathway linking a states' prioritization and mortality. Second, some of the mechanisms may be difficult to measure. In particular, symbolic mechanisms, such as racist rhetoric, are hard to gauge. Third, the mechanisms may vary over time and space, challenging the ability to detect average effects of important pathways. Finally, there may be other changes in overarching policy and political contexts occurring since the 1980s that may also account for Black and White mortality trends. Indeed, since the 1980s the U.S. has experienced important political, economic, and legal shifts such as the rise of partisan polarization, a new balance of policymaking authority across federal, state, and local governments, the growing influence of corporations, their lobbying groups, and the gradual movement toward restrictive abortion among many other factors that may plausibly determine mortality rates (Grumbach, 2018; Hertel-Fernandez, 2019; Montez et al., 2021).

Future research should seek to examine whether the impacts of a penal-welfare regime that prioritizes carceral spending are further stratified by class and place. Indeed, socio-economic inequalities in mortality in the U.S. have increased since the 1980s, such that the gap in mortality

risk between lower- and higher-educated adults expanded between 1986 and 2006 to create even larger disparities in the length of life among many Americans (Montez et al., 2011). At the same time jails and prisons are disproportionately occupied with people whose income is below the poverty line (Nellis 2021; Rabuy and Kopf 2015). Research is needed that studies whether the growing socio-economic inequalities in mortality are a product of the development of a penal state that disproportionately targets the socio-economically disadvantaged, as Wacquant's theory would predict. The impact of the expansion of the penal-welfare regime may also vary by geography. Existing research has found that most large U.S. cities spend more on carceral systems than on health and supportive services, combined (Skaathun et al., 2022). Analysis assessing the association between a penal-welfare regime that prioritizes carceral spending and health by class, and place could illuminate potential mechanisms linking penal state development and health.

While this study is limited in its ability to identify causal effects and mechanisms, it contributes to theoretical debates on politics and health. First, this study illustrates and contributes to theories on the role of the penal state as an enduring source of racial inequality A rich literature on penal state development details its historical development in the U.S. and beyond and theorizes its implications for producing marginality by race, class, and place (e.g. Squires & Lea, 2012; Wacquant, 2009). There remains a significant need to empirically test this in inequality research. This study helps bridge the gap between theoretical penal state literature and evidence. Second, it contributes to the growing literature emphasizing the institutional determinants of health inequities (Beckfield & Krieger, 2009; Rodriguez, 2019). In focusing on the health implications of an overarching policy regime that has prioritized carceral punishment over social protection,

this study buttresses research that brings together social epidemiology and political sociology to investigate how political systems and priorities shape racial health inequities. States are macro-institutions which create social norms and distribute resources (Montez, 2020). Accordingly, this study also adds to the growing literature demonstrating how state context can influence health inequality across states (P. A. Homan & Brown, 2022; Komro et al., 2016; Montez et al., 2016; Montez, 2017). My results suggest that a state's prioritization of carceral spending has mortality implications, resulting in considerable added deaths for White and for Black groups in the U.S. A significant change in the current penal-welfare regime is necessary to avoid these preventable deaths.

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Tables & Figures

Table 1: Descriptive statistics

	Age-adjusted Black Mortality (out of 100,000)	Age-adjusted White Mortality (out of 100,000)	Carceral Resource Index (mean)	Personal Income $ (mean)	Black residents (proportion)	Residents under the FPL (%)	Annual per capita spending $ (mean)	Unemployment rate (%)
Connecticut	609.3259	365.463	-.4872973	104920.7	.0979403	7.974074	9393.407	4.81
Massachusetts	536.2222	389.7333	-.5762187	173026	.0643004	10.01111	9867.593	5.24
New Jersey	701.337	395.3185	-.3552782	235319.4	.1532941	8.966667	9584.148	5.74
New York	637.0074	414.663	-.5239632	501355.5	.1849134	15.00741	12849.15	6.23
Pennsylvania	746.6	418.2556	-.4892991	279382	.1042368	11.36667	8262.444	6.36
Rhode Island	592.8037	394.1148	-.4594543	23810.67	.0555358	10.80741	9162.37	5.87
Total Northeast	**637.216**	**396.258**	**-.4819185**	**219635.7**	**.1100368**	**10.68889**	**9853.185**	**5.71**
Illinois	757.3037	407.8815	-.4956609	299400.1	.1611257	12.55556	8242.111	6.85
Indiana	692.1481	432.1296	-.5914502	122779.5	.0860457	11.64815	6972.926	5.94
Iowa	647.5926	369.3111	-.595629	60754.07	.0220524	11.05556	8044.259	4.77
Kansas	651.8037	388.4296	-.5342394	57420.48	.0634759	11.37037	7718.37	4.64
Michigan	739.0074	411.2889	-.4861669	213714.9	.1475217	12.9	8702.037	7.99
Minnesota	586.8741	342.4556	-.6062862	114534.9	.0327417	10.33704	9757.111	4.78
Missouri	728.8444	429.8111	-.5265015	115969.1	.1166682	12.9037	6669	5.90
Nebraska	670.2	373.5259	-.7670001	36572.85	.041868	11.1037	9303.63	3.46
Ohio	680.763	429.5259	-.5216184	244087.4	.1166862	12.3037	8278.481	6.78
Wisconsin	640.1407	368.7333	-.4543901	114660.3	.0574623	9.807407	8649.185	5.35
Total Midwest	**679.4678**	**395.3093**	**-.5578943**	**137989.4**	**.0845648**	**11.59852**	**8233.711**	**5.65**
Alabama	722.6704	466.7296	-.680007	81414.15	.2645193	17.81111	7426.111	7.22
Arkansas	733.8259	461.1778	-.5245598	45899.48	.1654195	18.58148	6216.407	6.57
Delaware	691.4852	419.5185	-.4123221	18127	.1938273	9.396296	9377.222	4.84
Florida	700.6259	397.8296	-.4244478	341615.7	.1577905	13.79259	7609.407	5.62
Georgia	726.4444	443.7481	-.5782448	161680.5	.2922348	14.99259	7660.407	5.54
Kentucky	708.7333	485.1037	-.5252577	73314.67	.0757236	16.64074	7089.778	6.81
Louisiana	748.8556	467.0519	-.5348211	83057.22	.3238337	20.23704	8171.556	7.59
Maryland	670.2222	402.7815	-.3327139	137392.3	.2826794	9.22963	8318.407	5.03
Mississippi	726.0148	479.363	-.6266805	45699.48	.3695221	22.01852	7093.63	7.70
North Carolina	709.3667	422.2074	-.5815131	157772.5	.2308727	14.26296	7362.556	5.34
Oklahoma	677.5889	470.1667	-.5291466	66302.85	.086965	15.36296	7056.593	5.17
South Carolina	749.4296	445.3481	-.6369584	72618.11	.3063125	15.57778	7721.037	6.29
Tennessee	745.0222	459.7259	-.7548886	110037.4	.1681056	16.44074	7833.481	6.33
Texas	680.6	422.9111	-.4870565	424145.2	.1259692	16.5963	7300.556	6.24
Virginia	670.9593	400.0926	-.4457447	166413.1	.2052375	10.15556	7341.778	4.52
West Virginia	710.4148	498.6556	-.5781996	31957.15	.0333479	18.35556	7493.815	9.10
Total South	**710.7662**	**446.4007**	**-.5407851**	**126090.4**	**.2051475**	**15.59074**	**7567.046**	**6.24**

Table 1: Descriptive statistics (continued)

	Age-adjusted Black Mortality (out of 100,000)	Age-adjusted White Mortality (out of 100,000)	Carceral Resource Index (mean)	Personal Income $ (mean)	Black residents (proportion)	Residents under the FPL (%)	Annual per capita spending $ (mean)	Unemployment rate (%)
Alaska	461.5259	400.9519	-.4188423	15560.33	.0515845	9.677778	22816	8.04
Arizona	596.0037	403.2037	-.3861913	95757.67	.0383073	15.11481	7986.481	5.84
California	663.263	404.4741	-.5234549	810452.3	.0876305	14.38148	10126.74	6.92
Colorado	547.5296	368.2407	-.4903182	98330.04	.0442982	10.59259	8601.778	5.22
Hawaii	429.2519	348.1741	-.5868292	28421.81	.0732259	10.41481	9747.037	4.36
Nevada	644.5037	475.637	-.3362678	42570.85	.0785986	10.37407	8535.481	5.88
New Mexico	524.1333	408.4704	-.4101394	31566.22	.0255765	20.16296	8508.333	6.78
Oregon	644.1037	400.1926	-.4983864	69788.48	.0197019	12.25185	9228.296	6.84
Utah	586.3407	347.8111	-.5557353	39166.04	.0093067	9.796296	8319.037	4.82
Washington	595.6704	382.5259	-.6299037	133323.1	.0383729	10.72593	10362.85	6.76
Total West	**569.2326**	**393.9681**	**-.4836068**	**136493.7**	**.0466603**	**12.34926**	**10423.2**	**6.15**
Total Nation	**659.1086**	**414.5889**	**-.5228353**	**144764.1**	**.1251151**	**13.16817**	**8732.405**	**6.00**

Note: FPL stands for Federal Poverty Line

Source: Urban Institute's State and Local Finance Data, Public-use Compressed Mortality Files (CMF) from CDC, Current Population Survey, Census Bureau's Annual Survey of State Government Finances, Local Area Unemployment Statistics (LAUS) program of the Bureau of Labor Statistics (BLS), Kaplan, Jacob. United States Governors 1775-2020. Ann Arbor, MI: Inter-university Consortium for Political and Social Research

Table 2: FE Regression results for mean Black and White mortality rate: 1980 to 2008

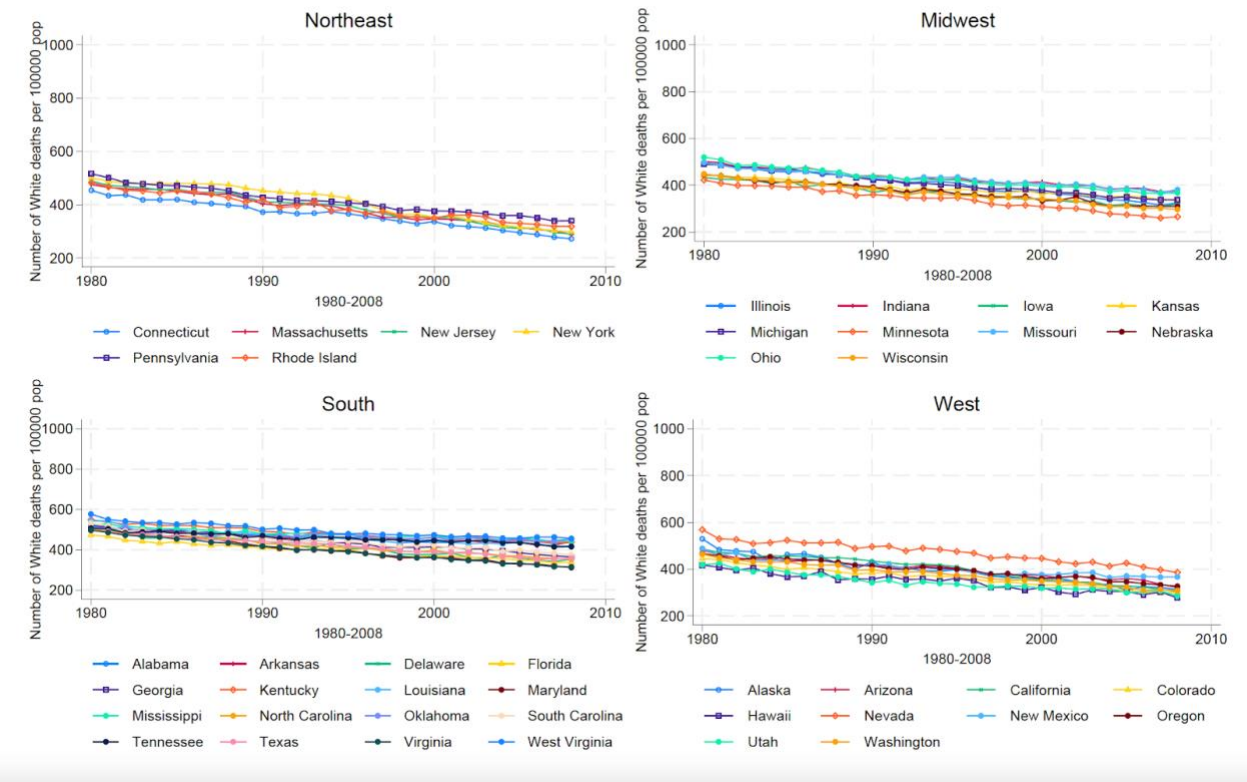
	Black Mortality rate M1	**Black Mortality rate M2**	**White Mortality rate M1**	**White Mortality rate M2**
Carceral Resource Index	109.88*	134.04*	46.67*	50.92*
	(30.96)	(31.78)	(9.22)	(8.25)
Average personal income (mean $)		-0.00*		-0.00*
		(0.00)		(0.00)
Percent of Black population in state		-11.91*		-6.32*
		(2.03)		(0.53)
Percent of the population under the federal poverty line		-1.67*		-0.70*
		(0.82)		(0.21)
Total annual per capita expenditure of each state (total $)		-0.00		0.00*
		(0.00)		(0.00)
Unemployment rate		-4.83*		-1.22*
		(1.40)		(0.36)
Governor's party in the last election (Ref: Democrat)		0.96		1.04
Republican		(2.92)		(0.76)
		-5.55		4.31
other		(10.74)		(2.79)
		(10.58)		(2.80)
Constant	925.65*	1,318.00*	578.51*	748.08*
	(25.68)	(57.36)	(7.65)	(14.89)
Observations	1,134	1,050	1,134	1,050
R-squared	0.876	0.885	0.954	0.968

Notes: M1 regression based on two-way fixed effect models controlling for year and state-fixed effects. M2 regression adds state-level time-varying controls: average personal income, percent of Black population in state, percent of the populations under the federal poverty line, total annual per capita expenditure of each state, unemployment rate, and the governor's party in the last election.

* Indicates statistically significant differences at 95% confidence interval.

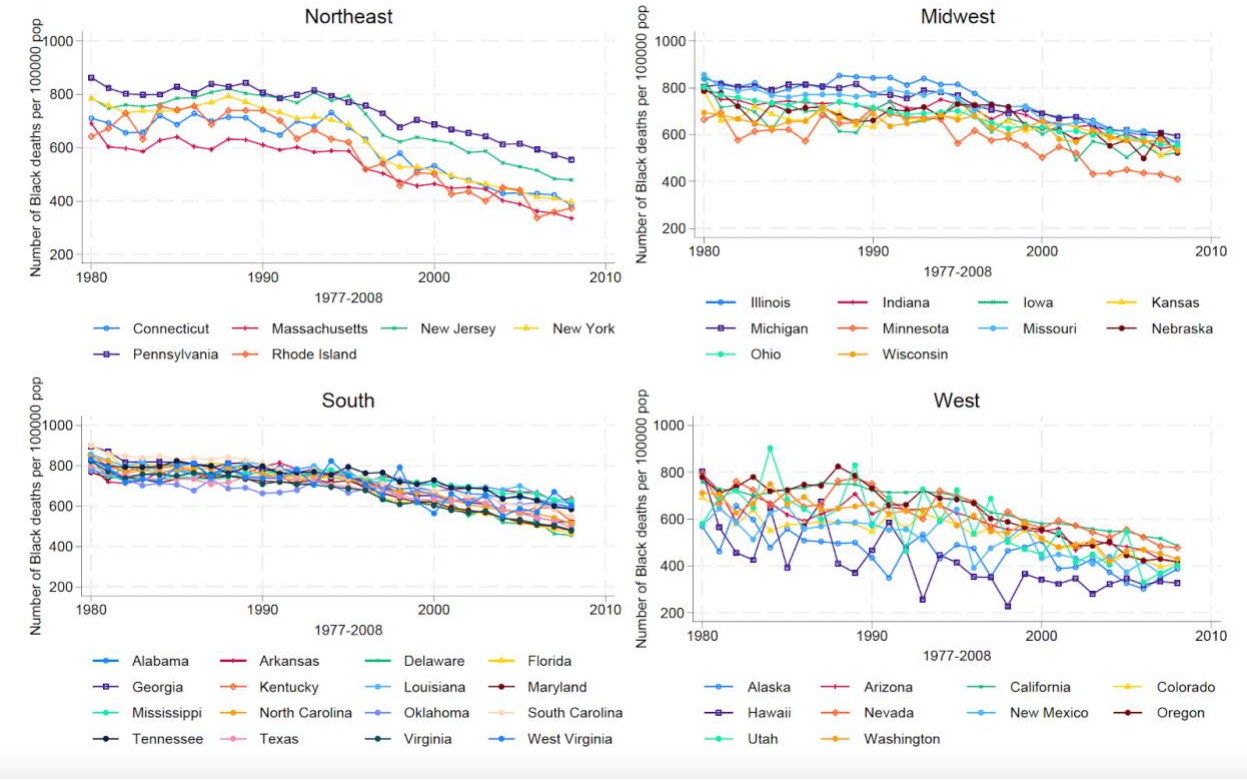
Source: Urban Institute's State and Local Finance Data, Public-use Compressed Mortality Files (CMF) from CDC, Current Population Survey, Census Bureau's Annual Survey of State Government Finances, Local Area Unemployment Statistics (LAUS) program of the Bureau of Labor Statistics (BLS), Kaplan, Jacob. United States Governors 1775-2020. Ann Arbor, MI: Inter-university Consortium for Political and Social Research

Figure 1: Age-adjusted White Mortality by Regions & States in the U.S.



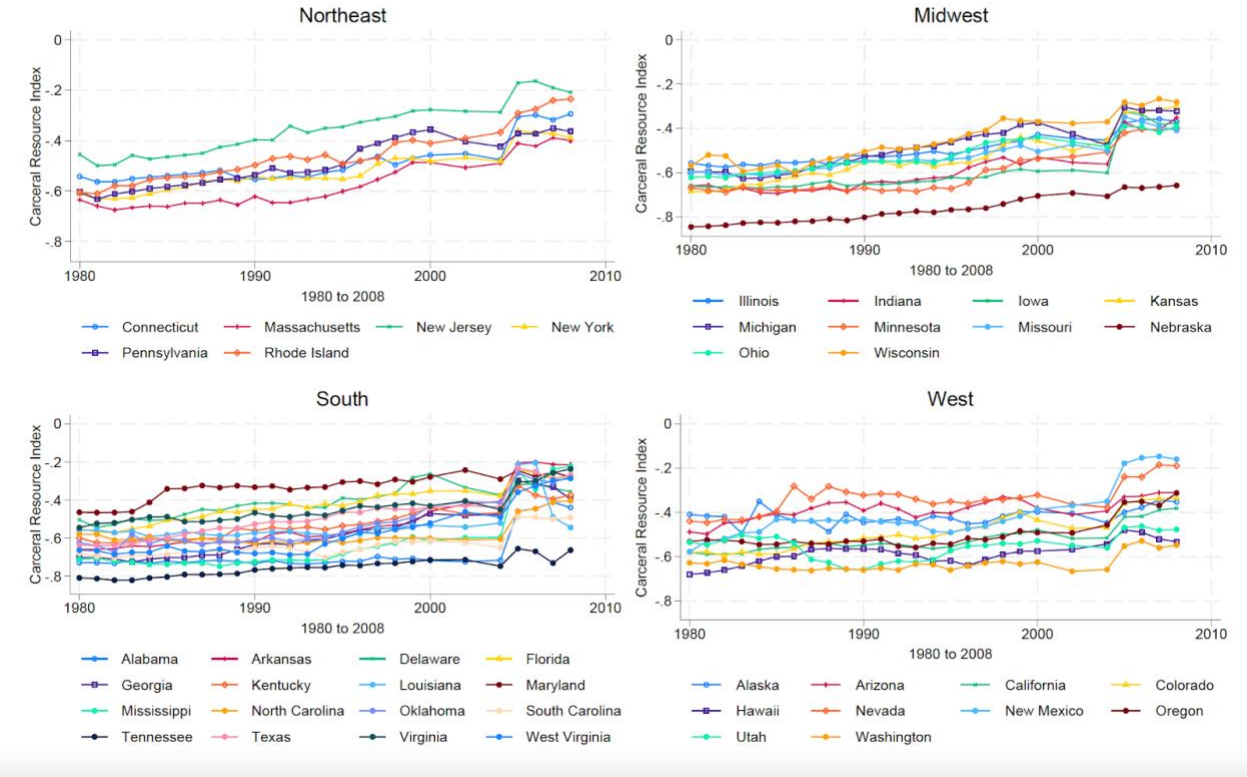
Source: Public-use Compressed Mortality Files (CMF) from CDC, 1980-2008

Figure 2: Age-adjusted Black Mortality by Regions & States in the U.S.

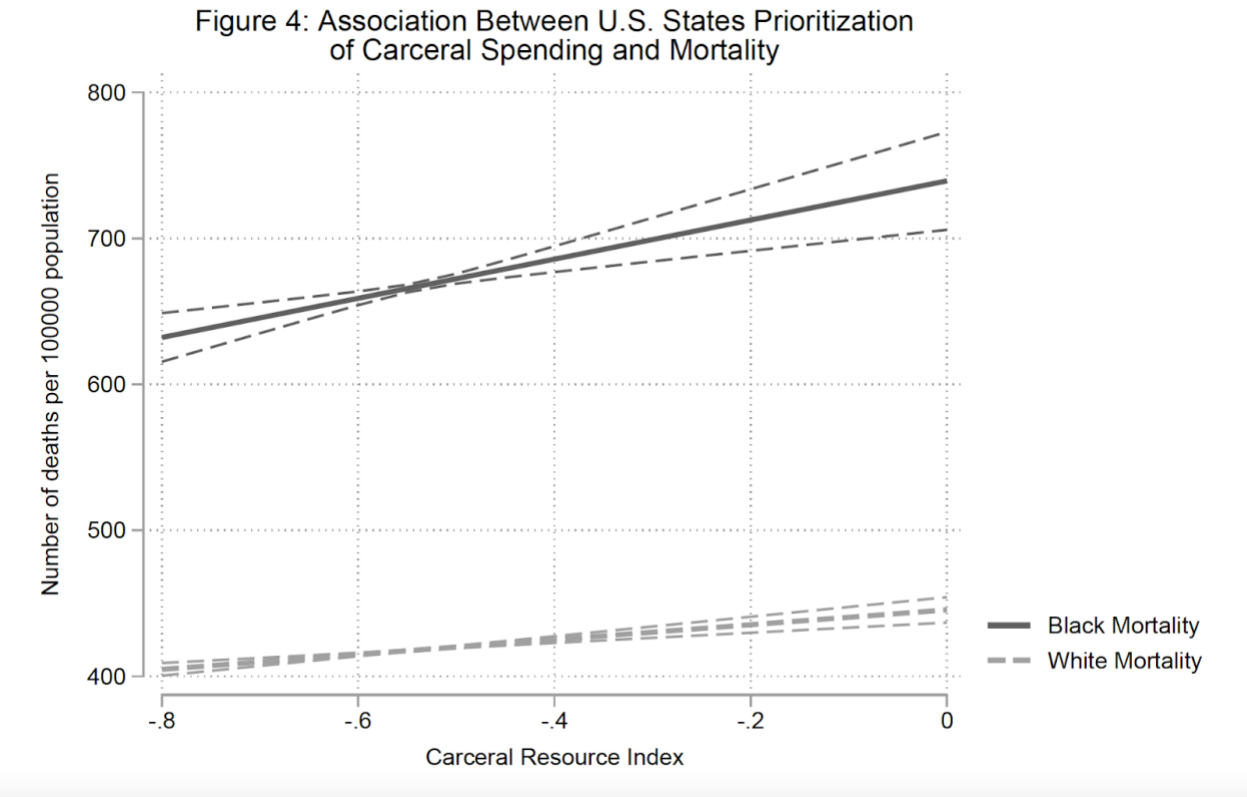


Source: Public-use Compressed Mortality Files (CMF) from CDC, 1980-2008

Figure 3: Carceral Resource Index by Regions & States in the U.S.



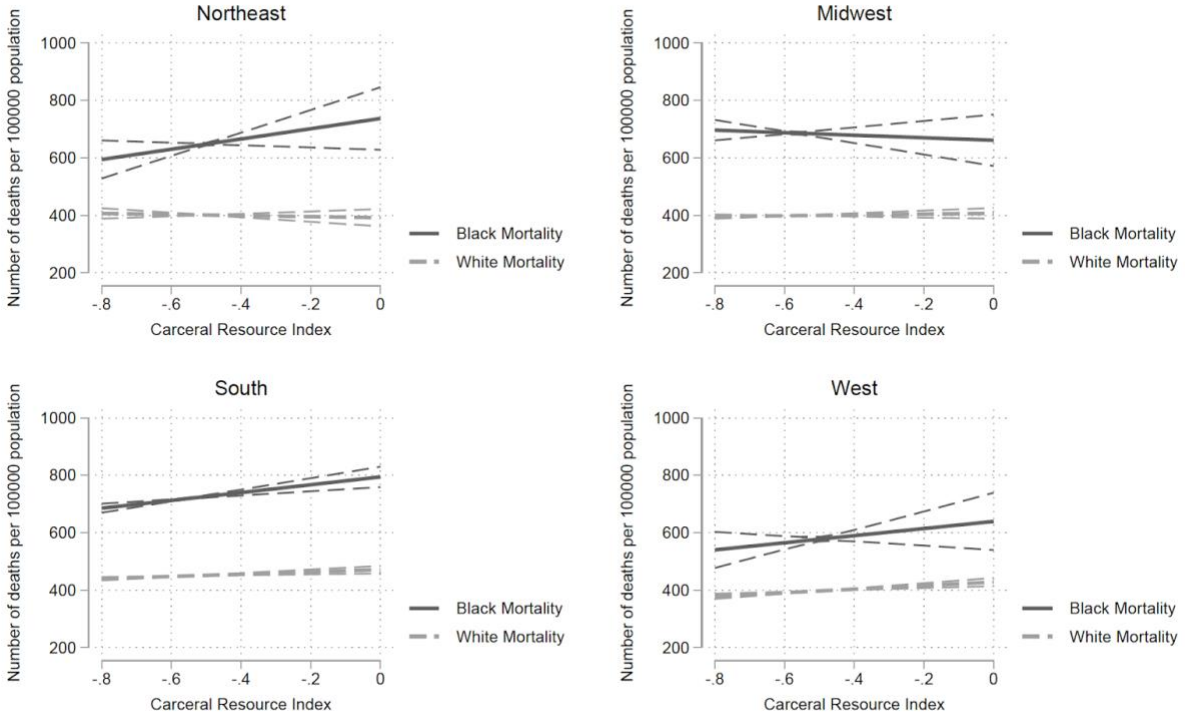
Source: Urban Institute's State and Local Finance Data



Notes: Linear regression line modeled by predicted age-adjusted Black and White mortality rate at different levels of CRI after adjusting for the fixed effect regression model included in Equation 1. Horizontal dotted lines show 95% confidence intervals based on regression results in Table 2.

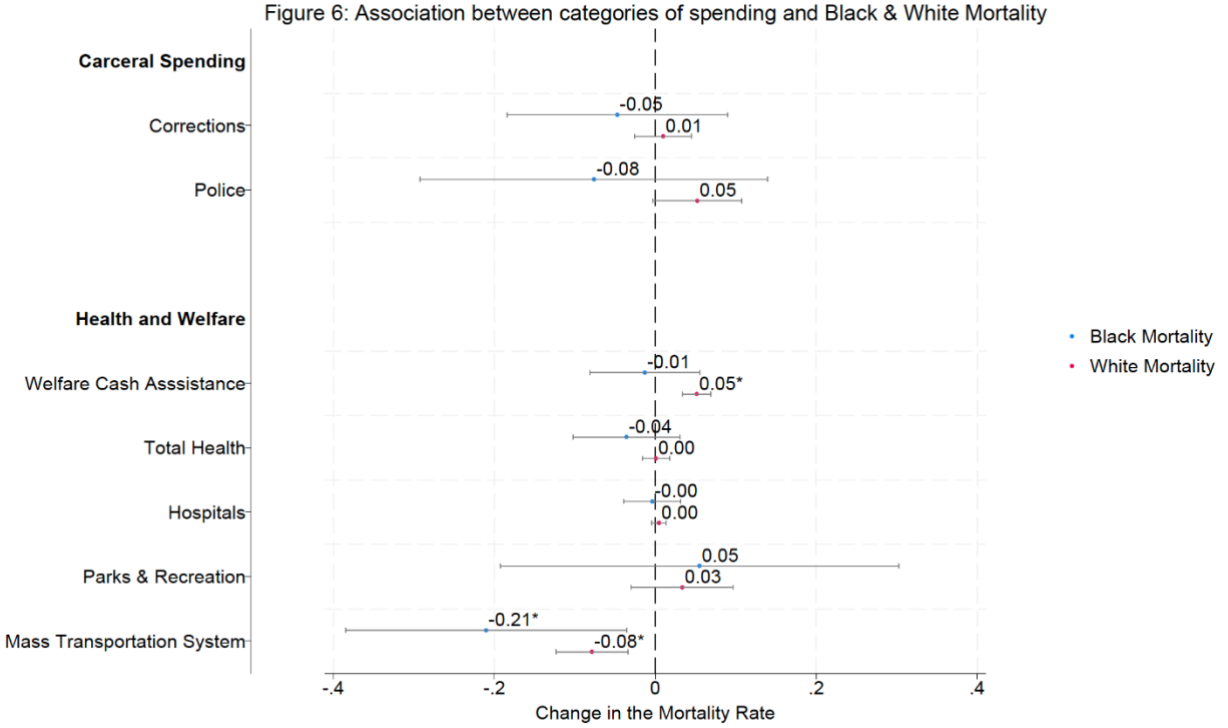
Source: Urban Institute's State and Local Finance Data, Public-use Compressed Mortality Files (CMF) from CDC, Current Population Survey, Census Bureau's Annual Survey of State Government Finances, Local Area Unemployment Statistics (LAUS) program of the Bureau of Labor Statistics (BLS), Kaplan, Jacob. United States Governors 1775-2020. Ann Arbor, MI: Inter-university Consortium for Political and Social Research

Figure 5: Association Between U.S. States Prioritization of Carceral Spending and Mortality by Census Regions



Notes: Linear regression line modeled by predicted age-adjusted Black and White mortality rate at different levels of CRI after adjusting for the fixed effect regression model included in Equation 1. Horizontal dotted lines show 95% confidence intervals based on regression results in Table 2 in supplementary table.
Source: Urban Institute's State and Local Finance Data, Public-use Compressed Mortality Files (CMF) from CDC, Current Population Survey, Census Bureau's Annual Survey of State Government Finances, Local Area Unemployment Statistics (LAUS) program of the Bureau of Labor Statistics (BLS), Kaplan, Jacob. United States Governors 1775-2020. Ann Arbor, MI: Inter-university Consortium for Political and Social Research

Figure 6: Association between categories of spending and Black & White Mortality



Notes: Solid markers show parameter estimates after adjusting for the fixed effect regression model included in Equation 2; horizontal bars show 95 percent confidence intervals 2 based on regression results in Table 3 in supplementary table.

Supplementary Material

Type of Spending Health in Justice (HIJ) Action Lab	Inclusion Criteria of the Health in Justice Action Lab	Breakdown HIJ Action Lab (municipal spending)	Breakdown Urban Institute correspondin g functional code	Description of Urban Institute functional code, based on Classification Manual 2006	Classification Manual 2006 Code	Urban Institute variable name
Carceral	**Any department** in consideration for inclusion in our CRI analysis must have a direct association with one of two things: either the overall population's health and wellbeing or with criminal justice outcomes. The inclusion parameters discussed below were developed with this in mind	Police Departments Investigation and ccountability Boards • Parking Citations & Tickets • Forensics Sheriff's Offices	Police Protection Current Operational Cost (Function Code 62)	Expenditures for general police, sheriff, state police, and other governmental departments that preserve law and order, protect persons and property from illegal acts, and work to prevent, control, investigate, and reduce crime.	Code *62	E088 Police Prot Cur Oper (E62)
		Corrections	Total Correctional Spending	Residential institutions or facilities for the confinement, correction, and rehabilitation of convicted adults, or juveniles adjudicated, delinquent or in need of supervision, and for the detention of adults and juveniles charged with a crime and awaiting trial. Correctional activities other than Federal, state and local residential institutions or facilities, as described under Correctional Institutions. Includes: Probation offices (whether operated by courts or correctional agencies) boards of parole, boards of pardon, and the like; noninstitutional activities such as administration of a correctional agency, training of correctional employees, and nonresidential halfway houses and community corrections centers.	Code *04 + Code *05	E022 Total Correct-Current Operational Cost

Type of Spending Health in Justice (HIJ) Action Lab	usion Criteria of the Health in Justice Action Lab	Breakdown HIJ Action Lab (municipal spending)	Breakdown Urban Institute corresponding functional code	Description of Urban Institute functional code, based on Classification Manual 2006	Classification Manual 2006 Code	Urban Institute variable name
Health	We included these departments because a person's health and access to health care are associated with a reduced likelihood of criminal justice involvement. State Medicaid expansion led to overall improved access to care among older adults and to increased self-reporting of good health status. This is particularly relevant given that justice-involved individuals face high uninsurance rates; Medicaid-expansion under the Affordable Care Act in 2014 led to a 9.7 percent increase in this demographic. Additionally, some of the strongest evidence for investing in public health as a means of crime prevention is through funding substance use treatment, specifically with regards to methadone and buprenorphine	Health and Human Services; Public Health Departments; Disability Services; Elderly Services; Behavioral Health	Health	Provision of services for the conservation and improvement of public health, other than hospital care, and financial support of other governments' health programs.	Code *32	E056 Health Current Operatio n (E32)
			Hospitals	Expenditures related to a government's own hospitals as well as expenditures for the provision of care in other hospitals (public or private). Own hospitals are facilities directly administered by the government, including those operated by public universities. Other expenditures cover the provision of care in other hospitals and support of other public and private hospitals. This function also covers direct payments for acquisition or construction of hospitals (whether or not the government will operate the completed facility) and payments to private corporations that lease and operate government owned hospitals.	Code *36	E062 Own Hospital Cur Oper (E36)
	We included open spaces and parks because they are essential to community gathering. One study found that individuals living near recently- reclaimed vacant lots reported reduced safety concerns and perceptions of criminal activity. Importantly, they also reported significant increases in the use of outdoor spaces for socialization and relaxation. For more reading, Palaces for the People by Eric Klinenberg provides an extended argument in favor of the ways in which access to public space and investments in social infrastructure promote community health and resilience.	Public Spaces; Parks & Recreation	Parks & Recreation	Provision and support of recreational and cultural-scientific facilities maintained for the benefit of residents and visitors.	Code *61	E085 Parks Rec Cur Opere (E61)

Type of Spending Health in Justice (HIJ) Action Lab	usion Criteria of the Health in Justice Action Lab	Breakdown HIJ Action Lab (municipal spending)	Breakdown Urban Institute corresponding functional code	Description of Urban Institute functional code, based on Classification Manual 2006	Classification Manual 2006 Code	Urban Institute variable name
Support Services	We included housing because of its direct relation to criminal justice outcomes, especially in cities with high populations of unhoused individuals who regularly interface with local police. Assisting persons experiencing homelessness through public health program intervention may result in reduced crime rates. In support of this view, several studies illustrate an association between experiencing homelessness and the likelihood of committing a crime. One such study from New York University which conducted longitudinal interviews with persons experiencing both homelessness and mental illness found that psychological symptom severity and homelessness was predictive of an increase in a community's non-violent crime. Similarly, a 2012 study found a positive correlation between the duration of homelessness and the number of times a person had been arrested.	Housing; Neighborhood Development;	Housing and Community Development	Construction, operation, and support of housing and redevelopment projects and other activities to promote or aid public and private housing and community development.	Code *50	E075 Hous Com Cur Oper (E50)
		Utility Assistance	Sewerage	Provision, maintenance, and operation of sanitary and storm sewer systems and sewage disposal and treatment facilities, as well as all intergovernmental payments for such activities.	Code *80	E098 Sewerage Current Oper (E80)
			Water Supply	Operation, maintenance, and construction of public water supply systems, whether for distribution of water to the general public or to other public or private utilities. This function covers government water supply activities for residential, commercial, and industrial water usage.	Code *91	E116 Water Util Cur Pper (E91)
			Electric Power	Operation, maintenance, and construction of public electric power systems, including production, acquisition, and distribution of electricity to general public or to other public or private utilities. This function covers government electric power activities for residential, commercial, and industrial electrical usage.	Code *92	E124 Elec Util Cur Oper (E92)
			Gas Supply	Operation, maintenance, and construction of public natural gas supply systems, including production, acquisition, and distribution of gas to general public or to other public or private utilities. This function covers government gas supply activities for residential, commercial, and industrial gas usage.	Code *93	E128 Gas Util Cur Oper (E93)
			Public Mass Transit Systems	Operation, maintenance, and construction of public mass transit systems, including subways, surface rails, and buses.	Code *68	E094 Welf Cash Cash Assist (E68)

Type of Spending Health in Justice (HIJ) Action Lab	usion Criteria of the Health in Justice Action Lab	Breakdown HIJ Action Lab (municipal spending)	Breakdown Urban Institute corresponding functional code	Description of Urban Institute functional code, based on Classification Manual 2006	Classification Manual 2006 Code	Urban Institute variable name
Additional state-specific categories that fit into either health or social services	These are functional codes specific to the Urban Institute's variable list that fit into support services and/or health categories proposed by the Health in Justice Action Lab		Public Welfare - Federal Categorical Assistance Programs	This function covers expenditures associated with only three Federal programs Supplemental Security Income (SSI) Temporary Assistance for Needy Families (TANF) Medical Assistance Program (Medicaid)	Code *67	E093 Welf Categ Cash Assist (E67)
			Public Welfare - Other Cash Assistance Programs	Cash payments made directly to individuals contingent upon their need, other than those under Federal categorical assistance programs. Includes: Poor relief; general relief; home relief; emergency relief; general assistance; refugee assistance; medical assistance, housing expense relief, energy assistance (e.g., Federal Low Income Home Energy Assistance Program, or LIHEAP), emergency assistance, etc. paid directly to individuals and not to vendors; other direct assistance to needy persons not covered by or eligible for Federal categorical assistance; payments to other governments in support of, or as reimbursement for costs of, these types of assistance programs.	Code *68	E094 Welf Cash Cash Assist (E68)

TABLE 2: FE Regressions of Black and White Mortality; United States, 1980 to 2008

PANEL A: Black Mortality

	Model 1: Northeast Black Mortality	Model 2: Northeast Black Mortality	Model 3: Midwest Black Mortality	Model 4: Midwest Black Mortality	Model 6: South Black Mortality	Model 5: South Black Mortality	Model 7: West Black Mortality	Model 8: West Black Mortality
Carceral Resource Index	184.98+	178.41	-11.81	-44.02	161.32*	136.24*	86.14	124.01
	(102.97)	(110.34)	(73.87)	(79.23)	(38.14)	(32.41)	(98.57)	(102.52)
Average personal income (mean $)		-0.00+		-0.00*		-0.00*		0.00
		(0.00)		(0.00)		(0.00)		(0.00)
Proportion of black population in state		-17.88*		-1.15		-7.91*		-12.77
		(8.48)		(7.43)		(1.69)		(11.65)
Percent of the population under the federal poverty line		-1.79		4.44*		-2.85*		3.01
		(2.55)		(1.53)		(0.92)		(2.55)
Total annual per capita expenditure of each state (total $)		0.01		0.01		-0.02*		-0.00
		(0.01)		(0.01)		(0.00)		(0.00)
Unemployment rate		-6.44		1.19		-3.99*		-15.02*
		(4.51)		(2.78)		(1.48)		(5.65)
Governor's party in the last election (Ref: Democrat)		6.74		-8.60+		3.97		16.73+
Republican		(7.09)		(4.83)		(3.29)		(9.88)
		39.11*		-0.97		13.87		-51.08
other		(18.24)		(15.24)		(17.29)		(34.93)
Constant	824.11*	949.81*	859.37*	801.70*	964.96*	1,338.42*	634.22*	886.97*
	(59.86)	(87.44)	(44.30)	(138.15)	(30.67)	(51.18)	(50.84)	(118.93)
Observations	150	150	250	250	400	400	250	250
R-squared	0.961	0.966	0.885	0.900	0.864	0.907	0.795	0.810

PANEL B: White Mortality

	Model 1: Northeast White mortality	Model 2: Northeast White mortality	Model 3: Midwest White mortality	Model 4: Midwest White mortality	Model 5: South White mortality	Model 6: South White mortality	Model 7: West White mortality	Model 8: West White mortality
Carceral Resource Index	14.50	-18.55	13.44	14.11	54.51*	39.28*	96.88*	62.16*
	(35.53)	(30.43)	(19.63)	(16.58)	(15.15)	(11.97)	(16.82)	(14.71)
Average personal income (mean $)		-0.00*		-0.00*		-0.00*		-0.00*
		(0.00)		(0.00)		(0.00)		(0.00)
Proportion of black population in state		10.51*		-6.71*		-6.19*		-2.73
		(2.34)		(1.56)		(0.62)		(1.67)
Percent of the population under the federal poverty line		0.08		0.41		-0.53		0.17
		(0.70)		(0.32)		(0.34)		(0.37)
Total annual per capita expenditure of each state (total $)		0.00		0.00*		-0.01*		0.00*
		(0.00)		(0.00)		(0.00)		(0.00)
Unemployment rate		-3.59*		-0.30		-2.00*		-0.78
		(1.24)		(0.58)		(0.55)		(0.81)
Governor's party in the last election (Ref: Democrat)		-2.30		0.82		1.53		-0.71
Republican		(1.95)		(1.01)		(1.22)		(1.42)
		-2.99		1.92		0.69		2.54
other		(5.03)		(3.19)		(6.39)		(5.01)
Constant	463.32*	367.33*	490.84*	592.24*	576.51*	774.01*	529.61*	429.99*
	(20.65)	(24.11)	(11.77)	(28.91)	(12.18)	(18.91)	(8.68)	(17.07)
Observations	150	150	250	250	400	400	250	250
R-squared	.975	.986	.977	.987	.932	0.970	.980	

Notes: M1, M3, M5 & M7 regression based on two-way fixed effect models controlling for year and state-fixed effects. M2, M4, M6, M8 regression adds state-level time-varying controls: average personal income, percent of Black population in state, percent of the populations under the federal poverty line, total annual per capita expenditure of each state, unemployment rate, and the governor's party in the last election.

* Indicates statistically significant differences at 95% confidence interval.
Source: Urban Institute's State and Local Finance Data, Public-use Compressed Mortality Files (CMF) from CDC, Current Population Survey, Census Bureau's Annual Survey of State Government Finances, Local Area Unemployment Statistics (LAUS) program of the Bureau of Labor Statistics (BLS), Kaplan, Jacob. United States Governors 1775-2020. Ann Arbor, MI: Inter-university Consortium for Political and Social Research

Table 3: FE Regression of Black and White Mortality by Spending Types; United States, 1980 to 2008

	Model 1 Black Mortality	Model 2 Black Mortality	Model 3 White Mortality	Model 4 White Mortality
Corrections	-0.14*	-0.05	-0.05*	0.01
	(0.06)	(0.07)	(0.02)	(0.02)
Police	-0.23*	-0.08	-0.00	0.05+
	(0.07)	(0.11)	(0.02)	(0.03)
Welfare Cash Assistance	-0.03	-0.01	0.05*	0.05*
	(0.03)	(0.03)	(0.01)	(0.01)
Total health	-0.05	-0.04	-0.01	0.00
	(0.03)	(0.03)	(0.01)	(0.01)
Hospitals	0.02	-0.00	0.02*	0.00
	(0.02)	(0.02)	(0.00)	(0.00)
Parks & Recreation	0.25*	0.05	0.13*	0.03
	(0.11)	(0.13)	(0.03)	(0.03)
Mass Transportation System	-0.35*	-0.21*	-0.19*	-0.08*
Average personal income (mean $)		-0.00*		-0.00*
		(0.00)		(0.00)
Proportion of black population in state		-9.76*		-5.54*
		(2.24)		(0.57)
Percent of the population under the federal poverty line		-1.35		-0.65*
		(0.84)		(0.22)
Total annual per capita expenditure of each state (total $)		0.00		0.00*
		(0.00)		(0.00)
Unemployment rate		-4.72*		-1.79*
		(1.45)		(0.37)
Governor's party in the last election (Ref: Democrat)				
Republican		-0.27		0.97
		(2.98)		(0.76)
other		-3.89		5.21+
		(11.04)		(2.83)
Constant	853.85*	1,147.37*	520.15*	673.79*
	(16.74)	(60.36)	(4.76)	(15.46)
Observations	1,134	1,050	1,134	1,050
R-squared	0.882	0.884	0.960	0.968

Notes: M1, M3, regression based on two-way fixed effect models controlling for year and state-fixed effects. M2, M4, regression adds state-level time-varying controls: average personal income, percent of Black population in state, percent of the populations under the federal poverty line, total annual per capita expenditure of each state, unemployment rate, and the governor's party in the last election.

* Indicates statistically significant differences at 95% confidence interval.

Source: Urban Institute's State and Local Finance Data, Public-use Compressed Mortality Files (CMF) from CDC, Current Population Survey, Census Bureau's Annual Survey of State Government Finances, Local Area Unemployment Statistics (LAUS) program of the Bureau of Labor Statistics (BLS), Kaplan, Jacob. United States Governors 1775-2020. Ann Arbor, MI: Inter-university Consortium for Political and Social Research