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Suppressing the Vote, Suppressing Future Voters: A Multilevel Analysis of Voter Suppression and Black-White Disparities in Life Expectancy and Infant Outcomes

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Suppressing the Vote, Suppressing Future Voters:
A Multilevel Analysis of Voter Suppression and Black-White Disparities in Life Expectancy and Infant Outcomes

A dissertation submitted in partial satisfaction of the requirements for the Degree of Doctor of Philosophy in Community Health Sciences

by

Anna K. Hing

2021

ABSTRACT OF THE DISSERTATION

Suppressing the Vote, Suppressing Future Voters:

A Multilevel Analysis of Voter Suppression and Black-White Disparities in Life Expectancy and Infant Outcomes

by

Anna K. Hing

Doctor of Philosophy in Community Health Sciences

University of California, Los Angeles, 2021

Professor Gilbert C. Gee, Committee Chair

This dissertation examines the differential impact of voter suppression on life expectancy, gestational age, and birth weight by race-ethnicity. Voter suppression, though not typically studied by public health researchers, is a critical part of understanding how racial disparities in health are created, maintained, and even exacerbated. Voting is a civil right, and consequently, it is connected to many aspects of everyday life, especially the social determinants of health. Through its ability to concentrate power and resources, as suggested by Fundamental Cause Theory, voter suppression may impact health. Further, voter suppression and the logics that support it are grounded in the ideology of White Supremacy. While some may argue that the goal of voter suppression is to prevent voter fraud, the outcome is to disenfranchise certain groups of people, often defined by race.

As such, in Aim 1, I first conduct a county-level analysis to investigate whether inequality in voting for Blacks compared to Whites is associated with four social determinants: segregation, income inequality, child poverty, and air pollution. Next, I test the relationships among voter suppression, county social determinants, and life expectancy, investigating whether social determinants mediate or moderate the impact of voting inequality on health. Data include Robert Wood Johnson Foundation County Health Rankings 2019 and Cooperative Congressional Election Survey (CCES) Data from 2008, 2012, and 2016 aggregated to the county-level are used (N=841 counties). I found that voting inequality is associated, at the county-level, with lower air pollution, higher segregation, and higher income inequality. Further, the strength of the association on social determinants varies with the level of voting inequality (none, low, high). Low voting inequality was a significant predictor of higher White life expectancy, but not significantly associated with Black life expectancy, in bivariate models and as covariates were added, but this relationship was attenuated once social determinants were added to the model. While mediation results were not significant, I did observe a significant interaction effect between segregation and voting inequality in bivariate analyses and one of marginal significance when all covariates were added in predicting Black life expectancy. This relationship is complex: when low and no voting inequality interact with segregation, lower life expectancy is predicted, but when high voting inequality interacts with segregation, we observe a protective effect through which higher levels of segregation are associated with higher life expectancy.

In Aim 2, the items from the CCES were used to approximate county-level voter suppression. National Center for Health Statistics Birth Cohort (NCHS) Data was matched to the CCES using county identification codes. Using this multilevel data set, the impact of county-level voter suppression on two birth outcomes, gestational age and birthweight, were tested separately for three Presidential Elections (2008, 2012, and 2016). Voter suppression items included the proportion who had to wait 30 minutes or more to vote, proportion who were unable to vote in general and proportion unable to vote due to reasons such as long lines, loss of absentee ballot, etc. A second set of state-level analyses was conducted which tested the association of state voter identification requirements with birth outcomes. Results for voter suppression items were mixed, with some significant positive and negative associations, as well as many nonsignificant findings. However, when moderation by mother's race was tested, a clear pattern emerged. While not all results were significant, the majority of significant interaction terms suggest that voter suppression has a disparate, negative impact upon birth outcomes for Black infants compared to White infants.

Lastly, Aim 3 investigated the impact of the *Shelby County v. Holder* Supreme Court decision which invalidated Section 5 of the Voting Rights Act, thus removing voting protections in counties with a history of discrimination at the polls. These counties had been required to seek "preclearance" from the Department of Justice for any changes made to their electoral policies. To test the association between this policy decision and birth outcomes, using NCHS data from 2012-2013 and 2016-2017, a difference in differences approach was used to compare infant outcomes in preclearance counties and non-preclearance counties before and after the policy decision. While the policy decision was not significantly associated with birth outcomes once covariates were added in final models, moderation by mother's race was tested. For gestational age, the difference in difference in differences estimate was significant and associated with higher gestational age for Black infants in counties previously covered by preclearance.

Together, the results suggest that to understand the associations of voter suppression on birth outcomes, once must utilize a race conscious approach. To ignore the roles of race and racism in the pathways connecting voter suppression and health would yield an incomplete picture. Thus, voter suppression may be an important piece in understanding the persistence of racial disparities in birth outcomes and moving towards racial equity.

The dissertation of Anna K. Hing is approved.

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Kate Crespi

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Gilbert C. Gee, Committee Chair

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2021

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This dissertation was possible because of the support of so many wonderful people in my life. Thank you to my chair and mentor, Gilbert C. Gee, for challenging me and encouraging my pursuit of this understudied topic. This dissertation would not have been possible without your support and guidance.

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PUBLICATIONS

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2. Bacong, A. M., Nguyen, A.N., **Hing, A. K.** (2020) Making the Invisible Visible: The Role of Public Health Critical Race Praxis in Data Disaggregation of Asian Americans and Pacific Islanders in the Midst of the COVID-19 Pandemic. *AAPI Nexus*.
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Under Review

1. Bacong, A.M., **Hing, A.K**., Morey, B.M., de Castro, A.B., Gee, G.C. Evaluating Contributors to Self-Rated Health Pre-Migration and Post-Migration: Results from the Health of Philippine Emigrants Study. In preparation for submission to *Ethnicity & Health.*

In-Preparation

1. **Hing, A. K.**, Gee, G.C. Voting Inequality and Health: A county-level analysis. In preparation.
2. **Hing, A.K.**, Bacong, A.M., Morey, B.M. Discrimination in the Philippinnes. In preparation.

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CHAPTER 1.

INTRODUCTION AND THEORETICAL FRAMEWORK

Introduction

Besides its intrinsic importance, infant mortality is often used as an indicator of social conditions that impact health. Infant mortality, low birth weight, and preterm birth rates have been used as established indicators of quality of life, especially for the worst-off members of society, as these rates are sensitive to short-term changes in social conditions (Chung & Muntaner, 2006; Conley & Springer, 2001). Social inequalities in education, health care, and income, which are often structured by race-ethnicity, have been found to contribute to infant mortality (Macinko et al., 2004; Ruiz et al., 2015). Unfortunately, racial disparities exist in infant mortality: African Americans experience more than *twice the rate of infant mortality* (11.3 deaths per 1,000 live births) than their White counterparts (4.9 deaths per 1,000 live births) in 2015 (Centers of Disease Control and Prevention, 2020). Reduction of infant mortality disparities is a key objective for Healthy People 2020 (US Department of Health and Human Services, Office of Disease Prevention and Health Promotion, n.d.).

Past research suggests that racism and political empowerment may explain some of the racial disparities in mortality and birth outcomes in the United States (Chae et al., 2018; Geronimus, 1996a; Krieger et al., 2014; LaVeist, 1992; Novak et al., 2017; Williams & Mohammed, 2013). The notion that social circumstances influence infant outcomes is not new. Over two decades ago, LaVeist (1992) found that increasing the share of political power at the city level contributed to reduce infant mortality rates for African Americans. A more recent study by Almond and colleagues found that enactment of the Title VI of the Civil Right Act, which required desegregation of all federally funded institutions, resulted in about 25,000 more Black infants surviving in the 1965-2002 period than had the Act not been implemented (Almond et al., 2006). Moreover, Black infant mortality rates decreased dramatically from 40 per thousand in 1965 to 24 per thousand by 1975. Building upon the idea that infant mortality disparities are responsive to social policies and political engagement, this dissertation proposes to study how voter suppression of Black voters may explain racial disparities in two birth outcome - low birth weight and premature birth, which are key risk factors for infant mortality - and life expectancy.

Disparities in voter turnout are well-documented; in 2016, 59.6% of African Americans voted compared to 65.3% of Whites (Krogstad et al., 2017). In 2020, voting rates were slightly higher with 63% for African Americans and 71% for Whites (Fabina, 2021). Some disparities in voting appear to be due to structural barriers, in the forms of laws and policies at the state and county levels (Hajnal et al., 2017; Parson & McLaughlin, 2007). As compared to 2012, there were an estimated 868 fewer places to vote in 2016 (Fund TCLE 2017). Further, as of 2016, 31 states implemented voter identification laws, with many more laws proposed but not enacted (National Conference of State Legislatures, 2017). Both poll closures and voter identification laws act as obstacles for the more socially vulnerable, such as the poor, elderly, and people of color, to access the vote (Hajnal et al., 2017). The implementation of identification laws has been found to vary with the political party in control and the proportion of minority voters in the state (Hajnal et al., 2017). This ecologic variation among states and counties allows for a national analysis of the relationship between these policies and health.

The goal of this research is to identify the various forms of voter suppression as indicators of structural racism and to determine if a relationship exists between voter suppression and health. Further, this study aims to examine the impact of a specific policy decision, the weakening of the Voting Rights Act through the *Shelby County v. Holder* Supreme Court decision in 2013, on infant birth outcomes. Multilevel logistic regression analyses linking infant, county, and state level data will be used to address this goal.

Literature Review

Voter Suppression

Suppression of the minority vote has manifest in numerous ways throughout the past century (Combs, 2016; Highton, 2017; Parson & McLaughlin, 2007; White et al., 2015). First, a common form of voter suppression is the use of *voter identification laws*, which are state-level policies that regulate the type of identification required to vote. For example, some states require photo identification or a state-issued identification card, while other states require no identification at all (National Conference of State Legislatures, 2017). Nationally, African Americans have driver's licenses at half the rate of Whites, suggesting a much higher burden upon African American voters as compared to White voters to acquire the necessary identification (Parson & McLaughlin, 2007a).

Second, states vary in their allowance of early voting and the *conditions required to vote by mail*. Allowing alternative options, other than voting at a polling place on Election Day, provides voters with more convenient choices (Stern 2016). States that have reduced early voting make it more difficult for the disabled, elderly, and those with little control over their job schedule to vote. Further, reduced early voting may result in longer lines at the polling booths on Election Day.

Third, on Election Day, suppression can occur through the *closing of polling places* and the *reduction in resources* provided to different neighborhoods. In 2016, early voting days and voting on Sundays were cut which “targeted African Americans with almost surgical precision” according to the U.S. Court of Appeals for the 4th Circuit (Stern 2016). These methods can result in confusion at the polls and increased wait times to vote, making it likely that some had to leave before being able to cast their ballot (Fund TLCE 2017). Research has documented that the costs associated with voting reduce voter turnout (Rocha & Matsubayashi, 2014).

Fourth, within institutions, individuals may act in discretionary manners which bias the information and resources provided based on one's race-ethnicity. An audit study of county election officials sent emails inquiring about voting on Election Day prior to the 2012 election to determine if such discrimination exists (White et al., 2015). One email was signed with a White name and the other was signed with a Latino name. Emails from the Latino name were five percent less likely to receive a response and were less likely to contain accurate information about identification requirements as compared to emails from a White name. In the face of changing identification laws and other Election Day policies, the unequal distribution of information could further suppress minority voter turnout.

Although voter suppression manifests in a myriad of ways, to our knowledge, no studies have considered how these multiple forms of voter suppression combine to impact a more distal outcome, such as health.

Disparities in Voter Turnout

Voter turnout varies with many demographic characteristics including, race-ethnicity, age, gender, wealth, education level (Franko et al., 2016), and health status (Pacheco & Fletcher, 2015). For example, the elderly vote at higher rates than other age groups (Bentele & O'Brien, 2013). A recent study using the Cooperative Congressional Election Study (CCES) data from 2006 to 2014 found that voter identification policies reduced turnout for racial-ethnic minorities in primary and in general elections (Hajnal et al., 2017). Such policies may diminish turnout in two manners: both directly, through the actual inability of voters to cast a ballot due to more stringent requirements, and indirectly, as voters may choose not to try to vote, even if they can, because they feel targeted, intimidated, or unwelcome at the polls (Hajnal et al., 2017; Highton, 2017). Although one study found that voter identification policies limited voter turnout for people of color, previous studies have been equivocal in their results, finding both null and negative results (Alvarez et al., 2008; Highton, 2017; Rocha & Matsubayashi, 2014). However, as previous studies did not disaggregate results for Black or Hispanic voters, it is possible the effects of voter identification laws vary by racial-ethnic group and that more disaggregated data would allow for examination of these differences (Highton, 2017).

Voter Suppression as Structural Racism

Harrell (2000) defines racism, structurally, as " a system of dominance, power, and privilege based on racial designations, rooted in the historical oppression of a group defined or perceived by dominant-group members as inferior, deviant, undesirable; and occurring in circumstances where members of the dominant group create or accept their societal privilege by maintaining structures, ideology, values, and behavior that have the intent or effect of leaving non-dominant-group members relatively excluded from power, esteem, status, and/or equal access to societal resources" (43). This definition harkens to the disenfranchisement created and maintained by structural racism; with voter suppression policies, one can begin to understand how voting becomes a privilege, instead of a right, possessed only by the dominant racial group.

Commonly studied forms of structural racism are residential segregation (Acevedo-Garcia et al., 2003; Gee & Ford, 2011; Viruell-Fuentes, 2007; Williams & Collins, 2016), immigration policy and citizenship (Armenta, 2017; Gee & Ford, 2011b; Philbin et al., 2018; Viruell-Fuentes, 2007; Viruell-Fuentes et al., 2012), and the criminal justice system and incarceration (Alexander et al., 2012; Wildeman & Wang, 2017). Voter suppression may be a form of structural racism in that it manifests through institutions and is supported by ideologies of White supremacy. Just as immigration policy has been used to define Whiteness (Gee & Ford, 2011), so too has voting policy been used to delineate who is White and deserves the privileges associated with Whiteness. Thus, it is possible that the anti-minority voter climate that such exclusion creates, just as the anti-immigrant climate, may produce more experiences of discrimination for people of color (Gee & Ford 2011).

Racism operates as a system, its whole reinforces its parts and their effects (Reskin, 2012). Voter suppression is part of the larger system to reinforce discrimination in other domains by shaping one's environment, resources, political power, and social capital. Further, voter suppression would be a pernicious form of structural racism in that has the ability to impact many known social determinants of health, including education and schools, housing policies and quality, health care policy, and community conditions. Although some voting policies that disproportionately impact people of color may not be explicitly malevolent, many voting policies have been introduced to disenfranchise people of color (Bentele & O'Brien, 2013). For example, voter identification laws may be proposed in order to address voter fraud; however, some argue that reports of voter fraud are rare and far from the magnitude that would require such extensive prevention measures (Bentele & O'Brien, 2013). The proposal of such identification policies is consistent with a symbolic racism perspective (Sears, 1988). Symbolic racism suggests that contemporary racism has taken a more covert form than the more explicit discrimination of the past. Though policies appear race-neutral they may act to protect Whites' privileged position in society (Sears & Jessor, 1996). Thus, although identification laws are meant to stamp out voter fraud, they may actually preserve voting as a privilege for Whites. Supposing this is the case, then it follows that voter suppression policies may advantage White health in addition to harming Black health. However, it is also possible that voting regulation policies are necessary to eliminate voter fraud and that these policies are enacted to protect democracy and without malicious intent.

Researchers have found that states with larger populations of African Americans tend to make it more difficult for African Americans to vote (Bentele & O'Brien, 2013), have lower average rates of Black voter turnout, and are more likely to have race-related election lawsuits filed under the Voting Rights Act (Acharya et al., 2016). This relationship between the African American population and suppressive policies may not be coincidental. Contemporary forms of voter suppression have evolved from racist laws associated with slavery and the Jim Crow era (Acharya et al., 2016). The Voting Rights Act in 1965 was passed as a solution to the centuries of disenfranchisement faced by African Americans in the United States with the goal to remedy the history of slavery, Black codes, and Jim Crow laws (Acharya et al., 2016). Even with institutional change, some suggest that pre-VRA voter suppression policies created a racial climate shaped by the expectation that Blacks should not vote, which may alter future voting behavior (Acharya et al., 2016). Thus, it is possible that voter suppressive policies may have lasting effects beyond the years in which they are enforced. The Act's weakening in 2013 signifies a reversal towards those unjust policies. More research is needed to determine the extent of which historic suppression is related to contemporary suppression.

In consideration of the above framing of voter suppression as a potential form of racism, this dissertation will address the call towards a more structural interpretation of racism (Bonilla-

Silva, 1997). Bonilla Silva (1997) argues that “racism is ultimately viewed as a psychological phenomenon to be examined at the individual level” and that this paradigm has shaped current research on racism, which is problematic as it places the blame on the individual instead of on society. Because the individual level of racism is often prioritized, the measurement of racism often occurs at the microlevel by assessing individual’s perceptions of experiences of racism through traditional survey methods. These methods often miss the ambiguous, less intentional, though still pernicious forms of structural racism; thus, area-level measures of racism are required that transcend self-report and capture the climate of racism within a given geographic area (Chae et al., 2018).

Structural Racism and Health

Racism is a fundamental cause of disease, meaning that it is linked to multiple health outcomes through multiple mechanisms that reproduce and endure over time (Phelan & Link, 2015). Because of this role as a fundamental cause, structural racism can exist upstream of known social determinants of health, such as poverty, environmental pollutants, and exposure to unsafe work conditions, influencing the impact of these social determinants on health unequally (Gee & Ford, 2011b). Structural racism may also restrict access to health promoting factors for people of color (Wallace et al., 2015). Racial disparities in life expectancy exist even when factors such as health care access, socioeconomic status, and other resources are considered and persist over time (Phelan & Link, 2015). Structural racism in its many forms, from segregation (Williams & Collins, 2016), immigration policies (Viruell-Fuentes et al., 2012), incarceration (Schnittker et al., 2011), and access to health care (J. Feagin & Bennefield, 2014), has been linked to poorer health outcomes (Gee & Ford, 2011b; Williams & Mohammed, 2009).

Structural racism in the United States, as operationalized through state-level racial inequity in educational attainment, median household income, imprisonment, juvenile custody, immigration policy, and political participation, has specifically been associated with infant mortality (LaVeist, 1992; Novak et al., 2017; Wallace et al., 2015).

If we suppose that racism functions as a tool to maintain privilege and control resources, then it follows that racism could produce unequal resource distribution, ultimately creating health disparities (Bailey et al., 2017a). Structural racism, through its existence across multiple political, social, and economic domains shapes life chances (or extinguishes those chances) and may harm the health of minority groups while augmenting the health of Whites (Lukachko et al., 2014). For example, Lukachko and colleagues (2014) found that structural racism, measured across four domains of political participation, employment, educational attainment, and judicial treatment, negatively impacted the health of Blacks, specifically the odds of myocardial infarction. Blacks living in states with higher levels of structural racism were more likely to report past-year myocardial infarction than Blacks living in low-structural racism states. In comparison, Whites living in states with high levels of structural racism against Blacks reported lower prevalence of myocardial infarction than Whites living in low-structural racism states. Additionally, Wallace and colleagues (2015) found a significant positive relationship between structural racism in employment and education sectors and infant mortality for Blacks, but found no relationship between any state-level measures of structural racism and infant mortality for Whites. Further, structural racism and discrimination may have transgenerational impacts on health, thus allowing inequalities to reproduce across time and generations (Goosby & Heidbrink, 2013).

Thus, voter suppression may be a mechanism of structural racism that influences health and evolves over time. For example, even with the passing of the Civil Rights Act 1968 and the outlawing of discrimination at the polls through the Voting Rights Act, new, more subtle forms of voter suppression manifest to disenfranchise voters of color. These new methods of voter suppression, such as the requirement of voter identification, appear to be colorblind and become normalized and hidden even as their operation endures. This disenfranchisement may be one cause of racial health disparities.

Racial Disparities in Life Expectancy

Life expectancy, the estimated age of death for a given population, was chosen as an outcome because it has been used as an indicator of overall well-being (Clarke et al., 2010). Rather than being an indicator of an individual, it captures societal conditions, including how well a society takes care of its citizens. By examining differences in life expectancy by race, we can begin to understand how living in a racialized society gets under the skin and steals years of life from people of color. While life expectancy has generally continued to increase, the magnitude and rate improvement is not the same for all racial groups (Harper et al., 2012). Further, those additional years of life are not necessarily filled with good health. In 2014, overall life expectancy was 78.8 years, but Black life expectancy was 3.4 years less than Whites (Riddell et al., 2018). The Black/White gap in life expectancy in the United States is a function of state level variation in racial group distribution and individual state-specific gaps, thus reflecting state differences in health care access and economic conditions (Harper et al., 2012). Overall, from 1990-2009, we have observed a decrease in the Black/White life expectancy gap (Harper et al., 2012), yet the gap has persisted. Further, as a result of the COVID-19 pandemic, it is estimated that the gap has increased, with Black life expectancy decreasing 2.1 years (Andrasfay & Goldman, 2021).

Risk Factors for Life Expectancy

Life expectancy can be shortened by a number of factors. Life expectancy generally increases when mortality for infants and those at young ages improves through access to medical care and reductions in infectious disease (Beltrán-Sánchez et al., 2015). Further, declines in death due to chronic disease may also lead to increases in life expectancy (Beltrán-Sánchez et al., 2015). Life expectancy is generally higher for those with more education compared to those with less, and for Whites compared to racial minorities. The largest contributor to the Black/White life expectancy gap for males, in a study conducted in Wisconsin using data from 1999-2016, was homicide, followed by heart disease and cancer (Roberts et al., 2019). For females, heart disease and cancer were the leading contributors to the gap. In 2009, Wisconsin had the larger gap for males of any state, with a difference of 8.2 years (Roberts et al., 2019); for comparison, the gap for females is 6.7 years. The life expectancy gap varies by states, though, and is partially a product of state-level policies that regulate things such as tobacco and alcohol sales, nutrition and physical activity, and vehicle emissions (Riddell et al., 2018).

Most relevant to this dissertation is that of the contribution of racism to the Black/White life expectancy gap. If we consider cumulative disadvantage theory, we can begin to understand how discrimination experienced by people of color over their life course will widen with age, resulting in disparities in life expectancy (Harper et al., 2012). However, no quantitative studies named or tested structural racism as a key contributor to the Black/White life expectancy gap. Theoretically though, some have begun to identify the mechanisms through which racism should influence age of death using life course theory (Gee et al., 2012) and other perspectives attending to socially created inequities, such as notions of embodiment (Krieger, 2016). Yes, cardiovascular disease, cancer, and non-communicable diseases contribute to shortened life expectancy, but the disproportionate burden of these illnesses on Black people compared to Whites is not just happenstance but is a function of the central role of racism in American society (Gee et al., 2012). Life expectancy is not just a function of biology, but of social structures. As such, we must attend to the primary contribution of racism to the sustained Black/White gap in life expectancy.

Given the temporal lag through which social determinants and racism influence life expectancy, the examination of the link between racism and life expectancy must account for this timing. Thus, when examined in this dissertation, life expectancy in 2019 is mapped onto the cumulative experience of disenfranchisement in 2008, 2012, and 2016 to account for the latency period between exposure and the appearance of disease (Gee et al., 2012). This latency period could be even longer than the scope of the study, as the latency period for exposure to discrimination is hypothesized to be even longer for physical health outcomes compared to mental health outcomes (Gee et al., 2012).

Racial Disparities in Infant Outcomes

African Americans experience twice the rate of infant mortality as Whites (Centers of Disease Control and Prevention, 2020). Not only has this disparity in infant mortality persisted for African Americans, but the gap expanded from 1.6 times the rate of Whites in the 1950s to 2.4 times that of Whites in 2005 (Collins Jr & David, 2009). Some have reported that Black women are also *twice as likely to deliver a preterm baby* (<37 weeks gestation) and *three times* *more likely to deliver a low birth weight* (<2500 g, LBW) infant as compared to Whites (Hauck et al., 2011). Black infants are 3.9 times more likely to die from disorders related to short gestation than White infant (Collins Jr & David, 2009). Very low birth weight (<1500 g, VLBW), which accounts for more than half of infant deaths, has been increasing among African Americans (Collins Jr & David, 2009). Racial disparities persist even with higher socioeconomic success; for example, among women who receive adequate prenatal care, college-educated Black women are two times more likely to give birth to a low birth weight infant than college-educated White women (Collins Jr & David, 2009). Even when accounting for known risk factors such as quality of pre- and postnatal care, maternal comorbidities, parity, age, and social factors such as socioeconomic status and health behaviors, these racial inequities in birth outcomes persist (Larrabee Sonderlund et al., 2021). These disparities are not due to genetic variation in race, but are produced by social conditions within the United States (Collins Jr & David, 2009). Specifically, we might attribute this persistent disparity to racism inherent in American society which acts as a chronic source of psychosocial stress which afflicts women of color and contributes to worse birth outcomes (Larrabee Sonderlund et al., 2021).

Risk Factors for Low Birth Weight and Preterm Births

Major biologic determinants of infant mortality are LBW and preterm birth. Both of these can develop from a number of factors. Mother's age, parity, poor prenatal care, cigarette use, alcohol use, and drug use are all associated with poor birth outcomes (Centers of Disease Control and Prevention, 2020). The effect of mother's age on infant outcomes is modified by race; importantly, the effect of race is not biological but grounded in exposure to stressors that are patterned by racism (Geronimus, 1996). Women who were themselves classified as LBW when they were born are of greater risk of delivering an LBW infant (Collins Jr & David, 2009). Further, allostatic load has been found to be a key risk factor for these two adverse birth outcomes, as well as connected to preeclampsia and other pregnancy complications (Larrabee Sonderlund et al., 2021).

Poor infant outcomes are also influenced by social determinants. Risk of poor birth outcomes decreases with increasing socioeconomic status, such as income and education, although these effects differ in magnitude by race (Goza et al., 2007). The cumulative wear and tear (weathering) from social inequality on the body is a racialized phenomenon that has consequences for reproduction (Geronimus 1996). Exposure to stressors, such as interpersonal discrimination, is an additional risk factor for very low birth weight that is especially relevant to the dissertation at hand (Collins Jr & David, 2009; Geronimus, 1996; Lauderdale, 2006; Novak et al., 2017). Discrimination is an established risk factor for adverse birth outcomes and a driver of racial disparities in birth outcomes (Larrabee Sonderlund, Schoenthaler, & Thilsing 2021). To truly understand the risk of preterm birth associated with discrimination, we should look to three prospective cohort studies. The first found that an experience of discrimination was associated with a 40% increased risk of preterm birth (Dole et al., 2003), and a follow up study found that this risk jumped to 80% for Black women who experienced high levels of racial discrimination (Dole et al., 2004)). The third found that the odds of experiencing preterm birth for women who reported discrimination in three or more situations were 205% higher compared to women who had experienced no discrimination (Mustillo et al., 2004). Case-control studies echo these results (Larrabee Sonderlund et al., 2021).

Experience of discrimination are also linked to low birth weight (Larrabee Sonderlund et al., 2021). One study suggests that discrimination interacts with other risk factors of high parity, poor prenatal care, inadequate social support, and alcohol, tobacco, and drug consumption to increase the odds of giving birth to a very low birth weight infant (Collins Jr et al., 2000). Yet another study found evidence of a dose-response relationship between lifetime experiences of discrimination and risk of very low birth weight (Collins Jr et al., 2004). However, other studies have shown null results linking discrimination to adverse birth outcomes (Larrabee Sonderlund et al., 2021). Discrimination may result in poor birth outcomes through its effects on allostatic load (Larrabee Sonderlund et al., 2021).

Pathways Linking Voter Suppression and Poor Infant Outcomes

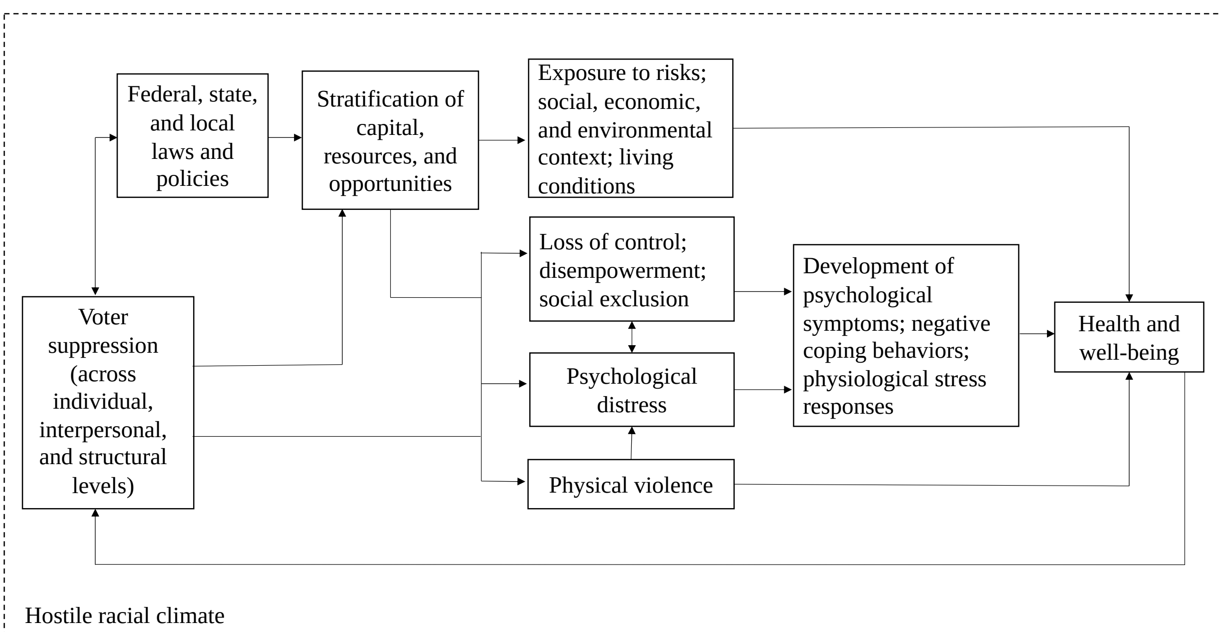
In consideration of the connection between structural racism and health, it is plausible that an association could exist between voter suppression and birth outcomes. The presence of such voter suppression policies may be related to health through several pathways, including stress, social capital, disempowerment, racial discrimination, or structurally, through the policy and laws enacted without all citizen's input.

Theoretical Framework

The proposed framework is situated within the notion that we live and function within a society characterized by racism which produces a hostile racial climate. And, within this racialized society (Hauck et al., 2011), racism structures access to opportunities and resources, social, economic, and political, including civic power (J. R. Feagin, 2012; Jones, 2000). Voter suppression, as a form of structural racism, could distribute power unequally, produce policies across domains which reinforce this inequality, and create unequal resource distribution with direct consequences for health (Bailey et al., 2017; Phelan & Link, 2015). Voter suppression may be especially destructive because of its ability to impact other known social determinants of health. For example, disenfranchised voters cannot advocate for policies that shape their neighborhood schools, affordable housing, or health care (Hanh et al., 2018), consequently reproducing inequity across these domains.

The proposed framework (Figure 1) suggests that voter suppression directly influences the creation of federal, state, and local, laws and policies, which, in turn, determine the distribution of resources across society. At the community level, individuals may act in a suppressive manner to directly impact community allocation of resources; for examples, election officials may choose to close polling places or distribute voting machines, poll workers, or other supplies unequally, stratifying these resources by neighborhoods, districts, or cities (Pettigrew, 2017; White et al., 2015). This stratification of resources and opportunities shapes the context in which individuals and communities exist, including exposure to stressors and environmental risks, with direct consequences for health and well-being.

Figure 1. Voter suppression as a determinant of health and well-being



Next, voter suppression delineates who is allowed to vote and whose voice matters, and symbolically assigns value to voters and non-voters, stigmatizing those who cannot participate in democracy. This stigma may result in feelings of exclusion, psychological distress, vigilance, and rumination, which can result in psychological symptoms, negative coping mechanisms, and somatic manifestations of stress (McEwen, 1998). Additionally, voter suppression may manifest in physical violence. Lastly, it is important to recognize that one's well-being and health can, in turn, reinforce the impacts of voter suppression (Mattila et al., 2013; Rodriguez et al., 2015). Those who are sick may not be able to access the polls, while those who are deceased cannot vote at all. Considering these findings, we may also posit that voter suppression is a form of structural racism that exacerbates health disparities for people of color.

Given the pervasiveness of voter suppression and its influence upon key social determinants of health, there are multiple pathways through which voter suppression may worsen health, as illustrated in Figure 1. First, voter suppression creates individual- and group-level exclusion from democracy, with consequences for the health of both voters and non-voters. Voter suppression policies diminish turnout for voters of color; consequently, these excluded voters cannot influence laws and policies across federal, state, and local levels, which create the social conditions in which they are embedded. A common form of suppression which prevents 2.3% of the voting age population from participating in elections, is felon disenfranchisement laws. These marginalized voters, numbering in the millions, cannot elect representatives to advocate for their interests, leaving their concerns excluded from the public sphere (Phillips & Deckard, 2016). In 2014, 2.3 million African Americans were incarcerated, constituting 34% of the correctional population – but only about 14% of all Americans (National Association for the Advancement of Colored People, 2019). Consequently, this exclusion of incarcerated and previously incarcerated people diminishes the collective power of the African American voting bloc. In fact, historically, felon disenfranchisement laws were produced to restrict the African American vote, with racial disparities in incarceration generating further disparities in voting (Manza & Uggen, 2004). Therefore, policies may be enacted that are disproportionately detrimental to these excluded voters and their community: because the disenfranchised have had their political voice silenced at such a large magnitude to include millions who are disproportionately Black or people of color, the collective voting power of entire racial groups has been reduced. Further, restrictive voting policies limit the ability of already marginalized groups to advocate for laws that align with their concerns across all interests, including health, education, immigration, transportation, and environmental policies (Avery & Peffley, 2005).

Recently, between 2010 and 2016, 22 states that have suppressive voting laws have also proposed or passed restrictive reproductive health laws (Boguhn, 2016). It is possible that this correlation exists because suppressed voters are not able to elect representatives who advocate for their best interests, including their reproductive rights. For example, some states, including Texas, North Carolina, Georgia, and Alabama, participated voter suppression during the 2016 and 2018 elections, including the closing of polling places, performing voter roll purges, requiring burdensome identification, and gerrymandering districts. These same states passed legislation to limit the functionality of abortion clinics which consequently resulted in closure. In the 2018 Georgian gubernatorial race, Brian Kemp, a candidate who also oversaw the state's election as current secretary of state, purged 53,000 people from voter rolls, with 80% being voters of color, and closed 214 polling places over the past 6 years (Berman, 2019). Once in office, Governor Kemp signed a measure prohibiting abortion after six weeks (Berman, 2019). Thus, the reproductive health consequences of voter suppression cannot be ignored: access to reproductive health care and procedures is being limited as a result of voter suppression. Such restrictions to reproductive health care impact people disparately, most likely harming rural, poorer, women of color. With 46.2 maternal deaths per 100,000 live births, Georgia has the highest rate of maternal mortality in the country (Americas Health Rankings, n.d.); and women of color bear a disproportionate burden (Somer et al., 2017). Thus, women of color may be disenfranchised from both civic and medical spaces, with direct consequences to their health and the health of their children.

In a similar manner, voter suppression may also result in the passing of policies that exacerbate climate change, hinder COVID-19 relief distribution, support gun rights, or dismantle social safety net programs, all of which impact health. These suppressive policies serve to create policies that stratify resources, capital, and opportunities by influencing known determinants of health, such as who receives public assistance, which schools receive funding, and how neighborhoods are zoned.

Second, disenfranchisement is tied to one's social position in society; being unable to vote may cause an individual to experience loss of control, disempowerment, or exclusion (Marmot, 2003). Low control is associated with poorer health, including the development of cardiovascular disease and depression (Marmot, 2003). Collectively, the exclusion experienced by members of disenfranchised groups may diminish less tangible resources of social capital and social cohesion, which are known to impact well-being (Blakely et al., 2001; Gilbert & Dean, 2013; Macinko et al., 2004). With reduced social capital, there may be fewer collective and individual resources to buffer against the stress and discrimination encountered through voter suppression. Empowerment has been established to improve health (LaVeist, 1992; M. Marmot, 2007; Wallerstein, 2002); voter suppression could then influence health through disempowerment. For example, 29% of Blacks believe their vote will not be counted compared to only 8% of Whites (Parson & McLaughlin, 2007b). Being unable to vote or feeling as if your vote does not matter may also cause an individual to feel disempowered, therefore harming their well-being.

Third, voter suppression may operate through psychosocial processes to influence health and exacerbate health disparities. For example, voter suppression may contribute to less overt, but still consequential, effects of discrimination that have been linked to psychological distress (Paradies et al., 2008; Williams & Mohammed, 2009). Checks for identification at polls may be more common for voters of color than for White voters (Cobb et al., 2010), such phenomenon contribute to perceived experiences of discrimination and subsequent psychological distress. Interpersonal discrimination, as outlined above, is a risk factor for preterm birth and low birth weight (Larrabee Sonderlund et al., 2021). Over time, the effects of discrimination compound, which can harm health via established stress processes (Paradies et al., 2015; Williams & Mohammed, 2009). Further, during such encounters, people may be unable to determine if differential treatment is motivated by racism or if it is simply coincidental. In fact, the ambiguity of these stressors has been found to be especially pernicious, leading to rumination of the encounter, which prompts increased vigilance in anticipation of future interactions (Hicken et al., 2018; Williams & Mohammed, 2009). Through rumination, an acute stressor may be transformed into a chronic one with negative consequences for cardiovascular, endocrinological, and immunological systems (Brosschot et al., 2005), as well as psychological and emotional distress (Williams & Mohammed, 2009). To alleviate this distress, an individual may engage in negative coping behaviors, such as consuming unhealthy food or drink (Hicken et al., 2018). Stress caused by voter suppression may emerge through physiological processes that contribute to allostatic load, a measure of the ‘wear and tear’ of stressors on the body (Geronimus, 1996b; McEwen, 1998). Further, increased allostatic load may amplify vulnerability to environmental exposures, worsening their negative impacts upon health (Gee & Payne-Sturges, 2004).

Voter suppression and bearing witness to other members of your group being targeted, asked to show identification, and having to fight for their voice to be heard, could be interpreted as a form of vicarious racism, which is experienced indirectly, through seeing or hearing about discriminatory or racist actions towards members of one’s racial group (Chae et al., 2021). Vicarious racism includes racism directed at the entire racial group, not just an individual. Much of the rhetoric around voter suppression is about who is allowed to vote, who is a true American, and whose vote matters. Just as we have seen those in power devalue Black lives, we have also seen them devalue Black votes. Observing this devaluation as a Black voter, then, may be toxic to your health. Vicarious racism has been linked to poor mental health, psychosocial stress, maladaptive coping behaviors, physiologic dysregulation (Chae et al., 2021).

Stress, both acute and chronic, is an important contributor to infant mortality and prematurity (Hauck et al., 2011). In the six months following September 11, 2001, which resulted in documented increases of discrimination towards Arabs, Arabic-named women experienced higher risk for poor birth outcomes as compared to the same period one-year earlier(Lauderdale, 2006). More recently, Immigration and Customs Enforcement (ICE) raids have been linked to worse birth outcomes, including birth weight and preterm birth, for Latina women, both immigrant and U.S. born, in Iowa, demonstrating how the stress of these racialized policies harms the health of future generations (Novak et al., 2017).

Fourth, biological mechanisms link perinatal stress to infant prematurity and low birth weight. Voter suppression may influence infant outcomes through *stress pathways*, with the mechanisms outlined above stratifying resources women have to cope with this stress. Additionally, pregnancy is *a critical period*, in which changes in stress could have magnified consequences for both mother and fetus (Ben-Shlomo & Kuh, 2002). When pregnant women experience stress, neuropeptide corticotrophin-releasing hormone (CRH) increases in their placenta; higher levels of CRH may prompt early labor, causing low birth weight or preterm birth and increased risk for mortality (Lauderdale, 2006). Even if a woman does not experience suppression directly, she may empathize with group members who are experiencing this stressor, indirectly taxing herself and her child. Further, barriers to voting are racialized and reflect a history of disenfranchisement of people of color before the passing of the Civil Rights Act. These contemporary injustices may cause women to ruminate upon past civil rights injustices experienced by their racial group, with suppression acting as a more chronic stressor. This study will be the first to our knowledge to investigate whether voter suppression is associated with higher risk for low birth weight and premature birth.

Fifth, voter suppression may manifest as physical violence and hate crimes. In 2016, 53 electoral violence events were reported leading up to the Presidential Election (Araida 2015). This violence could result in immediate injuries or even loss of life. Voter suppression polices may also have secondary effects on health. For example, when waiting to vote, one may stand in line in extreme heat for long hours; such experiences could contribute to health problems, including asthma attacks and heat stroke.

Sixth, we must consider how health disparities can, in turn, reinforce voter suppression and voting disparities. For example, the premature mortality experienced by African Americans translated into one million Black votes lost in the 2004 Presidential Election (Rodriguez et al., 2015). Additionally, we know that those who are less healthy are less likely to vote (Mattila et al., 2013). Therefore, the voices of voters with poor health are silenced, and the health disparities they experience may be exacerbated because those who can most speak to the flaws in the system cannot assert their agency to change the system. Not only does voter suppression cause poor health, but this poor health results in further suppression of potential voters and voices.

Seventh, these processes outlined above are situated within a hostile racial climate. This climate is driven by structural stigma, which consists of "societal conditions, cultural norms, institutional policies, and practices that constrain the opportunities, resources, and wellbeing of the stigmatized" (Hatzenbuehler & Link, 2014, p. 2). Voter suppression symbolically and literally delineates who can and cannot vote, creating stigma for those who cannot. These negative messages could also be accepted by the individual as true, operating as internalized racism, which has been associated with increased metabolic risk, cortisol secretion, and depressive symptoms (Mouzon & McLean, 2017).

Disregard for voters of color may be a symptom of a hostile racial climate that chronically stresses minority voters. Pettigrew found that the extended wait times for minority voters in the 2016 presidential election was due to the *systematic prioritizing of resources*, such as assigning polling officials and voting machines, to primarily White precincts over primarily minority precincts (Pettigrew, 2017). In the most recent 2020 Presidential Election, it was also found that wait times were higher in poor and racial minority neighborhoods (Quealy & Parlapiano, 2021). The 2016 Presidential Election was the first since the weakening of the VRA in 2013 through which full protection of the Act was not implemented. This event provides the opportunity to examine the effects of this policy change on health. Specifically, the preclearance mandate, which required Congress to approve all changes to election policies in counties with a history of voter discrimination, was repealed. As a result, the 2016 election saw 868 fewer polling places available in counties that were previously covered under the preclearance mandate (Pettigrew, 2017). Fewer polling places may have made it more difficult to vote; in counties with reduced polling places, long wait times were reported (National Conference of State Legislatures 2017). In the 2016 Election, voters of color waited almost twice as long to vote as Whites; African Americans, in particular, waited an average of 25 minutes, while White voters waited only 11 minutes (Pettigrew 2017). The repeal of the VRA’s preclearance mandate, which was originally enacted to prevent discrimination, disproportionately impacted people of color through reduced regulation of electoral policies, which may allow for implicit biases to influence policy decisions. Further, the repeal for socially vulnerable voters may act as an acute stressor, which could result in negative health outcomes.

Living in a community characterized by high levels of prejudice has also been associated with increased mortality for U.S.-born people of Asian and Hispanic descent (Morey et al., 2018). Therefore, living in a society characterized by racial prejudice, as indicated by racial disparities in voting created by voter suppression, constitutes a chronic stressor which could subsequently intensify racial health disparities. Thus, many possible mechanisms across multiple levels of influence link voter suppression to health.

Similarly, existing in a climate of prejudice and discrimination in which minority group members are targeted may act as an acute stressor influencing infant health, as occurred for pregnant Arab-named women in the six months following September 11, 2011 (Lauderdale, 2006). The repeal of Section 5 could result in less regulation of election day activities; this deregulation could cause voters stress because they may need to find a new polling place, wait in a longer line, navigate new voter registration, and cope with negative messages about one’s racial group. This stress could also tax pregnant women, resulting in worse health for them and their newborns. Additionally, polling places were more often closed in racial minority neighborhoods, creating “poll deserts” for minority voters. The reduction of voting resources in primarily minority areas may be a reflection of a larger trend of disinvestment of public resources to minority neighborhoods. This combination of stressors could overload women of. color, “weathering” them (Geronimus, 1996) and resulting in increased risk of poor birth outcomes.

While this framework has focused primarily upon the effects of national elections and state policies, the effects of suppression on local elections and outcomes is no less significant. Although state-level policies do influence voter turnout and access to the vote, these policies may be differentially applied within the local context (Geronimus, 1996). For example, counties may respond differently to state-level decreases in election funds – some counties may close polling places while others may cut staffing or other resources. Further, the results of local elections, compared to federal elections, may more directly shape the social and environmental conditions in which one lives - including school quality, policing, public works, public transit, and sanctuary city status.

Critical Race Theory and Public Health Critical Race Praxis. Given the framing of voter suppression as a form of structural racism, a Public Health Critical Race Praxis (PHCRP) lens (Ford & Airhihenbuwa, 2010b), which draws from Critical Race Theory (CRT) to apply those concepts to public health and its practice, can be used as a theoretical methodology through which to interrogate the connections among voter suppression, racism, and health. CRT should be used to break down the power hierarchies that produce inequities. Disenfranchisement is a direct attack on power and a method through which whole groups of people, based on race, are shut out from that power. Thus, CRT has consequences for both research and action.

Knowledge production is core to CRT and PHCRP, as both provide a lexicon and concepts through which to understand contemporary forms of racism and how their operation influences health. Key concepts of CRT and PHCRP include the need to be race conscious, the ordinariness of race, the primacy of racialization, the contemporary mechanisms of racism, and structural determinism (Ford & Airhihenbuwa, 2010a, 2010b). These concepts apply to both the theoretical research question itself and the methods through which the question is addressed. Race consciousness demands that race be accounted for so that one can understand the ways in which the deployment of race contributes to inequities (Ford & Airhihenbuwa, 2010a). Because of the racialized context in which people live and the social construction of racism, racial groups experience their social context differently. For voting rights, then, we must consider how voter suppression policies differentially impact people by race, not just recognizing the disparities, but also examining the mechanisms that drive these racial disparities in voting. By attending to the ordinariness of race, one recognizes that racism is integral, not abnormal, to the functioning of society. When applied to voter suppression, one can see how disenfranchisement functions to uphold power inequities by race in the civic sphere in support of White Supremacy. Further, due to this ordinariness, racial minorities encounter racism daily, across many forms, and may cope with this exposure in various ways, impacting their health. Sometimes these coping strategies may result in health outcomes counter to what might be expected. The call to recognize contemporary mechanisms of racism harkens to the ability of racism to evolve across time and contexts. Consequently, the form of voter suppression has changed over time. Before 1965 and the Civil Rights Act, voter suppression was more overt and took the form of poll taxes, literacy tests, and outright violence. Today, voter suppression has taken a more subtle, though no less impactful, form through voter identification laws, the closing of polling places, and gerrymandering. Thus, to measure the impact of contemporary voter suppression, our conceptualization and measurement must attend to these changes in form. Thus, this study seeks to operationalize voter suppression using the most common forms of contemporary voter suppression to assess how they may differentially impact health by racial group.

The primacy of racialization suggests that stratification by race fundamentally contributes to societal inequities and that misspecification of these inequities being due to race instead of racism hinders our understanding of the mechanisms perpetuating inequities (Ford & Airhihenbuwa, 2010b). In considering voter suppression, we must be vigilant to not attribute difference in voting rates to racial preferences or a racial propensity against voting. Rather, we must understand different behavior by racial groups within a context of racialization, to determine how societal inequities in other domains perpetuate inequities in the voting booth.

Next, race consciousness also asks that the researcher interrogate their own social position due to their race and other social advantages. As a researcher of mixed Asian-White descent, I have largely been protected from the negative impacts of voter suppression. However, as a researcher guided by the pursuit of equity, I will use my privilege to produce research that supports the goals of Critical Race Theory: "to move beyond merely documenting health inequities toward understanding and challenging the power hierarchies that undergird them" (Ford & Airhihenbuwa, 2010b, p. 1390).

Lastly, structural determinism is an essential concept which informed the creation of the research questions at hand. Structural determinism highlights "the fundamental role of macro-level forces driving and sustaining inequities across time and contexts; *the tendency of dominant group members and institutions to make decision or take actions that preserve existing power hierarchies*" (Ford & Airhihenbuwa, 2010b, p. 1394). That last point, that those in power will take actions that ensure the preservation of existing power hierarchies, is critical for understanding why voter suppression measures disproportionately target Black voters and how voter suppression furthers White Supremacy, both in ideology and in practice. Voter suppression concentrates resources for those in power by concentrating civic power itself. Consequently, those in power continue to write the rules of society that advantage them, which sustains and even exacerbates inequities across time. Thus, analysis of voter suppression is truly about understanding one mechanism that allows White Supremacy to persist, to evolve, and to resist intervention. Given this, we must operationalize those power inequities by examining racial disparities in voter turnout. Further, we can examine specific policy decisions and laws, such as Preclearance or voter identification requirements, to unpack how they operate to preserve existing power hierarchies. By studying voter suppression and its health impacts, I hope to find solutions to intervene upon one manner through which White Supremacy reproduces itself across time and space.

Counter arguments. Of course, the link between voter suppression and birth outcomes could be spurious. Perhaps, a period effect from a natural disaster or event that coincides with counties that also have higher levels of voter suppression could impact infant health and skew results. Alternatively, there could exist a unique feature of a candidate and their campaign that could have a specific impact upon one's health. For example, after the 2016 election, the media reported a phenomenon of "post-election stress disorder," which consists of anxiety and depression as a result of the election (Gold 2017). This post-election stress disorder could impact all pregnant women, regardless of their racial identity; thus, we could expect to see a general increase in preterm birth and low birth weight infants across all racial groups after the 2016 election. As a result, the effects of voter suppression during this election as compared to the effects of the election results as an acute stressor would be difficult to disentangle. However, if voter suppression still influences primarily women of color, we should still see a higher level of stress and negative birth outcomes for them.

Other socioeconomic characteristics such as income and education have also been associated with voter turnout (Franko et al., 2016). Perhaps differences appear to be correlated with race, but are actually driven by socioeconomic status. However, race and socioeconomic status are entangled, as a product of racial capitalism. While we can control for socioeconomic status, we must recognize this is connected. As voting rates vary with health, it is possible that we will observe an association between political participation and health but that the causal path is reversed so that health status actually predicts voting behavior (Pacheco & Fletcher, 2015).

Voter turnout is also impacted by contextual factors regarding each election; for example, turnout increases when elections are close (Blais, 2006). If an election were close, it could be that the stress of the unknown outcome, rather than stress related to voter suppression, that could negatively impact health.

Reduced resources in a county may drive closures in polling places. For example, shortened hours for early voting or more restrictions on vote-by-mail options may be implemented because funding and staff are unavailable to support these efforts. Perhaps, fewer resources for election correlates with fewer resources for other county-level social supports. If a county is understaffed and underfunded, it is possible that roads may need to be repaired, streetlights could be broken, and schools may be under-resourced. In such a situation, the stress of living in such an environment may be harming one's health and voter suppression may not exist, rather poor health results from living in a resource-strapped neighborhood or county.

As voter suppression policies may be a symptom of a hostile racial climate, it may be difficult to disentangle the effects of the general anti-immigrant, racist discourse that often arises during election campaigns from the effect of experiencing actual voter suppression. Thus, potential scenarios exist in which an apparent pathway between voter suppression and infant health may be spurious.

Research Aims and Hypotheses

See Table 1 for overview of aims, data, measures, levels, and statistical methods.

Table 1. Overview of data, measures, and methods for each specific aim.

AIM	OUTCOME	KEY MEASURES		DATA	STATISTICAL METHODS
	Item	**Item**	**Level**		
1	Life expectancy	Voting inequality	County	CCES 2008, 2012, 2016 RWJF County Health Rankings 2019	Linear regression
2	Low birth weight and gestational age	Birth weight and gestational age	Infant	NCHS Linked Birth/Infant Death Files 2008-2009, 2012-2013, 2015-2016	Mixed regression analyses
		Intimidation at polls	County	CCES 2016	
		Wait times		CCES 2008, 2012, 2016	
		Unable to vote			
		Unable to vote because line was too long			
		Unable to vote because requested but did not receive absentee ballot			
		Unable to vote but tried			
		County covariates		American Community Survey 2008, 2012, 2016	
		Voter Identification Laws	State	NCSL 2008, 2012, 2016	
		State covariates		American Community Survey 2008, 2012, 2016	
3	Low birth weight and gestational age	Birth weight and gestational age	Infant	NCHS Linked Birth/Infant Death Files 2012-2013, 2015-2016	Difference in difference in difference with mixed regression analyses
		Preclearance	County	Department of Justice Jurisdictions Previously Covered by Preclearance	
		County covariates		U.S. Census Bureau	
		State covariates	State		

AIM 1: Investigate if racial inequality in voter turnout is associated with worse health outcomes.

Differences in voter turnout between Black and White voters, operationalized as voter inequality, will be examined in relation to both social determinants of health and life expectancy.

H1a: At the county-level, higher racial inequality in political participation will be associated with worse determinants of health.

H1b: At the county-level, higher racial inequality in political participation will be associated with worse health.

H1c: The effects of voting inequality on life expectancy will be mediated by social determinants.

H1d: The effects of voting inequality on life expectancy will be moderated by social determinants.

AIM 2: Determine if voter suppression explains observed racial health disparities in infant outcomes.

I will analyze the relationship between our voter suppression measures and infant outcomes to test the following hypotheses:

H2a: Voter suppression is associated with higher risk of low birth weight and lower gestational age.

H2b: The effect of voter suppression on infant outcomes will be modified by race, such that the effect of voter suppression will be stronger for Blacks as compared to Whites.

AIM 3: Examine the effect of the dismantling of the significant civil rights legislation of the Voting Rights Act, specifically the Section 5 preclearance requirement, on infant outcomes.

H3a: The weakening of the Voting Rights Act will be associated with worse infant outcomes.

H3b: The influence of the Voting Rights Act on infant outcomes will be modified by race, such that the effect will be stronger for Blacks as compared to Whites.

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Chapter 2.

Aim 1

Introduction

The intended effect of voter suppression is to disenfranchise a specific group of voters, whether based on race-ethnicity, gender, political ideology, or other characteristics. Barriers to voting and civic participation disproportionately impact people of color and may prevent them from casting a ballot (Hajnal et al., 2017). Thus, if voter suppression is effective, the consequence would be an observed disparity in voter turnout between the group that was targeted by suppression (e.g., Blacks) and the group that was not (e.g., Whites). While socioeconomic inequality in voting has been associated with higher risk of poor health (Blakely et al., 2001), other forms of inequality in voting have not been examined. The goal of this chapter is to investigate whether *racial inequality in voter turnout*, a potential effect (if not goal) of voter suppression, is bad for health.

Lower voter turnout is representative of unequal power within society (Boyce et al., 1999). Those who cannot or do not vote have less say over policies and less representation, with their interests being subsumed by those of the privileged (Hajnal & Trounstine, 2005). Voting inequality is also an indicator of the presence of structural racism within that community. For example, a state's history of structural racism has been linked to lower voter turnout for African Americans (Acharya et al., 2016). Whether people of color choose not to vote due to cultural norms, which have been shown to be shaped by historic structural racism (Acharya et al., 2016) or if they presently are prevented from voting by laws, policies, or institutional norms, their political voice and civid power is less than that of Whites. In general, Whites have higher rates of voting (Franko et al., 2016). Additionally, voting is higher among those with more education, those with higher income, and those with better health (Barrett & Brunton-Smith, 2014; Franko et al., 2016). In the United States (U.S.), these factors are all intertwined with race, such that people of color, and African Americans specifically, tend to have lower levels of education, lower income, and worse health compared to their White counterparts, as a consequence of structural racism (Bailey et al., 2017; Gee & Ford, 2011; Lukachko et al., 2014). This interconnectedness of racial inequities across institutions is not accidental, but a product of structural racism (Gee & Hicken, 2021). The discrimination experienced by a person of color when registering to vote, or casting a ballot, is not separate from institutional discrimination experienced when obtaining a driver's license, or being pulled over by the police at disproportionately high rates. A driver's license is often a required document to vote, but African Americans have driver's licenses at half the rates of white Americans. And, if one is arrested after being pulled over, the mark of incarceration can prevent the individual from voting in the present and in the future. When we consider even more upstream factors, such as segregation, environmental pollution, and socioeconomic inequality, when can begin to imagine how voter suppression may play a part in maintaining these forms or racism.

Many forms of structural racism, including immigration policy, incarceration, and segregation have been associated with worse health for African Americans and other people of color as compared to Whites (Gee & Ford, 2011). If voting inequality is a marker of the presence of structural racism (Hing, 2020), as voter suppression results from laws created and maintained to uphold the power of one racial group at the expense of another, it is likely that voting inequality could produce health disparities through two key pathways.

First, voting inequality could have negative consequences for many social determinants of health (Hing, 2020). Laws and referendums passed directly through voting and indirectly by elected officials shape other institutions that impact health through the social determinants. For example, when people vote, they exercise their right to determine which policies are passed within their community. They could vote to expand public transportation and green spaces, to use taxes to improve the local school system, or to prevent a factory from being built in their neighborhood. Thus, their vote, and the votes of members of their communities, have direct consequences for community institutions and known social determinants of health, including 1) segregation, 2) income inequality, 3) child poverty, and 4) air pollution. All four have been found to predict worse health (Brunekreef & Holgate, 2002; Wickham et al., 2016; Wilkinson & Pickett, 2006; Williams & Collins, 2016). Therefore, a person's vote may shape not only those social determinants, but, also, their health (Hing, 2020).

Of those four, let us first consider segregation. Segregation, the physical separation of people by race in residential contexts (Williams & Collins, 2016), and voter suppression go hand-in-hand, as both are consequences of historic Jim Crow Laws that limited both the neighborhoods in which African Americans could live and the ease in which they could cast a ballot (Shah & Smith, 2021). Thus, the urban spaces primarily occupied by Black voters are the same spaces in which voter identification laws and other suppressive laws are most often applied and enforced (Shah & Smith, 2021). Given this entanglement, there should be a strong association between segregation and voting inequality. We would expect those living in more highly segregated neighborhoods to be the most highly policed at the ballot box, and more generally.

While not much has been written about voting inequality and segregation, specifically, other forms of politician power have been investigated in relation to segregation. LaVeist (1993) operationalized political power through political representation, by measuring the number of Black city council members compared to the percentage of the population that identified as Black, and used this metric to examine the relationship between political representation, segregation, and infant mortality. He found that the impact of segregation on infant mortality was moderated by political power, such that the negative association between segregation and infant mortality could be attenuated, but not eliminated by high levels of political power (LaVeist, 1993). Thus, there likely exists a feedback loop between voting and segregation.

In addition to infant mortality, segregation has been associated with many other health outcomes, including self-rated health (Do et al., 2017), exposure to air pollution and environmental toxins (Morello-Frosch & Lopez, 2006), adult mortality, cardiovascular disease, and obesity, among others (Landrine & Corral, 2009), and has been argued to be a fundamental cause of racial health disparities (Williams & Collins, 2016). Segregation operates to influence health through pathways of socioeconomic status, neighborhood and housing quality, access to quality medical care, and health behaviors (Williams & Collins, 2001).

We should next consider how socioeconomic factors, such as income inequality and child poverty, are related to both voting and health. A measure of income inequality, specifically and as opposed to the mean or median income, is important to consider because it tells us about the distribution of income in the county. As we are interested in voting inequality, and income inequality has been found to influence voter turnout, we should also be interested in income inequality as a potential pathway through which voting and health are connected. Voting rates are negatively associated with income inequality (van Holm, 2019). Further, the interplay between lower voting rates and the presence of income inequality may result in the creation of biased policies, which privilege the interests of those in power over the marginalized. Through the proposal and passing of such biased policies, elected officials may shift policy ideology in ways that (re)produce socioeconomic disparities through legislation that taxes pensions, provides tax cuts to corporations, weakens organized labor, or does not expand Medicaid under the Affordable Care Act (Latner, 2019). Thus, not only does income inequality influence voter turnout, but income inequality may also be a consequence of lower voter turnout. This biased policy may then harm health via mechanisms of poverty and socioeconomic distress (Latner, 2019). Others have found that income inequality may result in the passing of policies that are harmful to health, such as more restrictive welfare spending (Hill & Leighley, 1992). Independent of voting, income inequality has been connected to higher mortality and self-rated health (Kaplan et al., 1996), which may operate through pathways of material resources, social cohesion/social capital, and psychosocial perceptions of one's social position (Blakely et al., 2001).

Child poverty is included as an additional measure of a county's socioeconomic status because high levels of child poverty could, 1) logically, result from detrimental social policies - passed via voter suppression – and, 2) act as a marker of overall marginalization because these social safety net policies are not reaching the people they are meant to help, as they are not reducing the number of children living in poverty. Children who grow up in poverty are more likely to be low birth weight and are at higher risk of infant mortality, have slower language development, higher risk for chronic illness, increased exposure to environmental toxins, and suffer from stress dysregulation (American Academy of Pediatrics, 2016). Further, childhood poverty is associated with higher odds of lower educational attainment, unemployment, and incarceration, which are also risk factors for worse adult health (American Academy of Pediatrics, 2016). And, African American children are twice as likely to remain in poverty as adults, compared to their White peers, which may contribute to observed racial health disparities (American Academy of Pediatrics, 2016). Thus, given the link between voting and poverty policy and the connection between poverty and health, the levels of child poverty in a community may mediate the association between voting and health.

Further, voting and health may be related through the impact of voting on the environment. Climate and environmental policy may be weakened as a consequence of voter suppression (Boyce et al., 1999). More biased legislatures, ones that are not representative of their constituents, created by voter suppression such as gerrymandering or the total lack of representation that occurs when an emergency manager is appointed can result in policies that are harmful for the environment and may cause environmental health disparities (Latner, 2019). For example, in Flint, Michigan, when an emergency manager took municipal control, the manager switched the water supply source which resulted in an outbreak of lead poisoning in which thousands were exposed and 12 died (Latner, 2019). The Trump administration, which was elected amidst national accusations of voter suppression, rolled back environmental regulations which have been estimated to have increased greenhouse gases and to have led to thousands of excess deaths from poor air quality each year (The State Energy & Environmental Impact Center, 2019).

Poorer voters have been found to endorse stricter environmental policies (McAusland, 2003), yet poorer voters are also less likely to vote (Leighley & Nagler, 2013), have 2.5 times less political influence than the richest Americans (Erikson, 2015), and may be more impacted by barriers to voting (Ellis, 2008; Leighley & Nagler, 2013). Thus, voter suppression may result in more lenient environmental policies being passed, which could cause increased pollution that negatively impacts health.

Thus, these four (segregation, income inequality, child poverty, and air pollution) are measured at the county-level because there are contextual level effects that influence the individual, above and beyond intrapersonal characteristics.

In addition to influencing social determinants of health, voting may operate through another key pathway of empowerment (LaVeist, 1992; Marmot, 2007; Wallerstein, 2002). Feeling in control and participating in society could connote psychosocial benefits upon the individual, while being excluded from voting could, in turn, be harmful. Voting and being politically engaged could also increase one's social network and social capital, resources which could be used to buffer against adversity (Gilbert & Dean, 2013; LaVeist, 1993; Macinko et al., 2004).

In consideration of the above, this chapter examines if racial inequality in voter turnout is linked to racial inequality in life expectancy for Blacks compared to Whites. Specifically, life expectancy by race is examined. Life expectancy was chosen because it is an indicator that captures the effect of stress exposure over the life course. Throughout life, people experience stressors, but they also have resources to cope with these stressors. If stressors outweigh the resources, they may die prematurely, if the converse is true, they may outlive the average. Life expectancy may be influenced by social determinants, stress, and many other factors that may be structured by the laws and policies created by voters and politicians. In her definition of racism, Dr. Ruth Wilson Gilmore explicitly includes the idea of vulnerability to premature death, or, more simply, a shorter life, as a consequence of structural racism (Gilmore, 2007).

Given the posited connection between voting and social determinants, this chapter will, first, identify if voting inequality is connected to these social determinants and, second, will examine how these social determinants impact the relationship between voting inequality and health at the county-level through mediation and moderation.

Using county-level data, I will investigate the following:

Aim 1: Is racial inequality in voter turnout associated with negative social determinants and worse health outcomes?

H1a: At the county-level, higher racial inequality in political participation will be associated with worse social determinants (segregation, income inequality, air pollution, child poverty).

H1b: At the county-level, higher racial inequality in political participation will be associated with worse health.

H1c: The effects of voting inequality on life expectancy will be mediated by social determinants.

H1d: The effects of voting inequality on life expectancy will be moderated by social determinants.

Methods

Data

Health and community data were acquired from the Robert Wood Johnson Foundation (RWJF) County Health Rankings (CHR) 2019 data. This data provides a snapshot of health across U.S. counties, including information about mortality (life expectancy), and even community social determinants of health (education, community safety, air and water quality, housing). The CHR is comprised of county-level data collected from the American Community Survey Data, Behavioral Risk Factor Surveillance System, National Center for Health Statistics, and many others.

Voting data were attained from the Cooperative Congressional Election Survey (CCES), a nationally representative sample of adults eligible to vote in each presidential election year (2008, 2012, and 2016). The CCES assesses voting behavior and attitudes before and after the presidential election, with between 32,800 and 64,600 respondents each year. Each year's panel data, collected through the Internet by YouGov, evaluates voting behavior, political attitudes, general demographic factors, and election experiences before (September and October of the election year) and after (November of election year) the presidential election, with between 32,800 and 64,600 respondents for each year. The sample is collected using proximity matching methodology in which a target random sample is identified; because members of this sample may be unreachable, members of the opt-in pool of respondents are matched to characteristics of those in the target sample. The survey is administered over the Internet.

Sample. The sample consisted of 841 counties without missing data.

Measures

The following items were used in regression analyses.

*Outcome*s. Social determinants. Four social determinant variables were examined first: segregation, air pollution, child poverty, and income inequality. *Racial segregation* for Blacks and Whites was measured using the dissimilarity index, possible values range from 0 – 100, with 0 indicating no segregation and 100 indicating total segregation. The RWJF County Health Rankings data for this indicator came from American Community Survey (ACS) 5-year estimates (2013-2017). This index of dissimilarity represents the evenness of how two groups (Black and White residents) are dispersed across census tracts that make up counties. *Air pollution* was measured using particulate matter of 2.5 micrometers ($PM_{2.5}$) per cubic meter. RWJF CHR used data from the U.S. Environmental Protection Agency's Air Quality Systems (AQS). Multiple monitors exist throughout a county and are captured at different points throughout the day. The highest 24-hour average (daily) PM2.5 concentration among all the monitors was selected to create the daily average county level data. *Child poverty* indicates the percent of people in the county under the age of 18 living in poverty, ranging from 0 – 100, as reported by the US Census Bureau. *Income inequality* was constructed as the ratio of household income at the 80th percentile to that at the 20th percentile in each county, a higher ratio indicates greater inequality, values ranged 3.15-9.15. RWJF compiled data from ACS 5-year estimates (2013-2017).

Health. Life expectancy for Blacks and life expectancy for Whites measured in years. Life expectancy, compiled from the National Center for Health Statistics Mortality Files, is age-adjusted and estimates the number of years from birth a person is expected to live according to the current age-specific death rates of the county population.

Predictors. Voting inequality. Each participant in the CCES data was asked if they voted or not in the Presidential Election (2008, 2012, and 2016) and each respondent also reported their race. Limiting the sample to non-Hispanic Black and non-Hispanic White voters, who by definition are over 18-years of age and are citizens of the U.S., I aggregated individual-level responses to generate a county-level percentage of voter turnout by race. Thus, for each county, there exists an indicator for Black voter turnout (proportion of Black eligible voters who voted) and White voter turnout (proportion of White eligible voters).

From these, two different variables were created for each year that examined inequality using 1) the difference in voter turnout by race (Black voter turnout – White voter turnout) and 2) a rate ratio of voter turnout by race (Black voter turnout/White voter turnout, the ratio inequality variable). Each year (2008, 2012, 2016) was examined individually and then averaged into an overall measure of inequality for all years. While voting inequality was higher in 2012 than in other years (Appendix A), an aggregate measure theoretically makes sense to examine the cumulative impact of experiencing county-level voting inequality across three elections and eight years on life expectancy. Thus, for parsimony, the overall voter inequality created as the mean value across all years is used. This continuous variable was then converted into categorical variables of 0 “No Black Voting Inequality” and 1 “Low Black Voting Inequality” and 2 “High Black Voting Inequality.” Categories were created using both theoretical (no inequality is a value of 1 or greater for the ratio variable and a value of 0 or greater for the difference variable) and statistical criteria (based on the distribution and cut at the terciles). Given that the distribution of voters was similar across the three categories between the two types of variables, difference and ratio, the difference variable is reported here to illustrate results. Results using the ratio variable are available in Appendix B.

Covariates. For each county, the following controls from the RWJF County Health Rankings 2019 were included: proportion age 65 or older, proportion of county female, proportion of county non-Hispanic Black, proportion of county rural, median household income, proportion uninsured, proportion of county with college degree, and proportion unemployed. These covariates were chosen to account for factors that may confound the relationship between voting inequality and social determinants and between voting inequality and health. Race, sex, urbanicity, education, and employment are all factors that are associated with voting behavior and with health.

Analyses

All analyses were conducted using Stata15 MP. First, analyses were conducted using univariate and bivariate means to examine the distribution of variables alone and stratified by voting inequality category (i.e. “No voting inequality” vs. “Low Black Voting Inequality” vs. “High Black Voting Inequality”) and correlations to examine the relationships among variables. Bivariate regression analyses were examined to determine if differences between groups were statistically significant. Next, regression models were fit to examine how voting inequality is associated with first, social determinants (H1a), and second, health outcomes at the community-level (H1b). Models were built beginning with bivariate associations between voting inequality and the outcome. Next, county demographic variables were added, followed by county socioeconomic variables. For models predicting life expectancy, social determinants were then added.

To test mediation (H1c), the `sureg` command in Stata was used to assess the direct, indirect, and total effects of voting inequality, a categorical variable, when potential mediators (segregation, air pollution, income inequality, and child poverty) were included. The standard errors associated with the coefficients created from `sureg` are usually positively skewed and kurtotic. To account for this unreliability, bootstrapped standard errors and confidence intervals were calculated using the `bootcm` and bootstrap commands with 5,000 replications. These confidence intervals were then used to determine if the proportion mediated was significant. Four mediators were hypothesized: segregation, income inequality, air pollution, and child poverty.

To test moderation (H1d), interaction effects were created, for voting inequality by each of the four social determinants: segregation, income inequality, air pollution, and child poverty. First models were run with just voting inequality, the social determinant, and the interaction term. Then, county covariates were added in Model 2. Using the `margins` command, estimates were graphed to demonstrate the interaction effect for significant interactions.

Results

Descriptive Statistics

First, descriptive statistics stratified by level of voting inequality were examined as shown in Table 1. Of the 841 counties included in this analysis, 301 had no voting inequality, 258 had low voting inequality, and 282 had high voting inequality using the vote difference variable (Table 1). Thus, in 64% of counties included in this study, Black voters have lower voting rates than White voters. Logically, we might expect that voting inequality would be associated with worse health outcomes, social determinants, and socioeconomic measures. However, we do not see a clear pattern across these variables when stratified by type of voting inequality. The results for the difference and ratio inequality variables are comparable when examining significant differences, although there is variation in the actual values. Thus, voting differences values are reported here, unless otherwise noted.

We see that there are significant differences for White life expectancy, segregation, air pollution, income inequality, the proportion of the county that is rural, proportion over 65, proportion female, median household income, proportion with a college degree, and the proportion unemployed when counties are stratified by voting inequality (Table 1). Surprisingly, Black life expectancy is highest in counties with high voting inequality for Blacks (75.77 years) and White life expectancy in highest in counties with low voting inequality (78.42 years). White life expectancy is significantly higher in both low voting inequality and high voting inequality areas as compared to areas with no voting inequality, but no significant differences in Black life expectancy by voting inequality.

Segregation is higher in counties with low voting inequality for Blacks (47.74) and in counties with high voting inequality (43.68) as compared to counties with equal voter turnout (41.21). Income inequality is highest in counties with low voting inequality (4.84), with similar levels experienced in counties with no inequality (4.67) and high inequality (4.66). Interesting, air pollution is lowest in counties with high voting inequality. Counties with low voting inequality tend to be less rural, have fewer White residents and more female residents, have higher median household income, and have a lower proportion with a college degree, than counties without inequality or with high inequality.

Table 1. Descriptive statistics (means and standard errors or proportion) for County Health Ranking 2019 counties stratified by voting inequality – difference variable (n=841).

	Mean (SE)		
Variable	No Voting Inequality for Blacks (n=301)	Low Voting Inequality for Blacks (n=258)	High Voting Inequality for Blacks (n=282)
Black life expectancy	75.27 (.21)	75.74 (.22)	75.77 (.23)
White life expectancy	77.12 (.15)	78.42 (.17)***	77.57 (.15)*
Segregation (Black/White dissimilarity index, range 0-100)	41.21 (.74)	47.74 (.84)***	43.68 (.83)*
Income inequality (range 3.15-9.15)	4.67 (.04)	4.84 (.05)**	4.66 (.04)
Air pollution (Particulate matter 2.5 μg/m^3)	10.12 (.07)	10.12 (.10)	9.87 (.09)*
Child poverty (proportion)	.21 (.00)	.22 (.01)	.21 (.01)
Age 65 or older (proportion)	. 17 (.00)	.16 (.00)**	.17 (.00)
Female (proportion)	.51 (.00)	.51 (.00)***	.51 (.00)
Non-Hispanic White (proportion)	.67 (.01)	.60 (.01)***	.69 (.01)
Rural (proportion)	.38 (.01)	.19 (.01)***	.35 (.02)
Median household income	54,287 (950.81)	60,155.57 (1,152.06)***	55,333 (978.41)
Uninsured	.11 (.00)	.11 (.00)	.11 (.00)
College degree (proportion)	.59 (.01)	.65 (01)***	.60 (.01)
Unemployed (proportion)	.05 (.00)	.05 (.00)**	.05 (.00)*

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, as compared to "No Voting Inequality for Blacks"
Standard errors for continuous variable provided in parentheses.
[a] Significance of t-test comparing counties with voting inequality to counties without voting inequality.

The Association between Voting Inequality and Social Determinants of Health

Tables 2a-d present the multiple linear regression results for social determinants predicted by voting inequality. In Table 2a, Model 1, we can see that segregation is significantly associated with voting inequality for Blacks, such that low voting inequality predicts a 6.43 unit increase in segregation compared to counties without voting inequality, while high voting inequality predicts a 2.36-unit increase. When demographic variables are added in Model 2, this relationship is slightly attenuated. However, even when socioeconomic variables are added in Model 3, a significant relationship persists for low voting inequality, such that low voting inequality indicates a 3.49 unit increase in segregation. The ratio variable follows the same pattern.

When we consider air pollution (Table 2b), we see that a significant relationship between high voting inequality and particulate matter exists in Model 1, predicting a .25 $\mu g/m^3$ reduction in particulate matter, which indicates better air quality in counties with voting inequality. However, this relationship is attenuated and only marginally significant as demographic and socioeconomic variables are added. The ratio variable follows a similar pattern, but low voting inequality is positively associated with particulate matter in Model 1.

In Table 2c, Model 1, the proportion of children in poverty is not significantly associated with voting inequality. However, we see statistical suppression operating – when demographic controls are added and again when social determinants are added, we see that low voting inequality significantly predicts a one-unit increase (Model 3) in child poverty as compared to counties without voting inequality, all else equal. Yet, high voting inequality is not associated with child poverty. When measured with the ratio variable, results in Model 2 vary slightly, although neither were significant. However, when we consider Model 3, results are the same as with the difference variable.

Table 2a. Multiple Linear Regression of Black/White Segregation on Voting Inequality (difference), Robert Wood Johnson Foundation County Health Rankings 2019 (n=841).

	Model 1		Model 2		Model 3	
VARIABLES	β	CI	β	CI	β	CI
Black/White Segregation (Dissimilarity Index)						
Voting inequality						
No voting inequality	*ref*		*ref*		*ref*	
Low voting inequality	6.43***	4.196, 8.663	3.06**	1.012, 5.115	3.49***	1.489, 5.482
High voting inequality	2.36*	0.182, 4.545	1.26	-0.627, 3.150	1.55+	-0.277, 3.381
Age (percent 65 or older)			57.51***	35.658, 79.371	41.48***	18.846, 64.110
Female (percent)			-0.84	-51.954, 50.280	-4.10	-55.379, 47.172
Non-Hispanic White (percent)			16.08***	11.264, 20.897	16.85***	10.822, 22.873
Rural (percent)			-27.07***	-30.536, -23.597	-30.55***	-34.597, -26.511
Median household income					-0.00**	-0.000, -0.000
Uninsured (percent)					-68.75***	-92.653, -44.839
Some college or more (percent)					-15.95*	-28.460, -3.444
Unemployed (percent)					62.87	-15.705, 141.448
Constant	41.31***	39.796, 42.831	31.68*	5.629, 57.732	56.71***	29.320, 84.093
Observations	841		841		841	
R-squared	0.037		0.286		0.337	

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table 2b. Multiple Linear Regression of Air Pollution on Voting Inequality (difference), Robert Wood Johnson Foundation County Health Rankings 2019 (n=841).

	Model 1		Model 2		Model 3	
VARIABLES	β	CI	β	CI	β	CI
Particulate matter						
Voting inequality						
No voting inequality	*ref*		*ref*		*ref*	
Low voting inequality	-0.01	-0.245, 0.233	0.01	-0.233, 0.260	0.08	-0.160, 0.326
High voting inequality	-0.25*	-0.485, -0.018	-0.22+	-0.450, 0.004	-0.19+	-0.411, 0.034
Age (percent 65 or older)			-9.27***	-11.897, -6.643	-11.74***	-14.492, -8.985
Female (percent)			11.63***	5.485, 17.773	12.76***	6.524, 19.000
Non-Hispanic White (percent)			0.27	-0.309, 0.848	0.82*	0.091, 1.557
Rural (percent)			0.86***	0.442, 1.276	0.39	-0.102, 0.881
Median household income					-0.00	-0.000, 0.000
Uninsured (percent)					-4.80**	-7.705, -1.889
Some college or more (percent)					-2.38**	-3.904, -0.861
Unemployed (percent)					13.79**	4.228, 23.346
Constant	10.12***	9.959, 10.284	5.27**	2.136, 8.398	6.32***	2.986, 9.650
Observations	841		841		841	
R-squared	0.007		0.069		0.115	

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table 2c. Multiple Linear Regression of Proportion of Children in Poverty on Voting Inequality (difference), Robert Wood Johnson Foundation County Health Rankings 2019 (n=841).

	Model 1		Model 2		Model 3	
VARIABLES	β	CI	β	CI	β	CI
Percent child poverty						
Voting inequality						
No voting inequality	*ref*		*ref*		*ref*	
Low voting inequality	-0.01+	-0.028, 0.002	-0.00	-0.014, 0.009	0.01*	0.001, 0.014
High voting inequality	-0.01	-0.021, 0.008	0.00	-0.009, 0.011	0.00	-0.003, 0.008
Age (percent 65 or older)			0.47***	0.349, 0.591	0.12***	0.054, 0.195
Female (percent)			0.51***	0.224, 0.789	0.31***	0.146, 0.466
Non-Hispanic White (percent)			-0.30***	-0.327, -0.273	-0.18***	-0.196, -0.158
Rural (percent)			0.15***	0.133, 0.171	0.04***	0.023, 0.048
Median household income					-0.00***	-0.000, -0.000
Uninsured (percent)					-0.17***	-0.242, -0.093
Some college or more (percent)					-0.12***	-0.158, -0.080
Unemployed (percent)					0.65***	0.407, 0.897
Constant	0.22***	0.208, 0.228	0.03	-0.118, 0.170	0.38***	0.295, 0.466
Observations	841		841		841	
R-squared	0.003		0.509		0.855	

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table 2d. Multiple Linear Regression of Income Inequality on Voting Inequality (difference), Robert Wood Johnson Foundation County Health Rankings 2019 (n=841).

	Model 1		Model 2		Model 3	
VARIABLES	β	CI	β	CI	β	CI
Income Inequality						
Voting inequality						
No voting inequality	*ref*		*ref*		*ref*	
Low voting inequality	0.17**	0.051, 0.291	0.12*	0.002, 0.231	0.12*	0.017, 0.228
High voting inequality	-0.00	-0.120, 0.115	0.03	-0.077, 0.134	0.05	-0.050, 0.143
Age (percent 65 or older)			0.28	-0.936, 1.505	0.03	-1.163, 1.226
Female (percent)			7.40***	4.549, 10.259	3.81**	1.103, 6.516
Non-Hispanic White (percent)			-1.63***	-1.896, -1.358	-1.61***	-1.929, -1.292
Rural (percent)			0.49***	0.299, 0.687	0.39***	0.175, 0.602
Median household income					-0.00***	-0.000, -0.000
Uninsured (percent)					-2.21***	-3.474, -0.950
Some college or more (percent)					1.83***	1.166, 2.486
Unemployed (percent)					5.45*	1.305, 9.601
Constant	4.67***	4.584, 4.747	1.77*	0.311, 3.221	3.66***	2.214, 5.106
Observations	841		841		841	
R-squared	0.012		0.208		0.343	

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

The last community characteristic examined is income inequality (Table 2d). Low voting inequality is significantly associated with income inequality across all models. While high voting inequality is not significantly associated, it does suggest a positive association with income inequality. While Model 2 for the ratio variable is slightly different, when all controls are added, low voting inequality is associated with higher child poverty.

Next, to address Hypothesis 2 which examines the relationship between voting inequality and life expectancy, multiple linear regression analyses were run. Tables 3a-b use the voting inequality difference measure. Table 3a shows a nonsignificant negative association between Black life expectancy and low voting inequality and a nonsignificant positive association between Black life expectancy and high voting inequality in Model 4 once all controls are added. In this final model, income inequality, air pollution, and child poverty are significant predictors of lower Black life expectancy.

In Table 3b, low voting inequality is a statistically significantly associated with higher White life expectancy, suggesting 1.3 years more of life in Model 1, which persists when demographic controls (Model 2) are included, although this effect is reduced when socioeconomic variables and social determinants are added in Models 3 and 4, respectively. High voting inequality is significantly associated with higher White life expectancy across the first three models, but is only marginally significant in the final model, predicting .22 (CI: -.029, .466, $p<.10$) years longer of life. All four of the social determinants (segregation, income inequality, air pollution, and child poverty) are significant predictors of White life expectancy in the final model, with segregation and income inequality associated with better life expectancy and air pollution and child poverty associate with worse life expectancy for Whites.

Table 3a. Multiple Linear Regression of Black Life Expectancy on Voting Inequality (difference), Robert Wood Johnson Foundation County Health Rankings 2019 (n=841).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	CI	β	CI	β	CI	β	CI
Black life expectancy (years)								
Voting inequality								
No voting inequality	*ref*		*ref*		*ref*		*ref*	
Low voting inequality	0.47	-0.145, 1.091	0.10	-0.521, 0.714	-0.31	-0.827, 0.214	-0.14	-0.636, 0.365
High voting inequality	0.51	-0.099, 1.109	0.37	-0.194, 0.943	0.33	-0.142, 0.812	0.27	-0.181, 0.730
Age (percent 65 or older)			-0.59	-7.174, 5.988	13.49***	7.588, 19.389	7.98**	2.032, 13.935
Female (percent)			-44.01***	-59.404, -28.620	-41.95***	-55.317, -28.581	-30.26***	-43.233, -17.280
Non-Hispanic White (percent)			3.03***	1.583, 4.484	-1.87*	-3.437, -0.295	-3.78***	-5.631, -1.929
Rural (percent)			-4.20***	-5.244, -3.155	0.47	-0.584, 1.524	1.23*	0.058, 2.406
Median household income					0.00***	0.000, 0.000	0.00***	0.000, 0.000
Uninsured (percent)					6.04+	-0.197, 12.269	0.87	-5.255, 7.001
Some college or more (percent)					8.64***	5.384, 11.905	7.35***	4.026, 10.665
Unemployed (percent)					-17.86+	-38.349, 2.622	-1.92	-21.831, 17.994
Segregation (Black/White dissimilarity index)							0.00	-0.016, 0.019
Income inequality (range 3.15-9.15)							-0.54**	-0.893, -0.195
Air pollution (Particulate							-0.55***	-0.693, -

Matter 2.5 µg/m^3)								0.415
Child poverty (proportion)							-8.31**	-14.110, -2.516
Constant	75.27***	74.853, 75.693	97.25***	89.410, 105.098	84.96***	77.818, 92.098	93.54***	86.350, 100.727
Observations	841		841		841		841	
R-squared	0.004		0.126		0.392		0.451	

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table 3b. Multiple Linear Regression of White Life Expectancy on Voting Inequality (difference), Robert Wood Johnson Foundation County Health Rankings 2019 (n=841).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	CI	β	CI	β	CI	β	CI
White life expectancy (years)								
Voting inequality								
No voting inequality	*ref*		*ref*		*ref*		*ref*	
Low voting inequality	1.30***	0.871, 1.738	0.57**	0.167, 0.978	0.18	-0.099, 0.466	0.13	-0.140, 0.403
High voting inequality	0.45*	0.025, 0.871	0.28	-0.093, 0.654	0.27*	0.014, 0.532	0.22+	-0.029, 0.466
Age (percent 65 or older)			2.37	-1.957, 6.689	15.90***	12.697, 19.105	14.88***	11.654, 18.109
Female (percent)			-15.24**	-25.355, -5.134	-18.81***	-26.067, -11.548	-17.07***	-24.109, -10.033
Non-Hispanic White (percent)			1.94***	0.986, 2.892	-2.92***	-3.774, -2.068	-3.41***	-4.411, -2.403
Rural (percent)			-5.09***	-5.772, -4.399	-0.59*	-1.163, -0.018	-0.14	-0.779, 0.494
Median household income					0.00***	0.000, 0.000	0.00***	0.000, 0.000
Uninsured (percent)					1.99	-1.396, 5.373	2.27	-1.057, 5.590
Some college or more (percent)					11.40***	9.624, 13.166	8.92***	7.121, 10.721
Unemployed (percent)					-7.69	-18.817, 3.433	-4.76	-15.562, 6.037
Segregation (Black/White dissimilarity index)							0.01*	0.002, 0.021
Income inequality (range 3.15-9.15)							0.71***	0.522, 0.901
Air pollution (Particulate							-0.14***	-0.211, -

Matter 2.5 $\mu g/m^3$)								0.060
Child poverty (proportion)							-8.71***	-11.858, -5.570
Constant	77.12***	76.823, 77.412	85.09***	79.939, 90.244	75.83***	71.956, 79.711	76.73***	72.833, 80.630
Observations	841		841		841		841	
R-squared	0.041		0.260		0.648		0.683	

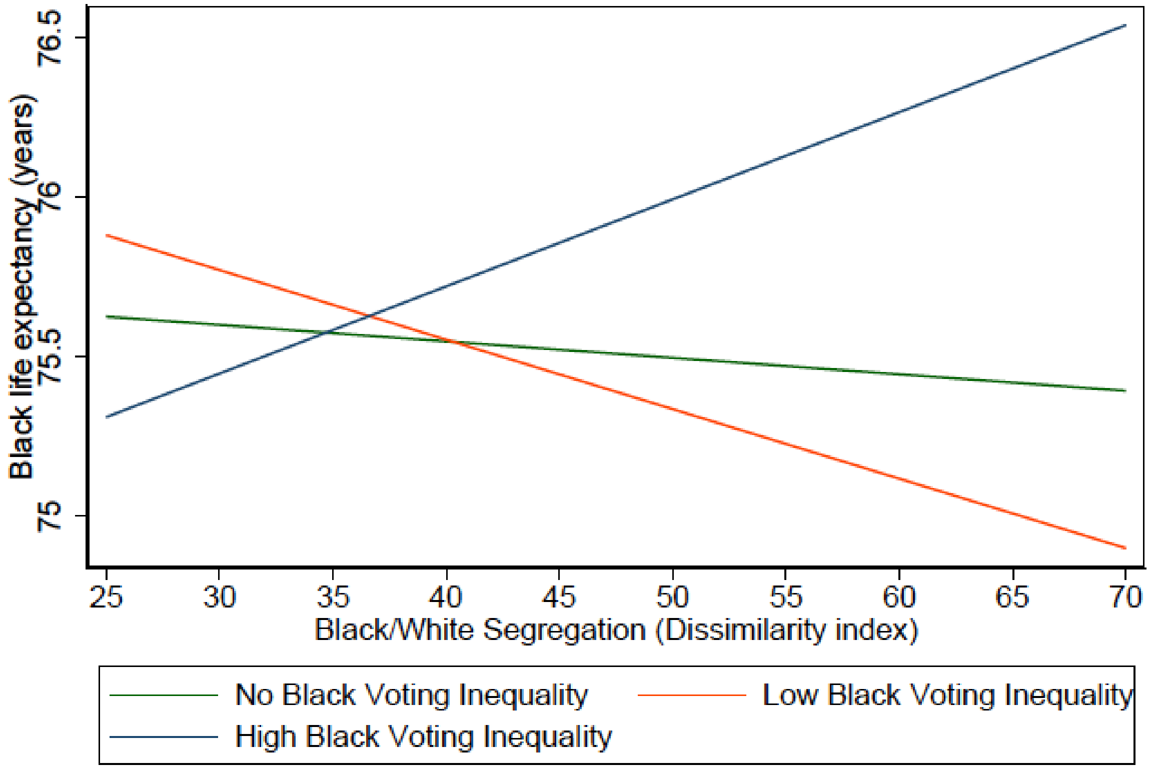
Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table 4. Multiple Linear Regression of Black Life Expectancy on Voting Inequality (difference) and Segregation to test Moderation using Robert Wood Johnson Foundation County Health Rankings 2019 (n=841).

	Model 1		Model 2	
VARIABLES	β	CI	β	CI
Black life expectancy (years)				
Voting inequality				
No voting inequality	ref	ref	ref	ref
Low voting inequality	1.97	-.21, 4.14	.67	-.98, 2.33
High voting inequality	-1.65	-3.66, .36	-1.13	-2.64,.38
Segregation (Black/White dissimilarity index)	-.001	-.03, .03	-.01	-.03, .02
Voting inequality x segregation				
No voting inequality x segregation	ref	ref	ref	ref
Low voting inequality x segregation	-.03	-.08,.02	-.02	-.05, .02
High voting inequality x segregation	.05*	.004,.09	.03+	-.00, .07
Age (percent 65 or older)			8.25**	2.31, 14.19
Female (percent)			-29.56***	-42.51, -16.63
Non-Hispanic White (percent)			-3.97***	-5.83, -2.11
Rural (percent)			1.27*	.10,2 .44
Median household income			.00***	.00, .00
Uninsured (percent)			.82	-5.28, 6.93
Some college or more (percent)			7.42***	4.10, 10.73
Unemployed (percent)			-3.09	-22.96, 16.77
Income inequality (range 3.15-9.15)			-.48**	-.83 -.13
Air pollution (Particulate Matter 2.5 µg/m^3)			-.548***	-.68, -.40
Child poverty (proportion)			-8.38	-14.15, -2.60
Constant	75.33			93.08
Observations	841		841	
R-squared	.02		.46	

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Figure 1. Segregation & Black life expectancy moderated by voting inequality.



Analyses for both ratio and difference variables in predicting both Black and White life expectancy do not show that income inequality, air pollution, or child poverty were significant mediators (Appendix C). However, segregation was a significant mediator between the vote ratio variable and White life expectancy, accounting for 11.1% of the total effect of voting inequality on health.

While the hypotheses of mediation were not upheld, moderation was also tested between the voting variables and social determinant variables as predictors of Black and White life expectancy. With these results, we see that the interaction effect between segregation and voting inequality is significant in simple analyses and of marginal significance when all covariates are added in predicting Black life expectancy (Table 4). Interestingly, when low and no voting inequality interact with segregation, lower life expectancy is predicted (Figure 1), but when high voting inequality interacts with segregation, we observe a protective effect through which higher levels of segregation garner higher life expectancy.

Discussion

Reduced collective political power may prevent individuals from advocating for beneficial policies that influence known social determinants of health (Hahn et al., 2018), including educational opportunities, the environment, housing, or neighborhood conditions. In light of the increase in contemporary voter suppression, this paper provides a critical next step in untangling the relationship between civic engagement, social determinants, and health. I find that voting inequality is associated at the county-levels with lower air pollution, higher segregation, and higher income inequality. Structural racism operates as a system, with different forms reinforcing one another. Consequently, we cannot separate voting inequality from spatial or economic inequality, which are both entangled with race and racism. While voting inequality by income has been linked to health (Blakely et al., 2001), voting inequality by race has not been studied. This paper provides the first step to thinking about how voting inequality may influence health, specifically through shaping social determinants.

When considering the social determinants, investigated here that include segregation, air pollution, child poverty, and income inequality, we also see that the strength of the association on social determinants varies with the level of voting inequality (none, low, high). A significant, positive relationship between segregation and voting inequality is observed (Table 2a), which persists even when county-level controls are added in subsequent models. Interestingly, while both low and high levels of voting inequality are associated with higher segregation, low inequality predicts about a 6-unit increase in segregation, while high predicts only a 2-unit increase. Thus, even lower levels of voting inequality for African Americans have significant consequences for patterns of geographic distribution.

This finding that voting inequality is associated with higher segregation is quite logical, one would expect that in counties with high levels of segregation, one of the most frequently used indicators of structural racism, that other forms of structural racism would be positively associated. Residential segregation may inform policy attitudes and preferences of White individuals, with consequences for voting policies and practices, as the segregated, non-White population may be viewed as a threat (Rocha & Espino, 2009). Segregation produces heightened visibility of the racial minority group but also minimizes interaction between racial groups, leading to othering and dehumanization (Rocha & Espino 2009). Conversely, areas with lower segregation should have more social contact between racial groups and would not develop policies as a reaction to this perceived threat. Empirical evidence suggests that in the non-South, residents in more segregated metropolitan areas are less likely to have representatives in Congress who are Black, a member of the Democratic Party, or will vote in support of civil rights issues or other interests of Black residents (Ananat & Washington, 2009). However, the literature on segregation and political power, beyond solely voting, is mixed, suggesting that living in segregated neighborhoods concentrates Black political power, increasing political efficacy (LaVeist, 1992).

Perhaps, there even exists a feedback loop in which the presence of segregation enables more voter suppression, while voter suppression simultaneously prevents policies from being passed that might reduce levels of segregation. Evidence suggests that many forms of voter suppression do occur more frequently in neighborhoods that are majority Black and Brown

(Pettigrew, 2017). Longer wait times and more poll closures were both reported, anecdotally, to cluster in African American neighborhoods in the 2016 Presidential Election (Pettigrew, 2017). Other research suggests that Black political efficacy and Democratic Party representation are reduced in segregated areas (Ananat & Washington, 2009), and consequently, lower Black voter turnout could occur. Currently, most voter identification laws and restrictions to voting in 2021 have been proposed by representatives in the Republican Party (Berman, 2021), which could provide more evidence of a bidirectional relationship between segregation and voting. Further, this paper does not investigate gerrymandering and its influence on vote dilution, but future research should investigate if segregated areas are also more gerrymandered.

Next, consider the findings for voting and air pollution. High levels of voting inequality were significantly predictive of lower levels of particulate matter in bivariate analyses, but became marginally significant when county controls were added (Table 2b). Low levels of voting inequality were not predictive, when compared to no voting inequality. This finding is counter to what one might assume, high levels of voter inequality for Blacks, as compared to no inequality, is associated with a decrease in the amount of particulate matter. Perhaps the units of analysis are not small enough, and we should use neighborhood census tracts instead of the county – Black segregated neighborhoods could bear the brunt of the air pollution, while White neighborhoods are protected and are able to place polluters away from their communities. In this paper, our geographic unit is larger than neighborhoods, it is the county. Hypothetically, if White people are the majority racial group in the county and have higher voting rates, then the power would be in their hands and they would likely also control a majority of the landmass within the county. Then average air quality in the county would be good overall, but the highest particulate matter could still be concentrated in Black neighborhoods, Unfortunately, due to data constraints, our measure is not refined enough to identify this spatial pattern and we cannot further investigate this potential explanation. However, this premise is partially supported by the observed relationship between voting inequality and segregation: as segregation has a positive association with voting inequality, it is possible that higher levels of segregation are concentrating the environmental burden of air pollution in Black neighborhoods.

In the final models, with county controls, child poverty was positively associated with low voting inequality, however, the coefficient is quite small (.01; CI: .001, .014; $p<.05$). This relationship is in the expected direction though, as poverty and race are closely linked, it is possible that disenfranchised, poorer people of color are not able to vote to pass policies that would reduce poverty.

Worse income inequality was significantly associated with low voting inequality, but not with high voting inequality. As with child poverty, it is possible that those with the most political power have the most wealth and will pass policies that preserve this wealth rather than redistributing it to reduce income inequality.

Next, we consider how voting inequality is linked to health, controlling for these county-level determinants of segregation, air pollution, child poverty, and income inequality. Previously, Lukachko and colleagues (2014) posited that the presence of structural racism can actually be beneficial to the health of Whites, as they saw when examining myocardial infarctions. This study finds a similar result for life expectancy: low voting inequality for Blacks was significantly associated with higher White life expectancy in bivariate analyses and when both demographic and socioeconomic controls are included in the model (Table 3B, Models 1-3). Yet, this effect was reduced to marginal significance when social determinants were added (Table 3B Model 4).

Thus, voting inequality may be operating similarly to other forms of structural racism in that it preserves resources and power for Whites, which translates into improved health for them.

While mediation results were not significant, we did observe a significant interaction effect between segregation and voting inequality in simple analyses and of marginal significance when all covariates were added in predicting Black life expectancy (Table 4). Further, this relationship is complex: when low and no voting inequality interact with segregation, lower life expectancy is predicted (Figure 1), but when high voting inequality interacts with segregation, we observe a protective effect through which higher levels of segregation are associated with higher life expectancy. While this finding may seem counter intuitive initially – as we may expect that multiple forms of structural racism would combine to negatively impact health – the finding may actually have a logical explanation. LaVeist (1993) found that political representation attenuated the impact of segregation on infant mortality, thus previous literature has established that other forms of political power may be able to counter the negative impact of high voting inequality. While voting rates may be lower, perhaps because Black voters are segregated into specific areas, they are still able to elect officials who advocate for their best interests in ways that are beneficial to health.

In addition to representation, other forms of political power and social power exist. Perhaps in these marginalized zones, in which multiple forms of oppression compound, residents develop alternative forms of power and resistance. In this resistance and resiliency, it is possible that people are able to develop psychosocial benefits and/or to improve upon the conditions in which they live and actually enhance their health. The ethnic density hypothesis (Halpern & Nazroo, 2000)suggests that living in an area with a high density of your ethnic group can result in higher social cohesion, mutual support, and sense of community which could buffer the negative effects of voting inequality on life expectancy.

Limitations and Future Research

Given the complex findings regarding voting inequality, segregation, and health, future research should measure psychosocial mechanisms linking voting inequality and health to better understand how segregation or ethnic density modifies this relationship. Additionally, it is possible that the dissimilarity index, while the most commonly used measure of segregation, is no longer the most appropriate. Segregation has changed over time, and perhaps measuring evenness with the dissimilarity index is not the most appropriate measure to capture segregation currently. Measures of clustering or isolation could be more useful in understanding the link between segregation, voting, and health. Perhaps, too, measuring segregation and/or voting inequality at the county level is not the most appropriate and a smaller unit of analysis, such as census tract, is necessary.

Examining interactions between two forms of racism is useful in that it allows us to better understand the interconnected nature of racism across different institutional domains (Gee & Hicken, 2021). Voting inequality and segregation work in tandem to marginalize African Americans and uphold White Supremacy. Thus, research should attend to this complexity when trying to understand how any form of institutional racism perpetuates health inequities.

Stronger relationships among voting inequality, social determinants, and life expectancy were anticipated, but the results were not significant across all models. This may be due to errors in the inequality measures. Voting rates across the three presidential elections examined varied greatly, and were reported much higher in the counties included than across the nation (DeSilver et al., 2021). Measuring inequality in participation using voter turnout by race is only one indicator of disparities in participation. While people may be voting, processes such as gerrymandering may dilute the influence of a vote so that this vote may not actually impact the social determinants hypothesized here.

This study was limited in the fact that it could not account for the impacts of felon disenfranchisement. The CCES did not identify people based on their incarceration history and those currently incarcerated were excluded from the study. Yet, I believe, these voters should be included in the denominator of potential voters. Incarcerated or previously incarcerated people are excluded from voting in many states, yet, they should be included as a suppressed non-voter. While we do not have the data to analyze here, we can hypothesize that those who are incarcerated will be more likely to be Black, will likely have less education, lower socioeconomic status, and also have poorer health. Voting is a right, not a privilege, yet many states have chosen to take away voting rights for those currently imprisoned and have made it difficult for former felons to gain these rights back. In the United States, people of color make up an overwhelming majority of people currently and formerly imprisoned (Uggen et al., 2016). An estimated 6.1 million people are prevented from voting each year by felon disenfranchisement laws, resulting in 7.4 percent of the adult Black population being disenfranchised compared to 1.8 percent for non-Black adults (Uggen et al., 2016). If these potential voters were added to the denominator for number of eligible Black voters, we would actually see that Black voter turnout is much lower than estimated here. This adds another example of the systemic interactions of racism across structures and also serves to underestimate the inequality in voting rates for Whites and Blacks. As voting rates and incarceration are directly connected, this could possibly explain the weak results between voting inequality and health, as my sample likely contains a healthier population by excluding incarcerated peoples.

A limitation of this research is that data are aggregated and do not match a specific individual. When interpreting results, one must be cognizant of avoiding the ecological fallacy with these results. While the data were confined to county-level analyses, it would be useful to conduct the same analyses for the individual or with multilevel models. Other limitations are that, while the CCES data is collected to be a representative sample of the voting aged population in the United States, the reported voting rates (80%) are higher than national averages (60%). As voting reports are matched with voting records, it unlikely the higher rates are due to response bias. Rather, those who opt to participate may vote more. Additionally, county data was limited to 841 counties, of 3,007 counties in the United States. These counties are not representative of the nation, and results could change if analysis is expanded to all counties. Counties with White voter turnout of 0% were excluded because a voting ratio could not be calculated, as were counties with only one individual data point, as data for black and white voting behavior could not be aggregated up from one person. These criteria likely impacted smaller, more rural counties, which could impact voter behavior and suppression tactics.

The observed relationships may be less robust because of a temporal lag, as well. Voting inequality data from 2008, 2012, and 2016 was used, with health data collected in 2019. However, 3-11 years may not be enough time for the effects of voting inequality to negatively impact life expectancy. Future analyses should examine more temporally sensitive health outcomes such as mental health or sleep.

Despite these limitations, this study is the first to examine the connections between racial inequality in voting, social determinants, and health. While the theoretical support for the link between voter suppression and health exists, the empirical data is lacking. This study provides insight into the mechanisms through which voting inequality, a potential consequence of voter suppression may influence health. While mediation results were non-significant for life expectancy, it is still possible that these may mediate the link between voter suppression and health for other health outcomes. Further, the influence of voting inequality on segregation, especially, as well as air pollution and income inequality, is evident in these analyses. Future research should further examine the link between voter suppression, social determinants, and health to better understand the mechanisms at work that perpetuate political and health disparities.

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CHAPTER 3.

AIM 2

Introduction

Racialized voting policy. Perhaps it is not just voting inequality (investigated in Chapter 2), the objective of voter suppression, that is connected to health, but the actual experience of voter suppression itself. Voting policy across the United States is a patchwork of state, county, and local directives on how to conduct elections. Given this, voting and voter suppression looks very different depending on one's geographic location. In Oregon, a state with automatic voter registration, no identification is required when voting and residents[1] have the option to vote by mail. In Texas, residents must register within 30 days of the election to vote. If residents want to vote absentee, they must apply for absentee voting at least seven business days before the election and the absentee ballot must be received by close of election day. If Texas residents vote in person, they must show a passport or driver's license, and if they show an alternative photo identification, they must fill out a "reasonable impediment declaration" (Adolphe et al., 2020). These requirements, while often adopted under the logic that such measures ensure the legitimacy of the vote, place an undue burden on many voters, especially voters of color (Barreto et al., 2019). While the racialized impact of various forms of voter suppression may be more subtle, such as reducing early voting hours, others are obvious, such as the closing of polling places in majority Black or Latinx neighborhoods.

The racialization of voting policies, especially suppressive polices, not only leads to disparities in turnout, but also symbolically and materially allocates rights based on racial group. By assuming those who are allowed (given the privilege) to vote are White, and those who are denied are Black, the larger hierarchical conceptualization of who is American and whose lives

[1] Here, I use "resident" to refer to a resident of the state who is eligible to vote as a U.S. citizen and has no restrictions on voting based on incarceration or a history of incarceration. Voting rights are determined by citizenship status, and non-U.S. citizens who are residents are denied the right to vote.

matters is reified and normalized, even if it is not, in fact, normal (Ford & Airhihenbuwa, 2010). Enforcement of voting laws acts as a type of policing of who can and cannot vote, but this policing has substantial consequences. In the 2020 Presidential Election, a White man admitted that he voted illegally using his dead mother's name was given five years of probation, while a Black woman who voted on supervised release when she did not know she was ineligible to vote, received five years in prison (Editorial Board, 2021).

Health disparities are a consequence of discriminatory voting policy. From the above example, as well as countless others, one can conclude that tactics of voter suppression disproportionately hurt people of color (Hajnal et al., 2017) and that this disparate impact, may be intentional. This disenfranchisement is a form of discrimination and symbolically delineates who is allowed to vote, whose vote matters, and who is a full citizen. Being relegated to second-class citizenship, such that one feels disempowered with a loss of voice or agency, is harmful. In fact, being able to exert control over your life and feeling empowered is beneficial to health (Marmot, 2007; Wallerstein, 2002). Thus, we would expect that when the opportunity for empowerment is removed through voter suppression, this might be detrimental to one's well-being. Through previously established mechanisms of discrimination such as weathering, embodiment and stress (Bailey et al., 2017; Gee & Ford, 2011; Geronimus, 1996; Williams & Mohammed, 2013), the direct experience of voter suppression may harm health both acutely and chronically (Hing, 2020). Further, voter suppression may negatively impact the health of others through indirect pathways. Members of groups targeted by voter suppression or those who know people who have encountered voter suppression may experience vicarious racism, which has been found to negatively impact health, including infant outcomes.

Infant mortality and its comorbidities of preterm birth and low birth weight are often used as harbingers of societal well-being. Lower gestational age and low birth weight are two or the largest risk factors for infant mortality, and can contribute to future health and developmental problems, including stunting, learning disabilities, obesity, and diabetes (Larrabee Sonderlund et al., 2021). Further, persistent racial disparities exist across both, with Black women having much higher prevalence than White women of preterm (18.3% vs. 11.5%) and low birth weight (13.8% vs. 7.2%) infants (Giurgescu et al., 2011).

Discrimination is an established risk factor for adverse birth outcomes and a driver of racial disparities in these outcomes (Larrabee Sonderlund et al., 2021; Wallace et al., 2015). The consistency of this association has been found in numerous reviews linking discrimination and birth outcomes, yet the exact mechanisms are still being investigated (Larrabee Sonderlund et al., 2021). While most studies examine direct experience of racism across the life course or in different domains, such as work, some have examined how vicarious racism, racism that is experienced indirectly, through seeing or hearing about discriminatory or racist actions towards members of one's racial group, is related to health (Chae et al., 2021). The life course theory emphasizes the notion of linked lives, which suggests that lives are interconnected, and events experienced by one person also impact others in their network (Gee et al., 2012).

Dominguez and colleagues (2008) examined vicarious racism experienced across the life course, and found that for each one-unit increase in experience of lifetime racial discrimination, birth weight decreased by 39.6 grams. Hilmert and colleagues (2014) found that direct and vicarious experiences of racism were associated with lower infant birth weight through effects on prenatal diastolic blood pressure. Others found that direct and vicarious racism separately and jointly increase the odds for low infant birth weight (Slaughter-Acey et al., 2019). A one-unit increase in vicarious racism increased the odds of low birth weight by 184% in Black women over 25 years old.

The timing of exposure to racism during pregnancy is also important. While studies have found that childhood and lifetime exposure to racism does significantly impact health outcomes, such as preterm birth (Daniels et. al 2020), others have tried to identify the contribution of racism-related stress during specific sensitive periods of pregnancy (Lauderdale, 2006). Exposure to acute stress during pregnancy, such as through intense racialized events, has been found to be detrimental to infant health (Lauderdale, 2006; Novak et al., 2017). Lauderdale (2006) studied Arabic-named women who gave birth in the six months after September 11, 2001, as violence and harassment towards Arabs increased greatly during this period. This acute stressor was associated with an increase in the relative risk of preterm birth for Arab-named women. Novak, Geronimus, & Martinez-Cardoso (2017) found similar associations between acute, racialized stress and birth outcomes in studying the effects of the largest single-stie immigration raid in United States history. Specifically, risk of low birth weight increased 24% for infant born to Latina mothers after the raid compared to the same period a year prior, while no change was observed for infants born to White women. Both instances illustrate that, whether or not one is directly impacted by the event, the vicarious experience of witnessing your group members encounter racism during pregnancy, is stressful and can cause maladaptive physiological responses and adverse birth outcomes.

Measuring the relationships between voter suppression and health. Given the previous research linking discrimination and racism-related stress to birth outcomes, I propose that voter suppression experienced during Presidential elections will be associated with negative birth outcomes, especially for Black women. To study voter suppression, we must examine the various manifestations of voter suppression by operationalizing the concept through an array of different items. Although no one has yet empirically studied the impact of voter suppression on health, it is likely that different forms of voter suppression may differently impact health, either with variation in effect size or in the mechanisms through which the two are linked.

Using the Cooperative Congressional Election Survey (CCES), items were used to estimate the experience or presence of voter suppression in a county (CCES, Common Content 2008, 2012, 2016). For example, the "proportion of voters who reported being unable to vote for any reason" is included as it suggests that eligible voters faced barriers substantial enough to prevent them from voting, even though their intention to vote was present. Having to wait in line is another potential indicator of voter suppression as it can result from the closing of polling places, which then concentrates more voters at a given location, or the reduction of resources at a given polling places. If there are fewer poll workers or fewer voting machines, it might take people longer to vote, driving an increase in wait times.

Other items to measure voter suppression were created from data on specific policies that may suppress the vote or prevent suppression. For example, with the *Shelby v. Holder* Supreme Court Decision, states with a history of discrimination at the polls, which had been covered under Preclearance, were no longer required to seek approval from the Department of Justice when making changes to voting protocol. Consequently, there was an influx of voter identification laws proposed across the country, as well as other suppressive measures. Voter identification laws are argued to be a form of structural racism (Agénor et al., 2021) Given this, a dummy variable indicating if a county was covered under Preclearance or not, is included in these analyses, and a categorical variable indicating the strictness of voter identification requirements is included.

Each of these voting items indicates something different about the pathways of voter suppression, specifically, and structural racism, more generally. Having to wait for a long period of time to vote could point to disinvestment of election-related resources to specific, often majority Black and Brown, neighborhoods (Pettigrew, 2017). Wait times, then, at most, may indicate a larger pattern of disinvestment in a neighborhood, while, at minimum, mark the amount of time participants must spend to cast their ballot. This time spent waiting to vote takes away from time spend on paid work, childcare, leisure time, or sleep. Further, the loss of this time could cause increased stress upon the individual, negatively impacting their health. While it could be acute and limited to election day, the anticipatory stress of figuring out and when to vote, and enduring this for each election, could harm health. Further, if this time waiting is spent in adverse conditions, such as outside in the early winter cold or an abnormal heat wave, very direct health impacts of hypothermia or heat stress could be experienced. For pregnant women, who are already in a more vulnerable states, the effects could be injurious to both mother and infant.

Voter identification laws also highlight how racism within electoral institutions is connected to racism in other civic and citizenship-producing institutions such as the Department of Motor Vehicles (DMV) or even the carceral system. One of the most common reasons to interact with the DMV is to obtain or renew a driver’s license. Going to the DMV can be onerous, not only does license renewal cost money but given the limited hours that the DMV is open, which is similar to the hours of a polling place, one must usually take a couple hours off from work, if not more. For those with salaried positions, this may not be so difficult, but for those with hourly-paid jobs, it may be challenging to schedule time off; further, the loss of that income may be non-negotiable. These barriers, among others, including the cost of a car and car insurance, may prevent people from needing or being able to afford a driver's license, which is the most commonly accepted form of identification for voting. African Americans have driver's licenses at half the rates of Whites (Parson & McLaughlin, 2007). Thus, requiring government issued photo identification, as eight states currently do, can result in many voters, especially voters of color, being turned away. Not only the chronic frustration of interacting with institutions not built to meet the needs of all citizens, but also the specific insult of being turned away when you try to vote, could act as stressor triggering psychosomatic responses.

Thus, although no literature has yet measured the association between voter suppression and health disparities, the above evidence suggests that voter suppression should influence health, and that voter suppression will have a more detrimental effect on the health of people of color.

Given the above, this chapter seeks to investigate the following hypotheses:

H2a: Voter suppression is associated with lower birth weight and lower gestational age.

H2b: The effect of voter suppression on infant outcomes will be modified by race, such that the negative effect of voter suppression will be stronger for Blacks as compared to Whites.

Methods

Data

Birth data were obtained from the National Center for Health Statistics Birth Cohort Data from 2008-2009, 2012-2013, and 2016-2017 (Statistics NCfH). All births are reported, along with county of birth. Records include infant characteristics (month prenatal care began, birth in hospital or not, birth weight, delivery method, birth order, gestational age, and age of infant at death if applicable) and maternal characteristics (age, race, Hispanic origin, marital status, education). These analyses utilized the denominator file, containing all birth certificates for all infants born in a given year. These data are especially useful as it provided information on every birth in the United States. Protected data was requested and obtained from the National Center for Health Statistics which contains geographic information (county of birth), which was used to match infant outcomes to county-level and state-level exposures. Zip code data is not available. As data is obtained from birth certificates, there is some missing data cross demographic characteristics and mother's health history and behaviors.

To examine the impact of county voter suppression on individual health, multiple datasets were used, as no one dataset currently meaningfully examines both voting and health. Voting data was obtained from the Cooperative Congressional Election Study 2008, 2012, and 2016 (CCES Common Content). While this data is collected at the individual level, results were aggregated to the county level. Individual responses were dichotomized into dummy variables, and after using the collapse command in Stata with weights, represent the proportion of people who answered with that response in that county.

A list of counties previously covered by Preclearance was collected from the Department of Justice Report. Two townships in Michigan were covered under Preclearance but were not included as being under Preclearance in this analysis as the townships only make up a fraction of the overall county. I sought to be conservative in my estimation and marked these counties as not being covered, since there were still many people in those counties unaffected by Preclearance. Once the analytic sample was created, those two counties were excluded due to missingness, and, thus, that coding decision was inconsequential.

The *National Conference of State Legislatures (NCSL),* a bipartisan organization that collects data and provides resources to strengthen state legislatures, created a comprehensive summary of voter identification laws in each state, categorizing each by level of strictness and the requirement of photo identification. For each year beginning in 2000, NCSL tracked the development and passing of voter identification laws in each state, and categorized each state's policy into five categories. For example, Georgia is a state categorized as "strict photo ID," as this state requires photo identification to be shown at the polls. Without proper identification, the constituent must vote on a provisional ballot and then return in three days to verify their identity (National Conference of State Legislatures, 2021). In comparison, New York requires no form of identification to vote and is categorized as such. This data will be used as the basis for the *state-level voter identification measure* of voter suppression and is measured in each presidential election year 2008, 2012, and 2016.

To estimate covariates at the county level, American Community Survey (ACS) data was used. For 2008 covariates, both ACS 3-year and ACS1-year were used, as health insurance status was only available in the 1-year extract (US Census Bureau, 2020). All other covariates (percent black, percent with college education, etc.) were collected from the 2008 ACS 3-year data. The 2012 covariates were calculated using 2012 ACS 5-year data (US Census Bureau, 2020) and the 2016 covariates were calculated using the 2016 ACS 5-year data (US Census Bureau, 2020). As ACS is an individual-level dataset, weights were applied and then data was aggregated to the appropriate level (county and state) using the `collapse` command in Stata.

Once these data were cleaned, they were matched based on the Federal Information Processing Standards (FIPS) code, which is unique for each county. A state FIPS code also exists, and data were matched on this identifier for state-level analyses with voter identification laws.

Sample

While there are nearly 4 million births each year, once birth data was matched to available county data and the sample was restricted to participants without missing data on any of the included variables, the sample size was 341,054 infants nested in 120 counties for 2008, 416,196 infants nested in 96 counties for 2012, and 332,642 infants nested in 94 counties for 2016. As this is just over 10% of total births clustered in only some of the 3,243 counties, this data is not representative of the country as a whole, but instead consists of a highly selected sample from which we can begin to understand how voter suppression influences health. Only infants born to women who were pregnant during the election were included in the sample; these inclusion criteria were calculated using an infant's birth month and year and gestational age. This sample also excludes counties that, although they had mothers who were not missing on any variables, were also missing White or Black births. As this analysis is about understanding racial disparities in infant outcomes, each county needed to have at least one Black and one White infant for comparison. Participants were also dropped when the voting variables were added to the analysis due to matching with geographic data. As they were only asked of a subsample of the CCES data, and we further required participants to have answered all voting items. These inclusion criteria resulted in a smaller sample size, but it is the appropriate sample given the research questions at hand.

A separate sample was used to examine state voter suppression, which was assessed using voter identification laws. As state data was dependent on matching ACS and NCHS data to

NCSL data, the sample for each year is larger, only slightly for 2008 (378,081 infants nested in 12 states), but almost double for 2012 (762,404 infants nested in 22 states) and 2016 (748,243 infants in 30 states).

Measures

Birth outcomes. Birth weight, measured in grams, is the weight of the infant when born and ranges from 227-8,165 grams across all years. Generally speaking, higher birth weight in considered a better outcome, as increased risk for mortality exists when an infant is more with low birth weight, which is a weight under 2,500 (5.5 lbs).

Gestational age, measured in weeks, is the estimated age of the infant when born. This date is calculated as the birth date minus the number of weeks since mother's last menstrual cycle and is subject some error as result of the nature of reporting. Gestational age ranged from 17-47 weeks. Babies are considered premature at 37 weeks and face higher health risks when born early.

A physician specializing in obstetrics and gynecology was consulted about the more extreme values of gestational age and birth weight, and while they are uncommon, they exist within the realm of biologic possibility, and, as such, were included in analyses. Birth weight is the more reliable outcome, as it is less subject to error due to its calculation process. Because gestational age is estimated from the date of the mother's last menstrual cycle, it is subject to recall bias, whereas birth weight is measured on a scale at birth, avoiding such memory issues.

Voter suppression items- county level. All voter suppression items were created from dichotomous variables at the individual-level in the CCES datasets, which were then aggregated to represent the proportion of people in each county who experienced that particular indicator of voter suppression.

Proportion unable to vote. The proportion of people who were unable to vote was assessed using a dummy variable created from a question about voting behavior, which asked, “which of the following statements best describes you?” ‘1’ I did not vote in the election this November; ‘2’ I thought about voting this time – but didn’t; ‘3’ I usually vote but didn’t this time; ‘4’ I attempted to vote but did not or could not; ‘5’ I definitely voted in the November General Election. If a respondent answered ‘4’ I attempted to vote but did not or could not, they were coded as ‘1’ for the dummy variable, while all other answers were coded as ‘0.’ This question of voting behavior was asked of all survey participants. The dummy variable ‘unable to vote’ does not capture the *reason* that an individual could not cast a ballot. Rather, this item identifies any individual who was unable to vote for any number of causes.

Proportion waited more than 30 minutes to vote. To assess voting wait time, respondents were asked, “how long did you wait to vote?” and could answer ‘1' not at all, ‘2’ less than 10 minutes, ‘3’ 10-30 minutes, ‘4’ 31 minutes to an hour, ‘5’ more than one hour in which participants asked to provide their wait time in an opened ended follow-up question. This variable was dichotomized into ‘0’ waited 30 minutes or fewer and ‘1’ waited more than 30 minutes. The proportion of people who reported waiting more than 30 minutes is used in analyses as a county-level variable. As wait times tend to increase with many forms of voter suppression, such as reduction in early voting, the closing of polling places, or shorter voting hours, it is an important indicator of possible voter suppression.

Proportion unable to vote because. The following three items were asked only of people who reported they were unable to vote. If they were unable to vote, they were asked to choose from a list of reasons for why they could not vote. Reasons that could be indicative of voter suppression were selected for inclusion in this analysis and were: unable to vote because the line was too long, unable to vote because requested but did not receive an absentee ballot, and unable to vote but tried. Other reasons included 'I did not like the candidate,' 'I forgot,' and 'bad weather,' but these reasons were not theoretically linked to known forms of voter suppression. The following three items are important and distinct from the previous two, in that they do not just indicate conditions around voting, but show how many people experienced conditions that actually prevented them from voting. These people had the intention to vote, but because of various reasons, were not able to fulfill this objective. From these items, the proportion of people experiencing each were created to be county-level variables: proportion unable to vote because line was too long; proportion unable to vote because requested but did not receive absentee ballot, and proportion unable to vote but tried.

Experienced intimidation when voting. The proportion who experienced intimidation at the polls was measured by asking "did you personally feel intimidated at the place where you voted", with responses '1' yes, '2' no, and '3' do not remember. This question was only asked in the 2016 survey.

Formerly covered by Section 5 Preclearance. The United States Department of Justice provides a list of counties previously covered under Section 5 of the Voting Rights Act which required states with a history of discrimination to undergo a process of Preclearance before making changes to their voting policies. Thus, this variable acts as an indicator of historic discrimination but also may have prevented discrimination at the polls in 2008 and 2012. However, in 2016, after the Preclearance was abolished, it acts only as a marker of historic racism. Given this change, analyses using this variable must be understood within their specific temporal context. Counties were coded as '1' previously covered under Section 5 and '0' not previously covered under Section 5.

Voter suppression items- state level. <u>Voter identification requirement</u>. The National Conference of State Legislatures categorizes state voter identification laws into five groupings: strict photo, strict non-photo, photo identification requested, identification requested photo not required, and no document required. From these groupings, a five categorical variable was created from least strict (no document required) to most strict (strict photo). However, as a result of inclusion criteria related to other variables, no states with "no document required" were included in analyses. Non-strict non-photo is used as the reference group for all analyses.

Moderators. <u>Mother's race-ethnicity</u>. Mother's race-ethnicity is included as a potential modifier across analyses to investigate the differential impact of voter suppression on health by race given the effect of living in a racialized society. Race, while not biologic, is a social construct which indicates one's social position on a racial hierarchy upheld by an ideology of White Supremacy. As a result, race acts as a marker of exposure to stressors and access to resources which may have consequences for voting access and birth outcomes. Race and ethnicity are indicated on the birth certificate and are directed to be self-reported by the mother. Using this information, a dichotomous variable was created of '0' non-Hispanic White and '1' non-Hispanic Black. Infant race is not reported. In consideration of stress pathways linking racism to birth outcomes, knowing the race of the mother is the most important because it is she who exists in the racialized world and internalizes its stressors through embodiment (Krieger, 2005).

Infant-level covariates. Sex. Infant sex was reported on birth certificate as male or female and was coded as ‘1’ and ‘0’ respectively. Sex was included as a covariate because male infants are more at risk of infant mortality and preterm birth.

Mother’s marital status. Birth certificates reported married ‘yes’ or ‘no’ which was coded as ‘1’ and ‘0’, respectively.

Mother’s educational level. Mother’s education was recoded into a five-category variable: ‘1’ Less than high school, ‘2’ High school graduate, ‘3’ Some college, ‘4’ College graduate, and ‘5’ more than college. Education has been linked to both voting behavior and infant outcomes. Further, mother’s education is especially important in understanding racial disparities in infant outcomes (Fishman et al., 2020).

Mother’s age. Mother’s age is included as a covariate because age is associated with voting behavior and is a known risk factor for infant outcomes and acts as a pathway explaining racial disparities in infant outcomes (Geronimus, 1992). Age is reported as a range of 1-9 and was used as a continuous indicator. As coded ,‘1’ is under 15 years, ‘2’ is 15-19 years, ‘3’ is 20-24 years, ‘4’ is 25-29 years, ‘5’ is 30-34 years, ‘6’ is 35-39 years, ‘7’ is 4-44 years, ‘8’ us 45-49 years, and ‘9’ is 50-54 years.

No prenatal care. Prenatal care is associated with infant outcomes and was coded dichotomously as ‘0’ receiving any prenatal care and ‘1’ receiving no prenatal care.

Type of birth. Type of birth was coded as ‘0’ vaginal and ‘1’ Caesarean section.

Total birth order. A continuous variable, total birth order tells which number of pregnancies the infant was, this includes both live births and miscarriages.

Pre-pregnancy and gestational risk factors. Five maternal risk factors both before and during pregnancy were included and coded as '0' no and '1' yes. These five include pre-pregnancy diabetes, gestational diabetes, pre-pregnancy hypertension, gestational hypertension, and eclampsia.

Cigarette use. Birth data reported cigarette use across each trimester. Measured continuously, these three numbers were added to represent the total number of cigarettes smoked during pregnancy.

County-level covariates. Factors that may influence the context in which voting policies are passed and the lived experience of mothers within these counties, were added as covariates. For example, anecdotal evidence of voter suppression, such as polling place closures, suggests this occurs more frequently in non-White neighborhoods; thus, an indicator of the racial composition of the county is included. Covariates include demographic variables such as the county's proportion of Black residents and the proportion over the age of 65 years, and socioeconomic variables, such as the proportion unemployed, the proportion with a college degree, and the proportion uninsured. Because those with college degrees, older adults, healthier adults, and employed persons tend to vote more, it is possible that more resources to access voting exist in counties in which these groups are more plentiful. In the same manner and county-level voting items, this information was aggregated from individual-level responses in ACS data.

Analyses

Analyses were conducted using Stata MP 15 and SAS Enterprise 9.4. While the intention was to use Stata for all analyses, the software could not converge the mixed regression models to find a solution; thus, analyses were switched to SAS 9.4 which was more powerful. Descriptive statistics were obtained, using Stata, for infant-level, county-level, and state-level variables. Models were only ever run with two levels (infant and county or infant and state), not three. Given the interest in racial health disparities and the hypothesized racialized effect of voter suppression on Black mothers and infants, infant items were stratified by mother's race. County and state-level items were also stratified, but instead by high or low voter suppression for each voting item. High/low categories were created using the median value for continuous indicators to determine if conditions in counties with higher prevalence of voter suppression differ from counties with lower voter suppression. As Preclearance is a dichotomous categorical variable, descriptive statistics with this indicator were stratified by being previously covered or not. Group differences were tested using t-tests and significance was reported.

Given the nested nature of the data of mothers/infant located within specific geographic locations (counties or states), mixed modeling is used. While the intraclass correlation coefficient was low, at about 0.01 for all years and outcomes, the large number of groups, as well as the large design effect, required the use of mixed models to address the lack of independence among observations. When analyzing of multilevel data, some key threats to the validity of the data include: aggregation bias and misestimated standard errors. I address aggregation bias by looking at the same variables across the two levels, for example, what is the effect of a mother's education on the infant outcome as opposed to the overall level of education for the county itself? By including both, I was able to decompose the effects of these variables into separate components by their level and understand their unique contribution to infant outcomes. Misestimated standard errors are accounted for because by using `proc mixed` in SAS 9.4, I am able to account for the dependence among the level-1 respondents that exists because of their shared experiences across geographic locations by including a random intercept for county or state. Weights were not applied at this stage as they were applied earlier for ACS and CCES datasets when aggregated. No weights were required for NCHS birth data.

First, I examined the relationship between continuous birth outcomes (birth weight in grams and gestational age in weeks) and voter suppression items, with one model run for each combination of birth outcome and voter suppression item. A random intercept was included to account for the county or state of residence. Next, county-level covariates were added to these models, followed by infant-level covariates. In the final model, an interaction term between mother's race and the voter suppression item were added to determine if the effect of voter suppression on health varies by race-ethnicity. The significance of these effects was tested using both t-tests, to understand the effect of a single category in a categorical variable or whole continuous variable, and F-tests to examine if the whole categorical variable, especially the interaction terms, was significant. Interactions were plotted using Excel. Simplified equations for each model are shown below. In each, r_{ij} represents the random error for each individual and u_{0j} represents the random intercept for each county or state's unique effect on the outcome.

Model 1

$$\text{Birth outcome} = \beta_0+\beta_1(\text{voter suppression item})_{1j}+r_{ij}+u_{0j}$$

Model 2

$$\text{Birth outcome} = \beta_0+\beta_1(\text{voter suppression item})_{1j} + \beta_2(\text{county covariates})_{2j} +r_{ij}+u_{0j}$$

Model 3

$$\text{Birth outcome} = \beta_0+\beta_1(\text{voter suppression item})_{1j} + \beta_2(\text{county covariates})_{2j} +\beta_3(\text{infant covariates})_{3ij} +r_{ij}+u_{0j}$$

Model 4

$$\text{Birth outcome} = \beta_0+\beta_1(\text{voter suppression item})_{1j} + \beta_2(\text{county covariates})_{2j} + \beta_3(\text{race})_{3ij}+ \beta_4(\text{infant covariates})_{4ij}+ \beta_5(\text{voter suppression item})_{1j}(\text{race})_{3ij} +r_{ij}+u_{0j}$$

Given the issues with model convergence in Stata and the time taken to access, learn, and run models in SAS, logistic regression with dichotomous birth outcomes (premature birth and low birth weight) were not run. However, these should be investigated in future analyses if software is able to estimate a solution.

Results

Descriptive statistics – County analytic sample

Tables 1a-c display the means with standard errors or percents for each set of data by year: 2008, 2012, and 2016. The key variables for consideration are birth outcomes (gestational age in weeks and birth weight in grams), voter suppression items, and mother's race. Given that voter suppression is the key predictor, and race is a potential modifier, descriptive statistics have been stratified accordingly. Infant-level characteristics are stratified by mother's race while county-level characteristics are first reported unstratified. Additional tables for each county-level variable stratified by each voter suppression item (high vs. low) are provided in Appendix D. In 2008, the sample is about 20% Black and 80% White; in 2012, it is about 24% Black and 76% White; and in 2016, it is about 26% Black and 74% White. The United States is about 14% Black, so there are slightly more Black participants in our sample than the national average.

Birth outcomes. Table1a shows that, for 2008, there are significant differences by race across almost all variables. For key health outcomes, the average gestational age for Black infants (38.3 weeks) is .4 weeks less than for White infants (38.7 weeks). Birth weight is also significantly lower for Black infants (3,103.4 g) compared to White infants (3,340.1 g). Similar numbers are observed for the state analytic sample – though average birth weight is slightly lower for both racial groups.

Infant-level covariates. When we consider demographic and socioeconomic infant-level variables, we see that education is substantially skewed lower for mother's of Black infant, and higher for mother's of White infants. In 2008, when categories are combined, more than 40% of White mothers have a college degree or higher compared to just under 13% for Black mothers. Another large disparity exists for marriage, with 24.1% of Black mothers married compared to 74.8% of White mothers (Table1a). Both these trends persist into 2012 and 2016. In 2016, the education gap is even larger, with 50% of White mothers having a college education or more, while Black mothers remained at about 14% (Table 1c). These results suggest that infants are born into vastly different contexts with varying resources at the disposal of the mother to foster a healthy first year. Black mothers also tend to be younger.

Regarding health behaviors and risk factors, significant differences exist by race across all items. In all years, Black mothers show more favorable outcomes for the number of cigarettes smoked during pregnancy (for example, 1.6 vs. 2.9 in 2008) and gestational diabetes (3.1% vs. 3.6%) compared to White mothers. In all other regards though, Black mothers and infants ae disadvantaged. Across all years, Black mothers have at least a three times higher percent of receiving no prenatal care during their pregnancy, with 4.5% not receiving care in 2016 compared to White mothers. Black mothers also have significantly higher prevalence across all years of pre-pregnancy diabetes, both pre-pregnancy and gestational hypertension, and eclampsia.

County-level voting characteristics. First, we will examine the unstratified county-level covariates, which are relatively stable across years. In this sample, voting rates are much higher than the reported national average of about 61% across this time period, with 89% voting in 2008, 92% in 2012, and 91% in 2016. The proportion who reported they were unable to vote is low, about .01-.02% of the population. While this may seem like voter suppression is a small problem, is .01% of the sample is still about 10,000 people across these three years who were unable to vote. Further, this number does not include the number of people who were able to vote but had to overcome additional barriers to do so. When we consider the reasons why someone was unable to vote, we see that for 2008 and 2016, the proportion for being unable to vote because of long lines, not receiving requested absentee ballots, or having tried but being turned away is .01 for each item compared to less than .01 for 2012. The proportion of people waiting 30 minutes or more to vote was lowest in 2016 (.44), and highest in 2008 (.57). When considering the percent of counties covered by Preclearance, variation across years is observed. The percent of counties covered by Preclearance is lowest in 2008 (21.9%), increases in 2012 (25.7%), and is highest in 2016 (35.3%).

County-level covariates. First, county-level covariates are presented unstratified. As the number of Black participants increases over the years, so does the mean proportion of Black residents in counties included in this sample. In 2008, the mean proportion Black is .13, but this increases to .20 in 2016. The counties also age, as would be expected with overall demographic trends in the United States of the aging Baby Boomer generation; the mean proportion over age 65 is .11 in 2008 and increases to .13 in 2016. Mean proportion unemployed shifts a bit across years, between .04 (2008) and .6 (2012). Mean proportion uninsured increases from 2008 (.14) to 2012 (.16) but then decreases in 2016 (.12).

Next, county-level covariates were stratified by high/low voter suppression for each indicator, complete results are available in Appendix D. Nearly all county-level variables, both voting items and covariates, are significantly different between counties with high vs. low voter suppression. The only nonsignificant category is the proportion of people who were unable to vote but tried in 2012, as stratified by being unable to vote because the line was too long. First examining the number of counties that are designated 'high' or 'low' is illustrative. There is not a steady split in any year across voting items. For example, in 2008, 68 counties were categorized as 'low' and 52 as 'high' for the proportion of people unable to vote (Appendix D, Table D1). When we then look at stratification by proportion unable to vote because did not receive the requested absentee ballot, the breakdown is 100 'low' counties and 20 'high' counties (Appendix D, Table D4). Even across years, the breakdown for each category changes, as we might expect given that the composition of counties in each yearly sample varies.

As a consequence of suppressive policies could be lower voter turnout, it is important to note that the proportion who voted is significantly lower in almost all instances. Interestingly, though, voter turnout in 2012 was higher in counties with higher proportions of people waiting more than 30 minutes to vote (.93) than in counties where fewer people waited (.92; Appendix D, Table D8). However, it is possible that wait times were higher because more people turned out to vote and, thus, had to wait longer.

Table 1a. Means and percents for 2008 Cooperative Congressional Election Study, 2008-2009 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2008 3-year Data (N=120 Counties, 341,054 infants).

Level 1 – Mother/Infant N=341,054			
Characteristic	Black N=68,742	White N=272,312	p-value
Gestational age (weeks)	38.3 (2.7)	38.7 (2.2)	***
Birth weight (grams)	3,103.4 (596.7)	3,340.1 (566.3)	***
Male infant	50.8%	51.2%	
Mother's education level			
Less than high school	21.7%	7.9%	***
High school	31.8%	20.2%	***
Some college	33.7%	30.4%	***
College	8.5%	26.8%	***
More than college	4.3%	14.8%	***
Mother married	24.1%	74.8%	***
Mother's age (range 1-9)	3.7 (1.3)	4.4 (1.2)	***
No prenatal care	3.7%	1.0%	***
Cesarean-section birth	35.0%	33.1%	
Total birth order	2.7 (1.8)	2.3 (1.5)	***
Pre-pregnancy diabetes	.8%	.5%	***
Gestational diabetes	3.1%	3.6%	***
Pre-pregnancy hypertension	2.4%	1.1%	***
Gestational hypertension	5.1%	4.4%	***
Eclampsia	.2%	.2%	***
Cigarettes smoked during pregnancy	1.6 (8.2)	2.9 (11.1)	***
Level 2 – County N=120			
Proportion voted		.89 (.06)	
Proportion unable to vote		.02 (.03)	
Proportion waited more than 30 minutes to vote		.57 (.16)	
Proportion unable to vote because the line was too long		.01 (.01)	
Proportion unable to vote because requested but did not receive absentee ballot		.01 (.01)	
Proportion unable to vote at the polls but tried		.01 (.01)	
Preclearance		21.9%	
Proportion Black		.13 (.12)	
Proportion over 65 years		.11 (.03)	
Proportion unemployed		.04 (.01)	
Proportion with a college degree		.21 (.06)	
Proportion uninsured		.15 (.06)	

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for Black vs. White

Table 1b. Means and percents for 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 5-year Data (N=96 Counties, 416,916 infants).

Characteristic	Black	White	p-value
	Level 1 – Mother/Infant N=416,196		
	N=99,378	N=316,818	
Gestational age (weeks)	38.3 (2.7)	38.8 (2.2)	***
Birth weight (grams)	3,097.3 (606.4)	3,338.4 (570.1)	***
Male infant	50.8%	51.3%	**
Mother's education level			***
Less than high school	17.9%	5.8%	
High school	32.8%	17.8%	
Some college	35.0%	28.9%	
College	9.4%	29.1%	
More than college	5.0%	18.3%	
Mother married	23.1%	75.1%	***
Mother's age (range 1-9)	4.3 (3.0)	4.4 (2.9)	*
No prenatal care	3.1%	1.0%	***
Cesarean-section birth	36.1%	32.6%	***
Total birth order	2.7 (1.8)	2.3 (1.5)	***
Pre-pregnancy diabetes	1.0%	.6%	***
Gestational diabetes	4.0%	4.3%	*
Pre-pregnancy hypertension	2.8%	1.3%	***
Gestational hypertension	6.1%	5.0%	***
Eclampsia	.5%	.2%	***
Cigarettes smoked during pregnancy	1.1 (7.1)	1.8 (8.3)	***
	Level 2 – County N=96		
Proportion voted		.92 (.05)	
Proportion unable to vote		.01 (.02)	
Proportion waited more than 30 minutes to vote		.45 (.19)	
Proportion unable to vote because the line was too long		.00 (.01)	
Proportion unable to vote because requested but did not receive absentee ballot		.00 (.01)	
Proportion unable to vote at the polls but tried		.00 (.01)	
Preclearance		25.7%	
Proportion Black		.16 (.12)	
Proportion over 65 years		.12 (.03)	
Proportion unemployed		.06 (.01)	
Proportion with a college degree		.22 (.07)	
Proportion uninsured		.16 (.05)	

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for Black vs. White

Table 1c. Means and percents for 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=94 Counties, 332,642 infants).

Level 1 – Mother/Infant N=332,642			
Characteristic	Black N=87,663	White N=244,979	p-value
Gestational age (weeks)	38.2 (2.8)	38.8 (2.2)	***
Birth weight (grams)	3,066.2 (607.2)	3,335.2 (571.6)	***
Male infant	51.0%	51.2%	
Mother's education level			***
Less than high school	14.0%	5.0%	
High school	35.2%	17.3%	
Some college	35.3%	27.2%	
College	9.9%	30.7%	
More than college	5.6%	19.9%	
Mother married	22.6%	76.4%	***
Mother's age (range 1-9)	4.0 (1.2)	4.6 (1.1)	***
No prenatal care	4.5%	1.5%	***
Cesarean-section birth	34.8%	31.0%	***
Total birth order	2.9 (1.8)	2.4 (1.6)	***
Pre-pregnancy diabetes	1.3%	.7%	***
Gestational diabetes	4.5%	5.4%	***
Pre-pregnancy hypertension	4.3%	1.8%	***
Gestational hypertension	8.8%	7.4%	***
Eclampsia	.4%	.2%	***
Cigarettes smoked during pregnancy	1.0 (7.0)	1.6 (8.1)	***
Level 2 – County N=94			
Proportion voted		.91 (.05)	
Proportion unable to vote		.02 (.02)	
Proportion waited more than 30 minutes to vote		.44 (.19)	
Experienced intimidation when voting		.05 (.06)	
Proportion unable to vote because the line was too long		.01 (.01)	
Proportion unable to vote because requested but did not receive absentee ballot		.01 (.01)	
Proportion unable to vote at the polls but tried		.01 (.01)	
Preclearance		35.2%	
Proportion Black		.20 (.14)	
Proportion over 65 years		.13 (.03)	
Proportion unemployed		.05 (.01)	
Proportion with a college degree		.25 (.07)	
Proportion uninsured		.12 (.04)	

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for Black vs. White

We also might expect counties with higher levels of voter suppression to have a higher proportion of Black residents (Acharya et al., 2016) given that some research has found that markers of voter suppression, such as increased wait times, are more prevalent in communities of color (Pettigrew, 2017). While this is the notable trend across most voting items and years, there are a handful of exceptions, with most occurring in 2016. For example, in 2012, the proportion of Black residents was lower in counties with a higher proportion of people waiting 30 minutes or more and in counties with a higher proportion of people being unable to vote because they did not receive their absentee ballot. In addition to those to voting items for 2016, a lower proportion of Black residents was also observed in counties with high proportion of people unable to vote, people who were unable to vote but tried, and people who were intimidated. While this is still a small diversion from the overall trend, it is notable that 2016 is such a unique year.

Descriptive statistics – State analytic sample

Overall, results for the state sample mirror the patterns observed in the analytic sample (Tables 2a-c). In 2008, 17% of the infant sample was Black; in 2012, this was 20%; and in 2016, this was 21%. As there was only one voting item at the state-level, infant-level characteristics in these tables are stratified by race, while state-level characteristics are stratified by strict (strict photo or strict non-photo) or non-strict (non-strict photo, non-strict non-photo, or no requirement) voting requirements. The distribution of states between these two categories is uneven, with 2 strict and 10 non-strict in 2008, 6 strict and 16 non-strict states in 2012, and 9 strict and 21 non-strict in 2016. While not an exact match, this does follow the general trend of fewer states having strict requirements and follows the increase in the presence of strict requirements over time.

Birth outcomes. Across all the years, stratified means are almost identical for birth outcomes. The mean gestational age for Black infants is 38.2 weeks for all years, and for Whites is 38.7 for 2008 and 38.8 for 2012 and 2016. Mean birth weight for Black infants ranges from 3,059 grams to 3,074 grams while mean birth weight for White infants ranges from 3,310 grams to 3,336 grams. The differences between racial groups for both birth outcomes are statistically significant at $p<.001$.

Infant-level covariates. As seen with the county-level analyses, some variation across years exists in the distribution of education levels, but the overall pattern of White mother's having a higher average level of education compared to Black mothers holds steady, as do the much higher rates of marriage for White mothers compared to Black mothers. Age differences are also apparent, with White mothers significantly older than Black mothers.

For health-related factors, prevalence of no prenatal care is also three times higher for Black mothers compared to White. Black mothers have lower prevalence of gestational diabetes, but higher prevalence of pre-pregnancy diabetes and hypertension, gestational hypertension, and eclampsia. Black mothers smoked significantly fewer cigarettes during pregnancies.

State-level covariates. State-level covariates were stratified by strict or non-strict voter identification requirements, with strict requirements presenting an increased barrier to the ballot box. In examining the proportion of Black residents in the state, there are more Black residents in strict states than non-strict for 2012 and 2016. As I hypothesize that voter identification requirements are a means of controlling access to the vote, it follows that more regulation might occur in states with larger proportion of Black residents. However, the opposite is observed in 2008 (Table 2a), in which non-strict states have a larger proportion of Black residents (0.11) compared to strict states (0.10). This may be due to the relatively small number of states with strict voter identification requirements at that time. This notion is supported by evidence in 2012 (Table 2b) and 2016 (Table 2c) which shows that strict states have 2% more Black residents than do non-strict states. The proportion uninsured is higher in non-strict states compared to strict for all years, and no discernible pattern exists between strict and non-strict states and the other covariates of age, unemployment, and education.

In examining the means of the proportion of people reporting on items of voter suppression in county-level descriptive statistics (Tables1a-c), we see that the prevalence of these items varies greatly. Waiting in line for 30 minutes or more is especially common, with almost 50% of people experiencing this. Whereas only 1-2% of the population are truly unable to vote in this sample. Further, in examining the county-covariates in tables in Appendix D as stratified by high and low voter suppression, the observed variability suggests that these voter suppression items are quite distinct in their relation to other demographic and socioeconomic characteristics, and likely, via social determinants, health. Thus, each voter suppression item is examined in its own model to better understand how that specific form or indicator of voter suppression may be related to health. Lastly, given the strong association between race and birth outcomes and the hypotheses of moderation, the investigation of an interaction between voter suppression and birth outcomes is warranted.

Table 2a. Means and percents for 2008 Cooperative Congressional Election Study, 2008-2009 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2008 3-year Data (N=12 states, 378,081 infants)

	Level 1 – Mother/Infant N=378,081		
Characteristic	Black N=64,320	White N=313,761	p-value
Gestational age (weeks)	38.2 (2.7)	38.7 (2.2)	***
Birth weight (grams)	3,067.9 (586.1)	3,310.7 (558.6)	***
Male infant	50.6%	51.2%	**
Mother's education level			***
Less than high school	23.4 %	12.4%	
High school	32.6%	24.7%	
Some college	33.3%	31.3%	
College	7.3%	22.0%	
More than college	3.4%	9.7%	
Mother married	23.2%	68.7%	
Mother's age (range 1-9)	3.6 (1.2)	4.1 (1.2)	***
No prenatal care	4.5%	1.3%	***
Cesarean-section birth	34.9%	32.8%	**
Total birth order	2.56 (1.66)	2.3 (1.5)	***
Pre-pregnancy diabetes	0.9%	0.6%	***
Gestational diabetes	3.5%	4.1%	***
Pre-pregnancy hypertension	2.6%	1.4%	***
Gestational hypertension	5.7%	5.3%	***
Eclampsia	0.3%	0.2%	***
Cigarettes smoked all pregnancy	2.0 (8.7)	5.1 (14.0)	***
	Level 2 – State N=12		
	Strict Identification Requirement N=2	Non-strict Identification Requirement N=10	p-value
Proportion Black	0.10 (0.01)	0.11 (0.07)	***
Proportion over 65 years	0.13 (0.00)	0.12 (0.01)	***
Proportion unemployed	0.05 (0.00)	0.04 (0.00)	***
Proportion with a college degree	0.16 (0.01)	0.17 (0.03)	***
Proportion uninsured	0.12 (0.01)	0.18 (0.05)	***

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table 2b. Means and percents for 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 5-year Data (N=22 states, 762,404 infants).

	Level 1 – Mother/Infant N=762,404		
Characteristic	Black N=154,709	White N=607,695	p-value
Gestational age (weeks)	38.2 (2.8)	38.8 (2.2)	***
Birth weight (grams)	3,074.3 (597.8)	3,319 (561.9)	***
Male infant	50.7%	51.3%	***
Mother's education level			***
Less than high school	18.4%3	9.6%	
High school	4.6%	23.5%	
Some college	34.8%	32.7%	
College	8.1%	23.3%	
More than college	4.1%	10.9%	
Mother married	23.4%	68.6%	
Mother's age (range 1-9)	4.3 (3.0)	4.4 (2.9)	***
No prenatal care	3.1%	1.0%	***
Cesarean-section birth	36.1%	32.5%	***
Total birth order	2.6 (1.7)	2.4 (1.5)	***
Pre-pregnancy diabetes	1.1%	.7%	***
Gestational diabetes	4.0%	4.6%	***
Pre-pregnancy hypertension	3.1%	1.5%	***
Gestational hypertension	6.8%	5.9%6	***
Eclampsia	.3%	.3%	***
Cigarettes smoked all pregnancy	1.7 (8.6)	4.1 (12.7)	***
	Level 2 – State N=22		
	Strict Identification Requirement N=6	Non-strict Identification Requirement N=16	p-value
Proportion Black	.15 (.07)	.13 (.09)	***
Proportion over 65 years	.13 (.01)	.13 (.03)	**
Proportion unemployed	.06 (.01)	.06 (.01)	***
Proportion with a college degree	.18 (.03)	.18 (.02)	***
Proportion uninsured	.14 (.03)	.19 (.04)	***

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table 2c. Means and percents for 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=30 states, 748,243 infants).

	Level 1 – Mother/Infant N=748,243		
Characteristic	Black N=162,200	White N=586,043	p-value
Gestational age (weeks)	38.2 (2.7)	38.8 (2.2)	***
Birth weight (grams)	3,059.4 (594.4)	3,336.2 (560.4)	***
Male infant	50.1%	51.3%	**
Mother's education level			***
Less than high school	13.8%	8.0%	
High school	37.6%	23.3%	
Some college	35.1%	31.4%	
College	9.0%4	24.9%	
More than college	4.5%	12.4%	
Mother married	23.1%	69.2%	***
Mother's age (range 1-9)	3.9 (1,2)	4.3 (1.1)	***
No prenatal care	3.5%	1.3%	***
Cesarean-section birth	35.8%	31.3%	***
Total birth order	2.8 (1.8)	2.5 (1.5)	***
Pre-pregnancy diabetes	1.2%	.8%	***
Gestational diabetes	4.4%	5.4%	***
Pre-pregnancy hypertension	4.1%	1.8%	***
Gestational hypertension	8.0%	7.3%	***
Eclampsia	.4%	.3%	***
Cigarettes smoked all pregnancy	1.2 (7.3)	2.1 (11.6)	***
	Level 2 – State N=30		
	Strict Identification Requirement N=9	Non-strict Identification Requirement N=21	p-value
Proportion Black	.16 (.10)	.14 (.08)	***
Proportion over 65 years	.14 (.01)	.15 (.03)	***
Proportion unemployed	.04 (.01)	.04 (.01)	***
Proportion with a college degree	.20 (.03)	.19 (.02)	***
Proportion uninsured	.12 (.03)	.14 (.03)	***

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

The Association between Voter Suppression and Health – County-level Mixed Regression Results

Tables are presented for the mixed effect regression models with a random intercept to test the effect of voter suppression on birth outcomes. Analyses were run for each of the two outcomes (birth weight and gestational age), for each voting item, and for each year, resulting in

38 tables for county-level voting items and six for state-level analyses. As such, only a few illustrative models will be presented here, while tables for all other results can be found in the Appendix E. To summarize these results, two forest plots were created, one for birth weight (Figure 1) and one for gestational age (Figure 2). Models were built such that Model 3 is the full adjusted model, while Model 4 consists of Model 3 with the added interaction term. Forest plots were created from Model 3, as interactions were investigated separately.

Thus, to obtain a global perspective of the entirety of the models, we should first examine the forest plots. In both Figures 1 and 2, the coefficients are not clearly to the right or left of the center line at zero. Thus, there is no clear negative, as hypothesized, or positive association between voter suppression and birth outcomes across all models.

Next, we can take a closer look by focusing on each set of three dots, which represents the coefficient and confidence intervals for one voter suppression item across each of the three years. With this perspective, some patterns do emerge. The coefficients for the proportion unable to vote because the line was too long all show a negative association with birth weight (Figure 1). Thus, we can conclude that although they are not significant, living in a county with a higher proportion of people who were unable to vote because of long lines is generally associated with lower birth weight. This trend is somewhat echoed when we consider gestational age (Figure 2): for 2012 and 2016 the association between proportion of people unable to vote because of long lines and gestational age is negative, although this association is positive in 2008, and nonsignificant across all three.

Another pattern repeated across outcomes and years is that the proportion of people who were unable to vote but tried had a negative association with birth outcomes in 2008 and 2012 but a positive association in 2016. All were nonsignificant except for the association between this item and birth weight in 2008. Thus, conditions changed in 2016, with an extraneous factor likely shifting this association. Further, the effects of wait time and Preclearance on both outcomes are small and nonsignificant, oscillating between positive and negative associations.

To zoom in a bit further, let us consider which models, specifically, demonstrated significant associations between voter suppression and health. Of the 38 tables created for each set of county-level voter suppression models (all available in Appendix E), voting items were significantly associated with birth weight in three of the fully adjusted models (Model 3), for proportion unable to vote because requested but did not receive a ballot in 2008 (-) and in 2012 (+), and proportion unable to vote but tried in 2008 (-). Voting items were also significantly associated with gestational age in three other models: proportion unable to vote in 2008 (+), proportion unable to vote because requested but did not receive an absentee ballot in 2012 (+), and proportion who experienced intimidation while voting in 2016 (+). The direction of these associations varied.

To summarize the coefficients and standard errors of the voter suppression items across years and birth outcomes, six summary tables were created. Tables 3a-b for 2008 are included here while the four additional tables for 2012 and 2016 can be found in Appendix F. Table 3a displays the results for all voter suppression items, taken from their separates models with covariates added in stepwise fashion, for birth weight using the 2008 sample. While Table 3b displays results for all voter suppression items regressed on gestational age using the 2008 sample. While the coefficients and standard errors of the covariates are important, the primary goal of this analysis is to understand the association between voter suppression and health (H2a) and how this association is modified by race (H2b). These summary tables eliminate excessive information so that the focal relationship can be examined more clearly.

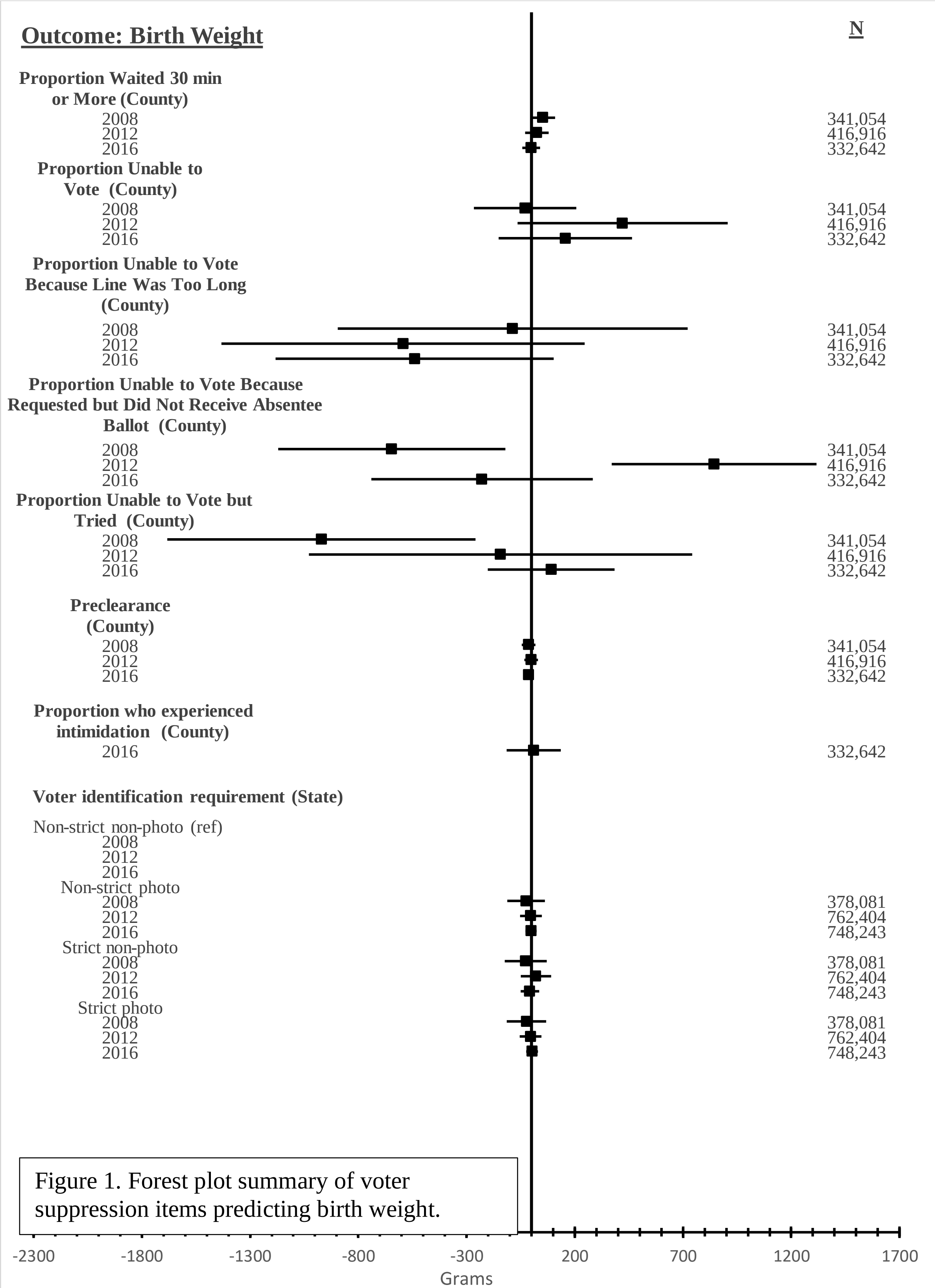


Figure 1. Forest plot summary of voter suppression items predicting birth weight.

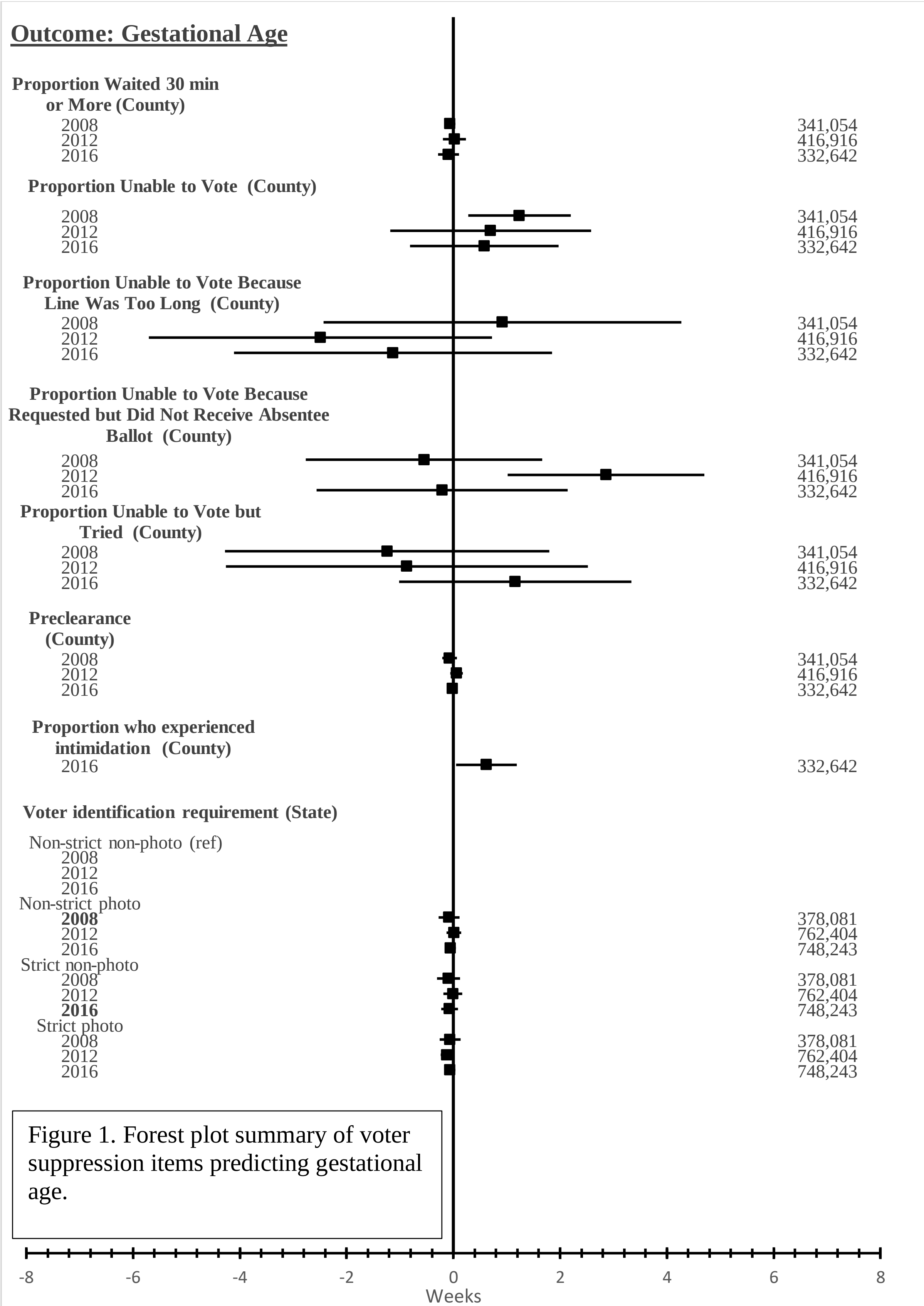


Figure 1. Forest plot summary of voter suppression items predicting gestational age.

For many models, the initial bivariate association between voter suppression and health was significant, but attenuated once county-level covariates and infant-level covariates were added (e.g. in 2008 for birth weight: waited more than thirty minutes, unable to vote because the line was too long, and Preclearance).

Of the significant models, once all covariates were added in Model 3, two were in the expected direction, such that a higher proportion of people experiencing voter suppression predicted worse birth outcomes. For example, in 2008, the proportion who were unable to vote but tried significantly predicted lower birth weight across all models - in the bivariate model, and when infant-level, county-level, and the interaction term were added. While the coefficient decreases in magnitude when county-level covariates are added, the coefficient increases once infant-level covariates are added, suggesting statistical suppression may be present. In Model 3, the coefficient is -970.57 (SE=363.27). As a one-unit increase in the proportion is not feasible (a proportion cannot exceed 1), we can estimate that a 1% increase in the number of people who were unable to vote but tried would be associated with a 9.7 g reduction in birth weight (Table 3a).

Table 3a also displays the results for the other set of analyses in which the voter suppression item, in this case the proportion of people who were unable to vote because they requested but did not receive an absentee ballot, is significantly and negatively associated with birth weight (Model 3). Here, we see that a 1% increase in the number of people who were unable to vote because of absentee ballot problems is associated with about a 6.4 g reduction in birth weight (β=-645.33, SE=267.72).

Conversely, four models showed somewhat contradictory results in which higher voter suppression was associated with higher birth weight or higher gestational age. These four models

Table 3a. Summary of the relationships between county-level voter suppression items and birth weight: 2008 Cooperative Congressional Election Study, 2008-2009 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2008 3-year Data (N=120 Counties, 341,054 infants). Each set of voter suppression items controlled for the same covariates across models, which are included in the Appendix.

	Model 1		Model 2		Model 3		Model 4	
Voter suppression item Mother's race Voter suppression * race	β	SE	β	SE	β	SE	β	SE
Proportion who waited more than 30 minutes to vote								
Proportion who waited more than 30 minutes to vote	76.06 ***	37.52	55.06	29.70	52.93	28.64	53.42	28.71
Mother's race					-178.31 ***	2.90	-175.82 ***	11.14
Proportion who waited more than 30 minutes * race							-4.40	19.09
Proportion unable to vote								
Proportion unable to vote	-235.35	152.10	-14.77	125.23	-29.55	120.68	-34.68	121.03
Mother's race					-178.31 ***	2.90	-179.37 ***	3.54
Proportion unable to vote * race							46.38	88.07
Proportion unable to vote because the line was too long								
Proportion unable to vote because the line was too long	-1,114.11 **	491.10	113.11	428.46	-86.80	412.38	-148.42	415.55
Mother's race					-178.3 ***	2.90	-180.29 ***	3.34
Proportion unable to vote because the line was too long * race							320.94	268.09
Proportion unable to vote because did not receive absentee ballot								
Proportion unable to vote because did not receive absentee ballot	-1,027.42 **	375.87	-687.97 *	277.72	-645.33 *	267.72	-663.89 *	269.19
Mother's race					-178.31 ***	2.90	-179.15 ***	3.18
Proportion unable to vote because did not receive absentee ballot * race							154.26	237.07
Proportion unable to vote but tried								
Proportion unable to vote but tried	-1,396.47 **	498.01	-842.31 *	380.89	-970.57 **	363.27	-999.13 **	364.28
Mother's race					-178.26 ***	2.90	179.53 ***	3..25
Proportion unable to vote but tried * race							157.81	182.06
Previously covered by Preclearance								
Preclearance	-85.48 ***	15.44	-29.47	16.53	-13.48	16.12	-12.74	16.17
Mother's race					-178.31 ***	2.90	-177.35 ***	3.38
Preclearance * race							-2.13	5.67

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1. Model 1 is the bivariate model of the voter suppression item and the outcome. Model 2 builds from the previous model by adding county-level covariates. Model 3 builds from the previous model by adding infant-level covariates. Model 4 builds upon the previous model by adding an interaction term between the voter suppression item and race ('1' Black, '0' White).

Table 3b. Summary of the relationships between county-level voter suppression items and gestational age: 2008 Cooperative Congressional Election Study, 2008-2009 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2008 3-year Data (N=120 Counties, 341,054 infants). Each set of voter suppression items controlled for the same covariates across models, which are included in the Appendix.

	Model 1		Model 2		Model 3		Model 4	
Voter suppression item Mother's race Voter suppression * race	β	SE	β	SE	β	SE	β	SE
Proportion waited more than 30 minutes to vote								
Proportion waited more than 30 minutes to vote	.17	.14	.15	.12	.14	.12	.13	.12
Mother's race					-.30 ***	.01	-.37 ***	.04
Proportion waited 30 minutes or more to vote * race							.12	.08
Proportion unable to vote								
Proportion unable to vote	-0.01	.55	1.15 *	.50	1.24 *	0.49	1.19 *	.49
Mother's race					-0.30 ***	0.01	-0.31	0.01
Proportion unable to vote * race							0.42	0.35
Proportion unable to vote because line was too long								
Proportion unable to vote because line was too long	-2.93	0.10	1.29	1.75	.92	1.71	0.73	1.72
Mother's race					-0.30 ***	0.01	-0.30 ***	0.01
Proportion unable to vote because line was too long * race							0.98	1.08
Proportion unable to vote because did not receive absentee ballot								
Proportion unable to vote because did not receive absentee ballot	-1.58	1.38	-0.64	1.16	-0.55	1.13	-0.22	1.14
Mother's race					-0.30 ***	0.01	-0.29 ***	0.01
Proportion unable to vote because did not receive absentee ballot * race							-2.78 **	0.96
Proportion unable to vote but tried								
Proportion unable to vote but tried	-3.46	1.83	-1.21	1.59	-1.24	1.55	-0.76	1.56
Mother's race					-0.30 ***	0.01	-0.28 ***	0.01
Proportion unable to vote but tried * race							-2.69 ***	0.73
Previously covered by Preclearance								
Preclearance	-0.27 ***	0.06	-0.07	0.07	-0.07	0.07	-0.06	0.07
Mother's race					-0.30 ***	0.01	-0.29 ***	0.01
Preclearance * race							-0.05 *	0.02

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1. Model 1 is the bivariate model of the voter suppression item and the outcome. Model 2 builds from the previous model by adding county-level covariates. Model 3 builds from the previous model by adding infant-level covariates. Model 4 builds upon the previous model by adding an interaction term between the voter suppression item and race ('1' Black, '0' White).

include a) proportion unable to vote regressed on gestational age in 2008 (Table 3b, β=1.24, SE=0.49), b) proportion who were unable to vote because requested but did not receive an absentee ballot regressed on birth weight in 2012 (Appendix F: Table F1, β=843.67, SE=241.35), c) proportion who were unable to vote because requested but did not receive an absentee ballot regressed on gestational age in 2012 (Appendix F: Table F2 β=2.86, SE=0.94), and d) proportion who experienced intimidation regressed on gestational age in 2016 (Appendix F: Table F4, β=0.62, SE=0.66). One may be able to explain these contrarian findings by considering these in relation to the interaction effects. While the overall effect on health could be positive, the effect by race may add new context to this story.

The Association between Voter Suppression, Race, and Health – County-level Mixed Regression Results

Mother's race was added in Models 3 and 4, first as a covariate of interest, and next, as part of an interaction term to understand differential effect of voter suppression on birth outcomes by race. Across all models, as can be seen in Appendix E, Black race significantly ($p<.001$) predicts lower birth weight and lower gestational age. This finding suggests that racism, indicated by race as a proxy measure of exposure to stressors driven by existence in a racialized society, is a key predictor of poorer birth outcomes. It is possible, then, that race, due to racism, is a key modifier for the relationship between voter suppression, one form of structural racism, and birth outcomes. To investigate this effect, we must examine the coefficients for the interaction terms added in Model 4 (Tables 3a-b; Appendix F: Tables F1-4).

All significant coefficients for voter suppression by race interaction terms are negative, supporting the hypothesis (H2) that voter suppression has a negative effect on birth outcomes for

Black mothers and infants as compared to their White peers. Of the 38 models, 12 interaction terms were significant. Interestingly, interaction terms are only significant in models in which the lower order voter suppression item is nonsignificant in Models 3 and 4. For example, in 2012 (Table 3d) and 2016 (Table 3f), the proportion of people who waited 30 minutes or more to vote was not a significant predictor of gestational age in Model 3. However, in Model 4, the interaction terms (for 2012: β=-0.12.86, SE=0.05; for 2016: β=-0.17, SE=0.07) are significant ($p<.05$). Further, the F-tests for the overall significance of the interaction term is also significant for both 2012 ($F=5.32$, $p=.02$) and 2016 ($F=5.16$, $p=.02$). Figures 3 and 4 illustrate the effect of race on the relationship between voter suppression and gestational age. Figures for all other significant interactions can be found in Appendix H. In these figures, the more negative slope for Black infants is observed for a majority, however two display a positive interaction effect: Proportion who waited 30 minutes or more by race in predicting birth weight in 2012 and 2016 (Appendix G: Figures G4 and G8). As the proportion of people who waited 30 minutes or more increases, gestational age more dramatically declines for Black compared to White infants. These figures are representative of interactions between other voter suppression items and race, as well.

In models in which the lower order voter suppression term is significant and positive, and, thus, is counterintuitive to hypotheses, the interaction term, even if nonsignificant, is negative, suggesting that while voter suppression may be positively associated overall with better birth outcomes, it is negatively associated with birth outcomes for Black mothers and infants. Thus, while voter suppression items may not necessarily result in negative birth outcomes for the general population, given the racialized context in which these laws are passed and implemented, they carry very real, negative health consequences for Black mothers and their infants. Consider the interaction in Figure 4. If all else is equal, if the proportion of people who wait 30 minutes or more to vote is .2, the difference in predicted gestational age for Black infants is .3 weeks lower than for Whites. As the proportion increases, so does this gap. If the proportion jumps to .8, then predicted gestational age is .4 weeks lower for Black infants compared to Whites.

Figure 3. Plot of the interaction effect of county-level proportion of people who waited 30 minutes or more and mother's race on gestational age: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth

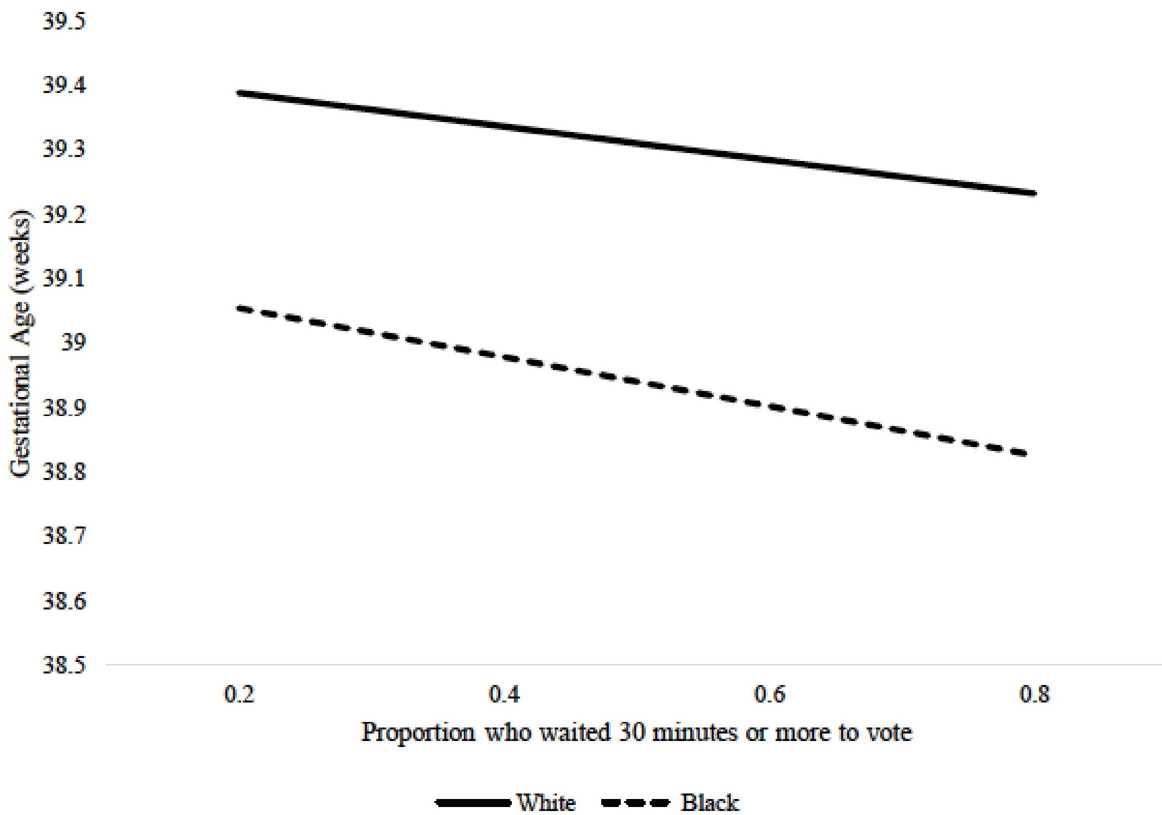
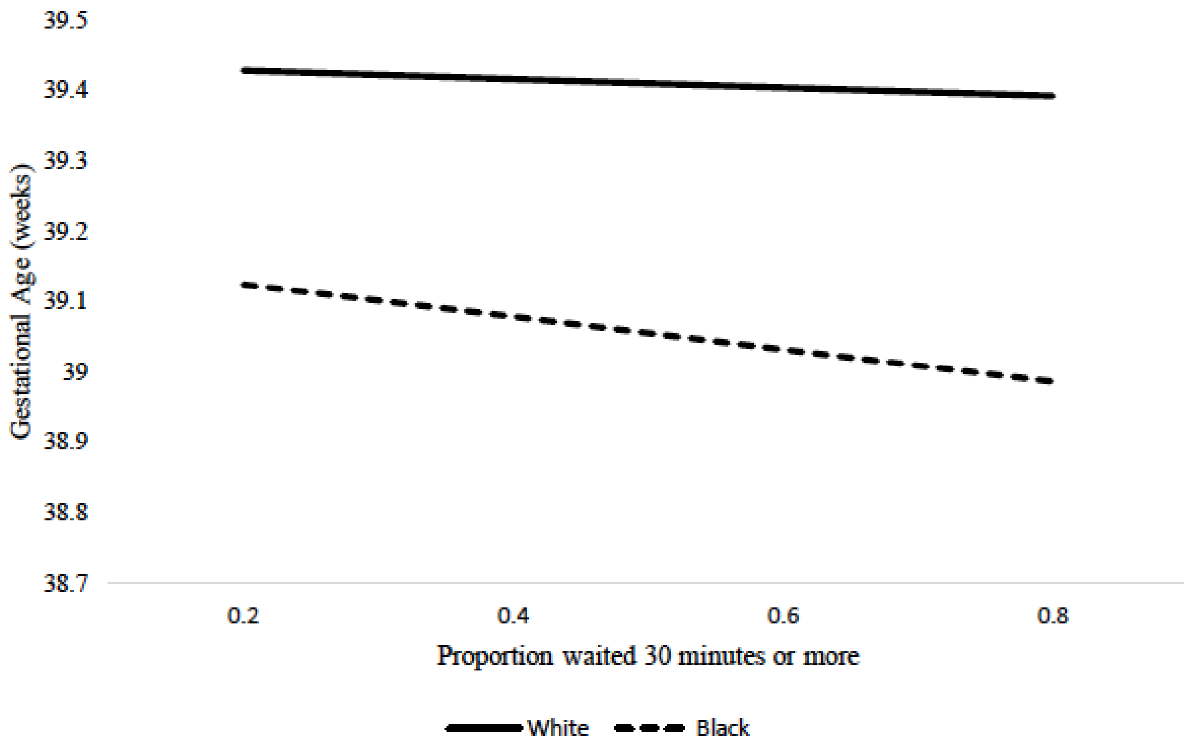


Figure 4. Plot of the interaction effect of county-level proportion of people who waited 30 minutes or more and mother's race on gestational age: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth



The Association between covariates and birth outcomes – County-level Mixed Regression Results

When considering the covariates, the infant-level covariates are highly significant across all models, regardless of year, voter suppression item, or birth outcome. Some variability is observed in the significance of mother's age, but infant sex, mother's marital status, education level, prenatal care, and maternal risk factors are all strongly significant predictors of birth outcomes in the expected directions. To summarize, mother's marital status, and increasing education level are all associated with higher birth weight and gestational age. No prenatal care, Caesarean section birth, pre-pregnancy and gestational hypertension, eclampsia, and more cigarettes smoked during pregnancy are associated with lower birth weight and gestational age. However, some variables have the opposite direction of association depending on birth outcome. Male infant, total birth order, pre-pregnancy diabetes, and gestational diabetes, are associated with lower gestational age but higher birth weight.

The Association between Voter Suppression, Race, and Health – State-level Mixed Regression Results

To test the association of state-level voter suppression on health, voter identification requirements were regressed upon birth outcomes (H2a). As with county-level analyses, a series of four models were run for each year and birth outcome, totally six sets of models. Across these six sets, no level of state voter identification requirement is significantly associated with health nor can any consistent direction of association be determined. However, mother's Black race was significantly associated with lower birth weight and lower gestational age across all models.

However, state identification laws were significant predictors when modification by race is considered. Results for 2016 gestational age (Table 4a and Figure 5) and 2008 birth weight (Table 4b) are provided here, while all others can be found in Appendix G. For 2012 gestational age models (Appendix H: Figure G11) and 2016 gestational age models (Figure 5), findings support the hypothesis that voter suppression has a stronger, more negative impact on health for Black mothers and infants (H2b). In 2012, when birth weight is modeled, both non-strict photo (β=-0.05, SE=0.02) and strict-non photo (β=-0.05, SE=0.02) levels have a negative association with birth weight for Black mothers and infants. The results of the F-test to measure the significance of the effect of the overall interaction is also significant (F=5.68, p=0.0007). The interaction term for voter identification requirement by race were also significant for gestational age in 2016 analyses (Table 4a). Each level of the interaction showed a negative association, in which Black mother's and infant had lower gestational age compared to White women, all else equal. Further, the F-test for this interaction was significant (F=10.41, p<.001). The F-test for the interaction term for 2016 analyses predicting birth outcomes was also significant F=3.57, p<.05)., although the individual t-tests for each level of the interaction were nonsignificant. However, in 2008 birth weight models, the interaction term for race by strict photo identification was positive (β=18.04, SE=8.46; Table 4b) as displayed in Figure 6.

Figure 5. Plot of the interaction effect state voter identification requirements and mother's race on gestational age: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth

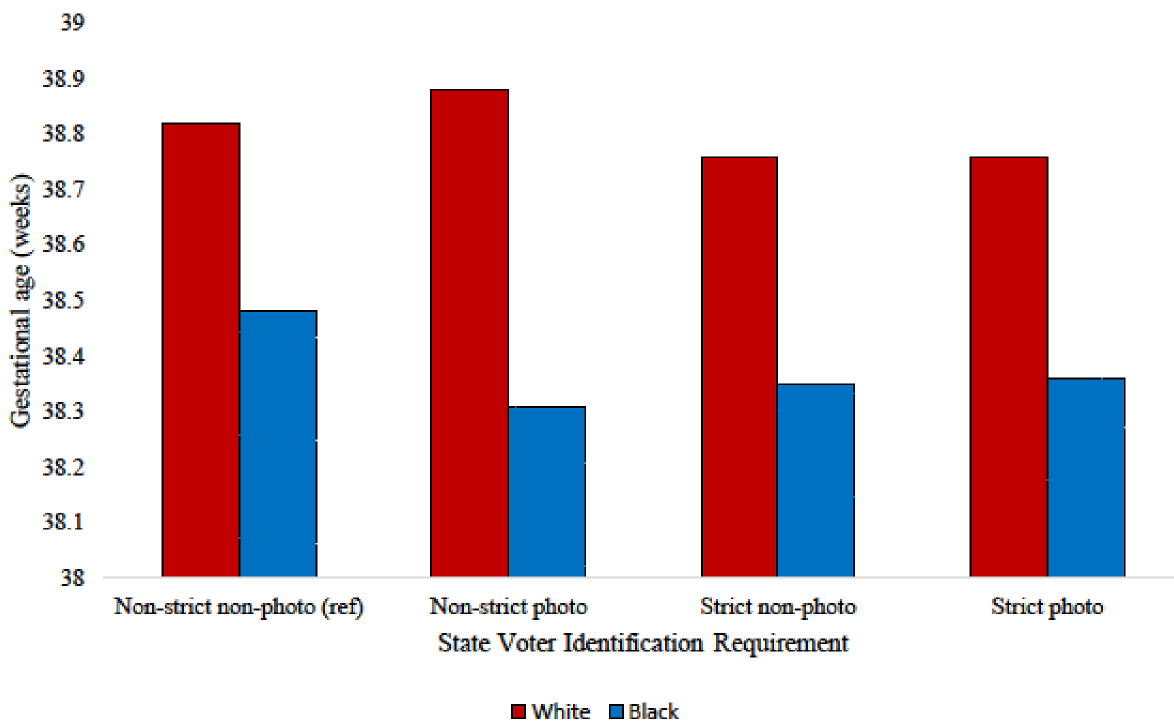
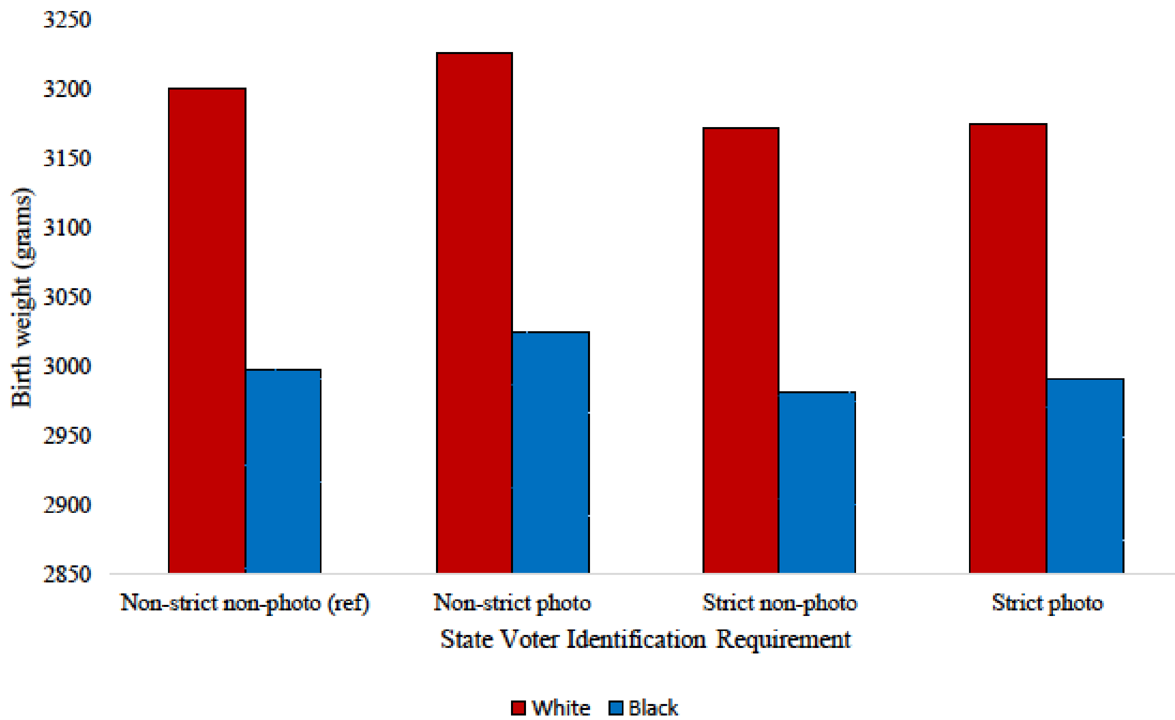


Figure 6. Plot of the interaction effect state voter identification requirements and mother's race on birth weight: 2008 Cooperative Congressional Election Study, 2008-2009 National Center for Health Statistics Infant Birth



In addition to displaying significant interaction terms, Tables 4a-b also show the trends in covariates that were observed across all models. The proportion Black has a negative association with both outcomes, although it is not always significant in the final models. As with county-level analyses, all infant-level covariates are highly statistically significant. Male infant tends to predict lower gestational age but higher birth weight. Higher education and being married are associated with higher birth weight and gestational age. Cigarette smoking, eclampsia, either form of hypertension, and no prenatal care are associated with worse birth outcomes. Total birth order and both forms of diabetes are associated with higher birth weight but lower gestational age.

Table 4a. Relationships between state-level voter identification requirement and gestational age: 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=30 states, 748,243 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
State voter identification requirement								
No identification required	No observations		No observations		No observations		No observations	
Non-strict non-photo	ref		ref		ref		ref	
Non-strict photo	-0.14	0.09	-0.05	0.05	-0.05	0.05	-0.03	0.05
Strict non-photo	-0.08	0.14	-0.09	0.08	-0.07	0.08	-0.06	0.08
Strict Photo	-0.19 *	0.09	-0.05	0.05	-0.06	0.05	-0.06	0.05
State-level covariates								
Proportion Black			-1.47 ***	0.27	-0.62 *	0.26	-0.63 *	0.26
Proportion 65 years or older			-0.39	1.16	0.15	1.11	0.08	1.11
Proportion unemployed			5.56	3.17	6.45 *	3.03	6.33 *	3.05
Proportion with college degree or higher			2.03 **	0.73	1.98 **	0.70	1.99 **	0.70
Proportion uninsured			-0.58	0.72	-0.38	0.69	-0.36	0.69
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-0.41 ***	0.01	-0.34 ***	0.01
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.07 ***	0.01	-0.07 ***	0.01
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.12	0.01	0.12 ***	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.06 ***	0.01	0.06 ***	0.01
Some college					0.11 ***	0.01	0.11 ***	0.01
College degree					0.18 ***	0.01	0.18 ***	0.01
More than college					0.14 ***	0.01	0.14 ***	0.01
Mother's age (range 1-9)					-0.05 ***	0.00	-0.04 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-0.83 ***	0.02	-0.83 ***	0.02
Type of birth								
Vaginal	ref		ref		ref		ref	

Caesarean section					-0.50 ***	0.01	-0.50 ***	0.01
Total birth order					-0.09 ***	0.00	-0.09 ***	0.00
Pre-pregnancy diabetes					-0.87 ***	0.03	-0.87 ***	0.03
Gestational diabetes					-0.30 ***	0.01	-0.30 ***	0.01
Pre-pregnancy hypertension					-0.87 ***	0.02	-0.87 ***	0.03
Gestational hypertension					-1.03 ***	0.01	-1.03 ***	0.01
Eclampsia					-1.78 ***	0.05	-1.78 ***	0.05
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-0.00 ***	0.00
Cross-level Interaction								
Voter identification * race								
No identification required	No observations		No observations		No observations		No observations	
Non-strict non-photo	ref		ref		ref		ref	
Non-strict photo							-0.11 ***	0.02
Strict non-photo							-0.07 **	0.3
Strict photo							-0.06 **	0.02
Constant	38.80 ***	0.05	38.41 ***	0.28	38.82 ***	0.26	38,82 ***	0.27
AIC	3,396,067		3,396,041		3,354,731		3,354,706	
-2 Log Likelihood	3,396,055		3,396,019		3,354,675		3,354,644	

Table 4b. Relationships between state-level voter identification requirement and birth weight: 2008-2009 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2008 3-year Data (N=12 states, 378,081 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
State voter identification requirement								
No identification required	No observations		No observations		No observations		No observations	
Non-strict non-photo	ref		ref		ref		ref	
Non-strict photo	58.9370	56.4467	-9.57	43.60	-24.95	44.32	-25.49	44.43
Strict non-photo	12.0457	55.9740	-10.85	48.52	-26.56	49.50	-28.23	49.55
Strict Photo	4.1450	55.9992	-7.49	45.53	-23.27	46.46	-25.48	46.51
State-level covariates								
Proportion Black			-387.86	208.23	-128.68	212.29	-123.19	212.46
Proportion 65 years or older			1012.30	1,424.59	714.64	1451.16	709.10	1452.26
Proportion unemployed			428.58	3,476.26	2244.28	3542.11	2233.28	3544.79
Proportion with college degree or higher			182.36	561.14	-406.23	572.17	-407.81	572.61
Proportion uninsured			-508.90	419.53	-641.28	427.37	-640.56	427.69
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-198.98 ***	2.66	-202.75 ***	3.03
Infant sex								
Female	ref		ref		ref		ref	
Male					122.77 ***	1.78	122.78 ***	1.78
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					51.40 ***	2.28	51.44 ***	2.28
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					41.3 ***	3.00	41.55 ***	3.00
Some college					69.15 ***	3.09	69.24 ***	3.09
College degree					95.25 ***	3.75	95.32 ***	3.75
More than college					85.05 ***	4.53	85.16 ***	4.53
Mother's age (range 1-9)					3.18 **	0.99	3.19 ***	1.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-180.01	6.73	-180.12	6.73

					***		***	
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-70.00 ***	1.92	-70.00 ***	1.92
Total birth order					3.35 ***	0.67	3.34 ***	0.67
Pre-pregnancy diabetes					98.59 ***	10.90	98.59 ***	10.90
Gestational diabetes					53.58 ***	4.60	53.60 ***	4.60
Pre-pregnancy hypertension					-212.37 ***	7.22	-212.19 ***	7.22
Gestational hypertension					-235.28 ***	3.99	-235.26 ***	3.99
Eclampsia					-539.76 ***	20.58	-540.42 ***	20.58
Total cigarettes smoked during pregnancy					-4.50 ***	0.07	-4.50 ***	0.07
Cross-level Interaction								
Voter identification * race								
No identification required	No observations		No observations		No observations		No observations	
Non-strict non-photo	ref		ref		ref		ref	
Non-strict photo							52.26	71.65
Strict non-photo							11.74	6.51
Strict photo							18.04 *	8.46
Voter identification * race								
Constant	3,281.27 ***	17.77	3,220.74 ***	368.26	3,199.82 ***	375.11	3,200.98 ***	375.39
AIC	5,869,370		5,869,370		5,84,0196		5,840,195	
-2 Log Likelihood	5,869,358		5,869,348		5,840,140		5,840,133	

Discussion

In this chapter, I examined the relationship among various forms of voter suppression, race, and birth outcomes. This was the first test, to my knowledge, of voter suppression as a contributor to health disparities. The presupposition that voter suppression contributes to the intractability of racial health inequities is grounded in foundational literature linking racism, structural, institutional, and interpersonal to health (Bailey et al., 2017; Gee & Ford, 2011; Gee & Hicken, 2021; Phelan & Link, 2015). Race, in this study then, does not capture any genetic or biological factor contributing to poorer birth outcomes for Black infants compared to White. Rather, race, as it is socially produced within a society characterized by White Supremacy, acts as a marker for the chronic and acute stressors that Black mothers are predisposed to experience because of this system of racism.

Voting policies, too, are racialized, meaning that the details of the policy, who they target, and where they are implemented cannot be divorced from the larger racial project of White supremacy. These racialized voting policies, especially ones that make it harder for people to vote (i.e. voter suppression), symbolically and physically delineate who can and cannot vote. Through this process, voting ceases to be a right and is, instead, an unearned privilege based on race. This difference in voting access is a difference of power and resources, which are known to influence health.

Voter suppression items predicted birth outcomes in six models, two with a negative association, and four with positive associations. The negative associations were only found for items regressed on birth weight, not gestational age. In 2008, the proportion who were unable to vote but tried had a significant, negative association with birth weight. This item clearly shows the number of individuals who faced a barrier that prevented them from voting, even though they "tried." Whether trying was showing up at the polls and being turned away, driving to the polling place only to find it had been moved or closed, we cannot say for sure. But the individual had the intent to vote, yet could not. And, even though the mean proportion of people who were unable to vote but tried was only .01, the prevalence of this was enough to have a significant association with birth weight. Perhaps, this finding is best explained by vicarious racism. While not many people shared this experience directly, hearing about family and friends being turned away with the intention to vote could remind other individuals of the injustice inherent in the electoral system, of the struggle for Civil Rights and the Voting Rights Act that is still not over, and this chronic burden of injustice could yield negative birth outcomes. While this is only evidence from one item, in one year, it does represent a first piece of evidence in linking voter suppression to poor health, as hypothesized.

The other item that had a negative association was the proportion who did not receive an absentee ballot had a negative relationship with birth weight in 2008. However, this item then had a significant, positive association with gestational age in 2012. This suggests that pathways in which voter suppression influences health varies, even for health outcomes we might consider highly linked.

The findings of a positive association between voter suppression and birth outcomes run counter to what was hypothesized. The four voting items with positive associations were proportion who requested but did not receive an absentee ballot in 2008 for birth weight, and proportion unable to vote in 2008, proportion unable to vote because requested but did not receive an absentee ballot in 2012, and proportion who experienced intimidation while voting in 2016 for gestational age. While initially perplexing, it is possible that, for the majority population, voter suppression laws, the loss of absentee ballots, or intimidation do not make it harder for them to vote. Even if a few people are disenfranchised, enough people who share their interests are able to vote, with elected officials and policies providing a salutorial effect. Being able to specify a more direct pathway between an individual's exposure to voter suppression and their health would help to illuminate whether or not this scenario is occurring here. However, others have found that structural racism operates in two directions, harming the health of the oppressed, while simultaneously improving the health of those in power (Lukachko et al., 2014). Lukachko and colleagues (2014) argue that racism is a tool used by those in power to corral resources and concentrate privilege to their benefit. Suppressing the vote, then, is a direct suppression of civic power. Further, suppression of civic power could lead to loss of power and resources in other domains (Hing, 2020). Thus, perhaps the improvements to White birth outcomes through the preservation of power for White voters, but not Black voters, is driving this positive association.

Evidence for this explanation is further found in the results for tests of moderation by race on the impact of voter suppression on birth outcomes. When moderation by race was tested, voter suppression was most often associated with worse birth outcomes for Black infants compared to Whites. If the effect of voter suppression on the health of Whites is nil, or in some cases beneficial, then Whites in power can continue to propose these laws with little consequence, whereas the burden will be, as it most often is, bourn by Blacks and other oppressed peoples. This explanation is consistent with a symbolic racism perspective (Sears, 1988). Symbolic racism suggests that contemporary racism has taken a more covert form than the more explicit discrimination of the past. Though policies appear race-neutral they may act to protect whites' privileged position in society (Sears & Jessor, 1996). Thus, although these voting laws are meant to stamp out voter fraud, they may preserve voting as a privilege for Whites to the detriment of others. Given this, voter suppression could be a mechanism through which health disparities are created and maintained. The additional negative effect of voter suppression could contribute to divergent health outcomes by race, as well as intersect with other institutions to perpetuate power inequities.

Significant interactions were observed for both state and county-level voter suppression, for all years, and both outcomes. Further, not only were reported experiences of being unable to vote negatively associated with birth outcomes by Black race, but so too were proxy indicators of voter suppression (long wait times) and policies (Preclearance), suggesting that many forms of voter suppression could be harmful.

Another interesting finding which highlights the interconnectedness of racism across institutions is that the proportion of uninsured is higher in non-strict states compared to strict states for all years (Tables 2a-c). This corroborates a previous report that thirteen states that passed voter suppression laws did not expand Medicaid benefits under the Affordable Care Act (Poor People's Campaign, 2019), which suggests that oppression from one institution can lead to increased oppression from another.

While these findings cannot be compared to any previous studies on voter suppression and health, other examples of how stress harmed health are illustrative, and this study builds upon that work. The results here are in conversation with Lauderdale's work on birth outcomes post-9/11. Within a hostile racial climate, as experienced by Arab-named women, adverse birth outcomes were reported at higher rates than in the control period. The increased attacks on voter suppression, that primarily target Black voters, also indicate a hostile racial climate. The right to vote has been contested and demanded throughout the history of this country. While it was legally protected for all in the 1965 Voting Rights Act, that Act has since been invalidated in 2013. That event represents more than a change in policy, rather, it represents a symbolic and physical attack on the right to vote that was hard fought and stood as a marker in the movement towards racial equity. Not only do Black voters face more barriers to voting, but the overall rhetoric around voting rights is a constant reminder of their second-class status in the United States. This stress, fear, and disempowerment may compile over time, harming health of both mothers and their infants. While Novak and colleagues (2017) studied the impact of the largest immigration raid in the US on birth outcomes, the effect cannot only be attributed to fear of that one event, but what that event symbolizes – an uncertain, tenuous, marginalized position in society in which your right to live in this country could be taken away at any time. The attack of voting rights is a harbinger of losses in the larger fight to achieve racial equity in both health and other domains.

Limitations and Future Research

The analytic sample here is only a fraction of the total births that could have been included. Some infants were excluded because they did not meet inclusion criteria of being in the window of exposure during a presidential election. This excluded about half the infants. Thus, many more were omitted because they were missing on key variables, much of this missingness was due to the matching of many different datasets by geography. While all three key data sets (CCES, ACS, and NCHS) strive to be representative of the United States, when matching based on one's county FIPS code, excluding counties without both White and Black births, and requiring no missingness, the samples are only a small portion of total births. Thus, only 6.3% of births across 2008-2009 were included in the 2008 sample, 8.3% of births in 2012-2013 were included in 2012, and 6.8% of birth in 2016-2017 were included in 2016. However, comparisons of the analytic sample to the full sample on some key characteristics were examined, and the samples are similar despite the missingness (Appendix I).

One cannot help but notice for a majority of analyses, voter suppression did not significantly predict birth outcomes. Given the theoretical plausibility of the connection between voter suppression and birth outcomes, we are left to wonder about what factors may be driving these null results. Certainly, a relationship between many forms of voter suppression and birth outcomes may simply not exist. However, it instead may be that the operationalization of voter suppression here is not specific enough.

First, I used county-level markers to estimate the prevalence of voter suppression as a predictor of individual outcomes. Future studies must interrogate the direct connection between an individual's experience of voter suppression and their health, both acutely such as through cortisol levels, and longitudinally over the life course as a cumulative effect is possible.

Second, while there are very clear voter suppression policies created at the county and state-levels. Much voter suppression happens within a more local context. Birth data was not available at a geographic unit smaller than county. Measuring the contextual effects of voter suppression in a precinct or census tract could help to understand more about informal voter suppression enacted by poll workers such as differential enforcement of identification requirements, the closing of polling places, or how the location of polling places allows for different forms of voter suppression to occur.

However, we also require a more macrolevel understanding of voter suppression at the state level. A database of state voting policies related to voter identification laws, purging of voter rolls, early voting or absentee voting requirements could help to better understand the effect of these on health, as well as in shaping more local voting contexts.

Third, I plan to examine dichotomous birth outcomes using logistic models to better assess clinically meaningful outcomes. While knowing that lower gestational age and birth weight occurs for Black infants as a result of voter suppression, it would be useful to understand if this is leading to more preterm or low birth weight infants, as greater risk in the first year of life and over the life course are associated with both.

Conclusion

This chapter highlights the effect of voter suppression, both as policies and practices, on racial disparities in birth outcomes. Voter suppression is experienced differently for Black and White mothers, resulting in worse birth outcomes for Black infants. While voter suppression is a relatively new topic in public health, it is a form of structural racism that has persisted for decades. In order to reverse these decades of damage, we must disentangle the mechanisms through which voter suppression harms health. Public health practitioners and policy makers should turn their attention to voter suppression as a place for innovative interventions to break one link the enduring chain connecting racism and health.

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CHAPTER 4.

AIM 3

Introduction

On June 25, 2013, the Supreme Court reversed a key provision of one of the most important Civil Rights Bills passed in 1965, the Voting Rights Act (VRA). With their decision on *Shelby County v. Holder*, the Court declared that Section 5 of the VRA was unconstitutional. Section 5 was essential for the prevention of discrimination at the polls, as it required states with a history of discrimination to submit proposed changes to voting practices for review by the Department of Justice before the change could go into effect. The formula to determine which states were covered under the Preclearance mandate was outlined in Section 4b, but this portion was deemed unconstitutional because it was grounded in an old formula that some Justices argued was out of date and, ironically, discriminatory. Yet, no new formula has been proposed which could be used to reinforce the provisions in Section 5. The rationale behind the decision was that the statute was no longer required because "things have changed dramatically" (Vance, 2020). Discrimination was posited to no longer be an issue at the polls, rendering the value of Section 5 moot. However, Justice Ruth Bader Ginsburg stated it best when she argued in her dissent that the county has changed *because* of the effectiveness of the VRA and compared the Court's decision to "throwing away your umbrella in a rainstorm because you are not getting wet" (Vance, 2020).

With this verdict, nine states were released from Preclearance as were a number of counties. Immediately following the decision, these states began proposing laws that had previously been struck down by Preclearance. Texas, Alabama, and Mississippi passed strict voter identification laws. Alabama also closed 7% of its voting precincts from 2010 to 2016, even though the population grew 2% (Anderson, 2018). As a consequence, Alabama saw its voter turnout rate drop 5% in primarily minority counties, the largest drop observed in the country (Anderson, 2018). In the nine years since, restrictions have targeted early voting days, closed hundreds of polling places, purged voters from voter rolls, and redrawn election districts. All of these disproportionately impact voters of color, some with "surgical precision" (Stern, 2016).

As this court decision is a key event in the evolution of voter suppression in the United States, it is important to consider the consequences of this verdict for health. Voter suppression may be one method used by White supremacy to concentrate power and resources that benefits Whites at the expense of others (Lukachko et al., 2014). Through this Court decision, voting power has been delineated as a privilege for few, rather than a right for all. This stratification of power, and consequently resources, could then cause disparities in health between oppressed and oppressors (Phelan & Link, 2015).

The impact of this decision on health should be grounded in previous research examining the connection between civil rights expansion and health equity. The passing of Civil Rights legislation, which sought to end legal discrimination in the United States, was found to have an enormous impact in reducing racial disparities in premature mortality between Blacks and Whites (Krieger et al., 2014). In examining infant mortality, similar results were found. Infant mortality was compared in states with and without Jim Crow legislation before and after the Civil Rights Act. Before the Act, the Black infant death rate was 1.19 times higher in places with Jim Crow legislation compared to those without. After the Act was passed, the rate ratio decreased to 1 (Krieger et al., 2013). In the five years following the passing of the Voting Rights Act (VRA), the Civil Rights Act, and the Fair Housing Act, another analysis found a 30% reduction in mortality of Black infants which significantly reduced the racial gap in infant mortality (Chay & Greenstone, 2000). Thus, the abolition of Jim Crow was advantageous to the health of the Black population. Conversely, policies that roll back the protections of civil rights could be deleterious to health.

A study of the impact of state laws that deny services to same-sex couples on mental distress found that denial of services was associated with a 46% increase in mental distress for sexual minority adults (Hatzenbuehler et al., 2009). While this study does not focus on racism, and instead interrogates the effects of heterosexism, the results are instructive. The denial of rights across many domains, whether the workplace or the ballot box, causes distress. In the short term, this distress may manifest as poor mental health, but as it accumulates over the life course, it can cause "wear and tear" on the body that results in premature aging and death (McEwen, 1998).

Preclearance status provides an interesting indicator of the level of racial prejudice in a community. Being covered by Preclearance acts as a marker of having such a high level of institutionalized discrimination at the ballot box that intervention by the Federal government was required. The legal burden of proving disparate impact can be difficult, so for a county to enact policies that are deemed discriminatory by the Department of Justice suggests a high level of racial prejudice. Further, prejudice in one domain likely signals prejudice in others (Gee & Hicken, 2021). High levels of community prejudice have been found to negatively impact mortality (Lee et al., 2015; Morey et al., 2018)

Why might this Court decision influence birth outcomes? Well, the abolition of Preclearance allows for more forms of voter suppression, such as those investigated in Aim 2, to occur. With limited oversight, counties can close polling places. In 2016, 868 fewer polling places were available to vote, as compared to 2012, in counties previously covered by Preclearance, a 16% reduction (The Leadership Conference Education Fund, 2016). Polling place closures are not always conducted with the intention to discriminate, as some are closed due to the popularity of early voting and vote by mail. However, one cannot help but wonder if these polls would have closed if Preclearance were still intact. Fewer places to vote can mean longer lines, longer travel times, and confusion about where to go. These closures act as an additional stressor, especially when closures often occur in minority areas (Salame, 2020). As outlined previously, stress, especially stress as a consequence of racism, is a known risk factor for adverse birth outcomes (Chae et al., 2018; Daniels et al., 2020; Dominguez et al., 2008; Larrabee Sonderlund et al., 2021; Lauderdale, 2006; Novak et al., 2017). Preclearance also ushered in the proposal of more strict voter identification laws, which were found to have a negative effect on Black birth outcomes in the previous chapter.

By analyzing the overall effect of Preclearance, rather than one individual voter suppression item, a better understanding of the total effect of protection of the vote, or lack of protection, on health can be attained. Further, analysis of the impact of the test of *Shelby County v. Holder* is critical to understanding how policy, even though not directly one of health policy, can result in the exacerbation of racial health disparities. The objective of this chapter is to determine whether the loss of protection against discrimination while voting is associated with worse birth outcomes. The study of the effects of Jim Crow found that, after the passing of the Civil Rights Act, the relative rate ratio for infant mortality between Jim Crow and non-Jim Crow polities converged (Krieger et al., 2013). The study at hand expects to the opposite, as the abolition of Section 5 allows for discriminatory practices to be reintroduced. Thus, I expect birth outcomes to diverge between counties covered by Preclearance and those not covered. Using difference in difference analyses, I will examine the impact of the invalidation of Preclearance on birth outcomes, as well as test for moderation by race. As such, the following hypotheses are examined:

H3a: The weakening of the Voting Rights Act will be associated with worse infant outcomes.

H3b: The influence of the Voting Rights Act on infant outcomes will be modified by race, such that the effect will be stronger for Blacks as compared to Whites.

Methods

Data

Data sources are similar for this analysis to those in Aim 2. Birth data were acquired from the National Center for Health Statistics Birth Cohort Data from 2012-2013 and 2016-2017 (NCHS). All births in the country are reported, along with county of birth. Records include infant characteristics (month prenatal care began, birth in hospital or not, birth weight, delivery method, birth order, gestational age, and age of infant at death if applicable) and maternal characteristics (age, race, Hispanic origin, marital status, education). These analyses utilized the denominator file, contains all birth certificates for all infants born in a given year. As data is obtained from birth certificates, there is some missing data cross demographic characteristics and mother's health history and behaviors.

Data for counties previously covered by Preclearance was collected from the Department of Justice Report (Department of Justice, 2020). Two townships in Michigan were covered under Preclearance but were not coded as being under Preclearance in this analysis as townships only make up a fraction of the overall county. I sought to be conservative in my estimation and marked these counties as not being covered, since there were still many people in those counties unaffected by Preclearance. Once the analytic sample was created, those two counties were excluded due to missingness, and, thus, that coding decision was inconsequential.

Voting data was obtained from the Cooperative Congressional Election Study 2008, 2012, and 2016 CCES 2008, 2012, 2016). While this data is collected at the individual level, results were aggregated to the county level. Individual responses were dichotomized into dummy variables, and after using the collapse command in Stata with weights, represent the proportion of people who answered with that response in that county.

American Community Survey (ACS) data was used to estimate covariates at the county level. The 2012 covariates were calculated using 2012 ACS 5-year data (U.S. Census Bureau, 2020) and the 2016 covariates were calculated using the 2016 ACS 5-year data (U.S. Census Bureau, 2020). As ACS is an individual-level dataset, weights were applied, and then data was aggregated to the appropriate level (county) using the `collapse` command in Stata.

Once these data were cleaned, they were matched based on the Federal Information Processing Standards (FIPS) code, which is unique for each county.

Sample

The sample was restricted to participants without missing data on any of the included variables, which resulted in 1,779,638 infants across 468 counties. Only infants born to women who were pregnant during the election were included in the sample; this inclusion criteria were calculated using an infant's birth month and year and their gestational age. As this is only a fraction (17%) of births in the US over the course of these four years, this data is not representative of the country as a whole but instead consists of a convenience sample from which we can begin to understand how the *Shelby County v. Holder* decision influences health.

Measures

Birth outcomes. Birth weight, measured in grams, is the weight of the infant when born and ranges from 227-8,165 grams. Generally speaking, higher birth weight in considered a better outcome, as the risk exists when an infant is more with low birth weight, which is a weight under 2,500 (5.5 lbs).

Gestational age, measured in weeks, is the estimated age of the infant when born. This date is calculated as the birth date minus the number of weeks since mother's last menstrual cycle. Gestational age ranged from 17-47 weeks. As with birth weight, a longer gestational period is usually better. Babies are considered premature at 37 weeks and face higher health risks when born this early.

A physician specializing in obstetrics and gynecology was consulted about the more extreme values of gestational age and birth weight, and while they are uncommon, they exist within the realm of biologic possibility, and, as such, were included in analyses. Birthweight is the more reliable outcome, as it is less subject to calculation error. Because gestational age is estimated from the date of the mother's last menstrual cycle, it is subject to recall bias, whereas birth weight is measured on a scale at birth, thus avoiding such memory issues.

Preclearance and time. Formerly covered by Section 5 Preclearance. The United States Department of Justice provides a list of counties previously covered under Section 5 of the Voting Rights Act which required states with a history of discrimination to undergo a process of Preclearance before making changes to their voting policies. Thus, this variable acts as an indicator of historic discrimination but also may have prevented discrimination at the polls in

2008 and 2012. However, in 2016, after the Preclearance was abolished, it acts only as a marker of historic racism and of the risk that, without protections, new discriminatory policies have been enacted. Counties were coded as ‘1’ previously covered under Section 5 and ‘0’ not previously covered under Section 5. Counties were covered as early as 1965 and none were added for coverage after 1976. This variable also identifies the “treated” group for the difference in difference analysis.

Time. A key predictor in difference in difference analyses is time, so that the pre-treatment and post-treatment difference can be estimated. A time variable was created to estimate pre- and post- *Shelby County v. Holder*, and was coded dichotomously with ‘0’ for 2012 (pre) and ‘1’ for 2016 (post).

Moderators. Mother’s race-ethnicity. Mother’s race-ethnicity is included as a potential modifier to investigate the differential impact of Preclearance on health by race given the effect of living in a racialized society. Race is a social construct which indicates social position within a racial hierarchy buttressed by an ideology of White Supremacy. Therefore, race acts as a marker of exposure to stressors and access to resources which may have consequences for birth outcomes. Race and ethnicity are indicated on the birth certificate and are directed to be self-reported by the mother. Using this information, a dichotomous variable was created of ‘0’ non-Hispanic White and ‘1’ non-Hispanic Black. Infant race is not reported.

Infant-level covariates. Sex. Infant sex was reported on birth certificate and was coded as ‘1’ male and ‘0’ female. Sex was included as a covariate because male infants are more at risk of infant mortality and gestational age.

Mother’s marital status. Birth certificates reported married ‘yes’ or ‘no’ which was coded as ‘1’ and ‘0’, respectively.

Mother’s educational level. Mother’s education was recoded into a five-category variable: ‘1’ Less than high school, ‘2’ High school graduate, ‘3’ Some college, ‘4’ College graduate, and ‘5’ more than college. Education has been linked to both voting behavior and infant outcomes.

Mother’s age. Mother’s age is included as a covariate because age is associated with voting behavior and is a known risk factor for infant outcomes and acts as a pathway explaining racial disparities in infant outcomes (Geronimus, 1992). Age is reported as a range of 1-9 and was used as a continuous indicator. As coded ,‘1’ is under 15 years, ‘2’ is 15-19 years, ‘3’ is 20-24 years, ‘4’ is 25-29 years, ‘5’ is 30-34 years, ‘6’ is 35-39 years, ‘7’ is 4-44 years, ‘8’ us 45-49 years, and ‘9’ is 50-54 years.

No prenatal care. Prenatal care is associated with infant outcomes and was coded ‘0’ receiving no prenatal care and ‘1’ receiving any prenatal care.

Type of birth. Type of birth was coded as ‘0’ vaginal and ‘1’ Caesarean section.

Total birth order. A continuous variable, total birth order tells which number of pregnancies the infant was, this includes both live births and miscarriages.

Pre-pregnancy and gestational risk factors. Five maternal risk factors both before and during pregnancy were included and coded as ‘0’ no and ‘1’ yes. These five include pre-pregnancy diabetes, gestational diabetes, pre-pregnancy hypertension, gestational hypertension, and eclampsia.

Cigarette use. Birth data reported cigarette use across each trimester. Measured continuously, these three numbers were added to represent the total number of cigarettes smoked during pregnancy.

County-level covariates. Factors that may influence the context in which voting policies are passed and the lived experience of mothers within these counties, were added as covariates. The proportion of people who voted, is included, as taken from estimates in the CCES, although these estimates do tend to be higher than the national average. For example, anecdotal evidence of voter suppression, such as polling place closures, suggests this occurs more frequently in non-White neighborhoods; thus, an indicator of the racial composition of the county is included. Covariates include demographic variables such as the county's proportion of Black residents and the proportion over the age of 65 years, and socioeconomic variables, such as the proportion unemployed, the proportion with a college degree, and the proportion uninsured. Proportion who voted is also reported using CCES data. Because those with college degrees, older adults, healthier adults, and employed persons tend to vote more, it is possible that more resources to access voting exist in counties in which these groups are more plentiful. In the same manner and county-level voting items, this information was aggregated from individual-level responses in American Community Survey data.

Analyses

Analyses were conducted using Stata MP 15 and SAS Enterprise 9.4. While the intention was to use Stata for all analyses, the software could not converge the multilevel regression models to find a solution; thus, analyses were switched to SAS which was more powerful. Descriptive statistics were obtained using Stata and stratified across both levels by Preclearance, as the primary purpose of this analysis is to identify the effect of Preclearance on birth outcomes.

To estimate the effect of the *Shelby County v. Holder* decision on health, difference in difference analysis was employed. However, because I also hypothesize an effect modification by race, a difference in difference in difference analysis is conducted. Further, due to the nested nature of the data, and the lack of independence of infants and mothers located within counties, mixed regression models are used which include a random intercept and are able to account for the interdependence when estimating the standard errors. Weights were not applied at this stage as they were applied earlier for ACS datasets when aggregated. No weights were required for NCHS birth data.

Difference in difference (DID) analyses are powerful in that they employ a quasi-experimental design, as treatment is not randomly assigned and determining a true causal inference is still challenging (Wing et al., 2018). The Presidential election in 2012 was used as the baseline time period, (t=0). Births in 2012 could occur in two types of counties, either covered by Preclearance or not covered. In 2012, being covered by Preclearance meant that residents in that county are protected from any discriminatory voting policies being implemented that would be make it harder for people of color to vote because that county has a history of doing so. The next time point is 2016, which is the first Presidential election to occur after the *Shelby County v. Holder* decision in 2013 that invalidated Section 5. Thus, in this election, the states considered to be in the treatment effect are those that lost protection under Preclearance. In comparison, states that were never covered under Preclearance saw no change in protections between 2012 and 2016.

The comparison of these two groups over time allows for measurement of the effect of the policy change, as we can compare the effect of time across these two categories. Further, we can test if the change over time varies with Preclearance by testing the significance of the

Preclearance by time interaction term. The coefficient of this interaction term is the estimate of the difference in difference (H3a).

However, as analyses in Aim 2 show, the impact of voter suppression varies by race. Thus, we would expect that the influence of Preclearance would also vary by race. To examine this effect then, a three-way interaction term must be tested among Preclearance, time, and race, with this coefficient indicating the difference in difference in difference estimate (H3b).

To gather these estimates, models were built in step-wise fashion in SAS using `proc mixed` with a random intercept term for county. First, Preclearance (Model 1) and time (Model 2) were regressed on birth outcomes separately. Then, race was added to estimate all lower order effects of key predictors (Model 3). The two-way interaction for Preclearance by time was added next (Model 4), followed by covariates (Model 5). Next, I added the three-way interaction between Preclearance, time, and race with all lower order two-way interactions without any covariates (Model 6), and then introduced covariates (Model 7). This set of analyses was run for both gestational age and birth weight. Building the models this way allowed for the difference in difference effect of Preclearance to be estimated with the interaction term for Preclearance by time in Model 4 without covariates and Model 5, with covariates. The effect of the three-way interaction term could then be assessed without covariates in Model 6 and with covariates in Model 7.

The significance of these effects was tested using both t-tests, to understand the effect of a single category in a categorical variable or whole continuous variable, and F-tests to examine if the whole categorical variable, especially the interaction terms, was significant. Interactions were plotted using Excel. Simplified equations for each model are shown below. In each, r_{ij} represents the random error for each individual and u_{0j} represents the random intercept for each county or state's unique effect on the outcome. The equations for these models can be found below:

Model 1
Birth outcome = $\beta_0+\beta_1(\text{Preclearance})_{1j}+r_{ij}+u_{0j}$

Model 2
Birth outcome = $\beta_0+\beta_2(\text{time})_{2j} +r_{ij}+u_{0j}$

Model 3
Birth outcome = $\beta_0+\beta_1(\text{Preclearance})_{1j} + \beta_2(\text{time})_{2j} +\beta_3(\text{race})_{3ij} +r_{ij}+u_{0j}$

Model 4
Birth outcome = $\beta_0+\beta_1(\text{Preclearance})_{1j} + \beta_2(\text{time})_{2j} + \beta_3(\text{race})_{3ij}+ \beta_4(\text{Preclearance})_{1j}(\text{time})_{2j} + r_{ij}+u_{0j}$

Model 5
Birth outcome = $\beta_0+\beta_1(\text{Preclearance})_{1j} + \beta_2(\text{time})_{2j} + \beta_3(\text{race})_{3ij}+ \beta_4(\text{Preclearance})_{1j}(\text{time})_{2j} + \beta_8(\text{county covariates})_{8j} + \beta_9(\text{infant covariates})_{9ij} +r_{ij}+u_{0j}$

Model 6
Birth outcome = $\beta_0+\beta_1(\text{Preclearance})_{1j} + \beta_2(\text{time})_{2j} + \beta_3(\text{race})_{3ij}+ \beta_4(\text{Preclearance})_{1j}(\text{time})_{2j} + \beta_5(\text{Preclearance})_{1j}(\text{race})_{3ij} + \beta_6(\text{time})_{2j}(\text{race})_{3ij} + \beta_7(\text{Preclearance})_{1j}(\text{time})_{2j}(\text{race})_{3ij} +r_{ij}+u_{0j}$

Model 7
Birth outcome = $\beta_0+\beta_1(\text{Preclearance})_{1j} + \beta_2(\text{time})_{2j} + \beta_3(\text{race})_{3ij}+ \beta_4(\text{Preclearance})_{1j}(\text{time})_{2j} + \beta_5(\text{Preclearance})_{1j}(\text{race})_{3ij} + \beta_6(\text{time})_{2j}(\text{race})_{3ij} + \beta_7(\text{Preclearance})_{1j}(\text{time})_{2j}(\text{race})_{3ij} + \beta_8(\text{county covariates})_{8j} + \beta_9(\text{infant covariates})_{9ij} +r_{ij}+u_{0j}$

Given the issues with model convergence in Stata and the time taken to access, learn, and run models in SAS, logistic regression with dichotomous birth outcomes (premature birth and low birth weight) were not run. However, these should be investigated in future analyses if software is able to estimate a solution.

Results

Descriptive statistics

Table 1 displays means with standard errors and percents for key characteristics of the sample. In the analytic sample, 26% of infants (455,636) were born in counties covered by Preclearance, while 74% were born in counties not covered (n=1,324,002). In total, 463 counties were included, and 27% of counties were covered by Preclearance, while 73% of counties were not covered. Gestational age and birth weight were significantly lower for infants in counties covered by Preclearance compared to counties not covered, although the clinical meaning of the difference is difficult to say. Preclearance infants had a mean gestational age of 38.6 (SE=2.4) weeks, while non-Preclearance infants had only a slightly longer gestational average of 38.7 (SE=2.4) weeks. Although not included in the table, but important to note nonetheless, the difference in birth outcomes across time by county type is important to know. In 2012, Preclearance counties had a mean gestational age of 38.6 weeks (SE=2.4) and mean birth weight of 3,247.1 grams (SE=591.8) compared to non-Preclearance counties whose mean gestational age and birth weight were 38.8 weeks (SE=2.4) and 3,304.3 grams (SE=587.9), respectively. Both outcomes were lower for Preclearance counties than non-Preclearance counties at baseline. In 2016, Preclearance counties had a mean gestational age of 38.6 weeks (SE=2.4) and mean birth weight of 3,252.0 grams (SE=585.8) compared to non-Preclearance counties whose mean gestational age and birth weight were 38.7 weeks (SE=2.4) and 3,295.3 grams (SE=589.1), respectively. Thus, overall, non-Preclearance counties saw birth weight and gestational age decrease slightly over time, while Preclearance counties saw no change in gestational age but an increase in birth weight.

The percent of Black infants was significantly higher in Preclearance counties, 29.4%, compared to non-covered counties, 19.2%. Infants in Preclearance counties may be born into slightly riskier conditions, that may explain the lower mean birth weight and gestational age. Mothers in Preclearance counties tended to be younger, have received no prenatal care, have a Caesarean section, and have gestational diabetes, which are all risk factors for worse birth outcomes. Mother's education, marital status, pre-pregnancy diabetes and hypertension, and gestational hypertension and eclampsia were not significantly different by county type.

Regarding county characteristics, all covariates were significantly different by county type, such that Preclearance counties had a .08 higher proportion of Black residents, younger, less educated, and more uninsured population. In fact, Preclearance counties had .05 higher proportion of the population uninsured compared to non-Preclearance counties. And, as one would expect, voting rates were significantly lower overall for Preclearance counties. Perhaps, even with some protections, the history of discrimination at the polls and in other institutions has driven down voting rates (Acharya et al., 2016).

The Association of Preclearance on Health - Difference in Difference Analysis

Tables 2a-b shows the results of the mixed regression difference in difference and difference in difference in difference analyses for gestational age and birth weight. First, let us examine the results for gestational age. Models 1-3 examine the individual effects of Preclearance and time, and then add in a key variable of interest – mother's race. Across all three models those three predictors are significant ($p<.001$). Across the sample, infants in Preclearance counties have, on average a .2 week lower gestational age than infants in non-Preclearance counties which means they are born 1.4 days earlier. If we compare infants born in 2012 compared to 2016, regardless of county type, we expect them to have .02 weeks lower gestational age. When Preclearance and time are controlled (Model 3), mother's race has the largest effect of these three variables, predicting a half week shorter gestational period for infants born to Black mothers compared to infants born to White mothers.

Table 1. Means and Percents for 2012-2013/2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 and 2016 5-year Data (N=468 counties, 1,779,638 infants).

	Level 1 – Mother/Infant N=1,779,638		
Characteristic	Not Preclearance N=1,324,002	Preclearance N=455,636	P-value
Gestational age (weeks)	38.7 (2.4)	38.6 (2.4)	***
Birth weight (grams)	3,300.6 (588.4)	3,249.3 (589.1)	***
Black	19.2%	29.4%	***
Male infant	51.2%	51.1%	
Mother's education level			
Less than high school	8.2%	9.3%	
High school	21.6%	24.2%	
Some college	31.3%	31.4%	
College	24.1%	23.0%	
More than college	14.8%	12.0%	
Mother married	62.7%	60.6%	
Mother's age (range 1-9)	4.5 (1.1)	3.9 (1.2)	***
No prenatal care	1.2%	2.3%	***
Cesarean-section birth	31.8%	34.5%	***
Total birth order	2.5 (1.6)	2.4 (1.6)	**
Pre-pregnancy diabetes	.8%	.8%	
Gestational diabetes	5.2%	3.9%	***
Pre-pregnancy hypertension	2.1%	1.9%	
Gestational hypertension	6.4%	6.4%	
Eclampsia	.3%	.3%	
Cigarettes smoked during pregnancy	2.5 (10.1)	1.5 (7.6)	***
	Level 2 – County N=468		
	Not Preclearance N=343	Preclearance N=125	
Proportion voted	.93 (.06)	.90 (.07)	***
Proportion Black	.14 (.12)	.22 (.14)	***
Proportion over 65 years	.13 (.03)	.11 (.03)	***
Proportion unemployed	.05 (.01)	.05 (.01)	***
Proportion with a college degree	.23 (.06)	.22 (.09)	***
Proportion uninsured	.12 (.04)	.17 (.05)	***

In Model 4, the interaction term (preclear by time) to estimate the difference in difference is added, yet it is not significant (β=0.01, SE=0.01), meaning that there is not a significant effect in the change of gestational age over time due to the policy change. The effect remains nonsignificant when covariates are added (Model 5). Additionally, covariates seem to account for the previously significant effect of time (β=-0.02, SE=0.00 Model 4), which becomes nonsignificant (β=0.01, SE=0.01 Model 5). Mother's race and Preclearance retain their significance.

However, as evident in Aim 2, some voter suppression items would appear to have a non-significant effect on health until moderation by mother's race was examined. Thus, in Models 6-7, I examine the estimate of a difference in difference in difference effect, which can be found in the coefficient for the three-way interaction term of Preclearance by time by race. In both models without (β=-0.06, SE=0.02 Model 6) and with covariates (β=-0.05, SE=0.02 Model 7), the interaction term is significant, indicating that Black women in counties with Preclearance do have a longer gestational age. Further, an F-test of the total effect of the three-way interaction, not just the specific comparison to the non-zero level, is also significant (F=8.52, p=0.004). Lower order interaction terms for Preclearance by race and time by race are also significant ($p<.001$) and negative, though Preclearance by time remains nonsignificant.

When the three-way interaction is interpreted in sum, with the lower order terms, and plotted (Figure 1), we can see a distinct positive effect of Black race on the association between the Preclearance policy change and birth outcomes, which is the opposite of what was hypothesized (H3b). In 2012, Black infants have lower mean gestational age in both Preclearance and non-Preclearance counties compared to White infants. If we examine infants born in non-Preclearance counties, we can estimate the general trend in gestational age over time, unaffected by *Shelby County v. Holder*. Thus, over time, black infants experienced a decrease in gestational age, independent of the policy change. If we then consider infants born in Preclearance counties, we observe that being born in a Preclearance county resulted in a positive change in gestational age over time (0.02 week increase, all else equal). White infants born in Preclearance counties also saw an increase in gestational age (0.01 weeks), although slightly smaller. Therefore, one can conclude that, while there is no significant effect of *Shelby County v. Holder* on gestational age across all infants, there is a clear, positive association of the policy change with gestation for Black infants.

When birth weight is considered, we see similar patterns in Models 1-3: Preclearance and time are significantly associated with lower birth weight, both separately and when race is added to the model (Table 2b). Mother's race, too, is a strong predictor of lower birth weight, with infants born to Black mothers being expected to be 250 grams smaller than infants born to White mothers, on average (Model 3). In this same model, infants born in a country covered by Preclearance are, on average, almost 27 grams smaller than infants born in non-covered counties. Additionally, infants born in 2016 tend to be 2.75 grams smaller than those born in 2012.

Birthweight results differ from those of gestational age, though, because here the interaction between Preclearance and time is significant in Model 4 (β=4.73, SE=1.96) but not when covariates are added (β=1.96, SE=1.2, Model 5). This positive association is the opposite of what was expected, as I hypothesized (H3a) that the policy change would have a negative impact on birth outcomes. The two-way interaction between Preclearance and time on birth weight can be seen in Figure 2, even though the interaction was not significant in Model 5.

As with gestational age, mother's race was tested as a modifier for the effect of the policy change, requiring a three-way interaction to be added to the model (Model 6). While the lower order interaction terms for preclear by race (β=-12.44, SE=3.15, Model 6) and time by race (β=-18.20, SE=3.07, Model 6) are significant, the interaction term is not. Further, the interaction term remains nonsignificant when covariates are added (Model 7). The two-way interaction terms

Table 2a. Difference in difference in difference analysis of Preclearance, time, race, and gestational age: 2012 & 2016 Cooperative Congressional Election Study, 2012-2013 & 2015-2016 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 and 2016 5-year Data (N=468 Counties, 1,779,638 infants).

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
VARIABLES	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
Preclear	-0.20 *** (0.03)		-0.13 *** (0.03)	-0.14 *** (0.03)	-0.06 * (0.03)	-0.13 *** (0.03)	-0.04 (0.03)
Time		-0.02 *** (0.00)	-0.02 *** (0.00)	-0.02 *** (0.00)	0.01 (0.01)	-0.01 (0.00)	0.01 (0.01)
Mother's race							
White	ref	ref	ref	ref	ref	ref	ref
Black			-0.51 *** (0.00)	-0.51 *** (0.00)	-0.36 *** (0.01)	-0.46 *** (0.01)	-0.32 *** (0.01)
Preclear* time				0.01 (0.01)	0.01 (0.01)	0.00 (0.01)	-0.00 (0.01)
Preclear * race						-0.07 *** (0.01)	-0.07 *** (0.01)
Time * race						-0.07 *** (0.01)	-0.04 ** (0.01)
Preclear * race * time						0.06 ** (0.02)	0.05 ** (0.02)
Proportion who voted					-0.04 (0.04)		-0.05 (0.04)
Proportion Black					-0.25 ** (0.09)		-0.25 ** (0.09)
Proportion 65 years or older					0.90 *** (0.26)		0.86 ** (0.26)
Proportion unemployed					2.00 *** (0.00)		1.98 *** (0.53)
Proportion with college degree or					-0.15 (0.15)		-0.16 (0.15)

higher							
Proportion uninsured					-0.80 *** (0.20)		-0.84 *** (0.20)
Infant sex							
Female	ref	ref	ref	ref	Ref	ref	ref
Male					-0.07 *** (0.00)		
Mother’s marital status							-0.07 *** (0.00)
Not married	ref	ref	ref	ref	ref	ref	
Married					0.10 *** (0.00)		0.10 *** (0.00)
Mother’s education level							
Less than high school	ref	ref	ref	ref	ref	ref	ref
High school degree					0.07 *** (0.01)		0.07 *** (0.01)
Some college					0.13 *** (0.01)		0.13 *** (0.01)
College degree					0.21 *** (0.01)		0.21 *** (0.01)
More than college					0.18 *** (0.01)		0.19 *** (0,01)
Mother’s age (range 1-9)					-0.06 *** (0.00)		-0.06 *** (0.00)
No prenatal care							
Prenatal care	ref	ref	ref	ref	ref	ref	
No prenatal care					-0.92 *** (0.01)		-0.92 *** (0.01)
Type of birth							
Vaginal	ref	ref	ref	ref	ref	ref	ref
Caesarean section					-0.55 *** (0.00)		-0.55 *** (0.00)
Total birth order					-0.09 ***		-0.09 ***

					(0.00)		(0.00)
Pre-pregnancy diabetes					-0.81 ***		-0.80 ***
					(0.02)		(0.02)
Gestational diabetes					-0.29 ***		-0.29***
					(0.01)		(0.01)
Pre-pregnancy hypertension					-0.88 ***		-0.87 ***
					(0.01)		(0.01)
Gestational hypertension					-1.04 ***		-1.03 ***
					(0.01)		(0.01)
Eclampsia					-1.75 ***		-1.75 ***
					(0.03)		(0.03)
Total cigarettes smoked during pregnancy					-0.00 ***		-0.00 ***
					(0.00)		(0.00)
Constant	38.85 ***	38.81 ***	38.93 ***	38.93 ***	39.35 ***	38.92 ***	39.47 ***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.08)	(0.01)	(0.08)
AIC	8,113,360	8,113,383	8,101,445	8,101,445	8,022,339	8,101,388	8,022,299
-2 Log Likelihood	8,113,352	8,113,375	8,101,433	8,101,431	8,022,281	8,101,368	8,022,235

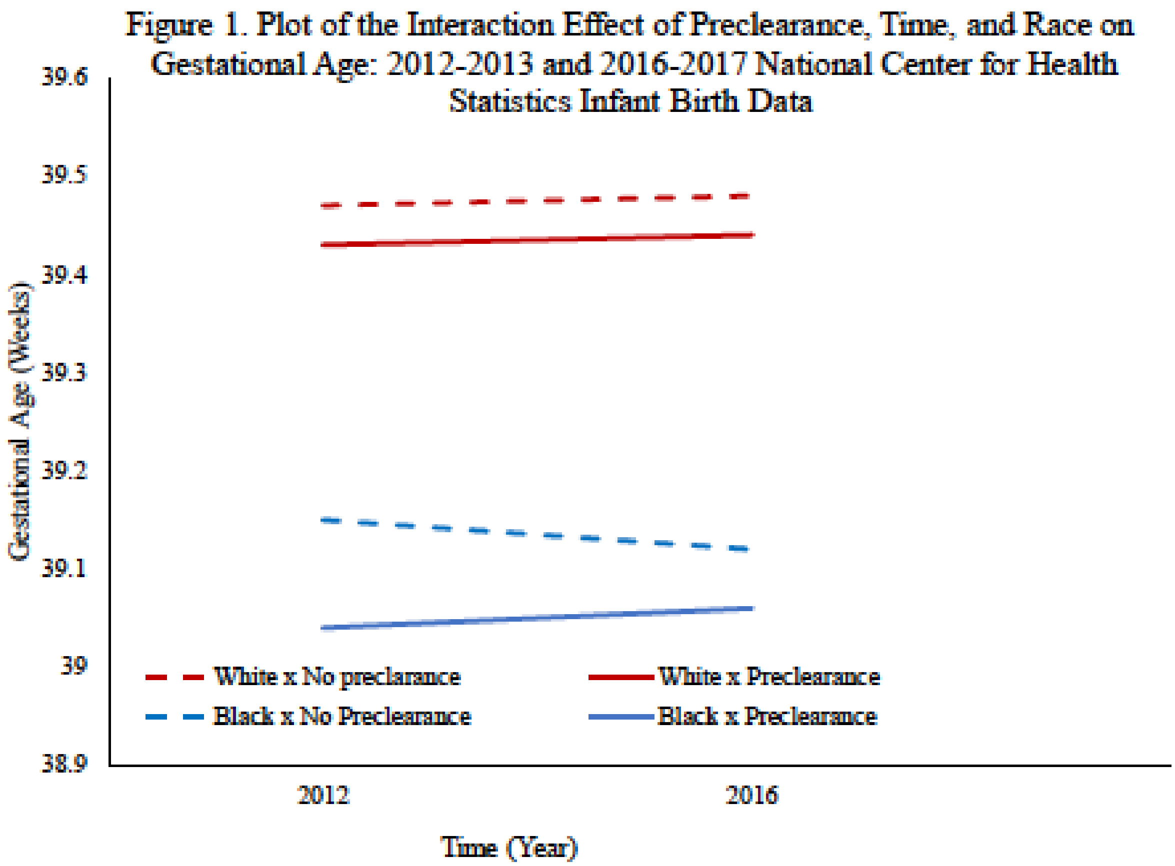
Table 2b. Difference in difference in difference analysis of Preclearance, time, race, and birth weight: 2012 & 2016 Cooperative Congressional Election Study, 2012-2013 & 2015-2016 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 and 2016 5-year Data (N=468 Counties, 1,779,638 infants).

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
VARIABLES	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
Preclear	-61.17 *** (7.77)		-26.96 *** (6.00)	-29.10 *** (6.08)	-6.51 (6.66)	-27.02 *** (6.13)	-2.78 (6.70)
Time		-2.70 ** (0.97)	-2.75 ** (0.96)	-3.98 *** (1.11)	-3.91 (2.18)	-0.03 (1.22)-	-.89 (2.22)
Mother's race							
White	ref	ref	ref	ref	ref	ref	ref
Black			-250.03 *** (1.13)	-250.04 *** (1.13)	-194.09 *** (1.23)	-238.64*** (1.77)	-181.74 *** (1.82)
Preclear* time				4.73* (2.18)	1.96 (2.16)	4.14 (2.5)	1.79 (2.47)
Preclear * race						-12.44*** (3.15)	-18.20 *** (3.07)
Time * race						-20.10 *** (2.61)	-16.79 *** (2.55)
Preclear * race * time						8.79 (4.63)	6.06 (4.51)
Proportion who voted					-14.41 (10.76)		-17.08 (10.76)
Proportion Black					-94.04 *** (21.01)		-93.31 *** (21.00)
Proportion 65 years or older					65.56 (61.69)		50.53 (61.73)
Proportion unemployed					552.19 *** (127.62)		548.36 *** (127.61)

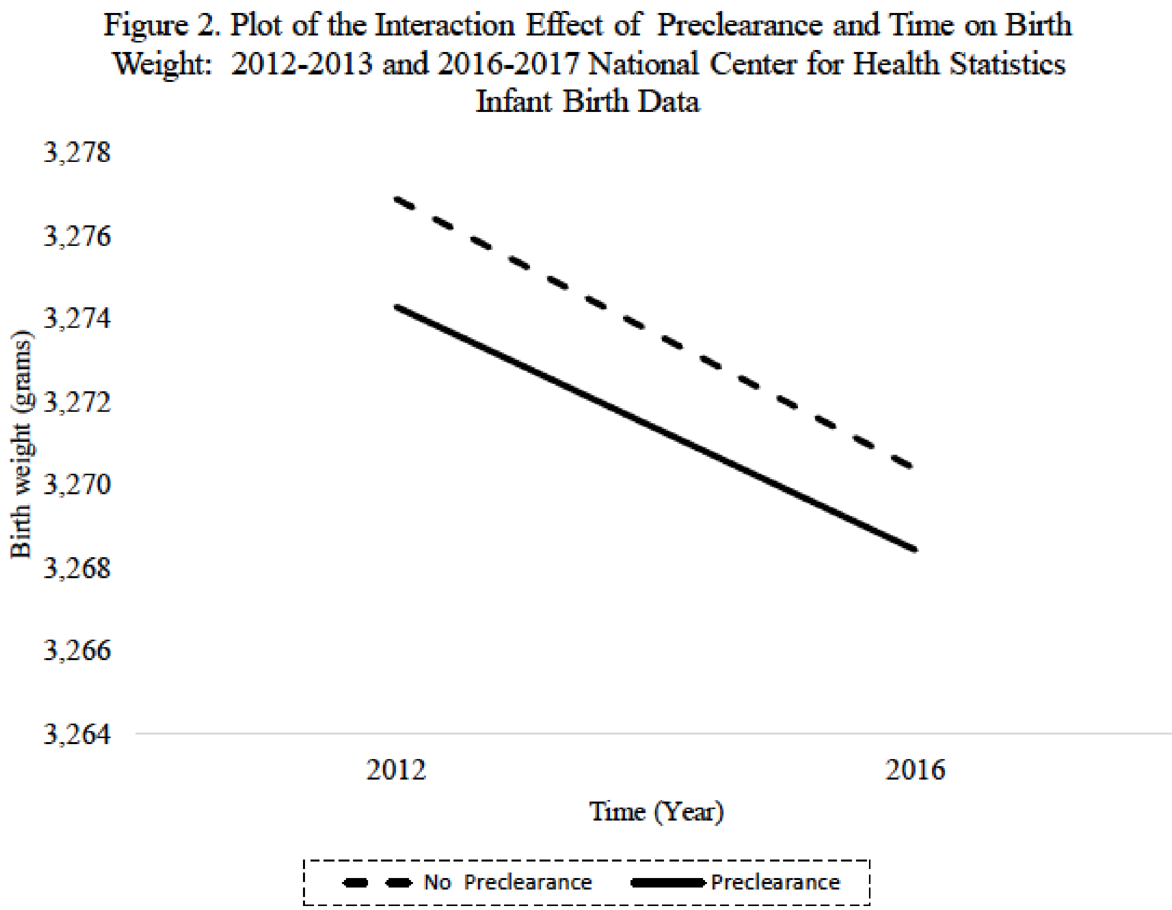
Proportion with college degree or higher					-142.27 ***		-145.66 ***
					(34.41)		(34.39)
Proportion uninsured					-291.19 ***		-306.25 ***
					(48.84)		(48.85)
Infant sex							
Female	ref	ref	ref	ref	ref	ref	ref
Male					123.89 ***		123.90 ***
					(0.84)		(0.84)
Mother’s marital status							
Not married	ref	ref	ref	ref	ref	ref	ref
Married					61.80 ***		61.69 ***
					(1.12)		(1.12)
Mother’s education level							
Less than high school	ref	ref	ref	ref	ref	ref	ref
High school degree					46.16 ***		46.49 ***
					(1.73)		(1.74)
Some college					82.90 ***		83.22 ***
					(1.74)		(1.74)
College degree					111.89 ***		112.22 ***
					(1.98)		(1.98)
More than college					99.88 ***		100.31 ***
					(2.19)		(2.19)
Mother’s age (range 1-9)					-2.03 ***		-1.89 ***
					(0.48)		(0.48)
No prenatal care							
Prenatal care	ref	ref	ref	ref	ref	ref	
No prenatal care					-195.47		-195.15 ***
					(3.52)		(3.52)
Type of birth							
Vaginal	ref	ref	ref	ref	ref	ref	
Caesarean section					-73.91 ***		-73.89 ***
					(-.92)		(0.92)

Total birth order					6.10 ***		6.04 ***
					(.30)		(0.30)
Pre-pregnancy diabetes					116.75 ***		116.80 (4.78)
					(4.78)		
Gestational diabetes					42.24 ***		42.17 ***
					(1.98)		(1.98)
Pre-pregnancy hypertension					-218.53 ***		-218.44 ***
					(3.05)		(3.05)
Gestational hypertension					-248.12 ***		-248.12 ***
					(1.74)		(1.74)
Eclampsia					-473.26 ***		-473.26 (8.35)
					(8.35)		
Total cigarettes smoked during pregnancy					-5.06 ***		-5.06 ***
					(0.05)		(0.05)
Constant	3,327.10 ***	3,312.51 ***	3,361.35 ***	3,361.88 ***	3,276.90 ***	3,359.86 ***	3,281.47 ***
	(3.96)	(3.65)	(3.09)	(3.10)	(18.66)	(3.11)	(18.68)
AIC	27,729,195	27,729,245	27,681,358	27,681,355	27,589,752	27,681,279	27,589,661
-2 Log Likelihood	27,729,187	27,729,237	27,681,346	27,681,341	27,589,694	27,681,259	27,589,597

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1



Note. Figure 1 uses coefficients estimated in Table 2a, Model 7 to estimate gestational age in each year for each set of groups. Means were plotted in Excel. All covariates were set to 0.



Note. Figure 2 uses coefficients estimated in Table 2b, Model 5 to estimate birth weight in each year for each group. Means were plotted in Excel. All covariates were set to 0.

with race do indicate that Black infants had a stronger negative association between time and birth weight and Preclearance and birth weight.

The infant-level and county-level covariates behaved similarly across models for both outcomes. Across all models, the proportion Black, proportion uninsured, mother's age, no prenatal care, having gestational or pre-pregnancy hypertension, and having a Caesarean section birth were associate with lower gestational age and birth weight. Differences were observed in infant sex, maternal risk factors, and total birth order: male infants on average had a higher birth weight but lower gestational age than female infants; a higher total birth order was associated with lower gestational age, but higher birth weight; and both gestational and pre-pregnancy diabetes were associated with higher birth weight but lower gestational age.

Discussion

The analyses in this chapter investigated the effect of the *Shelby County v. Holder* Supreme Court decision on birth outcomes by comparing births in counties covered by Preclearance or not in 2012 and 2016. While I had hypothesized the Court decision would exacerbate the disparity between Black and White infants, especially in counties covered by Preclearance, the opposite is true. While the gap between Black and White infants in non-Preclearance counties did increase from 2012 to 2016 by .04 weeks, the racial gap decreased in Preclearance counties by .01 weeks. Black infants in Preclearance counties saw an increase in gestational age over time, while Black infants in non-Preclearance counties experienced a decrease. However, while statistically significant, these findings may not have clinical meaning. A difference of .01 weeks is less than a 2 hour difference in gestation. Meanwhile, White infants in Preclearance and White infants in non-Preclearance counties saw a small, parallel increase in gestational age from 2012 to 2016. Thus, it is actually Black infants in non-Preclearance counties who are the unique group, as they are the only group of the four that experienced a decline in gestational age. While no certain conclusions can be made, we can point to some explanations, both theoretical and methodological, to interpret these puzzling findings.

In interpreting these findings, we must exercise caution. The values modeled in Figure 1 using Excel were taken from models that are not representative of conditions likely encountered in the general population as all covariates were set to zero. These estimates are drawn from one specific context, in a particular population of infants who were in utero during the Presidential Election. Thus, we can examine the trends, but even these must be scrutinized, as they represent association, not causation. *Shelby County v. Holder* did not directly impact the health of infants;

rather, it created unique and complex conditions in which mothers and infants are situated. The interactions among these conditions may play out in surprising ways.

It is important to state, that, from a moral and theoretical perspective, racism is never advantageous for health. If people experiencing oppression are able to be healthy under a system of racism and other intersecting oppressions, that is an act of resistance that should be celebrated, but in no way should we conclude that racism has a benign or positive impact. If people are able to achieve better health under oppression, imagine the health they could achieve in its absence.

The diminished impacts hypothesis may explain the present finding (Assari, 2018; Thomas Tobin & Moody, 2021). Perhaps counties covered by Preclearance have a higher prevalence of other forms of structural racism, which may create especially oppressive conditions. Through the process of habituation, the impact of these repeated exposures to stress may be lessened because individuals are forced to become more resilient in order to survive (Assari, 2018; Thomas Tobin & Moody, 2021). Preclearance counties tend to be in the Southern United States, in places with a history of slavery and Jim Crow law, and, as such, may be unique from many non-Preclearance counties. Descriptive statistics indicate that Preclearance counties have lower education, more uninsured, and a much higher proportion of the population is Black. Structural racism in accessing higher education and health care, in addition to the racism indicated by Preclearance, could compound in such a way that Black residents must develop resiliency to survive.

As Black voters have been targets of disenfranchisement for decades, it is also possible that, since that power has been denied, power and resources have had to be garnered in other ways, ways that exist outside the state. This resistant could take the form of mutual aid or alternative social organization that provide support to address the gaps of the state. Perhaps, in some cases, these alternatives are more beneficial than what the state can provide.

The diminished impacts hypothesis may also explain why Black infants in non-Preclearance counties saw a decline in gestational age from 2012 to 2016, while all other groups saw an improvement. Perhaps, people living in these counties had not experienced such high levels of institutionalized discrimination as people living in Preclearance counties do. Non-Preclearance counties, by definition, do not have a history of voting disenfranchisement requiring intervention from the federal government. Perhaps, with the trend of voter suppression laws passing in other places, these counties thought that they, too, needed to require identification to vote or reduce early voting. Twenty-six states enacted restrictive voting laws since the *Shelby County v. Holder* decision, but only 40% of these were previously covered by Preclearance (Berman, 2021). People in these non-covered counties would not have experienced such high levels of electoral oppression in the past, so would not have developed the tools to adapt (Thomas Tobin & Moody, 2021). The shock of experiencing this new stressor could be damaging for health. While the diminished impacts hypothesis has primarily been applied to individuals, perhaps communities experience this resilience and vulnerability to racism in the same ways.

In addition to a theoretical explanation, there are also methodological considerations that could explain the findings. A crucial assumption of difference in difference analysis is that of the common trend assumption – that “confounders varying across groups are time invariant, and time varying confounders are group invariant” (Wing et al., 2018, p. 455). Descriptive statistics show that there are significant differences between county types across infant and county-level covariates. Perhaps these are not time invariant, as was assumed. Regarding the second component of the common trends assumption, it is also possible that the two types of counties experienced uncommon trends over time. Although Figure 1 suggests a common trend in gestational age over time for White infants, the same cannot be said for Black infants. Whatever shock occurred would have impacted Black mothers and infants but not Whites. From 2012 to 2016, the recognition of police murders of Black men and women and the subsequent protests and unrests could have influenced these trends. The most covered murders by police of Michael Brown in Ferguson, Missouri in 2014, Tamir Rice in Cleveland, Ohio in 2014, and Freddie Gray in Baltimore, Maryland in 2015 occurred in counties that were not covered by Preclearance. Perhaps the stress of witnessing these killings in non-Preclearance counties caused increase stress that drove down gestational age. Thus, the positive association in Preclearance counties is an artifact of the overall trend in increased gestational age over this time, while the negative trend in non-Preclearance counties could be attributed to living in a place where heightened racism is harming health.

Perhaps, too, these findings can simply be attributed to regression towards the mean. A longer time sample, to really assess temporal trends, would be needed to determine if this is indeed the case.

The 2016 election and months leading up to it could have been exceptionally stressful for Black mothers. While President Obama's re-election was likely in 2012, the Presidential election in 2016 was much more tumultuous, with hateful, racist, and misogynistic rhetoric being spewed by Presidential candidates. The heightened racial hostility would have been felt across all counties, whether covered or not. However, it is possible that non-Preclearance counties, which have not experienced the same level of outright racist rhetoric sometimes used in the South and

Preclearance counties, experienced more stress from the increased levels of racist speech in the time leading up to the Election.

The use of cross-sectional data with only two time points also reduced the ability to really assess long-term trends that could have influenced gestational age patterns in many years before this study. Further, the effect of Preclearance may have been an acute stressor with little impact on gestational age, and the true effects may not be seen for many more years, requiring a longer period of study. There could be a larger effect of Preclearance that extends beyond the exposure period of a Presidential Election and is instead tied to the types of policies passed as a result of the lower vote. Future analyses could extend the study period and perhaps examine whether specific types of suppressive laws were passed, or if health or other social policies were passed that could negatively impact health. It may just be that the role back of protections itself is not significant, and the true impact comes from the actual presence of harmful policies, not the absence of protective ones.

In the end, it is possible that difference in difference analysis was not the best approach to examine this research question but was simply the most appropriate given the data available (Wing et al., 2018). The number of unmeasured variables is many and perhaps a critical variable went unaccounted for. Thus, we must interpret these results with the utmost caution before making any conclusions about the impact of voting protections on health disparities.

Conclusion

While the results of this study are inconclusive for how voting rights protections, or the lack of protections, are related to health, the political and social consequences of the Supreme Courts decision cannot be ignored. In practice, the *Shelby County v. Holder* decision halted voting rights protections in counties known to have endorsed voting policies that that placed a disparate impact on voters of color, most often Black voters. Symbolically, though, the Court declared that the United States had become a post-racial country in which racial inequity in voting had been solved (Sears & Jessor, 1996). However, this decision was not so much post-racial as it was colorblind (Bonilla-Silva, 2006). Rather than reckon with the historic injustices against African Americans, the Court turned a blind eye. Their unwillingness to name racism or recognize the continuing racial injustices in this country have real, detrimental effects on the health of the Black population. Perhaps, when racism is more insidious rather than overt, it is actually more dangerous, as its pernicious effects catch us off-guard and we are unable to garner resources to cope or adapt, resulting in worse health outcomes. Racism has not disappeared in America, and rather than ignoring it, interventions that are explicitly race-conscious need to be implemented to combat it. We do not need colorblind voting policies, rather, we need policies that consider the specific barriers faced by Black voters and other voters of color. Racism evolves (Ford & Airhihenbuwa, 2010). While an older form of racism is no longer relevant, we must be conscious of contemporary, insidious racism that may go unrecognized by those who do not directly experience it. Voter suppression has evolved, our measurement of it and understanding of the ways in which it impacts health must evolve, too.

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CHAPTER 5.

CONCLUSION

This dissertation examined three different manners in which voter suppression may exacerbate racial health inequities. To understand the many mechanisms through which voter suppression may impact health, I examined voting inequality (a consequence of voter suppression), direct reports of voter suppression as operationalized through wait times, being unable to vote, and voter identification laws, and the influence of the *Shelby County v. Holder* Supreme Court decision which rolled back voting rights protections for voters of color. Each of these was tested to predict health, either life expectancy or birth outcomes of birth weight and gestational age. Further, I investigated how voter suppression may differentially impact health by race-ethnicity. As voter suppression is a form of structural racism, its effects are likely to be seen more strongly in the health of Black populations as compared to White populations. These findings contribute to the literature examining the connection between civil rights and health (Almond et al., 2006; Chay & Greenstone, 2000; Krieger et al., 2013; LaVeist, 1992, 1993), but expand upon them by investigating an exposure that is understudied in public health: voter suppression. Most importantly, my results highlight that the effects of voter suppression on health are not distributed evenly, but are modified by race. In this chapter, I will summarize the story told by these results and discuss implications.

Synthesis of Study Findings

Each Aim of this dissertation investigated a different aspect of voter suppression. In Aim 1, I examined voting inequality between Black and White voters. If voter suppression policies are successful in disenfranchising voters of color, then voting rates between the two groups should be different. Conducted entirely at the county-level, this study sought to identify potential mechanisms through which this voting inequality influences health. In the framework presented in this introduction, it is hypothesized that voter suppression influences health through the concentration of power and resources along racial lines. This concentration of resources could be observed at the county-level through certain county characteristics related to the social determinants of health (Hahn et al., 2018). As Hahn notes, “Civil rights laws and their enforcement are social determinants of health because they affect other social determinants of health,” these other social determinants include housing, employment, and exposure to environmental toxins (Hahn et al., 2018, p. 17).

Aim 1 investigated the impact of voting inequality on four known social determinants of health: segregation, income inequality, child poverty, and air pollution, and then tested these four as mediators and moderators for the influence of voter suppression on Black and White life expectancy. The relationship between voting inequality, these four social determinants, and health was complex, with no clear pattern. One of the stronger associations was the moderation effect between voting inequality and segregation, which predicted improved life expectancy among Black residents. While this is only an association and other unaccounted for factors could be at play, it speaks to the findings in Aim 3.

Aim 2 investigated voter suppression operationalized through the proportion of people who experienced long waits, were unable to vote, or did not receive their absentee ballot. It also examined the influence of state voter identification laws on birth outcomes. While Aim 1 examined how lower voter turnout influences policy, Aim 2 sought to more specifically understand how the presence of voter suppression and peoples’ experience of voter suppression as a racialized stressor influenced their health. The most compelling pattern seen from the large number of results, is that voter suppression did not have a substantial impact on overall health, in some cases predicted better health, but many results were nonsignificant. However, when the effect of voter suppression was moderated by mother's race, the significant associations with birth outcomes were negative for 10 of 12 interactions. These results suggest that voter suppression may have an especially pernicious effect upon Black health.

Aim 3 examined the impact of the *Shelby County v. Holder* Supreme Court Decision on birth outcomes using a difference in difference in difference analysis by testing the additional moderation effect of mother's race on the interaction between policy coverage and time. This decision removed voting rights protections in counties that had a known history of discrimination at the polls. This deregulation led to an increase in the number of suppressive voting policies both proposed and passed. Thus, this Aim takes a step back from the focus of Aim 2 on mechanisms linking specific forms of voter suppression and health. Instead, Aim 3 seeks to understand how federal policy influences the conditions for voter suppression to occur and how those conditions are associated with health. Contrary to hypotheses, the three-way interaction was positive, and when plotted, showed that Black infants in preclearance counties saw an increase in their gestational age after voting protections were removed.

If we return to the concepts outlined by CRT and PHCRP, we can begin to disentangle the results of these three research questions. Most applicable to this study are the concepts of race consciousness, the ordinariness of race, the primacy of racialization, the contemporary mechanisms of racism, and structural determinism (Ford & Airhihenbuwa, 2010b, 2010a).

Firstly, all three sets of results demonstrate that, when trying to understand the impact of voter suppression on health, one must utilize a race conscious lens (Ford & Airhihenbuwa, 2010). Given the significant roles of race and racism in these results, the framework of voter suppression as a form of structural racism holds true. Race is a social construct, meaning that different racial groups experience the same social context distinctly (Ford & Airhihenbuwa, 2010a). Voter suppression operated to differentially impact health by race because of the racialization of this experience, and in some cases exacerbated racial health disparities. Without consideration of race and racism, the need to include race as a modifier at all would go overlooked.

In examining the results in Aim 2, before stratification by race, one might conclude voter suppression has no impact on health and move on. However, the findings in Aim 2 suggest that some forms of voter suppression do negatively impact health when race is considered. In congruence with the findings in Aims 1 and 3, a surprising pattern also emerged in which the presence of voter suppression has a positive association with health for Black participants. These findings also echo the idea of the ordinariness of race (Ford & Airhihenbuwa, 2010b). Because racism is so prevalent across society, racial minorities encounter racism daily and must develop coping strategies to survive given the number of encounters. Similar hypotheses, one of ethnic density and one of diminished impacts (Halpern & Nazroo, 2000; Thomas Tobin & Moody, 2021), suggest that in the face of such adversity, resilience and resistance develop with support of fellow group members and in some cases yield better health. We must present these findings with caution, though, and recognize that, unequivocally, racism is unjust; even if the oppressed have developed modes of resistance in which they are able to survive, we can only imagine what could be achieved in the absence of the burden of oppression.

Next, the primacy of racialization highlights how racial stratification contributes to societal inequities. Voter suppression, symbolically, reinforces existing racial hierarchies that privilege Whites over Blacks through the provision of voting privileges to White voters and the reduction of voting privileges to Black voters. This mechanism is key for understanding how voter suppression, through its reinforcement of existing hierarchies, also reinforces those existing mechanisms linking social inequities to health inequities. While that direct mechanism could not be measured here, it is a plausible explanation for some of the observed results. In Aim 1, we observed that racial inequality in voter turnout was associated with higher segregation, child poverty, and income inequality, and lower air pollution. That voting inequality was associated with higher segregation, poverty, and income inequality suggests that power inequalities in one domain manifest in the stratification of resources, though because this analysis was at the county-level only, one cannot say how this resource distribution varied by race.

To understand why various forms of voter suppression and voting inequality appears to benefit Whites, both for life expectancy and birth outcomes, we can turn to the PHCRP principle of structural determinism. In the 1960s, researchers found that the expansion of civil rights was associated with improved health outcomes and a reduction of disparities for African Americans (Almond et al., 2006; Krieger et al., 2013, 2014). One bill associated with the civil rights movement is the Voting Rights Act (VRA) of 1965. With that legislation, voting rights were guaranteed no matter one's race. However, since then, and especially in the last decade, the VRA and voting rights have been under attack, with policies being passed that make it harder for Black voters to cast a ballot. The logic for reducing voting protections for groups who have previously experienced discrimination in the polls and for increasing barriers to the vote can be explained through the principle of structural determinism, which suggests not only that macrolevel forces, such as policies and ideologies, shape health inequities, but also that these policies are adopted by the group in power to preserve their power. As one's power and social position in society have been linked to the stratification of resources and subsequent stratification of health, one can understand how the concentration of voting power by Whites could harm Black health. While this was not the unequivocal pattern observed in results, analyses in Aim 2 that examined specific forms of voter suppression interacted with race did suggest a positive effect of health for White participants at the expense of Black participants.

Lastly, in interpreting these results and in moving forward with studies of voter suppression, one should be cognizant of the contemporary mechanisms of structural racism. Poll taxes and literacy tests are no longer the primary method of disenfranchisement. Yet, even as we study voter identification requirements, the disparate impact of those is becoming recognized and regulated, forcing racism to again evolve into even trickier forms to control, such as gerrymandering, campaign financing regulations, and other methods of vote dilution. Some of these do not impact a person’s ability to vote, but instead reduce the influence of their vote. Perhaps results here were less robust because I could not attend to these aspects of vote dilution that could further explain the link between disenfranchisement and health.

Given these findings indicating the intersecting influences of racism and political on health, existing theories that can explain the impact of racism on health, though do not explicitly attend to racism such as Fundamental Cause theory (Phelan & Link, 2015), the social determinants of health, or the socioecological model, should consider how political determinants and inequities translate into resource inequities that then manifest as racial health inequities. Further, these results point to an even more upstream process, it is not just the racist policies that create and exacerbate inequities, but the racist processes through which these policies are created. When talking about power inequities, one must think about how power is generated and distributed, especially along racial lines. The focus on political power and the policy decisions made by those in power opens a new avenue for research and action. Existing theories can be expanded upon not only by incorporating a more upstream approach that considers political power and its distribution but also by incorporating these tenets of Critical Race Theory and truly asking "how is racism operating here?" (Jones 2002).

Strengths and Limitations

These results are some of the first to examine the connection between voter suppression and health, but they are, as a consequence of their novelty, limited by a few key factors. An important consideration for understanding these results is what the role of health selection might have been both through the highly selective sample and through the exclusion of incarcerated people. Most nationally representative studies are representative only of the non-incarcerated population, which is true for all data sets used here. Incarcerated people tend to have worse health than non-institutionalized adults (Schnittker et al., 2011). Further, 2.9% of the adult population has experienced incarceration, 17% of African American adult population have been or are currently incarcerated, that is almost 1 in 5 (Schnittker et al., 2011). And, those who are incarcerated, and often those who have been released but were formerly incarcerated, cannot vote. Thus, by excluding the incarcerated population from analyses, we are undercounting those who are unable to vote. Voting inequality would likely be much higher than what was calculated in Aim 1. We would also likely see lower Black life expectancy. While not as directly applicable to infant outcomes, the absence of a parent could reduce resources for the mother during pregnancy and lead to worse outcomes. County-level incarceration rates were associated with preterm birth in a study of Black births in Louisiana (Dyer et al., 2019). Thus, incarceration should be a factor when we consider the connections between disenfranchisement and health.

Another form of health selection may simply be that people in poor health flee counties with higher levels of voter suppression. States with voter suppression policies were less likely to expand Medicaid eligibility. Thus, those with poor health, who may also be disadvantaged in other domains, may have chosen to relocate to other place to give birth or seek medical care.

Given the sample size of millions across the three aims and the number of tests run, it is also possible that the significant findings are spurious. To address this, I will adjust the significance value for multiple tests in future analyses. Another critique could be that I did not include region as a covariate. While I did not want to over control my models, region as a covariate would have been redundant, as I chose an even more specific, more meaningful geographic indicator of county or, in some cases, state.

While I was unable to measure direct mechanisms linking voter suppression to health, this study does point to the possibility that different forms of structural racism interact with voter suppression to influence health differentially by race. This finding can act as a jumping off point for future analyses to estimate how voter suppression operates as one node in the machine of structural racism.

Future Research and Implications

Eight years ago, the Supreme Court gutted the Voting Rights Act, with Justice Roberts arguing that “things have changed dramatically” since the law was implemented in 1965 (Vance, 2020). Since that decision in 2013, things have changed dramatically once again. The rate of voter suppression laws being passed since the overturn of Section 5 in the Voting Rights Act has only increased. Since 2013, 26 states have enacted voting restrictions, never mind the number that have been proposed (Berman, 2021). With calls of fraudulent voting surrounding the 2020 Presidential Election, Republicans have begun proposing and passing a record number of voter suppression bills. While findings from 2008-2016 suggest that there is some negative impact of voter suppression on health, it's possible that the effects were isolated and that there is a threshold effect for the impact of voter suppression on health. Given the flood of new laws, analyses of the 2020 Presidential Election could attend to the density of voting restrictions as well as better estimate the long-term impacts of voter suppression bills introduced a decade earlier. If so, I would posit that we are approaching that threshold. Thus, research on voter suppression and health is urgently needed as one step towards achieving health equity.

Given this context, future research and action on voter suppression should strive to anticipate the ways in which voter suppression will evolve. Research can contribute to the documentation of the health effects of the policies, while action should be taken through legislation and advocacy to curtail the prevalence and magnitude of novel suppressive strategies. Research should attend to voter suppression at various geographic units, from polling precinct and census tract data to county and state levels depending on the type of voting variable and health outcome in question. Analyses should also extend beyond Presidential elections to consider how suppression at local elections influences the contexts in which people live and their consequent health.

When considering the health effects of voter suppression, the health outcome and appropriate time period for study should be chosen carefully. Perhaps mental health and mental distress would be appropriate to consider as more acute short-term effects of voter suppression. But, when considering chronic disease development or disability, a longer time frame should be considered through which lifetime exposure can be chronicled. When this research is undertaken, we should be adamant to use evidence to advocate for voting rights protections, as they directly influence health equity. The goal of public health is to assure the conditions in which all people can thrive. Health is a human right, and voting is, too.

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Appendix A. Aim 1 - Voting Inequality Variable Performance across Individual Years

Table A. Comparison of voting inequality variables across 3 years for Cooperative Congressional Election Survey 2008, 2012, 2016. Percents reported. N=841 counties.

Year	**Voting inequality (difference)**	**Voting inequality (ratio)**
2008		
No voting inequality	42.2	45.2
Low voting inequality	23.5	15.6
High voting inequality	34.3	39.2
2012		
No voting inequality	17.2	18.2
Low voting inequality	17.6	15.8
High voting inequality	65.2	66.0
2016		
No voting inequality	32.96	33.4
Low voting inequality	41.67	40.7
High voting inequality	25.37	25.9
All Three Years		
No voting inequality	19.7	21.8
Low voting inequality	28.8	23.0
High voting inequality	51.4	55.3

Appendix B. Aim 1 - Voting Inequality Ratio Variable Regression Results

Table B1. Descriptive statistics (means and standard errors or proportion) for County Health Ranking 2019 counties stratified by voting inequality – ratio variable (n=841).

	Mean (SE)		
Variable	No Voting Inequality for Blacks (n=301)	Low Voting Inequality for Blacks (n=271)	High Voting Inequality for Blacks (n=269)
Black life expectancy	75.27 (3.70)	75.61 (3.17)	75.91 (4.20) *
White life expectancy	77.12 (2.56)	78.47 (2.66) ***	77.48 (2.56)
Segregation (Black/White dissimilarity index, range 0-100)	41.31 (12.80)	47.43 (13.66) ***	43.80 (13.88) *
Income inequality (range 3.15-9.15)	4.67 (.65)	4.86 (.84) **	4.63 (.65)
Air pollution (Particulate matter 2.5 μg/m^3)	10.12 (1.25)	10.13 (1.56)	9.84 (1.49) *
Child poverty (proportion)	.21 (.09)	.22 (.09)	.21 (.08)
Age 65 or older (proportion)	.16 (.04)	.17 (.04) **	.16 (.04)
Female (proportion)	.51 (.02)	.51 (.02) ***	.51 (.01)
Non-Hispanic White (proportion)	.65 (.17)	.60 (.17) ***	.69 (.67)
Rural (proportion)	.38 (.26)	.19 (.21) ***	.36 (.25)
Median household income	54,287.1 (16,495.94)	59765.2 (18,288.38) ***	55,493 (16,642.11)
Uninsured	.11 (.00)	.11 (.00)	.11 (.00)
College degree (proportion)	.61 (.11)	.59 (.11) ***	.65 (10)
Unemployed (proportion)	.05 (.01)	.05 (.01) *	.05 (.01) *

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, as compared to "No Voting Inequality for Blacks"
Standard errors for continuous variable provided in parentheses.
[a] Significance of t-test comparing counties with Low or High voting inequality to counties without voting inequality.

Table B2. Multiple Linear Regression of Black/White Segregation on Voting Inequality (ratio), Robert Wood Johnson Foundation County Health Rankings 2019 (n=841).

	Model 1		Model 2		Model 3	
VARIABLES	β	CI	β	CI	β	CI
Black/White Segregation						
Voting inequality						
No voting inequality	*ref*		*ref*		*ref*	
Low voting inequality	6.11***	3.905, 8.321	2.57*	0.534, 4.601	2.96**	0.979, 4.934
High voting inequality	2.49*	0.273, 4.697	1.59	-0.319, 3.506	1.90*	0.041, 3.750
Age (percent 65 or older)			57.36***	35.480, 79.245	41.74***	19.075, 64.405
Female (percent)			0.13	-51.137, 51.387	-3.43	-54.822, 47.962
Non-Hispanic White (percent)			15.77***	10.950, 20.593	16.32***	10.301, 22.332
Rural (percent)			-27.34***	-30.823, -23.848	-30.71***	-34.770, -26.650
Median household income					-0.00**	-0.000, -0.000
Uninsured (percent)					-69.44***	-93.365, -45.510
Some college or more (percent)					-15.64*	-28.190, -3.094
Unemployed (percent)					61.61	-17.100, 140.328
Constant	41.31***	39.794, 42.833	31.53*	5.420, 57.636	56.69***	29.230, 84.140
Observations	841		841		841	
R-squared	0.034		0.284		0.335	

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table B3. Multiple Linear Regression of Air Pollution on Voting Inequality (ratio), Robert Wood Johnson Foundation County Health Rankings 2019 (n=841).

	Model 1		Model 2		Model 3	
VARIABLES	β	CI	β	CI	β	CI
Particulate matter						
Voting inequality						
No voting inequality	*ref*		*ref*		*ref*	
Low voting inequality	0.01	-0.227, 0.244	0.03	-0.209, 0.279	0.10	-0.139, 0.341
High voting inequality	-0.28*	-0.514, -0.042	-0.25*	-0.479, -0.020	-0.21+	-0.438, 0.012
Age (percent 65 or older)			-9.28***	-11.900, -6.651	-11.74***	-14.493, -8.992
Female (percent)			11.41***	5.262, 17.558	12.60***	6.365, 18.838
Non-Hispanic White (percent)			0.28	-0.293, 0.863	0.83*	0.098, 1.558
Rural (percent)			0.88***	0.466, 1.303	0.41	-0.081, 0.905
Median household income					-0.00	-0.000, 0.000
Uninsured (percent)					-4.86**	-7.762, -1.954
Some college or more (percent)					-2.44**	-3.962, -0.917
Unemployed (percent)					13.47**	3.917, 23.022
Constant	10.12***	9.959, 10.284	5.36***	2.228, 8.490	6.43***	3.103, 9.766
Observations	841		841		841	
R-squared	0.008		0.071		0.116	

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table B4. Multiple Linear Regression of Proportion of Children in Poverty on Voting Inequality (ratio), Robert Wood Johnson Foundation County Health Rankings 2019 (n=841).

	Model 1		Model 2		Model 3	
VARIABLES	β	CI	β	CI	β	CI
Percent child poverty						
Voting inequality						
No voting inequality	*ref*		*ref*		*ref*	
Low voting inequality	-0.01	-0.027, 0.003	-0.00	-0.012, 0.011	0.01*	0.001, 0.014
High voting inequality	-0.01	-0.022, 0.008	-0.00	-0.011, 0.010	0.00	-0.003, 0.008
Age (percent 65 or older)			0.47***	0.350, 0.591	0.12***	0.054, 0.195
Female (percent)			0.50***	0.218, 0.784	0.30***	0.144, 0.465
Non-Hispanic White (percent)			-0.30***	-0.325, -0.272	-0.18***	-0.196, -0.159
Rural (percent)			0.15***	0.134, 0.173	0.04***	0.023, 0.048
Median household income					-0.00***	-0.000, -0.000
Uninsured (percent)					-0.17***	-0.243, -0.094
Some college or more (percent)					-0.12***	-0.159, -0.081
Unemployed (percent)					0.65***	0.402, 0.892
Constant	0.22***	0.208, 0.228	0.03	-0.117, 0.171	0.38***	0.297, 0.468
Observations	841		841		841	
R-squared	0.003		0.509		0.855	

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table B5. Multiple Linear Regression of Income Inequality on Voting Inequality (ratio), Robert Wood Johnson Foundation County Health Rankings 2019 (n=841).

	Model 1		Model 2		Model 3	
VARIABLES	β	CI	β	CI	β	CI
Income Inequality						
Voting inequality						
No voting inequality	*ref*		*ref*		*ref*	
Low voting inequality	0.20***	0.081, 0.317	0.16**	0.042, 0.269	0.15**	0.050, 0.258
High voting inequality	-0.04	-0.158, 0.079	-0.01	-0.113, 0.100	0.02	-0.079, 0.116
Age (percent 65 or older)			0.29	-0.929, 1.504	0.02	-1.173, 1.211
Female (percent)			7.20***	4.348, 10.048	3.69**	0.990, 6.394
Non-Hispanic White (percent)			-1.60***	-1.869, -1.333	-1.59***	-1.903, -1.270
Rural (percent)			0.52***	0.331, 0.718	0.41***	0.194, 0.621
Median household income					-0.00***	-0.000, -0.000
Uninsured (percent)					-2.22***	-3.477, -0.961
Some college or more (percent)					1.78***	1.122, 2.441
Unemployed (percent)					5.32*	1.185, 9.462
Constant	4.67***	4.584, 4.746	1.84*	0.389, 3.292	3.73***	2.283, 5.170
Observations	841		841		841	
R-squared	0.020		0.213		0.346	

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table B6. Multiple Linear Regression of Black Life Expectancy on Voting Inequality (ratio), Robert Wood Johnson Foundation County Health Rankings 2019 (n=841).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	CI	β	CI	β	CI	β	CI
Black life expectancy (years)								
Voting inequality								
No voting inequality								
Low voting inequality	0.34	-0.270, 0.950	-0.07	-0.683, 0.538	-0.41	-0.928, 0.099	-0.22	-0.714, 0.274
High voting inequality	0.64*	0.030, 1.252	0.52+	-0.054, 1.094	0.45+	-0.036, 0.927	0.36	-0.104, 0.818
Age (percent 65 or older)			-0.61	-7.180, 5.960	13.53***	7.642, 19.410	8.10**	2.157, 14.046
Female (percent)			-43.18***	-58.576, -27.794	-41.39***	-54.728, -28.045	-30.01***	-42.968, -17.046
Non-Hispanic White (percent)			2.92***	1.475, 4.370	-1.93*	-3.495, -0.372	-3.80***	-5.642, -1.957
Rural (percent)			-4.33***	-5.376, -3.282	0.38	-0.670, 1.438	1.14+	-0.032, 2.322
Median household income					0.00***	0.000, 0.000	0.00***	0.000, 0.000
Uninsured (percent)					6.15+	-0.057, 12.366	0.98	-5.138, 7.098
Some college or more (percent)					8.85***	5.595, 12.110	7.46***	4.140, 10.772
Unemployed (percent)					-17.01	-37.446, 3.423	-1.50	-21.375, 18.380
Segregation (Black/White dissimilarity index)							0.00	-0.017, 0.018

Income inequality (range 3.15-9.15)							-0.52**	-0.872, -0.173
Air pollution (Particulate Matter 2.5 $\mu g/m^3$)							-0.55***	-0.688, -0.409
Child poverty (proportion)							-8.34**	-14.123, -2.550
Constant	75.27***	74.854, 75.693	96.96***	89.122, 104.800	84.60***	77.468, 91.723	93.21***	86.022, 100.401
Observations	841		841		841		841	
R-squared	0.005		0.129		0.395		0.453	

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table B7. Multiple Linear Regression of White Life Expectancy on Voting Inequality (ratio), Robert Wood Johnson Foundation County Health Rankings 2019 (n=841).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	CI	β	CI	β	CI	β	CI
White life expectancy (years)								
Voting inequality								
No voting inequality								
Low voting inequality	1.35***	0.926, 1.779	0.63**	0.226, 1.028	0.29*	0.008, 0.567	0.22	-0.045, 0.492
High voting inequality	0.36	-0.070, 0.785	0.23	-0.151, 0.604	0.19	-0.068, 0.456	0.15	-0.100, 0.401
Age (percent 65 or older)			2.36	-1.955, 6.682	15.85***	12.650, 19.058	14.81***	11.585, 18.043
Female (percent)			-15.62**	-25.740, -5.508	-19.06***	-26.325, -11.795	-17.21***	-24.248, -10.168
Non-Hispanic White (percent)			1.98***	1.024, 2.927	-2.83***	-3.678, -1.978	-3.34***	-4.338, -2.337
Rural (percent)			-5.04***	-5.723, -4.347	-0.54+	-1.118, 0.029	-0.10	-0.743, 0.536
Median household income					0.00***	0.000, 0.000	0.00***	0.000, 0.000
Uninsured (percent)					2.05	-1.331, 5.434	2.27	-1.049, 5.598
Some college or more (percent)					11.29***	9.520, 13.067	8.83***	7.025, 10.627
Unemployed (percent)					-7.76	-18.883, 3.371	-4.69	-15.488, 6.106
Segregation (Black/White dissimilarity index)							0.01*	0.002, 0.021

Income inequality (range 3.15-9.15)							0.71***	0.516, 0.896
Air pollution (Particulate Matter 2.5 μg/m^3)							-0.14***	-0.215, -0.063
Child poverty (proportion)							-8.76***	-11.907, -5.621
Constant	77.12***	76.824, 77.411	85.24***	80.088, 90.393	75.94***	72.057, 79.820	76.89***	72.984, 80.794
Observations	841		841		841		841	
R-squared	0.047		0.262		0.648		0.683	

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Appendix C. Aim 1 - Mediation Results

Table C1. Black Life Expectancy with Vote Difference

Mediator	Proportion mediated	CI with bootstrap
Segregation	.037	-.097, .107 (p)
		-.086, .116 (bc)
Income Inequality	-.307	-.126, .051 (p)
		-.139, .043 (bc)
Air pollution	.353	-.137, .285 (p)
		-.126, .295 (bc)
Child poverty	-.573	-.156, .029 (p)
		-.171, .019 (bc)

Table C2. Black Life Expectancy with Vote Ratio

Mediator	Proportion mediated	CI with bootstrap
Segregation	.022	-.096 .103 (p)
		-.088 .109 (bc)
Income Inequality	-.340	-.135 .047. (p)
		-.150 .036 (bc)
Air pollution	.362	-.122 .291 (p)
		-.117 .297 (bc)
Child poverty	-.545	-.150 .034. (p)
		-.162 .025 (bc)

Table C3. White Life Expectancy with Vote Difference

Mediator	Proportion mediated	CI with bootstrap
Segregation	.124	.002, .119 (p) .007, .133 (bc)
Income Inequality	.108	-.066, .155 (p) -.063, .158 (bc)
Air pollution	.050	-.049, .048 (p) -.048, .048 (bc)
Child poverty	-.178	-.144, .033 (p) -.153, .028 (bc)

Table C4. White Life Expectancy with Vote Ratio

Mediator	Proportion mediated	CI with bootstrap
Segregation	.111*	.001 .114 (p) .006 .130 (bc)
Income Inequality	.112	-.060 .168 (p) -.063 .165 (bc)
Air pollution	.050	-.032 .079 (p) -.026 .086 (bc)
Child poverty	-.158	-.147 .032 (p) -.152 .029 (bc)

p=percentile
bc= bias corrected

Appendix D: Aim 2 - Descriptive Tables for County-level Variables Stratified by High or Low Voting Items

Table D1. Level-2 covariates stratified by unable to vote using Congressional Cooperative Election Survey 2008 and ACS 2008 5-year Estimates. Mean proportions with standard deviations and percents reported.

	Level 2 – County N=120		
	Low N=68	High N=52	p-value
Proportion voted	.92 (.05)	.88 (.06)	***
Proportion waited more than 30 minutes to vote	.58 (.18)	.57 (.14)	***
Proportion unable to vote because the line was too long	.00 (.01)	.01 (.01)	***
Proportion unable to vote because requested but did not receive absentee ballot	.00 (.01)	.01 (.01)	***
Proportion unable to vote at the polls but tried	.00 (.00)	.01 (.02)	***
Preclearance	11.76%	28.85%	***
Proportion Black	.12 (.10)	.14 (.13)	***
Proportion over 65 years	.12 (.03)	.11 (.02)	***
Proportion unemployed	.04 (.01)	.04 (.01)	***
Proportion with a college degree	.21 (.06)	.21 (.07)	***
Proportion uninsured	.12 (.04)	.16 (.06)	***

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for high vs. low

Table D2. Level-2 covariates stratified by proportion waiting 30 minutes or longer using Congressional Cooperative Election Survey 2008 and ACS 2008 5-year Estimates. Mean proportions with standard deviations and percents reported.

	Level 2 – County N=120		
	Low N=50	High N=70	p-value
Proportion voted	.90 (.05)	.88 (.06)	***
Proportion unable to vote	.02 (.03)	.02 (.03)	***
Proportion unable to vote because the line was too long	.01 (.01)	.00 (.01)	***
Proportion unable to vote because requested but did not receive absentee ballot	.01 (.02)	.00 (.01)	***
Proportion unable to vote at the polls but tried	.01 (.02)	.01 (.01)	***
Preclearance	26.00%	14.29%	***
Proportion Black	.12 (.10)	.14 (.12)	***
Proportion over 65 years	.12 (.03)	.11 (.02)	***
Proportion unemployed	.04 (.01)	.04 (.01)	***
Proportion with a college degree	.22 (.08)	.20 (.06)	***
**Proportion uninsured	.14 (.06)	.15 (.05)	***

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for high vs. low

Table D3. Level-2 covariates stratified by unable to vote because the line was too long using Congressional Cooperative Election Survey 2008 and ACS 2008 5-year Estimates. Mean proportions with standard deviations and percents reported.

	Level 2 – County N=120		
	Low N=98	High N=22	p-value
Proportion voted	.90 (.06)	.87 (.05)	***
Proportion unable to vote	.02 (.04)	.03 (.02)	***
Proportion waited more than 30 minutes to vote	.59 (.18)	.54 (.12)	***
Proportion unable to vote because requested but did not receive absentee ballot	.00 (.01)	.01 (.01)	***
Proportion unable to vote at the polls but tried	.01 (.01)	.01 (.01)	***
Preclearance	14.29%	40.91%	***
Proportion Black	.10 (.10)	.18 (.12)	***
Proportion over 65 years	.12 (.02)	.11 (.03)	***
Proportion unemployed	.04 (.01)	.04 (.01)	***
Proportion with a college degree	.21 (.07)	.21 (.07)	***
Proportion uninsured	.13 (.04)	.17 (.07)	***

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for high vs. low

Table D4. Level-2 covariates stratified by unable to vote because requested but did not receive an absentee ballot using Congressional Cooperative Election Survey 2008 and ACS 2008 5-year Estimates. Mean proportions with standard deviations and percents reported.

	Level 2 – County N=120		
	Low N=100	High N=20	p-value
Proportion voted	.90 (.06)	.88 (.04)	***
Proportion unable to vote	.01 (.03)	.04 (.03)	***
Proportion waited more than 30 minutes to vote	.56 (.17)	.59 (.12)	***
Proportion unable to vote because the line was too long	.00 (.01)	.01 (.01)	***
Proportion unable to vote at the polls but tried	.00 (.01)	.01 (.02)	***
Preclearance	16.00%	35.00%	***
Proportion Black	.13 (.11)	.14 (.13)	***
Proportion over 65 years	.12 (.03)	.11 (.02)	***
Proportion unemployed	.04 (.01)	04 (.01)	***
Proportion with a college degree	.20 (.06)	.22 (.08)	***
Proportion uninsured	.14 (.05)	.17 (.06)	***

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for high vs. low

Table D5. Level-2 covariates stratified by unable to vote but tried using Congressional Cooperative Election Survey 2008 and ACS 2008 5-year Estimates. Mean proportions with standard deviations and percents reported.

	Level 2 – County N=120		
	Low N=98	High N=22	p-value
Proportion voted	.90 (.06)	.87 (.04)	***
Proportion unable to vote	.01 (.03)	.04 (.03)	***
Proportion waited more than 30 minutes to vote	.57 (.17)	.56 (.13)	***
Proportion unable to vote because the line was too long	.00 (.01)	.01 (.01)	***
Proportion unable to vote at the polls because requested but did not receive an absentee ballot	.00 (.01)	.01 (.02)	***
Preclearance	17.35%	27.27%	***
Proportion Black	.12 (.10)	.16 (.14)	***
Proportion over 65 years	.12 (.03)	.11 (.02)	***
Proportion unemployed	.04 (.01)	.04 (.01)	***
Proportion with a college degree	.21 (.08)	.20 (.04)	***
Proportion uninsured	.14 (.05)	.17 (.06)	***

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for high vs. low

Table D6. Level-2 covariates stratified by preclearance using Congressional Cooperative Election Survey 2008 and ACS 2008 5-year Estimates. Mean proportions with standard deviations and percents reported.

	Level 2 – County N=120		
	Not covered N=97	Covered N=23	p-value
Proportion voted	.90 (.05)	.85 (.07)	***
Proportion unable to vote	.02 (.03)	.04 (.04)	***
Waited more than 30 minutes	.58 (.16)	.53 (.14)	***
Proportion unable to vote because the line was too long	.00 (.01)	.01 (.01)	***
Proportion unable to vote at the polls because requested but did not receive absentee ballot	.00 (01)	.01 (.02)	***
Proportion unable to vote but tried	.01 (.01)	.01 (.02)	***
Proportion Black	.12 (.12)	.17 (.08)	***
Proportion over 65 years	.12 (.02)	.10 (.03)	***
Proportion unemployed	.04 (.01)	.04 (.01)	***
Proportion with a college degree	.21 (.06)	.21 (.09)	***
Proportion uninsured	.13 (.04)	.20 (.06)	***

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for covered vs. not covered

Table D7. Level-2 covariates stratified by unable to vote using Congressional Cooperative Election Survey 2012 and ACS 2012 5-year Estimates. Mean proportions with standard deviations and percents reported.

	Level 2 – County N=96		
	Low N=22	High N=74	p-value
Proportion voted	.96 (.04)	.92 (.05)	***
Proportion waited more than 30 minutes to vote	.40 (.16)	.46 (.19)	***
Proportion unable to vote because the line was too long	.00 (.01)	.00 (.01)	***
Proportion unable to vote because requested but did not receive absentee ballot	.00 (.01)	.01 (.01)	***
Proportion unable to vote at the polls but tried	.00 (.01)	.00 (.01)	***
Preclearance	18.18%	25.68%	***
Proportion Black	.20 (.12)	.15 (.12)	***
Proportion over 65 years	.12 (.02)	.12 (.03)	***
Proportion unemployed	.06 (.01)	.06 (.01)	***
Proportion with a college degree	.24 (.07)	.22 (.07)	***
Proportion uninsured	.12 (.04)	.17 (.05)	***

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for high vs. low

Table D8. Level-2 covariates stratified by proportion waited more than 30 minutes using Congressional Cooperative Election Survey 2012 and ACS 2012 5-year Estimates. Mean proportions with standard deviations and percents reported.

	Level 2 – County N=96		
	Low N=43	High N=53	p-value
Proportion voted	.92 (.04)	.93 (.05)	***
Proportion unable to vote	.02 (.02)	.01 (.02)	***
Proportion unable to vote because the line was too long	.00 (.01)	.01 (.01)	***
Proportion unable to vote because requested but did not receive absentee ballot	.00 (.01)	.00 (.01)	***
Proportion unable to vote at the polls but tried	.00 (.01)	.00 (.01)	***
Preclearance	20.93%	26.42%	***
Proportion Black	.16 (.10)	.15 (.13)	***
Proportion over 65 years	.12 (.03)	.12 (.03)	***
Proportion unemployed	.06 (.01)	.07 (.01)	***
Proportion with a college degree	.21 (.04)	.23 (.08)	***
Proportion uninsured	.15 (.06)	.16 (.04)	***

Note. + =.1, * = p.05; ** p<.01; *** p<.001, for high vs. low

Table D9. Level-2 covariates stratified by unable to vote because the line was too long using Congressional Cooperative Election Survey 2012 and ACS 2012 5-year Estimates. Mean proportions with standard deviations and percents reported.

	Level 2 – County N=96		
	Low N=60	High N=36	p-value
Proportion voted	.95 (.04)	.91 (.05)	***
Proportion unable to vote	.01 (.02)	.02 (.02)	***
Waited more than 30 minutes	.40 (.18)	.49 (.19)	***
Proportion unable to vote because requested but did not receive absentee ballot	.00 (.01)	.01 (.01)	***
Proportion unable to vote at the polls but tried	.00 (.01)	.00 (.01)	
Preclearance	20.00%	30.56%	***
Proportion Black	.15 (.12)	.16 (.12)	***
Proportion over 65 years	.12 (.03)	.12 (.03)	***
Proportion unemployed	.06 (.01)	.07 (.01)	***
Proportion with a college degree	.22 (.06)	.23 (.08)	***
Proportion uninsured	.14 (.05)	.18 (.05)	***

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for high vs. low

Table D10. Level-2 covariates stratified by unable to vote because requested but did not receive an absentee ballot using Congressional Cooperative Election Survey 2012 and ACS 2012 5-year Estimates. Mean proportions with standard deviations and percents reported.

	Level 2 – County N=96		
	Low N=64	High N=32	p-value
Proportion voted	.94 (.04)	.91 (.05)	***
Proportion unable to vote	.01 (.02)	.02 (.02)	***
Waited more than 30 minutes	.43 (.20)	.48 (.17)	***
Proportion unable to vote because the line was too long	.00 (.01)	.00 (.01)	***
Proportion unable to vote at the polls but tried	.00 (.01)	.00 (.01)	***
Preclearance	20.31%	31.25%	***
Proportion Black	.17 (.13)	.14 (.10)	***
Proportion over 65 years	.12 (.03)	.12 (.03)	***
Proportion unemployed	.06 (.01)	.07 (.01)	***
Proportion with a college degree	.22 (.06)	.23 (.08)	***
Proportion uninsured	.14 (.04)	.18 (.05)	***

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for high vs. low

Table D11. Level-2 covariates stratified by unable to vote but tried using Congressional Cooperative Election Survey 2012 and ACS 2012 5-year Estimates. Mean proportions with standard deviations and percents reported.

	Level 2 – County N=96		
	Low N=70	High N=26	p-value
Proportion voted	.93 (.05)	.91 (.03)	***
Proportion unable to vote	.01 (.02)	.01 (.02)	***
Waited more than 30 minutes	.45 (.20)	.44 (.16)	***
Proportion unable to vote because the line was too long	.00 (.01)	.00 (.01)	***
Proportion unable to vote at the polls because requested but did not receive absentee ballot	.00 (.01)	.01 (.01)	***
Preclearance	22.86%	26.92%	***
Proportion Black	.15 (.13)	.17 (.10)	***
Proportion over 65 years	.12 (.03)	.12 (.03)	***
Proportion unemployed	.06 (.01)	.07 (.01)	***
Proportion with a college degree	.24 (.07)	.20 (.05)	***
Proportion uninsured	.14 (.05)	.19 (.05)	***

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for high vs. low

Table D12. Level-2 covariates stratified by preclearance using Congressional Cooperative Election Survey 2012 and ACS 2012 5-year Estimates. Mean proportions with standard deviations and percents reported.

	Level 2 – County N=96		
	Not covered N=73	Covered N=23	p-value
Proportion voted	.92 (.05)	.89 (.05)	***
Proportion unable to vote	.01 (.01)	.02 (.03)	***
Waited more than 30 minutes	.44 (.21)	.45 (.16)	***
Proportion unable to vote because the line was too long	.01 (.01)	.00 (.00)	***
Proportion unable to vote at the polls because requested but did not receive absentee ballot	.00 (.01)	.01 (.02)	***
Proportion Black	.14 (.11)	.21 (.12)	***
Proportion over 65 years	.12 (.03)	.10 (.02)	***
Proportion unemployed	.07 (.01)	.06 (.01)	***
Proportion with a college degree	.22 (.06)	.24 (.10)	***
Proportion uninsured	.15 (.05)	.19 (.05)	***

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for covered vs. not covered

Table D13. Level-2 covariates stratified by unable to vote Congressional Cooperative Election Survey 2016 and ACS 2016 5-year Estimates. Mean proportions with standard deviations and percents reported.

	Level 2 – County N=94		
	Low N=27	High N=67	p-value
Proportion voted	.92 (.05)	.91 (.05)	***
Waited more than 30 minutes	.42 (.18)	.45 (.20)	***
Proportion unable to vote because the line was too long	.01 (.01)	.01 (.01)	***
Proportion unable to vote at the polls because requested but did not receive absentee ballot	.02 (.04)	.00 (.01)	***
Proportion unable to vote but tried	.00 (.00)	.01 (.01)	***
Proportion that felt unable to vote	.03 (.05)	.06 (.06)	***
Preclearance	22.22%	32.84%	***
Proportion Black	.20 (.17)	.19 (.14)	***
Proportion over 65 years	.13 (.04)	.13 (.03)	***
Proportion unemployed	.05 (.01)	.05 (.01)	***
Proportion with a college degree	.26 (.07)	.24 (.07)	***
Proportion uninsured	.10 (.04)	.13 (.04)	***

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for high vs. low

Table D14. Level-2 covariates stratified by proportion waited more than 30 minutes using Congressional Cooperative Election Survey 2016 and ACS 2016 5-year Estimates. Mean proportions with standard deviations and percents reported.

	Level 2 – County N=94		
	Low N=42	High N=52	p-value
Proportion voted	.91 (.05)	.91 (.05)	***
Proportion unable to vote	.02 (.02)	.02 (.02)	***
Proportion that felt unable to vote	.04 (.05)	.06 (.07)	***
Proportion unable to vote because the line was too long	.01 (.01)	.01 (.01)	***
Proportion unable to vote at the polls because requested but did not receive absentee ballot	.01 (.02)	.01 (.01)	***
Proportion unable to vote but tried	.00 (.01)	.01 (.02)	***
Preclearance	26.19%	32.69%	***
Proportion Black	.22 (.13)	.18 (.15)	***
Proportion over 65 years	.13 (.02)	.13 (.04)	***
Proportion unemployed	.05 (.01)	.05 (.01)	***
Proportion with a college degree	.24 (.05)	.25 (.08)	***
Proportion uninsured	.13 (.05)	.13 (.04)	***

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for high vs. low

Table D15. Level-2 covariates stratified by unable to vote because line was too long using Congressional Cooperative Election Survey 2016 and ACS 2016 5-year Estimates. Mean proportions with standard deviations and percents reported.

	Level 2 – County N=94		
	Low N=60	High N=34	p-value
Proportion voted	.93 (.05)	.91 (.04)	***
Proportion unable to vote	.02 (.03)	.02 (.02)	***
Waited more than 30 minutes	.42 (.21)	.47 (.18)	***
Proportion that felt unable to vote	.06 (.08)	.04 (.04)	***
Encountered a problem with registration or identification and was not allowed to vote or was given a provisional ballot	.46 (.45)	.37 (.39)	***
Proportion unable to vote at the polls because requested but did not receive absentee ballot	.01 (.01)	.01 (.01)	***
Proportion unable to vote but tried	.01 (.02)	.01 (.01)	***
Preclearance	25.00%	38.24%	***
Proportion Black	.18 (.15)	.21 (.14)	***
Proportion over 65 years	.13 (.03)	.13 (.03)	***
Proportion unemployed	.05 (.01)	.05 (.01)	***
Proportion with a college degree	.24 (.06)	.25 (.08)	**
Proportion uninsured	.12 (.04)	.13 (.05)	***

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for high vs. low

Table D16. Level-2 covariates stratified by unable to vote because requested but never received absentee ballot using Congressional Cooperative Election Survey 2016 and ACS 2016 5-year Estimates. Mean proportions with standard deviations and percents reported.

	Level 2 – County N=94		
	Low N=52	High N=42	p-value
Proportion voted	.92 (.05)	.91 (.05)	***
Proportion unable to vote	.01 (.02)	.02 (.02)	***
Waited more than 30 minutes	.39 (.20)	.47 (.18)	***
Proportion that felt unable to vote	.03 (.04)	.06 (.07)	***
Proportion unable to vote because the line was too long	.01 (.01)	.01 (.01)	***
Proportion unable to vote but tried	.01 (.01)	.01 (.01)	*
Preclearance	28.85%	30.95%	***
Proportion Black	.21 (.16)	.19 (.13)	***
Proportion over 65 years	.14 (.03)	.12 (.03)	***
Proportion unemployed	.05 (.01)	.05 (.01)	***
Proportion with a college degree	.24 (.06)	.25 (.08)	***
Proportion uninsured	.11 (.04)	.13 (.04)	***

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for high vs. low

Table D17. Level-2 covariates stratified by unable to vote but tried using Congressional Cooperative Election Survey 2016 and ACS 2016 5-year Estimates. Mean proportions with standard deviations and percents reported.

	Level 2 – County N=94		
	Low N=57	High N=37	p-value
Proportion voted	.93 (.05)	.90 (.04)	***
Proportion unable to vote	.01 (.02)	.02 (.02)	***
Waited more than 30 minutes	.44 (.22)	.44 (.16)	**
Proportion that felt unable to vote	.04 (.05)	.07 (.07)	***
Proportion unable to vote because the line was too long	.01 (.01)	.01 (.01)	***
Proportion unable to vote because requested but never received absentee ballot	.01 (.02)	.00 (.01)	***
Preclearance	38.07%	32.43%	***
Proportion Black	.21 (.17)	.18 (.12)	***
Proportion over 65 years	.13 (.03)	.13 (.03)	***
Proportion unemployed	.05 (.01)	.05 (.01)	***
Proportion with a college degree	.24 (.06)	.24 (.08)	***
Proportion uninsured	.11 (.03)	.13 (.05)	***

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for high vs. low

Table D18. Level-2 covariates stratified by intimidated using Congressional Cooperative Election Survey 2016 and ACS 2016 5-year Estimates. Mean proportions with standard deviations and percents reported.

	Level 2 – County N=94		
	Low N=37	High N=57	p-value
Proportion voted	.93 (.04)	.91 (.05)	***
Proportion unable to vote	.01 (.02)	.02 (.02)	***
Waited more than 30 minutes	.45 (.23)	.44 (.18)	***
Proportion unable to vote because the line was too long	.01 (.01)	.01 (.01)	***
Proportion unable to vote because requested but never received absentee ballot	.01 (.01)	.01 (.01)	***
Proportion unable to vote but tried	.00 (.01)	.01 (.01)	***
Preclearance	24.32%	33.33%	***
Proportion Black	.20 (.19)	.19 (.12)	***
Proportion over 65 years	.13 (.03)	.13 (.03)	***
Proportion unemployed	.05 (.01)	.05 (.01)	***
Proportion with a college degree	.25 (.06)	.25 (.07)	***
Proportion uninsured	.11 (.03).	13 (.05)	***

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for high vs. low

Table D19. Level-2 covariates stratified by preclearance using Congressional Cooperative Election Survey 2016 and ACS 2016 5-year Estimates. Mean proportions with standard deviations and percents reported.

	Level 2 – County N=94		
	Not covered N=66	Covered N=28	p-value
Proportion voted	.92 (.04)	.89 (.05)	***
Proportion unable to vote	.00 (.00)	.02 (.02)	***
Waited more than 30 minutes	.42 (.18)	.45 (.20)	***
Intimidated	.05 (.07)	.06 (.06)	***
Proportion unable to vote because the line was too long	.01 (.01)	.02 (.02)	***
Proportion unable to vote at the polls because requested but did not receive absentee ballot	.01 (.02)	.02 (.03)	***
Proportion Black	.19 (.15)	.21 (.14)	***
Proportion over 65 years	.13 (.03)	.12 (.02)	***
Proportion unemployed	.05 (.01)	.05 (.01)	***
Proportion with a college degree	.24 (.06)	.25 (.08)	
Proportion uninsured	.12 (.04)	.13 (.05)	***

Note. + =.1, * = p<.05; ** p<.01; *** p<.001, for covered vs. not covered

Appendix E: Aim 2 - Tables for County-level Mixed Regression Models with All Covariates

Table E1. Relationships between county-level proportion of people who wait 30 minutes or more to vote and birth weight: 2008 Cooperative Congressional Election Study, 2008-2009 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2008 3-year Data (N=120 Counties, 341,054 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion who waited more than 30 minutes to vote	76.06***	37.52	55.06	29.70	52.93	28.64	53.42	28.71
County-level covariates								
Proportion who voted			146.13	66.63	79.68	64.28	79.36	64.28
Proportion Black			-471.66 ***	54.27	-170.39 **	52.44	-170.42 **	52.423
Proportion 65 years or older			-5.19	200.68	147.40	193.58	147.20	193.53
Proportion unemployed			1,339 *	675.90	1,757.84 **	651.91	1,756.09 **	651.78
Proportion with college degree or higher			74.55	101.97	-123.09	98.45	-123.16	98.42
Proportion uninsured			-397.31 ***	117.37	-441.72	113.22 ***	-441.93 ***	113.20
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-178.31 ***	2.90	-175.82 ***	11.14
Infant sex								
Female	ref		ref		ref		ref	
Male					123.79 ***	1.91	123.78 ***	1.9088
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					40.54 ***	2.59	40.54 ***	2.59
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					46.04 ***	3.65	46.03 ***	3.65
Some college					81.08 ***	3.70	81.08 ***	3.70
College degree					109.96 ***	4.28	109.96 ***	4.28
More than college					94.41 ***	4.81	94.412 ***	4.81
Mother's age (range 1-9)					-0.98	1.05	-0.98	1.05
No prenatal care								

Prenatal care	ref		ref		ref		ref	
No prenatal care					-214.86 ***	8.02	-214.85 ***	8.02
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-82.78 ***	2.07	-82.78 ***	2.07
Total birth order					3.76 ***	0.70	3.76 ***	0.70
Pre-pregnancy diabetes					113.44 ***	12.52	113.45 ***	12.53
Gestational diabetes					36.84 ***	5.23	36.84 ***	5.23
Pre-pregnancy hypertension					-251.28 ***	8.27	-251.29 ***	8.27
Gestational hypertension					-257.90 ***	4.63	-257.90 ***	4.63
Eclampsia					-596.38 ***	23.55	-596.37 ***	23.55
Total cigarettes smoked during pregnancy					-4.17 ***	0.10	-4.17 ***	0.10
Cross-level Interaction								
Proportion who waited more than 30 minutes * race							-4.40	19.09
Constant	3,275.66 ***	22.11	3,189.73 ***	80.50	3149.72 ***	77.74	3,149.88 ***	77.72
Observations	341,054		341,054		341,054		341,054	
AIC	5,304,050		5,303,985		5,280,925		5,280,926	
-2 Log Likelihood	5,304,042		5,303,965		5,280,871		5,280,870	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E2. Relationships between county-level proportion of people unable to vote and birth weight: 2008 Cooperative Congressional Election Study, 2008-2009 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2008 3-year Data (N=120 Counties, 341,054 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote	-235.35	152.10	-14.77	125.23	-29.55	120.68	-34.68	121.03
County-level covariates								
Proportion who voted			122.20	73.15	53.17	70.50	54.11	70.50
Proportion Black			-495.77 ***	54.07	-192.77 ***	52.20	-192.57 ***	52.18
Proportion 65 years or older			-51.85	203.50	103.67	196.12	102.92	196.06
Proportion unemployed			1,757.03 **	669.39	2,138.15 ***	645.01	2,142.89 ***	644.85
Proportion with college degree or higher			114.01	101.91	-85.37	98.29	-85.39	98.26
Proportion uninsured			-404.54 ***	119.81	-448.85 ***	115.47	-449.51 ***	115.44
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-178.31 ***	2.90	-179.37 ***	3.54
Infant sex								
Female	ref		ref		ref		ref	
Male					123.78 ***	1.91	123.78 ***	1.91
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					40.57 ***	2.59	40.57 ***	2.59
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					46.02 ***	3.65	46.01 ***	3.65
Some college					81.07 ***	3.70	81.06 ***	3.70
College degree					109.91 ***	4.28	109.90 ***	4.28
More than college					94.35 ***	4.81	94.33 ***	4.81
Mother's age (range 1-9)					-0.98	1.05	-0.99	1.05

No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-214.96 ***	8.0230	-215.04 ***	8.02
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-82.80 ***	2.07	-82.80 ***	2.07
Total birth order					3.76 ***	0.70	3.77 ***	0.70
Pre-pregnancy diabetes					113.44 ***	12.53	113.41 ***	12.53
Gestational diabetes					36.84 ***	5.23	36.85 ***	5.23
Pre-pregnancy hypertension					-251.27 ***	8.27	-251.27 ***	8.27
Gestational hypertension					-257.84 ***	4.63	-257.84 ***	4.63
Eclampsia					-596.41 ***	23.55	-596.36 ***	23.55
Total cigarettes smoked during pregnancy					-4.17 ***	0.10	-4.17 ***	0.10
Cross-level Interaction								
Proportion unable to vote * race							46.38	88.07
Constant	3,323.18 ***	7.41	3,226.41 ***	86.62	3,189.18 ***	83.55	3,188.43 ***	83.54
AIC	5,304,052		5,303,988		5,280,928		5,280,929	
-2 Log Likelihood	5,304,044		5,303,968		5,280,874		5,280,873	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E3. Relationships between county-level proportion of people unable to vote because the line was too long and birth weight: 2008 Cooperative Congressional Election Study, 2008-2009 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2008 3-year Data (N=120 Counties, 341,054 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote because the line was too long	-1,114.11 **	491.10	113.11	428.46	-86.80	412.38	-148.42	415.55
County-level covariates								
Proportion who voted			134.30	74.53	53.47	71.73	55.04	71.74
Proportion Black			-498.94 ***	54.55	-192.21 ***	52.60	-192.56 ***	52.60
Proportion 65 years or older			-60.3448	204.78	106.23	197.09	102.96	197.10
Proportion unemployed			1796.02 **	650.37	2164.30 ***	625.88	2172.98 ***	625.88
Proportion with college degree or higher			112.70	101.98	-84.295 ***	98.23	-82.72	98.23
Proportion uninsured			-409.68 ***	120.72	-447.01	116.19	-444.74 ***	116.20
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-178.31 ***	2.90	-180.29 ***	3.34
Infant sex								
Female	ref		ref		ref		ref	
Male					123.78 ***	1.91	123.78 ***	1.91
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					40.56 ***	2.60	40.60 ***	2.59
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					46.02 ***	3.65	46.04 ***	3.65
Some college					81.07 ***	3.70	81.07 ***	3.70
College degree					109.92 ***	4.28	109.92 ***	4.28
More than college					94.35 ***	4.81	94.35 ***	4.81
Mother's age (range 1-9)					-.98	1.05	-.98	1.05
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-214.98	8.02	-214.99	8.02

					**		**	
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-82.80 ***	2.07	-82.79 ***	2.07
Total birth order					3.76 ***	0.70	3.76 ***	0.70
Pre-pregnancy diabetes					113.44 ***	12.53	113.46 ***	12.53
Gestational diabetes					36.84 ***	5.23	36.86 ***	5.23
Pre-pregnancy hypertension					-251.27 ***	8.27	-251.26 ***	8.27
Gestational hypertension					-257.83 ***	4.63	-251.26 ***	8.27
Eclampsia					-596.40 ***	23.55	-596.58 ***	23.55
Total cigarettes smoked during pregnancy					-4.17 ***	0.10	-4.17 ***	0.10
Cross-level Interaction								
Proportion unable to vote because the line was too long * race							320.94	268.09
Constant	3,323.35 ***	7.00	3,215.525 ***	84.34	3,186.795 ***	81.26	3,185.045 ***	82.27
AIC	5,304,049		5,303,988		5,280,928		5,280,928	
-2 Log Likelihood	5,304041		5,303,968		5,280,874		5,281,006	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E4. Relationships between county-level proportion of people unable to vote because requested but did not receive an absentee ballot and birth weight: 2008 Cooperative Congressional Election Study, 2008-2009 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2008 3-year Data (N=120 Counties, 341,054 infants).

	Model 1		Model 2		Model 3		Model 4		
VARIABLES	β	SE	β	SE	β	SE	β	SE	
Proportion unable to vote because requested but did not receive an absentee ballot	-1,027.42 **	375.87	-687.97 *	277.72	-645.33 *	267.72	-663.89 *	269.19	
Proportion who voted			111.63	65.78	46.78	63.43	46.70	63.42	
Proportion Black			-484.62 ***	52.69	-183.14 ***	50.90	-183.28 ***	50.89	
Proportion 65 years or older			-24.9575	198.75	127.84	191.65	129.17	191.63	
Proportion unemployed			1598.36 *	635.86	2011.35 **	613.04	2011.26 **	612.92	
Proportion with college degree or higher			94.73	99.77	-103.17	96.29	-102.64	96.27	
Proportion uninsured			-388.15 ***	117.18	-433.22 ***	113.00	-432.78 ***	112.98	
			-687.97						277.72
Mother's race									
White	ref		ref		ref		ref		
Black					-178.31 ***	2.90	-179.15 ***	3.18	
Infant sex									
Female	ref		ref		ref		ref		
Male					123.78 ***	1.91	123.78 ***	1.91	
Mother's marital status									
Not married	ref		ref		ref		ref		
Married					40.56 ***	2.59	40.59 ***	2.59	
Mother's education level									
Less than high school	ref		ref		ref		ref		
High school degree					46.03 ***	3.64	46.05 ***	3.65	
Some college					81.05 ***	3.70	81.06 ***	3.70	
College degree					109.88 ***	4.28	109.87 ***	4.28	
More than college					94.32 ***	4.81	94.32 ***	4.81	
Mother's age (range 1-					-0.98	1.05	-.99	1.05	

9)								
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-214.98 ***	8.02	-215.05 ***	8.02
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-82.80 ***	2.07	-82.80 ***	2.07
Total birth order					3.76 ***	0.70	3.76 ***	0.70
Pre-pregnancy diabetes					113.41 ***	12.53	113.39 ***	12.53
Gestational diabetes					36.84 ***	5.23	36.84 ***	5.23
Pre-pregnancy hypertension					-251.24 ***	8.27	-251.24 ***	8.27
Gestational hypertension					-257.83 ***	4.6324	-257.83 ***	4.63
Eclampsia					-596.38 ***	23.55	-596.32 ***	23.55
Total cigarettes smoked during pregnancy					-4.17 ***	0.10	-4.1708 ***	0.10
Cross-level Interaction								
Proportion unable to vote because requested but did not receive an absentee ballot * race							154.26	237.07
Constant	3,323.32 ***	6.85	3242.45 ***	78.68	3199.99 ***	75.9578	3,199.83 ***	79.94
AIC	5,304,047		5,303,982		5,280,922		5,280,924	
-2 Log Likelihood	5,304,039		5,303,962		5,280,868		5,280,868	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E5. Relationships between county-level proportion of people unable to vote but tried and birth weight: 2008 Cooperative Congressional Election Study, 2008-2009 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2008 3-year Data (N=120 Counties, 341,054 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote but tried	-1,396.47 **	498.01	-842.31 *	380.89	-970.57 **	363.27	-999.13 **	364.28
County-level covariates								
Proportion who voted			109.79	66.10	41.53	63.1159	41.3857	63.0383
Proportion Black			-478.22 ***	53.25	-173.19 ***	50.89	-172.77 ***	50.83
Proportion 65 years or older			-43.69	199.02	112.50	189.91	111.55	189.66
Proportion unemployed			1,390.24 *	657.08	1732.46 **	626.92	1728.74 **	626.11
Proportion with college degree or higher			103.04	99.88	-97.88	95.36	-98.42	95.24
Proportion uninsured			-379.25 **	117.90	-419.21 ***,	112.54	-419.52 ***	112.40
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-178.26 ***	2.90	179.53 ***	3..25
Infant sex								
Female	ref		ref		ref		ref	
Male					123.78 ***	1.91	123.78 ***	1.91
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					40.58 ***	2.59	40.63 ***	2.59
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					46.04 ***	3.65	46.06 ***	3.65
Some college					81.06 ***	3.70	81.03 ***	3.70
College degree					109.90 ***	4.28	109.86 ***	4.28
More than college					94.38 ***	4.81	94.37 ***	4.81
Mother's age (range 1-9)					-0.98	1.05	-.98	1.05
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-214.98 ***	8.02	-215.08 ***	8.02

Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-82.80 ***	2.07	-82.82 ***	2.07
Total birth order					3.76 ***	0.70	3.77 ***	.70
Pre-pregnancy diabetes					113.40 ***	12.53	113.38 ***	12.53
Gestational diabetes					36.85 ***	5.23	36.84 ***	5.22
Pre-pregnancy hypertension					-251.29 ***	8.27	-251.31 ***	8.27
Gestational hypertension					-257.87 ***	4.63	-257.88 ***	4.63
Eclampsia					-596.36 ***	23.55	-596.25 ***	23.55
Total cigarettes smoked during pregnancy					-4.17 ***	0.10	-4.17 ***	.10
Cross-level Interaction								
Proportion unable to vote but tried * race							157.81	182.06
Constant	3,325.50 ***	7.02	3,252.50 ***		3,215.92 ***		3,216.61 ***	76.00
AIC	5,304,046		5,303,983		5,280,921		5,280,922	
-2 Log Likelihood	5,304,038		5,303,963		5,280,867		5,280,866	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E6. Relationships between living in a county covered by Preclearance and birth weight: 2008 Cooperative Congressional Election Study, 2008-2009 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2008 3-year Data (N=120 Counties, 341,054 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Preclearance	-85.48 ***	15.44	-29.47	16.53	-13.48	16.12	-12.74	16.17
County-level covariates								
Proportion who voted			83.66	70.02	40.88	68.24	41.01	68.25
Proportion Black			-453.87 ***	57.93	-174.72 ***	56.60	-175.11 **	56.60
Proportion 65 years or older			-70.21	199.96	93.15	195.01	93.28	195.02
Proportion unemployed			1,354.15 *	678.53	1,985.60 **	661.64	1,984.39 **	661.69
Proportion with college degree or higher			128.39	100.50	-78.61	98.12	-79.29	98.14
Proportion uninsured			-286.80 *	135.38	-395.82 **	131.98	-396.36 **	131.99
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-178.31 ***	2.90	-177.35 ***	3.38
Infant sex								
Female	ref		ref		ref		ref	
Male					123.78 ***	1.91	123.78 ***	1.91
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					40.56 ***	2.59	40.55 ***	2.59
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					46.02 ***	3.65	46.03 ***	3.65
Some college					81.07 ***	3.70	81.09 ***	3.70
College degree					109.91 ***	4.28	109.94 ***	4.28
More than college					94.34 ***	4.81	94.40 ***	4.81
Mother's age (range 1-9)					-0.99	1.05	-.98	1.05
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-214.94 ***	8.02	-214.83 ***	8.03

Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-82.80 ***	2.07	-82.80 ***	2.07
Total birth order					3.76 ***	0.70	3.75 ***	.70
Pre-pregnancy diabetes					113.44 **	12.53	113.46 ***	12.53
Gestational diabetes					36.84 ***	5.23	36.85 ***	5.23
Pre-pregnancy hypertension					-251.26 ***	8.27	-251.25 ***	8.27
Gestational hypertension					-257.83 ***	4.63	-257.82 ***	4.63
Eclampsia					-596.45 ***	23.55	-596.49 ***	23.55
Total cigarettes smoked during pregnancy					-4.17 ***	0.10	-4.17 ***	.10
Cross-level Interaction								
Preclearance * race							-2.13	5.67
Constant	3,334.57 ***	6.76	3,261.40	81.72	3,199.13	79.76	3,199.13	79.77
AIC	5,304,027		5,303,985		5,280,927		5,280,929	
-2 Log Likelihood	5,304,019		5,303,965		5,280,873		5,280,873	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E7. Relationships between county-level proportion of people who waited 30 minutes or longer to vote and gestational age: 2008 Cooperative Congressional Election Study, 2008-2009 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2008 3-year Data (N=120 Counties, 341,054 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion waited more than 30 minutes to vote	.17	.14	.15	.12	.14	.12	.13	.12
County-level covariates								
Proportion who voted			0.71 **	0.28	0.58 *	0.27	0.58 *	0.27
Proportion Black			-1.21 ***	0.23*	-0.54	0.22	-0.54 *	0.22
Proportion 65 years or older			1.46	0.83*	1.67	0.82	1.67 *	0.82
Proportion unemployed			6.46 *	2.80*	6.48	2.74	6.53 *	2.75
Proportion with college degree or higher			-0.13	0.42	-0.19	0.42	-0.19	0.42
Proportion uninsured			-1.13 *	0.49 **	-1.05	0.48	-1.05 *	0.48
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-.30 ***	.01	-.37 ***	.04
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.07 ***	0.01	-0.07 ***	0.00
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.03 **	0.01	0.03 **	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.07 ***	0.01	0.07 ***	0.01
Some college					0.11 ***	0.01	0.11 ***	0.01
College degree					0.19 ***	0.01	0.19 ***	0.02
More than college					0.15 ***	0.02	0.15 ***	0.02
Mother's age (range 1-9)					-0.07 ***	0.00	-0.07 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-1.00 ***	0.03	-1.00 ***	0.03
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-0.54 ***	0.01	-0.54 ***	0.01
Total birth order					-0.10 ***	0.00	-0.10 ***	0.00
Pre-pregnancy diabetes					-0.70 ***	0.05	-0.70 ***	0.05
Gestational diabetes					-0.34	0.02	-0.34	0.02

Pre-pregnancy hypertension					-0.89 ***	0.03	-0.89 ***	0.03
Gestational hypertension					-0.99 ***	0.02	-0.99 ***	0.02
Eclampsia					-2.28 ***	0.09	-2.28 ***	0.09
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-0.00 ***	0.00
Cross-level Interaction								
Proportion waited 30 minutes or more to vote * race							.12	.08
Constant	38.66 ***	.08	37.90 ***	.33	38.66 ***	.33	38.66 ***	.33
AIC	1,534,407		1,534,373		1,519.259		1,519,258	
-2 Log Likelihood	1,534,399		1,534,353		1,519,205		1,519,202	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E8. Relationships between county-level proportion of people who were unable to vote and gestational age: 2008 Cooperative Congressional Election Study, 2008-2009 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2008 3-year Data (N=120 Counties, 341,054 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote	-0.01	.55	1.15 *	.50	1.24 *	0.49	1.19 *	.49
County-level covariates								
Proportion who voted			0.93 **	0.29	0.81 **	0.28	0.82 **	0.28
Proportion Black			-1.33 ***	0.22	-0.66 **	0.21	-0.66 **	0.21
Proportion 65 years or older			1.22	0.82	1.423	0.79	1.42	0.79
Proportion unemployed			9.21 ***	2.69	9.30 ***	2.61	9.34 **	2.60
Proportion with college degree or higher			-0.03	0.41	-0.09	0.39	-0.09	0.40
Proportion uninsured			-1.21	0.48	-1.14 *	0.47	-1.14 *	0.47
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-0.30 ***	0.01	-0.31	0.01
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.07 ***	0.01	-0.07 ***	0.01
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.03 ***	0.01	0.03 **	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.07 ***	0.01	0.07 ***	0.01
Some college					0.11 ***	0.01	0.11 ***	0.01
College degree					0.19 ***	0.02	0.19 ***	0.02
More than college					0.15 ***	0.02	0.15 ***	0.02
Mother's age (range 1-9)					-0.07 ***	0.00	-0.07 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-1.00 ***	0.03	-1.00 ***	0.03
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-0.54 ***	0.01	-0.54 ***	0.01
Total birth order					-0.10 ***	0.00	-0.10 ***	0.00
Pre-pregnancy diabetes					-0.70 ***	0.05	-0.70 ***	0.05

Gestational diabetes					-0.34 ***	0.02	-0,34 ***	0,02
Pre-pregnancy hypertension					-0.89 ***	0.03	-0.89	0.03
Gestational hypertension					-0.99 ***	0.02	-0.99 ***	0.02
Eclampsia					-2.28 ***	0.09	-2.28 ***	0.09
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-0.00 ***	0.00
Cross-level Interaction								
Proportion unable to vote * race							0.42	0.35
Constant	38.76 ***	0.03	37.69***	0.35	38.42 ***	0.341	38.42 ***	.34
AIC	1,534,408		1,534,369		1,519,254		1,519,254	
-2 Log Likelihood	1,534,400		1,534,349		1,519,200		1,519,198	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E9. Relationships between county-level proportion of people who were unable to vote because the line was too long and gestational age: 2008 Cooperative Congressional Election Study, 2008-2009 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2008 3-year Data (N=120 Counties, 341,054 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote because line was too long	-2.93	0.10	1.29	1.75	.92	1.71	0.73	1.72
County-level covariates								
Proportion who voted			0.76 *	0.30	0.59 *	0.30	0.60 *	0.30
Proportion Black			-1.30 ***	0.22	-0.63 **	0.22	-0.62 **	0.22
Proportion 65 years or older			1.25	0.84	1.49	0.82	1.48	0.82
Proportion unemployed			7.84 **	2.66	7.75 **	2.59	7.78	2.59
Proportion with college degree or higher			-0.04	0.42	-0.10	0.41	-0.10	0.41
Proportion uninsured			-1.20 *	0.49	-1.11 *	0.48	-1.10	0.48
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-0.30 ***	0.01	-0.30 ***	0.01
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.07 ***	0.01	-0.07 ***	0.01
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.03 **	0.01	0.03 **	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.07 ***	0.01	0.07 ***	0.01
Some college					0.11 ***	0.01	0.11 ***	0.01
College degree					0.19 ***	0.02	0.19 ***	0.02
More than college					0.15 ***	0.02	0.15 ***	0.02
Mother's age (range 1-9)					-0.07 ***	0.00	-0.07 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-1.00 ***	0.03	-1.00 ***	0.03
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-0.54 ***	0.01	-0.54 ***	0.01

Total birth order					-0.10 ***	0.00	-0.10 ***	0.00
Pre-pregnancy diabetes					-0.70 ***	0.05	-0.70 ***	0.05
Gestational diabetes					-0.34 ***	0.02	-0.34 ***	0.02
Pre-pregnancy hypertension					-0.89 ***	0.03	-0.89 ***	0.03
Gestational hypertension					-0.99 ***	0.02	-0.99 ***	0.02
Eclampsia					-2.28 ***	0.09	-2.28 ***	0.09
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-0.00 ***	0.00
Cross-level Interaction								
Proportion unable to vote because line was too long * race							0.98	1.08
Constant	38.77 ***	0.03	37.91 ***		38.69 ***	0.34	38.69 ***	0.34
AIC	1,534,406		1,534,374		1,519,260		1,519,261	
-2 Log Likelihood	1,534,398		1,534,354		1,519,206		1,519,205	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E10. Relationships between county-level proportion of people who were unable to vote because they requested but did not receive an absentee ballot and gestational age: 2008 Cooperative Congressional Election Study, 2008-2009 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2008 3-year Data (N=120 Counties, 341,054 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote because requested but did not receive an absentee ballot	-1.58	1.38	-0.64	1.16	-0.55	1.13	-0.22	1.14
County-level covariates								
Proportion who voted			0.65 *	0.27	0.51	0.27	0.51	0.27
Proportion Black			-1.26 ***	0.22	-0.60 **	0.22	-0.59 **	0.22
Proportion 65 years or older			1.35	0.83	1.57	0.81	1.54	0.81
Proportion unemployed			7.46 **	2.66	7.46 **	2.60	7.46 **	2.60
Proportion with college degree or higher			-0.05	0.42	-0.11	0.41	-0.12	0.41
Proportion uninsured			-1.14 *	0.49	-1.06 *	0.48	-1.07 *	0.48
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-0.30 ***	0.01	-0.29 ***	0.01
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.07 ***	0.00	-0.07 ***	0.01
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.03 **	0.01	0.03 **	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.07 ***	0.01	0.07 ***	0.01
Some college					0.11 ***	0.01	0.11 ***	0.01
College degree					0.19 ***	0.02	0.19 ***	0.02
More than college					0.15 ***	0.02	0.15 ***	0.02
Mother's age (range 1-9)					-0.07 ***	0.00	-0.07 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-1.00 ***	0.03	-1.00 ***	0.03
Type of birth								
Vaginal	ref		ref		ref		ref	

Caesarean section					-0.54 ***	0.01	-0.54 ***	0.01
Total birth order					-0.10 ***	0.00	-0.10 ***	0.00
Pre-pregnancy diabetes					-0.70 ***	0.05	-0.70 ***	0.05
Gestational diabetes					-0.34 ***	0.02	-0.34 ***	0.02
Pre-pregnancy hypertension					-0.89 ***	0.03	-0.89 ***	0.03
Gestational hypertension					-0.99 ***	0.02	-0.99 ***	0.02
Eclampsia					-2.28 ***	0.09	-2.29 ***	0.09
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-0.00 ***	0.00
Cross-level Interaction								
Proportion unable to vote because requested but did not receive an absentee ballot * race							-2.78 **	0.96
Constant	38.77 ***	0.03	38.01	0.34	38.76	0.32	38.77 ***	0.32
AIC	1,534,407		1,534,374		1,519,260		1,519,253	
-2 Log Likelihood	1,534,399		1,534,354		1,519,206		1,519,197	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E11. Relationships between county-level proportion of people who were unable to vote but tried and gestational age: 2008 Cooperative Congressional Election Study, 2008-2009 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2008 3-year Data (N=120 Counties, 341,054 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote but tried	-3.46	1.83	-1.21	1.59	-1.24	1.55	-0.76	1.56
County-level covariates								
Proportion who voted			0.64	0.28	0.50	0.27	0.50	0.27
Proportion Black			-1.25 ***	0.22	-0.58 **	0.22	-0.59 **	0.22
Proportion 65 years or older			1.34	0.83	1.56	0.81	1.57	0.81
Proportion unemployed			7.07 *	2.74	7.04 **	2.67	7.10 **	2.69
Proportion with college degree or higher			-0.04	0.42	-0.11	0.41	-0.10	0.41
Proportion uninsured			-1.11 *	0.49	-1.03 *	0.48	-1.03 *	0.48
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-0.30 ***	0.01	-0.28 ***	0.01
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.07 ***	0.01	-0.07 ***	0.01
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.03 **	0.01	0.03 **	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.07 ***	0.01	0.07 ***	0.01
Some college					0.11 ***	0.01	0.11 ***	0.01
College degree					0.19 ***	0.02	0.19 ***	0.02
More than college					0.15 ***	0.02	0.15 ***	0.02
Mother's age (range 1-9)					-0.07 ***	0.00	-0.07 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-1.00 ***	0.03	-1.00 ***	0.03
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-0.54 ***	0.01	-0.54 ***	0.01
Total birth order					-0.10 ***	0.00	-0.10 ***	0.00
Pre-pregnancy diabetes					-0.70 ***	0.05	-0.70 ***	0.05
Gestational diabetes					-0.34 ***	0.02	-0.34 ***	0.02

Pre-pregnancy hypertension					-0.89 ***	0.03	-0.89 ***	0.03
Gestational hypertension					-0.99 ***	0.02	-0.99 ***	0.02
Eclampsia					-2.28 ***	0.09	-2.28 ***	0.09
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-0.00 ***	0.00
Cross-level Interaction								
Proportion unable to vote but tried * race							-2.69 ***	0.73
Constant	38.78 ***	0.03	39.03 ***	0.33	38.79 ***	0.32	38.78 ***	0.33
AIC	1,534,405		1,534,374		1,519,259		1,519,248	
-2 Log Likelihood	1,534,397		1,534,354		1,519,205		1,519,192	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E12. Relationships between living in a county covered by Preclearance and gestational age: 2008 Cooperative Congressional Election Study, 2008-2009 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2008 3-year Data (N=120 Counties, 341,054 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Preclearance	-0.27 ***	0.06	-0.07	0.07	-0.07	0.07	-0.06	0.07
County-level covariates								
Proportion who voted			0.56	0.29	0.43	0.28	0.43	0.28
Proportion Black			-1.17 ***	0.24	-0.51 *	0.23	-0.51 *	0.24
Proportion 65 years or older			1.29	0.83	1.51	0.81	1.51	0.81
Proportion unemployed			6.62 *	2.81	6.63 *	2.74	6.62 *	2.74
Proportion with college degree or higher			0.01	0.42	-0.06	0.41	-0.07	0.41
Proportion uninsured			-0.87	0.56	-0.80	0.55	-0.81	0.55
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-0.30 ***	0.01	-0.29 ***	0.01
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.07 ***	0.01		
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.03 **	0.01	-0.07 ***	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.07 ***	0.01	0.07 ***	0.01
Some college					0.11 ***	0.01	0.11 ***	0.01
College degree					0.19 ***	0.02	0.19 ***	0.02
More than college					0.15 ***	0.02	0.15 ***	0.02
Mother's age (range 1-9)					-0.07 ***	0.00	-0.07 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-1.00 ***	0.03	-1.00 ***	0.03
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-0.54 ***	0.01	-0.54 ***	0.01
Total birth order					-0.10 ***	0.00	-0.10 ***	0.00
Pre-pregnancy diabetes					-0.70 ***	0.05	-0.70 ***	0.05

Gestational diabetes					-0.34 ***	0.02	-0.34 ***	0.02
Pre-pregnancy hypertension					-0.89 ***	0.03	-0.89 ***	0.03
Gestational hypertension					-0.99 ***	0.02	-0.99 ***	0.02
Eclampsia					-2.28 ***	0.09	-2.28 ***	0.09
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-0.00 ***	0.00
Cross-level Interaction								
Preclearance * race							-0.05 *	0.02
Constant	38.81 ***	0.02	38.08	0.34	38.84	0.33	38.84 ***	0.33
AIC	1,534,388		1,534,373		1,519,259		1,519,257	
-2 Log Likelihood	1,534,380		1,534,353		1,519,205		1,519,201	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E13. Relationships between county-level proportion of people who wait 30 minutes or more to vote and birthweight: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 5-year Data (N=96 Counties, 416,916 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion waited 30 minutes or more	-5.47	31.89	41.68	25.80	24.92	27.74	23.99	27.82
County-level covariates								
Proportion who voted			49.58	73.96	37.13	79.33	37.07	79.31
Proportion Black			-293.39 ***	41.12	-49.73	44.20	-49.72	44.19
Proportion 65 years or older			-50.17	127.88	166.80	137.58	166.65	137.55
Proportion unemployed			-97.96	490.84	714.19	527.15	715.70	527.03
Proportion with college degree or higher			-52.14	77.56	-196.39 *	83.41	-196.41 *	83.39
Proportion uninsured			-635.06 ***	119.99	-559.41 ***	129.02	-559.22 ***	128.99
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-185.77 ***	2.52	-188.15 ***	6.20
Infant sex								
Female	ref		ref		ref		ref	
Male					120.28 ***	1.75	120.28 ***	1.75
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					53.15 ***	2.38	53.13 ***	2.38
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					42.79 ***	3.59	42.78 ***	3.59
Some college					76.20 ***	3.61	76.19 ***	3.61
College degree					99.88 ***	4.11	99.87 ***	4.11
More than college					83.03 ***	4.49	83.01 ***	4.49
Mother's age (range 1-9)					-1.86	0.97	-1.86	0.97
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-219.17 ***	7.35	-219.14 ***	7.35
Type of birth								

Vaginal	ref	ref	ref		ref	
Caesarean section			-74.38 ***	1.90	-74.39 ***	1.90
Total birth order			5.56 ***	0.63	5.56 ***	0.63
Pre-pregnancy diabetes			124.21 ***	10.73	124.21 ***	10.73
Gestational diabetes			46.15 ***	4.39	46.14 ***	4.39
Pre-pregnancy hypertension			-200.11 ***	6.97	-200.10 ***	6.97
Gestational hypertension			-249.51 ***	3.97	-249.50 ***	3.97
Eclampsia			-429.29 ***	16.18	-429.28 ***	16.18
Total cigarettes smoked during pregnancy			-5.16 ***	0.11	-5.16 ***	0.11
Cross-level Interaction						
Proportion waited 30 minutes or more * race					-5.16	0.11
Constant	3,303.78	3,391.73	3,243.85	79.03	3,244.22 ***	79.01
AIC	6,485,291	6,485,230	6,455,941		6,455,943	
-2 Log Likelihood	6,485,283	6,485,210	6,455,887		6,455,887	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E14. Relationships between county-level proportion of people who were unable to vote and birthweight: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 5-year Data (N=96 Counties, 416,916 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote	12.79	207.69	345.33	236.72	421.05	247.66	462.86	247.87
County-level covariates								
Proportion who voted			138.44	107.63	161.85	113.18	157.51	113.11
Proportion Black			-306.45 ***	40.46	-55.71	42.91	-53.38	42.89
Proportion 65 years or older			-24.50	129.15	185.34	136.95	187.53	136.85
Proportion unemployed			416.72	475.16	1,153.05 *	503.10	1,155.68 *	502.72
Proportion with college degree or higher			1.27	71.91	-162.03 *	76.24	-165.24 *	76.19
Proportion uninsured			-615.46 ***	119.68	-569.01 ***	127.01	-575.39 ***	126.93
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-185.74 ***	2.52	-180.36 ***	3.07
Infant sex								
Female	ref		ref		ref		ref	
Male					120.29 ***	1.75	120.28 ***	1.7521
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					53.17 ***	2.38	53.22 ***	2.38
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					42.80 ***	3.59	42.82 ***	3.59
Some college					76.20 ***	3.61	76.18 ***	3.61
College degree					99.87 ***	4.11	99.90 ***	4.11
More than college					83.01 ***	4.49	83.10 ***	4.49
Mother's age (range 1-9)					-1.85	0.97	-1.82	0.97
No prenatal care								
Prenatal care	ref		ref		ref		ref	

No prenatal care					-219.20 ***	7.35	-219.30 ***	7.34
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-74.39 ***	1.90	-74.37 ***	1.90
Total birth order					5.56 ***	0.63	5.54 ***	0.63
Pre-pregnancy diabetes					124.21 ***	10.73	124.30 ***	10.73
Gestational diabetes					46.14 ***	4.39	46.11 ***	4.39
Pre-pregnancy hypertension					-200.11 ***	6.97	-200.19 ***	6.97
Gestational hypertension					-249.52 ***	3.97	-249.53 ***	3.97
Eclampsia					-429.20 ***	16.18	-429.42 ***	16.18
Total cigarettes smoked during pregnancy					-5.16 ***	0.11	-5.16 **	0.11
Cross-level Interaction								
Proportion unable * race							-398.17 **	129.62
Constant	3,301.11 ***	8.30	3,273.63 ***	112.13	3,096.66 ***	118.13	3,100.83 ***	118.05
AIC	6,485,291		6,485,230		6,455,939		6,455,931	
-2 Log Likelihood	6,485,283		6,485,210		6,455,885		6,455,875	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E15. Relationships between county-level proportion of people who were unable to vote because the line was too long and birthweight: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 5-year Data (N=96 Counties, 416,916 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote because line was too long	-796.96	547.72	-556.36	403.59	-593.37	428.06	-626.44	430.49
County-level covariates								
Proportion who voted			-2.83	75.13	-6.70	79.72	-6.72	79.75
Proportion Black			-314.79 ***	40.17	-64.63	42.73	-64.40	42.75
Proportion 65 years or older			7.38	130.45	217.42	138.63	217.83	138.67
Proportion unemployed			333.27	458.34	1027.23 *	486.23	1,025.56 *	486.38
Proportion with college degree or higher			4.93	71.36	-159.43 *	75.86	-159.13 *	75.88
Proportion uninsured			-577.82 ***	116.78	-523.06 ***	124.20	-522.84 ***	124.24
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-185.76 ***	2.52	-186.55 ***	2.73
Infant sex								
Female	ref		ref		ref		ref	
Male					120.28 ***	1.75	120.28 ***	1.75
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					53.17 ***	2.38	53.16 ***	2.38
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					42.81 ***	3.59	42.81 ***	3.59
Some college					76.20 ***	3.61	76.22 ***	3.61
College degree					99.87 ***	4.11	99.87 ***	4.11
More than college					83.01 ***	4.49	83.01 ***	4.49
Mother's age (range 1-9)					-1.86	0.97	-1.85 ***	0.97

No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-219.20 ***	7.35	-219.17 ***	7.35
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-74.39 ***	1.90	-74.38 ***	1.90
Total birth order					5.56 ***	0.63	5.56 ***	0.63
Pre-pregnancy diabetes					124.24 ***	10.73	124.21 ***	10.73
Gestational diabetes					46.14 ***	4.39	46.14 ***	4.39
Pre-pregnancy hypertension					-200.12 ***	6.97	-200.12 ***	6.97
Gestational hypertension					-249.51 ***	3.97	-249.51 ***	3.97
Eclampsia					-429.17 ***	16.18	-429.16 ***	16.18
Total cigarettes smoked during pregnancy					-5.16 ***	0.11	-5.16 ***	0.11
Cross-level Interaction								
Proportion unable to vote because line was too long * race							180.47	242.71
Constant	3,305.33 ***	7.46	3,409.40 ***	74.72	3,261.04 ***	79.37	3,261.09 ***	79.40
AIC	6,485,289		6,485,230		6,455,940		6,455,941	
-2 Log Likelihood	6,485,281		6,485,210		6,455,886		6,455,885	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E16. Relationships between county-level proportion of people who were unable to vote because requested but did not receive absentee ballot and birth weight: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 5-year Data (N=96 Counties, 416,916 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion of people who were unable to vote because requested but did not receive absentee ballot	543.79	302.96	749.28 **	233.62	843.67 **	241.35	818.15 **	243.24
County-level covariates								
Proportion who voted			67.5676	72.38	72.64	76.39	72.55	76.44
Proportion Black			-297.69 ***	39.35	-45.02	41.67	-44.61	41.70
Proportion 65 years or older			19.35	125.94	236.64	133.33	237.41	133.43
Proportion unemployed			209.39	441.38	911.05	466.22	899.01	466.72
Proportion with college degree or higher			4.57	69.69	-158.80 *	73.75	-158.39	73.80
Proportion uninsured			-629.02 ***	114.86	-585.44 ***	121.73	-582.55 *	121.85
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-185.76 ***	2.52	-186.51 ***	2.66
Infant sex								
Female	ref		ref		ref		ref	
Male					120.29 ***	1.75	120.29 ***	1.75
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					53.18 ***	2.38	53.18 ***	2.38
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					42.82 ***	3.59	42.83 ***	3.59
Some college					76.23 ***	3.61	76.23 ***	3.61
College degree					99.90 ***	4.11	99.90 ***	4.11
More than college					83.03 ***	4.49	83.01 ***	4.49
Mother's age (range 1-9)					-1.86	0.97	-1.86	0.97
No prenatal care								

Prenatal care	ref		ref		ref		ref	
No prenatal care					-219.09 ***	7.35	-219.08 ***	7.35
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-74.37 ***	1.90	-74.37 ***	1.90
Total birth order					5.56 ***	0.63	5.56 ***	0.63
Pre-pregnancy diabetes					124.22 ***	10.73	5.56 ***	0.63
Gestational diabetes					46.13 ***	4.39	46.11 ***	4.39
Pre-pregnancy hypertension					-200.16 ***	6.97	-200.16 ***	6.97
Gestational hypertension					-249.51 ***	3.97	-249.51 ***	3.97
Eclampsia					-429.12 ***	16.18	-429.07 ***	16.18
Total cigarettes smoked during pregnancy					-5.16 ***	0.11	-5.16 ***	0.11
Cross-level Interaction								
Proportion of people who were unable to vote because requested but did not receive absentee ballot * race							217.43	248.45
Constant	3,297.97 ***	7.18	3,348.86 ***	73.82	3,191.05 ***	78.05	3,191.28 ***	78.10
AIC	6,485,288		6,485,222		6,455,930		6,455,931	
-2 Log Likelihood	6,485,280		6,485,202		6,455,876		6,455,875	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E17. Relationships between county-level proportion of people who were unable to vote but tried and birth weight: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 5-year Data (N=96 Counties, 416,916 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion of people unable to vote but tried	-1,021.17	542.74	122.31	424.73	-142.93	451.73	93.29	457.34
County-level covariates								
Proportion who voted			31.60	78.53	12.02	83.54	11.82	83.88
Proportion Black			-312.04 ***	41.09	-57.05	43.79	-50.86	43.99
Proportion 65 years or older			-22.92	130.21	174.45	138.76	176.79	139.31
Proportion unemployed			220.61	455.26	902.93	484.14	875.00	486.06
Proportion with college degree or higher			-0.64	71.90	-166.56*	76.60	-171.04 *	76.91
Proportion uninsured			-586.43 ***	117.95	-527.13 ***	125.73	-531.61 ***	126.23
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-185.77 ***	2.52	-181.74 ***	2.71
Infant sex								
Female	ref		ref		ref		ref	
Male					120.28 ***	1.75	120.27 ***	1.7521
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					53.17 ***	2.38	53.20 ***	2.38
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					42.80 ***	3.59	42.84 ***	3.59
Some college					76.21 ***	3.61	76.18 ***	3.61
College degree					99.87 ***	4.11	99.89 ***	4.11
More than college					83.01 ***	4.49	83.12 ***	4.49
Mother's age (range 1-9)					-1.86	0.97	-1.82	0.97
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-219.19 ***	7.35	-219.36 ***	7.35
Type of birth								
Vaginal	ref		ref		ref		ref	

Caesarean section					-74.39 ***	1.90	-74.38 ***	1.90
Total birth order					5.56 ***	0.63	5.54 ***	0.63
Pre-pregnancy diabetes					124.22 ***	10.73	124.16 ***	10.73
Gestational diabetes					46.15 ***	4.39	46.11***	4.39
Pre-pregnancy hypertension					-200.12 ***	6.97	-200.24 ***	6.97
Gestational hypertension					-249.51 ***	3.97	-249.52 ***	3.97
Eclampsia					-429.18 ***	16.18	-429.66 ***	16.18
Total cigarettes smoked during pregnancy					-5.16 ***	0.11	-5.16 ***	0.11
Cross-level Interaction								
Proportion of people who were unable to vote but tired * race							-835.01 ***	208.72
Constant	3,306.56 ***	7.43	3,423,339 ***	80.16	3,255.90 ***	85.34	3,257.20	85.68
AIC	6,485,287		6,485,232		6,455,941		6,455,927	
-2 Log Likelihood	6,485,279		6,485,212		6,455,887		6,455,871	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E18. Relationships between living in a county covered by Preclearance and birth weight: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 5-year Data (N=96 Counties, 416,916 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Previously covered by Preclearance	-55.18 ***	15.73	-8.64	15.04	-1.57	16.06	2.36	16.07
County-level covariates								
Proportion who voted			20.55	73.23	21.10	77.98	23.02	77.77
Proportion Black			-298.54 ***	44.88	-57.51	47.97	-58.74	47.84
Proportion 65 years or older			-44.29	131.84	177.18	140.82	177.74	140.42
Proportion unemployed			91.76	505.62	881.93	539.45	893.27	537.95
Proportion with college degree or higher			4.43	72.30	-164.83 *	77.17	-169.40 *	76.97
Proportion uninsured			-546.05 ***	135.08	-522.58 ***	144.27	-530.51 **	143.89
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-185.77 ***	2.52	-181.51 ***	2.93
Infant sex								
Female	ref		ref		ref		ref	
Male					120.28 ***	1.75	120.28 ***	1.75
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					53.17 ***	2.38	53.04 ***	2.38
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					42.80 ***	3.59	42.81 ***	3.59
Some college					76.21 ***	3.61	76.31 ***	3.61
College degree					99.87 ***	4.11	100.02 ***	4.11
More than college					83.01 ***	4.49	83.29 ***	4.49
Mother's age (range 1-9)					-1.86	0.97	-1.79	0.97
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-219.18 ***	7.35	-219.00 ***	7.35
Type of birth								

Vaginal	ref		ref		ref		ref	
Caesarean section					-74.39 ***	1.90	-74.33 ***	1.90
Total birth order					5.56 ***	0.63	5.51 ***	0.63
Pre-pregnancy diabetes					124.22 ***	10.73	124.34 ***	10.73
Gestational diabetes					46.15 ***	4.39	46.18 ***	4.39
Pre-pregnancy hypertension					-200.12 ***	6.97	-200.12 ***	6.97
Gestational hypertension					-249.51 ***	3.97	-249.51 ***	3.97
Eclampsia					-429.20 ***	16.1761	-429.18 ***	16.18
Total cigarettes smoked during pregnancy					-5.16 ***	0.11	-5.16 ***	0.11
Cross-level Interaction								
Previously covered by preclearance * race							-13.42 **	4.76
Constant	3,313.70 ***	7.48	3,401.84 ***	75.24	3,247.13 ***	80.22	3,245.76 ***	80.00
AIC	6,485,279		6,485,232		6,455,942		6,455,936	
-2 Log Likelihood	6,485,271		6,485,212		6,455,888		6,455,880	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E19. Relationships between county-level proportion of people who waited 30 minutes or more and gestational age: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 5-year Data (N=96 Counties, 416,916 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion who waited 30 minutes or more	0.02	0.12	0.05	0.10	0.02	0.11	0.04	0.11
County-level covariates								
Proportion who voted			-0.14	0.30	-0.16	0.31	-0.16	0.31
Proportion Black			-0.92 ***	0.16	-0.30	0.17	-0.31	0.17
Proportion 65 years or older			0.84	0.51	1.22 *	0.53	1.22	0.53
Proportion unemployed			5.93 **	1.96	7.25 ***	2.03	7.21	2.04
Proportion with college degree or higher			-0.05	0.31	-0.19	0.32	-0.19	0.32
Proportion uninsured			-2.71 ***	0.48	-2.42 ***	0.50	-2.42	0.50
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-0.36 ***	0.01	-0.31 ***	0.03
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.08 ***	0.01	-0.31 ***	0.03
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.07 ***	0.01	0.07 ***	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.07 ***	0.01	0.07 ***	0.01
Some college					0.11 ***	0.01	0.11 ***	0.01
College degree					0.19 ***	0.02	0.19 ***	0.02
More than college					0.15 ***	0.02	0.15 ***	0.02
Mother's age (range 1-9)					-0.05 ***	0.00	-0.05 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-1.06 ***	0.03	-1.06 ***	0.03
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-0.54 ***	0.01	-0.54 ***	0.01
Total birth order					-0.09 ***	0.00	-0.09 ***	0.00
Pre-pregnancy diabetes					-0.70 ***	0.04	-0.70 ***	0.04

Gestational diabetes					-0.27 ***	0.02	-0.27 ***	0.02
Pre-pregnancy hypertension					-0.82 ***	0.03	-0.82 ***	0.03
Gestational hypertension					-1.06 ***	0.02	-1.06 ***	0.02
Eclampsia					-1.59 ***	0.07	-1.59 ***	0.07
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-1.59 ***	0.07
Cross-level Interaction								
Proportion who waited 30 minutes or more * race							-0.12 *	0.05
Constant	38.78 ***	0.06	38.94 ***	0.29	39.45 ***	0.31	39.44	0.31
AIC	1,893,202		1,893,161		1,872,817		1,872,814	
-2 Log Likelihood	1,893,194		1,893,141		1,872,763		1,872,758	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E20. Relationships between county-level proportion of people who were unable to vote and gestational age: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 5-year Data (N=96 Counties, 416,916 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote	-0.50	0.76	0.67	0.94	0.70	0.96	0.83	0.96
County-level covariates								
Proportion who voted			0.05	0.43	0.06	0.44	0.042	0.44
Proportion Black			-0.93 ***	0.16	-0.31	0.17	-0.30	0.17
Proportion 65 years or older			0.88	0.51	1.24 *	0.53	1.25 *	0.53
Proportion unemployed			6.73 ***	1.88	7.81 ***	1.94	7.82 ***	1.94
Proportion with college degree or higher			0.02	0.28	-0.15	0.29	-0.16	0.29
Proportion uninsured			-2.71 ***	0.47	-2.46 ***	0.49	-2.48 ***	0.49
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-0.36 ***	0.01	-0.35 ***	0.01
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.08 ***	0.01	-0.08 ***	0.01
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.07 ***	0.01	0.07 ***	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.07 ***	0.01	0.07 ***	0.01
Some college					0.11 ***	0.01	0.11 ***	0.01
College degree					0.19 ***	0.02	0.19 ***	0.02
More than college					0.15 ***	0.02	0.15 ***	0.02
Mother's age (range 1-9)					-0.05 ***	0.00	-0.05 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-1.06 ***	0.03	-1.0633	0.02984
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-0.54 ***	0.01	-0.54 ***	0.01
Total birth order					-0.09 ***	0.00	-0.09 ***	0.00
Pre-pregnancy diabetes					-0.70 ***	0.04	-0.70 ***	0.04

Gestational diabetes					-0.27 ***	0.02	-0.27 ***	0.02
Pre-pregnancy hypertension					-0.82 ***	0.03	-0.82 ***	0.03
Gestational hypertension					-1.06 ***	0.02	-1.06 ***	0.02
Eclampsia					-1.59 ***	0.07	-1.59 ***	0.07
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-0.00 ***	0.00
Cross-level Interaction								
Proportion unable to vote * race							-0.1.22 *	0.53
Constant	38.80 ***	0.03	38.71***	0.44	39.21 ***	0.46	39.22 ***	0.46
AIC	1,893,202		1,893,160		1,872,817		1,872,813	
-2 Log Likelihood	1,893,194		1,893,140		1,872,763		1,872,757	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E21. Relationships between county-level proportion of people who were unable to vote because the line was too long and gestational age: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 5-year Data (N=96 Counties, 416,916 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote because the line was too long	-1.83	2.00	-2.68	1.58	-2.49	1.64	-2.36	1.64
County-level covariates								
Proportion who voted			-0.30	0.29	-0.30	0.3048	-0.30	0.30
Proportion Black			-0.96 ***	0.16	-0.34 *	0.1633	-0.34 *	0.16
Proportion 65 years or older			1.04	0.51	1.39 **	0.5296	1.39 **	0.53
Proportion unemployed			6.90 ***	1.79	7.92 ***	1.8597	7.93 ***	1.86
Proportion with college degree or higher			0.05	0.28	-0.13	0.2900	-0.13	0.29
Proportion uninsured			-2.61 ***	0.46	-2.36 ***	0.4742	-2.36 ***	0.47
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-0.36 ***	0.01	-0.36 ***	0.01
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.08 ***	0.01	-0.08 ***	0.01
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.07 ***	0.01	0.07 ***	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.07 ***	0.01	0.07 ***	0.01
Some college					0.11 ***	0.01	0.11 ***	0.01
College degree					0.19 ***	0.02	0.19 ***	0.02
More than college					0.15 ***	0.02	0.15 ***	0.02
Mother's age (range 1-9)					-0.05 ***	0.00	-0.05 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-1.06 ***	0.03	-1.06 ***	0.03
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-0.54 ***	0.01	-0.54 ***	0.01

Total birth order					-0.09 ***	0.00	-0.09 ***	0.00
Pre-pregnancy diabetes					-0.70 ***	0.04	-0.70 ***	0.04
Gestational diabetes					-0.27 ***	0.02	-0.27 ***	0.02
Pre-pregnancy hypertension					-0.82 ***	0.03	-0.82 ***	0.03
Gestational hypertension					-1.06 ***	0.02	-1.06 ***	0.02
Eclampsia					-1.59 ***	0.07	-1.59 ***	0.07
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-0.00 ***	0.00
Cross-level Interaction								
Proportion unable to vote because the line was too long * race							-0.73	0.99
Constant	38.80 ***	0.03	39.01 ***	0.29	39.52 ***	0.30	39.52 ***	0.30
AIC	1,893,201		1,893,158		1,872,815		1,872,816	
-2 Log Likelihood	1,893,193		1,893,138		1,872,761		1,872,760	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E22 Relationships between county-level proportion of people who were unable to vote because requested but did not receive an absentee ballot and gestational age: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 5-year Data (N=96 Counties, 416,916 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion of people unable to vote because requested but did not receive absentee ballot	1.82	1.12	2.97 **	0.92	2.86 **	0.94	2.89 **	0.95
County-level covariates								
Proportion who voted			-0.00	0.28	-0.01	0.29	-0.01	0.29
Proportion Black			-0.89 ***	0.15	-0.27	0.16	-0.27	0.16
Proportion 65 years or older			1.05 *	0.49	1.42 **	0.51	1.42 **	0.51
Proportion unemployed			6.29 ***	1.72	7.39 ***	1.79	7.40 ***	1.79
Proportion with college degree or higher			0.04	0.27	-0.14	0.28	-0.14	0.28
Proportion uninsured			-2.81 ***	0.45	-2.57 ***	0.47	-2.57 ***	0.47
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-0.36 ***	0.01	-0.36 ***	0.01
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.08	0.01	-0.08	0.01
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.07	0.01	0.07	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.07 ***	0.01	0.07 ***	0.01
Some college					0.11 ***	0.01	0.11 ***	0.01
College degree					0.19 ***	0.02	0.19 ***	0.02
More than college					0.15 ***	0.02	0.15 ***	0.02
Mother's age (range 1-9)					-0.05 ***	0.00	-0.05 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-1.06 ***	0.03	-1.06 ***	0.03
Type of birth								
Vaginal	ref		ref		ref		ref	

Caesarean section					-0.54 ***	0.01	-0.54 ***	0.01
Total birth order					-0.09 ***	0.00	-0.09 ***	0.00
Pre-pregnancy diabetes					-0.70 ***	0.04	-0.70 ***	0.04
Gestational diabetes					-0.27 ***	0.02	-0.27 ***	0.02
Pre-pregnancy hypertension					-0.82 ***	0.03	-0.82 ***	0.03
Gestational hypertension					-1.06 ***	0.02	-1.06 ***	0.02
Eclampsia					-1.59 ***	0.07	-1.59 ***	0.07
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-0.00 ***	0.00
Cross-level Interaction								
Proportion of people unable to vote because requested but did not receive absentee ballot * race							-0.29	1.01
Constant	38.77 ***	0.03	38.76 ***	0.29	39.27 ***	0.30	39.27 ***	0.30
AIC	1,893,200		1,893,151		1,872,808		1,872,810	
-2 Log Likelihood	1,893,192		1,893,131		1,872,754		1,872,754	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E23. Relationships between county-level proportion of people who were unable to vote but tried and gestational age: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 5-year Data (N=96 Counties, 416,916 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote but tried	-3.38	1.98	0.02	1.68	-0.87	1.73	-0.61	1.75
County-level covariates								
Proportion who voted			-0.17	0.31	-0.23	0.32	-0.24	0.32
Proportion Black			-0.94 ***	0.16	-0.30	0.17	-0.29	0.17
Proportion 65 years or older			0.87	0.51	1.20 *	0.53	1.20 *	0.53
Proportion unemployed			6.35 ***	1.80	7.40 ***	1.86	7.37 ***	1.86
Proportion with college degree or higher			0.02	0.28	-0.16	0.29	-0.17	0.29
Proportion uninsured			-2.65 ***	0.47	-2.38 ***	0.48	-2.38 ***	0.48
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-0.36 ***	0.01	-0.36 ***	0.01
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.08 ***	0.01	-0.08 ***	0.01
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.07 ***	0.01	0.07 ***	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.07 ***	0.01	0.07 ***	0.01
Some college					0.11 ***	0.01	0.11 ***	0.01
College degree					0.19 ***	0.02	0.19 ***	0.02
More than college					0.15 ***	0.02	0.15 ***	0.02
Mother's age (range 1-9)					-0.05 ***	0.00	-0.05 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-1.06 ***	0.03	-1.06 ***	0.03
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-0.54 ***	0.01	-0.54 ***	0.01
Total birth order					-0.09 ***	0.00	-0.09 ***	0.00

Pre-pregnancy diabetes					-0.70 ***	0.04	-0.70 ***	0.04
Gestational diabetes					-0.27 ***	0.02	-0.27 ***	0.02
Pre-pregnancy hypertension					-0.82 ***	0.03	-0.82 ***	0.03
Gestational hypertension					-1.06 ***	0.02	-1.06 ***	0.02
Eclampsia					-1.59 ***	0.07	-1.59 ***	0.07
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-0.00 ***	0.00
Cross-level Interaction								
Proportion unable to vote but tried * race							-0.91	0.85
Constant	38.80 ***	0.03	38.95 ***	0.32	39.51 ***	0.33	39.52 ***	0.33
AIC	1,893,199		1,893,161		1,872,817		1,872,818	
-2 Log Likelihood	1,893,191		1,893,141		1,872,763		1,872,762	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E24. Relationships between living in a county previously covered by Preclearance and gestational age: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 35-year Data (N=96 Counties, 416,916 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Preclearance	-0.19 ***	0.06	0.07	0.05	0.06	0.06	0.08	0.06
County-level covariates								
Proportion who voted			-0.15	0.29	-0.16	0.30	-0.15	0.30
Proportion Black			-1.03 ***	0.18	-0.39 *	0.18	-0.40 *	0.18
Proportion 65 years or older			1.01	0.52	1.35 *	0.54	1.35 *	0.54
Proportion unemployed			7.43 ***	1.99	8.30 ***	2.07	8.35 **	2.06
Proportion with college degree or higher			-0.03	0.29	-0.20	0.30	-0.22	0.29
Proportion uninsured			-2.97 ***	0.53	-2.66 ***	0.55	-2.70 ***	0.55
Infant-level covariates								
Mother’s race								
White	ref		ref		ref		ref	
Black					-0.36 ***	0.01	-0.34 ***	0.01
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.08 ***	0.01	-0.08	0.01
Mother’s marital status								
Not married	ref		ref		ref		ref	
Married					0.07 ***	0.01	0.07 ***	0.01 ***
Mother’s education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.07 ***	0.01	0.07	0.01
Some college					0.11 ***	0.01	0.12	0.01
College degree					0.19 ***	0.02	0.19	0.02
More than college					0.15 ***	0.02	0.15	0.02
Mother’s age (range 1-9)					-0.05 ***	0.00	-0.05 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-1.06 ***	0.03	-1.06	0.03
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-0.54 ***	0.01	-0.54 ***	0.00
Total birth order					-0.09 ***	0.00	-0.09 ***	0.00
Pre-pregnancy diabetes					-0.70 ***	0.04	-0.70 ***	0.04

Gestational diabetes					-0.27 ***	0.02	-0.27 ***	0.02
Pre-pregnancy hypertension					-0.82 ***	0.03	-0.82 ***	0.03
Gestational hypertension					-1.06 ***	0.02	-1.06 ***	0.02
Eclampsia					-1.59 ***	0.07	-1.59 ***	0.07
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-0.00 ***	0.00
Cross-level Interaction								
Preclearance * race							-0.06 ***	0.02
Constant	38.83 ***	0.03	38.89 ***	0.30	39.41 ***	0.31	39.40	0.31
AIC	1,893,192		1,893,159		1,872,816		1,872752	
-2 Log Likelihood	1,893,184		1,893,139		1,872,762		1,872,808	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E25. Relationships between county-level proportion of people who waited 30 minutes or more and birth weight: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=94 Counties, 332,642 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion who waited 30 minutes or more	90.39 **	34.23	33.75	22.10	-1.38	20.98	3.87	21.16
County-level covariates								
Proportion who voted			-20.65	75.14	-91.59	71.36	-93.83	71.62
Proportion Black			-292.70 ***	36.97	-84.23 *	35.15	-84.12 *	35.28
Proportion 65 years or older			-152.17	119.67	24.22	113.69	30.05	114.13
Proportion unemployed			-819.38	528.66	470.39	502.19	447.54	504.13
Proportion with college degree or higher			-1.73	69.74	-164.24 *	66.32	-159.99 *	66.60
Proportion uninsured			-540.14 ***	109.12	-396.20 ***	103.62	-390.53 ***	104.04
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-197.11 ***	2.78	-179.55 ***	7.31
Infant sex								
Female	ref		ref		ref		ref	
Male					127.14 ***	1.96	127.14 ***	1.96
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					61.48 ***	2.68	61.68 ***	2.68
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					42.10 ***	4.24	42.15 ***	4.24
Some college					84.35 ***	4.28	84.37 ***	4.28
College degree					114.67 ***	4.78	114.75 ***	4.78
More than college					101.52 ***	5.19	101.77 ***	5.19
Mother's age (range 1-9)					-1.92	1.11	-1.90	1.11
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-167.33 ***	6.68	-167.48 ***	6.68

Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-88.76 ***	2.15	-88.73 ***	2.15
Total birth order					5.88 ***	0.67	5.86 ***	0.67
Pre-pregnancy diabetes					102.90 ***	10.51	102.78 ***	10.51
Gestational diabetes					27.38 ***	4.49	27.38 ***	4.49
Pre-pregnancy hypertension					-248.38 ***	6.47	-248.50 ***	6.47
Gestational hypertension					-240.83 ***	3.70	-240.87 ***	3.70
Eclampsia					-240.83 ***	3.70	-490.11 ***	18.94
Total cigarettes smoked during pregnancy					-4.87 ***	0.13	-4.87 ***	0.13
Cross-level Interaction								
Proportion who waited 30 minutes or more * race							44.21 **	17.00
Constant	3,246.09 ***	16.24	3,461.84 ***	77.32	3,364.50 ***	73.60	3,362.45 ***	73.86
AIC	5,190,587		5,190,502		5,161,640		5,161,635	
-2 Log Likelihood	5,190,587		5,190,482		5,161,586		5,161,579	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E26. Relationships between county-level proportion of people who were unable to vote and birth weight: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=94 Counties, 332,642 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote	-3.60	225.39	136.68	167.73	156.35	157.19	262.30	158.58
County-level covariates								
Proportion who voted			31.10	89.66	-46.71	83.91	-57.10	83.80
Proportion Black			-309.91 ***	35.51	-83.48 *	33.24	-86.80 **	33.19
Proportion 65 years or older			-155.66	120.62	27.22	112.87	24.62	112.68
Proportion unemployed			-759.65	533.25	496.28	498.88	578.13	498.35
Proportion with college degree or higher			-2.2376	70.86	-154.18 *	66.31	-158.69 *	66.20
Proportion uninsured			-521.22 ***	109.27	-397.43 ***	102.15	-403.01 ***	101.98
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-197.08 ***	2.78	-187.23 ***	3.49
Infant sex								
Female	ref		ref		ref		ref	
Male					127.14 ***	1.96	127.13 ***	1.96
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					61.46 ***	2.68	61.46 ***	2.68
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					42.11 ***	4.24	42.17 ***	4.24
Some college					84.38 ***	4.2	84.40 ***	4.28
College degree					114.71 ***	4.78	114.74 ***	4.78
More than college					101.57 ***	5.19	101.79 ***	5.19
Mother's age (range 1-9)					-1.92	1.11	-1.87	1.11
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-167.34 ***	6.68	-167.11 ***	6.68

Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-88.76 ***	2.15	-88.81	2.15
Total birth order					5.88 ***	0.67	5.83 ***	0.67
Pre-pregnancy diabetes					102.91 ***	10.51	102.76 ***	10.51
Gestational diabetes					27.39 ***	4.49	27.41 ***	4.49
Pre-pregnancy hypertension					-248.39 ***	6.47	-248.37 ***	6.46
Gestational hypertension					-240.85 ***	3.71	-240.94	3.70
Eclampsia					-490.03 ***	18.94	-489.53	18.94
Total cigarettes smoked during pregnancy					-4.87 ***	0.13	-4.87	0.1304
Cross-level Interaction								
Unable to vote * race							-531.91 ***	113.95
Constant	3,284.99 ***	8.40	3,424.98 ***	93.49	3,315.84 ***	87.70	3,322.14 ***	87.57
AIC	5,190,593		5,190,503		5,161,639		5,161,619	
-2 Log Likelihood	5,190,585		5,190,483		5,161,585		5,161,563	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E27. Relationships between county-level proportion of people who were unable to vote because the line was too long and birth weight: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=94 Counties, 332,642 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote because the line was too long	-992.36	573.02	-751.42 *	347.39	-539.92	327.76	-665.80 *	333.81
County-level covariates								
Proportion who voted			-51.35	76.80	-123.08	72.53	-120.72 **	72.41
Proportion Black			-316.41 ***	35.07	-88.18 ***	33.15	-86.68	33.10
Proportion 65 years or older			-140.70	119.00	37.18	112.42	39.50	112.23
Proportion unemployed			-608.46	530.38	593.42	500.87	576.84	500.02
Proportion with college degree or higher			-7.08	68.98	-161.27	65.21	-158.95 *	65.10
Proportion uninsured			-511.22 ***	107.61	-389.88 ***	101.60	-389.08 ***	101.41
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-197.04 ***	2.78	-199.81 ***	3.14
Infant sex								
Female	ref		ref		ref		ref	
Male					127.14 ***	1.9609	127.14 ***	1.96
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					61.48 ***	2.68	61.45 ***	2.68
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					42.08 ***	4.24	42.09 ***	4.24
Some college					84.34 ***	4.28	84.41 ***	4.28
College degree					114.67 ***	4.78	114.75 ***	4.78
More than college					101.51 ***	5.19	101.54 ***	5.19
Mother's age (range 1-9)					-1.91	1.11	-1.92	1.11
No prenatal care								
Prenatal care	ref		ref		ref		ref	

No prenatal care					-167.36 ***	6.68	-167.32 ***	6.68
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-88.77 ***	2.15	-88.76 ***	2.15
Total birth order					5.88 ***	0.67	5.89 ***	0.67
Pre-pregnancy diabetes					102.90 ***	10.51	102.97 ***	10.51
Gestational diabetes					27.41 ***	4.49	27.40 ***	4.49
Pre-pregnancy hypertension					-248.38 ***	6.47	-248.36 ***	6.47
Gestational hypertension					-240.83 ***	3.70	-240.86 ***	3.70
Eclampsia					-489.92 ***	18.94	-490.13 ***	18.94
Total cigarettes smoked during pregnancy					-4.87 ***	0.13	-4.87 ***	0.13
Cross-level Interaction								
Proportion unable to vote because line too long * race							364.89	192.37
Constant	3,290.60 ***	7.82	3,499.23 ***	78.17	3,387.44 ***	74.01	3,385.56 ***	73.89
AIC	5,190,590		5,190,499		5,161,637		5,161,635	
-2 Log Likelihood	5,190,582		5,190,479		5,161,583		5,161,579	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E28. Relationships between county-level proportion of people who were unable to vote because requested but did not receive an absentee ballot and birth weight: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=94 Counties, 332,642 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote because requested but did not receive absentee ballot	-6.39	461.83	-369.05	277.98	-228.33	261.00	-195.68	266.39
County-level covariates								
Proportion who voted			-14.49	75.21	-95.79	70.68	-95.76	70.73
Proportion Black			-317.63 ***	35.86	-88.245 ***	33.72	-88.49**	33.75
Proportion 65 years or older			-189.52	122.57	4.92	115.22	6.45	115.32
Proportion unemployed			-750.77	531.36	488.67	499.34	494.15	499.77
Proportion with college degree or higher			-11.16	69.86	-164.18	65.70	-163.09 *	65.77
Proportion uninsured			-517.17 ***	108.95	-394.78 ***	102.32	-393.45 ***	102.42
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-197.09 ***	2.78	-196.47 ***	2.95
Infant sex								
Female	ref		ref		ref		ref	
Male					127.14 ***	1.96	127.15 ***	1.96
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					61.48 ***	2.68	61.47 ***	2.68
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					42.11 ***	4.24	42.11 ***	4.24
Some college					84.36 ***	4.28	84.33 ***	4.28
College degree					114.68 ***	4.78	114.64 ***	4.78
More than college					101.52 ***	5.19	101.49 ***	5.19
Mother's age (range 1-9)					-1.9256	1.1085	-1.93	1.11
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-167.34	6.6792	-167.36	6.68

					***		***	
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-88.77 ***	2.15	-88.77 ***	2.15
Total birth order					5.88 ***	0.67	5.88 ***	0.67
Pre-pregnancy diabetes					102.89 ***	10.51	102.92 ***	10.51
Gestational diabetes					27.38 ***	4.49	27.38 ***	4.49
Pre-pregnancy hypertension					-248.39 ***	6.47	-248.36 ***	6.47
Gestational hypertension					-240.83 ***	3.70	-240.81 ***	3.70
Eclampsia					-490.01 ***	18.94	-490.05 ***	18.94
Total cigarettes smoked during pregnancy					-4.87 ***	0.13	-4.87 ***	0.13
Cross-level Interaction								
Proportion unable to vote because requested but did not receive absentee ballot * race							-111.22	178.72
Constant	3,284.97 ***	7.72	3,478.62 ***	78.11	3,371.37 ***	73.60	3,370.37 ***	73.67
AIC	5,190,593		5,190,502		5,161,639		5,161,640	
-2 Log Likelihood	5,190,585		5,190,482		5,161,585		5,161,584	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E29. Relationships between county-level proportion of people who were unable to vote but tried and birth weight: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=94 Counties, 332,642 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote but tried	177.76	416.17	-26.44	259.84	90.92	243.16	149.44	245.53
County-level covariates								
Proportion who voted			-11.06	79.19	-83.94	74.18	-86.84	74.00
Proportion Black			-310.52 ***	36.09	-81.67 *	33.83	-83.46 *	33.75
Proportion 65 years or older			-158.93	121.68	28.16	114.02	26.72	113.70
Proportion unemployed			-780.27	536.19	457.88	502.30	492.50	501.40
Proportion with college degree or higher			-10.87	70.48	-163.48 *	66.07	-166.07 *	65.90
Proportion uninsured			-520.74 ***	109.86	-397.30 ***	102.85	-400.48 ***	102.58
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-197.11 ***	2.78	-195.34 ***	3.02
Infant sex								
Female	ref		ref		ref		ref	
Male					127.14 ***	1.96	127.14 ***	1.96
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					61.48 ***	2.68	61.52 ***	2.68
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					42.10 ***	4.24	42.09 ***	4.24
Some college					84.36 ***	4.28	84.36 ***	4.28
College degree					114.68 ***	4.78	114.71 ***	4.78
More than college					101.53 ***	5.19	101.60 ***	5.19
Mother's age (range 1-9)					-1.92	1.11	-1.92	1.1085
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-167.32 ***	6.68	-167.31 ***	6.68

Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-88.76 ***	2.15	-88.75 ***	2.15
Total birth order					5.88 ***	0.67	5.87 ***	0.67
Pre-pregnancy diabetes					102.90 ***	10.51	102.94 ***	10.51
Gestational diabetes					27.37 ***	4.49	27.37 ***	4.49
Pre-pregnancy hypertension					-248.38 ***	6.47	-248.40 ***	6.47
Gestational hypertension					-240.84 ***	3.70	-240.85 ***	3.70
Eclampsia					-490.00 ***	18.94	-490.07 ***	18.94
Total cigarettes smoked during pregnancy					-4.87 ***	0.13	-4.87 ***	0.13
Cross-level Interaction								
Proportion unable to vote but tried * race							-292.67	193.15
Constant	3,283.79	7.67	3,469.81	81.82	3,355.90	76.85	3,357.98	76.66
AIC	5,190,593		5,190,504		5,161,639		5,161,639	
-2 Log Likelihood	5,190,585		5,190,484		5,161,585		5,161,583	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E30. Relationships between living in a county previously covered by Preclearance and birth weight: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=94 Counties, 332,642 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Preclearance	-41.96 **	15.21	-4.93	11.13	-13.22	10.32	-11.90	10.44
County-level covariates								
Proportion who voted			-15.15	77.05	-109.40	71.62	-107.80	71.73
Proportion Black			-306.28 ***	36.64	-73.58 *	34.06	-74.27 *	34.12
Proportion 65 years or older			-162.30	121.57	12.82	113.02	12.07	113.16
Proportion unemployed			-839.10	549.49	319.93	510.65	324.13	511.31
Proportion with college degree or higher			-9.91	70.46	-161.35	65.51	-163.09 *	65.62
Proportion uninsured			-497.01 ***	122.23	-332.69 **	113.51	-335.17 **	113.69
Infant-level covariates								
Mother's race					-197.12 ***	2.78	-195.33 ***	3.42
White	ref		ref		ref		ref	
Black								
Infant sex								
Female	ref		ref		ref		ref	
Male					127.14***	1.96	127.15 ***	1.96
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					61.50 ***	2.68	61.49 ***	2.68
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					42.07 ***	4.24	42.07 ***	4.24
Some college					84.31 ***	4.28	84.35 ***	4.28
College degree					114.61 ***	4.78	114.68 ***	4.78
More than college					101.46 ***	5.19	101.59 ***	5.19
Mother's age (range 1-9)					-1.92	1.11	-1.89	1.11
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-167.38 ***	6.68	-167.39 ***	6.68
Type of birth								

Vaginal	ref		ref		ref		ref	
Caesarean section					-88.76 ***	2.15	-88.75 ***	2.15
Total birth order					5.88 ***	0.67	5.85 ***	0.67
Pre-pregnancy diabetes					102.87 ***	10.51	102.85 ***	10.51
Gestational diabetes					27.37 ***	4.49	27.39 ***	4.49
Pre-pregnancy hypertension					-248.41 ***	6.47	-248.46 ***	6.47
Gestational hypertension					-240.85	3.70	-240.85 ***	3.70
Eclampsia					-490.00 ***	18.94	-489.98 ***	18.94
Total cigarettes smoked during pregnancy					-4.87 ***	0.13	-4.87***	0.13
Cross-level Interaction								
Preclearance * race							-4.43	4.92
Constant	3,297.23 ***	8.27	3,474.34 ***	79.77	3,382.80 ***	74.37	3,381.50	74.47
AIC	5,190,586		5,190,504		5,161,638		5,161,639	
-2 Log Likelihood	5,190,578		5,190,484		5,161,584		5,161,583	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E31. Relationships between county-level proportion of people who were intimidated when voting and birth weight: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=94 Counties, 332,642 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion intimidated	-35.94	116.51	-13.69	75.64	10.29	63.83	13.13	64.47
County-level covariates								
Proportion who voted			-13.69	75.64	-93.06	71.12	-93.36	71.11
Proportion Black			-309.55 ***	35.54	-83.44 *	33.44	-83.61 *	33.44
Proportion 65 years or older			-157.54	120.69	24.52	113.50	24.22	113.48
Proportion unemployed			-804.69	533.57	464.84	501.71	467.86	501.68
Proportion with college degree or higher			-12.27	70.18	-164.15 *	66.03	-164.58 *	66.03
Proportion uninsured			-532.71 ***	110.41	-399.23 ***	103.74	-399.33 ***	103.72
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-197.11 ***	2.78	-196.43 ***	3.55
Infant sex								
Female	ref		ref		ref		ref	
Male					127.14 ***	1.96	127.14 ***	1.96
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					61.48 ***	2.68	61.47***	2.68
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					42.11 ***	4.24	42.11 ***	4.24
Some college					84.35 ***	4.28	84.36 ***	4.28
College degree					114.67 ***	4.78	114.68 ***	4.78
More than college					101.52 ***	5.19	101.54 ***	5.19
Mother's age (range 1-9)					-1.93	1.11	-1.92	1.11
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-167.33 ***	6.68	-167.33 ***	6.68
Type of birth								

Vaginal	ref		ref		ref		ref	
Caesarean section					-88.76 ***	2.15	-88.76 ***	2.15
Total birth order					5.88 ***	0.67	5.88 ***	0.67
Pre-pregnancy diabetes					102.89 ***	10.51	102.89 ***	10.51
Gestational diabetes					27.38***	4.49	102.89 ***	10.51
Pre-pregnancy hypertension					-248.38 ***	6.47	-248.38 ***	6.47
Gestational hypertension					-240.83 ***	3.70	-240.83 ***	3.70
Eclampsia					-490.00 ***	18.94	-490.00 ***	18.94
Total cigarettes smoked during pregnancy					-4.87 ***	0.13	-4.87 ***	0.13
Cross-level Interaction								
Proportion intimidated * race							-13.40	43.21
Constant	3,286.59 ***	8.97	3,472.05 ***	78.15	3,365.19 ***	73.68	3,365.36 ***	73.66
AIC	5,190,593		5,190,503		5,161,640		5,161,641	
-2 Log Likelihood	5,190,585		5,190,483		5,161,586		5,161.585	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E32. Relationships between county-level proportion of people who waited 30 minutes or more to vote and gestational age: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=94 Counties, 332,642 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion waited 30 minutes or more to vote	0.14	0.12	-0.019	0.11	-0.09	0.10	-0.06	0.10
County-level covariates								
Proportion who voted			0.34	0.36	0.21	0.32	0.201	0.32
Proportion Black			-0.96 ***	0.18	-0.52 **	0.16	-0.52	0.16
Proportion 65 years or older			0.37	0.57	0.71	0.52	0.73	0.52
Proportion unemployed			5.64 *	2.54	9.35 ***	2.29	9.27	2.28
Proportion with college degree or higher			0.23	0.34	-0.05	0.30	-0.04	0.30
Proportion uninsured			-1.44 **	0.52	-1.27 **	0.47	-1.24	0.47
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-0.34 ***	0.01	-0.27 ***	0.03
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.06 ***	0.01	-0.06 ***	0.00
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.13 ***	0.01	0.13 ***	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.05 **	0.02	0.05 **	0.02
Some college					0.12 ***	0.02	0.12 ***	0.02
College degree					0.21 ***	0.02	0.21 ***	0.02
More than college					0.18 ***	0.02	0.18 ***	0.02
Mother's age (range 1-9)					-0.06 ***	0.00	-0.06 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-0.69 ***	0.03	-0.69 ***	0.03
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-0.61 ***	0.01	-0.61 ***	0.01
Total birth order					-0.09 ***	0.00	-0.09 ***	0.00
Pre-pregnancy diabetes					-0.88 ***	0.04	-0.87 ***	0.04

Gestational diabetes					-0.34 ***	0.02	-0.34 ***	0.02
Pre-pregnancy hypertension					-0.97 ***	0.03	-0.97 ***	0.03
Gestational hypertension					-1.00 ***	0.02	-1.00 ***	0.02
Eclampsia					-1.79 ***	0.08	-1.79 ***	0.08
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-0.00 ***	0.00
Cross-level Interaction								
Proportion waited 30 minutes or more * race							-0.17 *	0.07
Constant	38.65 ***	0.06	38.37 ***	0.37	39.01 ***	0.33	39.00	0.33
AIC	1,521,387		1,521,356		1,501,403		1,501,399	
-2 Log Likelihood	1,521,379		1,521,336		1,501,349		1,501,343	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E33. Relationships between county-level proportion of people who were unable to vote and gestational age: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=94 Counties, 332,642 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote	-0.29	0.79	0.78	0.78	0.58	0.71	0.62	0.72
County-level covariates								
Proportion who voted			0.56	0.42	0.35	0.38	0.35	0.38
Proportion Black			-0.95 ***	0.17	-0.47 **	0.15	-0.47 **	0.15
Proportion 65 years or older			0.38	0.57	0.73	0.52	0.73	0.53
Proportion unemployed			5.74 *	2.51	9.36 ***	2.28	9.39 ***	2.28
Proportion with college degree or higher			0.28	0.34	0.00	0.31	0.00	0.30
Proportion uninsured			-1.45 **	0.52	-1.32 **	0.47	-1.32 **	0.47
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-0.34 ***	0.01	-0.33 ***	0.01
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.06 ***	0.01	-0.06 ***	0.01
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.13	0.01	0.13 ***	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.05 **	0.02	0.05 **	0.02
Some college					0.12 ***	0.02	0.12 ***	0.02
College degree					0.21 ***	0.02	0.21 ***	0.02
More than college					0.18 ***	0.02	0.18 ***	0.02
Mother's age (range 1-9)					-0.06 ***	0.00	-0.06 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-0.69 ***	0.03	-0.69 ***	0.03
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-0.61 ***	0.01	-0.61 ***	0.01
Total birth order					-0.08 ***	0.00	-0.09 ***	0.00
Pre-pregnancy diabetes					-0.88 ***	0.04	-0.88 ***	0.04

Gestational diabetes					-0.34 ***	0.02	-0.34 ***	0.02
Pre-pregnancy hypertension					-0.97 ***	0.03	-0.97 ***	0.03
Gestational hypertension					-1.00 ***	0.02	-1.00 ***	0.02
Eclampsia					-1.79 ***	0.08	-1.79 ***	0.08
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-0.00 ***	0.00
Cross-level Interaction								
Proportion unable to vote * race							-0.22	0.47
Constant	38.72 ***	0.03	38.13 ***	0.44	38.82 ***	0.40	38.83 ***	0.40
AIC	1,521,388		1,521,355		1,501,403		1,501,405	
-2 Log Likelihood	1,521,380		1,521,335		1,501,349		1,501,349	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E34. Relationships between county-level proportion of people who were unable to vote because the line was too long and gestational age: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=94 Counties, 332,642 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote because line too long	-2.22	2.01	-1.98	1.68	-1.13	1.52	-1.41	1.54
County-level covariates								
Proportion who voted			0.22	0.37	0.12	0.33	0.12	0.33
Proportion Black			-0.96 ***	0.17	-0.48 **	0.15	-0.48 **	0.15
Proportion 65 years or older			0.42	0.57	0.74	0.52	0.75	0.52
Proportion unemployed			6.10 *	2.54	9.53 ***	2.31	9.49 ***	2.31
Proportion with college degree or higher			0.24	0.33	-0.03	0.30	-0.02	0.30
Proportion uninsured			-1.43**	0.52	-1.31 **	0.47	-1.30 **	0.47
Infant-level covariates								
Mother’s race								
White	ref		ref		ref		ref	
Black					-0.34 ***	0.01	-0.34 ***	0.01
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.06 ***	0.01	-0.06 ***	0.01
Mother’s marital status								
Not married	ref		ref		ref		ref	
Married					0.13 ***	0.01	0.13 ***	0.01
Mother’s education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.05 **	0.02	0.05 **	0.02
Some college					0.12 ***	0.02	0.12 ***	0.02
College degree					0.21 ***	0.02	0.21 ***	0.02
More than college					0.18 ***	0.02	0.18 ***	0.02
Mother’s age (range 1-9)					-0.06 ***	0.00	-0.06 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-0.69 ***	0.03	-0.69 ***	0.03
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-0.61 ***	0.01	-0.61 ***	0.01
Total birth order					-0.09***	0.00	-0.09***	0.00

Pre-pregnancy diabetes					-0.88 ***	0.04	-0.88 ***	0.04
Gestational diabetes					-0.34 ***	0.02	-0.34 ***	0.02
Pre-pregnancy hypertension					-0.97 ***	0.03	-0.97 ***	0.03
Gestational hypertension					-1.00 ***	0.02	-1.00 ***	0.02
Eclampsia					-1.79 ***	0.08	-1.79 ***	0.08
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-0.00 ***	0.00
Cross-level Interaction								
Proportion unable to vote because line too long * race							0.83	0.79
Constant	38.73 ***	0.03	38.45 ***	0.37	39.05 ***	0.34	39.04 ***	0.34
AIC	1,521,387		1,521,355		1,501,403		1,501,404	
-2 Log Likelihood	1,521,379		1,521,335		1,501,349		1,501,348	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E35. Relationships between county-level proportion of people who were unable to vote because requested but did not receive absentee ballot and gestational age: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=94 Counties, 332,642 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote because requested but did not receive absentee ballot	-0.21	1.61	-0.62	1.33	-0.21	1.20	-0.31	1.22
County-level covariates								
Proportion who voted			0.32	0.36	0.18	0.32	0.18	0.32
Proportion Black			-0.96 ***	0.17	-0.48 **	0.16	-0.48 **	0.16
Proportion 65 years or older			0.32	0.58	0.70	0.53	0.70	0.53
Proportion unemployed			5.68 *	2.53	9.28 ***	2.29	9.27 ***	2.29
Proportion with college degree or higher			0.23	0.33	-0.03	0.30	-0.04	0.30
Proportion uninsured			-1.44 **	0.52	-1.32 **	0.47	-1.32 **	0.47
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-0.34 ***	0.01	-0.34 ***	0.01
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.06 ***	0.01	-0.06 ***	0.01
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.13 ***	0.01	0.13 ***	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.05 **	0.02	0.05 **	0.02
Some college					0.12 ***	0.02	0.12 ***	0.02
College degree					0.21 ***	0.02	0.21 ***	0.02
More than college					0.18 ***	0.02	0.18 ***	0.02
Mother's age (range 1-9)					-0.06 ***	0.00	-0.06 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-0.69 ***	0.03	-0.69 ***	0.03
Type of birth								
Vaginal	ref		ref		ref		ref	

Caesarean section					-0.61 ***	0.01	-0.61 ***	0.01
Total birth order					-0.09 ***	0.00	-0.09 ***	0.00
Pre-pregnancy diabetes					-0.88 ***	0.04	-0.88 ***	0.04
Gestational diabetes					-0.34 ***	0.02	-0.34 ***	0.02
Pre-pregnancy hypertension					-0.97 ***	0.03	-0.97 ***	0.03
Gestational hypertension					-1.00 ***	0.02	-1.00 ***	0.02
Eclampsia					-1.79 ***	0.08	-1.79 ***	0.08
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-0.00 ***	0.00
Cross-level Interaction								
Proportion unable to vote because requested but did not receive absentee ballot * race							0.31 ***	0.73
Constant	38.71 ***	0.03	38.39 ***	0.37	39.00 ***	0.34	39.01 ***	0.34
AIC	1,521,388		1,521,356		1,501,404		1,501,406	
-2 Log Likelihood	1,521,380		1,521,336		1,501,350		1,501,350	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E36. Relationships between county-level proportion of people who were unable to vote but tried and gestational age: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=94 Counties, 332,642 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion unable to vote but tried	0.55	1.45	0.68	1.23	1.16	1.11	1.35	1.12
County-level covariates								
Proportion who voted			0.39	0.37	0.29	0.34	0.28	0.34
Proportion Black			-0.93 ***	0.17	-0.45 **	0.15	-0.46 **	0.15
Proportion 65 years or older			0.40	0.57	0.77	0.52	0.76	0.52
Proportion unemployed			5.53 *	2.52	9.12 ***	2.28	9.23 ***	2.28
Proportion with college degree or higher			0.24	0.33	-0.03	0.30	-0.04	0.30
Proportion uninsured			-1.45 **	0.52	-1.32 **	0.47	-1.33 **	0.47
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-0.34 ***	0.01	-0.33 ***	0.01
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.06 ***	0.01	-0.06	0.01
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.13 ***	0.01	0.13 ***	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.05 **	0.02	0.05 **	0.02
Some college					0.12 ***	0.02	0.12 ***	0.02
College degree					0.21 ***	0.02	0.21 ***	0.02
More than college					0.18 ***	0.02	0.18 ***	0.02
Mother's age (range 1-9)					-0.06 ***	0.00	-0.06 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-0.69 ***	0.03	-0.69 ***	0.03
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-0.61 ***	0.01	-0.61 ***	0.01
Total birth order					-0.09 ***	0.00	-0.09 ***	0.00

Pre-pregnancy diabetes					-0.88 ***	0.04	-0.88 ***	0.04
Gestational diabetes					-0.34 ***	0.02	-0.34 ***	0.02
Pre-pregnancy hypertension					-0.97 ***	0.03	-0.97 ***	0.03
Gestational hypertension					-1.00 ***	0.02	-1.00 ***	0.02
Eclampsia					-1.79 ***	0.08	-1.79 ***	0.08
Total cigarettes smoked during pregnancy					-0.00	0.00	-0.00	0.00
Cross-level Interaction								
Proportion unable to vote but tried * race							-0.95	0.79
Constant	38.71 ***	0.03	38.31 ***	0.38	38.89 ***	0.35	38.90 ***	0.35
AIC	1,521,388		1,521,356		1,501,403		1,501,403	
-2 Log Likelihood	1,521,380		1,521,336		1,501,349		1,501,347	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E37. Relationships between living in a county previously covered by Preclearance and gestational age: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=94 Counties, 332,642 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Preclearance	-0.14 **	0.05	0.01	0.05	-0.02	0.05	-0.02	0.05
County-level covariates								
Proportion who voted			0.35	0.36	0.15	0.33	0.16	0.33
Proportion Black			-0.95 ***	0.17	-0.45 **	0.16	-0.46 **	0.16
Proportion 65 years or older			0.38	0.57	0.70	0.52	0.69	0.52
Proportion unemployed			5.72 *	2.59	8.98 ***	2.35	9.00 ***	2.35
Proportion with college degree or higher			0.23	0.33	-0.03	0.30	-0.04	0.30
Proportion uninsured			-1.50 **	0.58	-1.20 *	0.52	-1.21 *	0.52
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-0.34 ***	0.01	-0.33 ***	0.02
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.06 ***	0.01	-0.06 ***	0.01
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.13 ***	0.01	0.13 ***	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.05 **	0.02	0.05 **	0.02
Some college					0.12 ***	0.02	0.12 ***	0.02
College degree					0.21 ***	0.02	0.21 ***	0.02
More than college					0.18 ***	0.02	0.18 ***	0.02
Mother's age (range 1-9)					-0.06 ***	0.00	-0.06 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-0.69 ***	0.03	-0.69 ***	0.03
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-0.61 ***	0.01	-0.61 ***	0.01
Total birth order					-0.09 ***	0.00	-0.09 ***	0.00
Pre-pregnancy diabetes					-0.88 ***	0.04	-0.88 ***	0.04

Gestational diabetes					-0.34 ***	0.02	-0.34 ***	0.02
Pre-pregnancy hypertension					-0.97 ***	0.03	-0.97 ***	0.03
Gestational hypertension					-1.00 ***	0.02	-1.00 ***	0.02
Eclampsia					-1.79 ***	0.08	-1.79 ***	0.08
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-0.00 ***	0.00
Cross-level Interaction								
Preclearance * race							-0.02	0.02
Constant	38.75 ***	0.03	38.35 ***	0.37	39.03 ***	0.34	39.03 ***	0.34
AIC	1,521,381		1,521,356		1,501,404		1,501,404	
-2 Log Likelihood	1,521,373		1,521,336		1,501,350		1,501,348	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table E38. Relationships between county-level proportion of people who were intimidated when voting and gestational age: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=94 Counties, 332,642 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
Proportion intimidated	0.53	0.40	0.71 *	0.32	0.62 *	0.29	0.66 *	0.2891
County-level covariates								
Proportion who voted			0.26	0.35	0.12	0.32	0.12	0.32
Proportion Black			-0.94 ***	0.16	-0.47 **	0.15	-0.47 **	0.15
Proportion 65 years or older			0.38	0.55	0.73	0.51	0.72	0.51
Proportion unemployed			5.34 *	2.46	9.02 ***	2.24	9.06 ***	2.24
Proportion with college degree or higher			0.22	0.32	-0.05	0.30	-0.05	0.30
Proportion uninsured			-1.61 **	0.51	-1.45 **	0.46	-1.45 **	0.46
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-0.34 ***	0.01	-0.33 ***	0.01
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.06 ***	0.01	-0.06 ***	0.01
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.13 ***	0.01	0.13 ***	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.05 **	0.02	0.05 **	0.02
Some college					0.12 ***	0.02	0.12 ***	0.02
College degree					0.21 ***	0.02	0.21 ***	0.02
More than college					0.18 ***	0.02	0.18 ***	0.02
Mother's age (range 1-9)					-0.06 ***	0.00	-0.06 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-0.69 ***	0.03	-0.69 ***	0.03
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-0.61 ***	0.01	-0.61 ***	0.01
Total birth order					-0.09 ***	0.00	-0.09 ***	0.00
Pre-pregnancy diabetes					-0.88 ***	0.04	-0.88 ***	0.04

Gestational diabetes					-0.34 ***	0.02	-0.34 ***	0.02
Pre-pregnancy hypertension					-0.97 ***	0.03	-0.97 ***	0.03
Gestational hypertension					-1.00 ***	0.02	-1.00 ***	0.02
Eclampsia					-1.79 ***	0.08	-1.79 ***	0.08
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-0.00 ***	0.00
Cross-level Interaction								
Proportion intimidated * race							-0.20	0.18
Constant	38.69 ***	0.03	38.43 ***	0.36	39.05 ***	0.33	39.05	0.33
AIC	1,521,386		1,521,351		1,501,399		1,501,400	
-2 Log Likelihood	1,521,378		1,521,331		1,501,345		1,501,344	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Appendix F. Aim 2 – Summary Tables for Voter Suppression, Race, and Voter Suppression by Race in County-level Mixed Regression Models

Table F1. Summary of the relationships between county-level voter suppression items and birthweight: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 5-year Data (N=96 Counties, 416,916 infants). Each set of voter suppression items controlled for the same covariates across models, which are included in the Appendix.

	Model 1		Model 2		Model 3		Model 4	
Voter suppression item Mother's race Voter suppression * race	β	SE	β	SE	β	SE	β	SE
Proportion waited 30 minutes or more								
Proportion waited 30 minutes or more	-5.47	31.89	41.68	25.80	24.92	27.74	23.99	27.82
Mother's race					-185.77 ***	2.52	-188.15 ***	6.20
Proportion waited 30 minutes or more * race							-5.16	0.11
Proportion unable to vote								
Proportion unable to vote	12.79	207.69	345.33	236.72	421.05	247.66	462.86	247.87
Mother's race					-185.74 ***	2.52	-180.36 ***	3.07
Proportion unable * race							-398.17 **	129.62
Proportion unable to vote because line was too long								
Proportion unable to vote because line was too long	-796.96	547.72	-556.36	403.59	-593.37	428.06	-626.44	430.49
Mother's race					-185.76 ***	2.52	-186.55 ***	2.73
Proportion unable to vote because line was too long * race							180.47	242.71
Proportion unable to vote because did not receive absentee ballot								
Proportion unable to vote because did not receive absentee ballot	543.79	302.96	749.28 **	233.62	843.67 **	241.35	818.15 **	243.24
Mother's race					-185.76 ***	2.52	-186.51 ***	2.66
Proportion unable to vote because did not receive absentee ballot * race							217.43	248.45
Proportion of people unable to vote but tried								
Proportion of people unable to vote but tried	-1,021.17	542.74	122.31	424.73	-142.93	451.73	93.29	457.34
Mother's race					-185.77 ***	2.52	-181.74 ***	2.71
Proportion of people who were unable to vote but tired * race							-835.01 ***	208.72
Previously covered by Preclearance								
Preclearance	-55.18 ***	15.73	-8.64	15.04	-1.57	16.06	2.36	16.07
Mother's race					-185.77 ***	2.52	-181.51 ***	2.93
Preclearance * race							-13.42 **	4.76

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1. Model 1 is the bivariate model of the voter suppression item and the outcome. Model 2 builds from the previous model by adding county-level covariates. Model 3 builds from the previous model by adding infant-level covariates. Model 4 builds upon the previous model by adding an interaction term between the voter suppression item and race ('1' Black, '0' White).

Table F2. Summary of the relationships between county-level voter suppression items and birthweight: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=94 Counties, 332,642 infants). Each set of voter suppression items controlled for the same covariates across models, which are included in the Appendix.

	Model 1		Model 2		Model 3		Model 4	
Voter suppression item Mother's race Voter suppression * race	β	SE	β	SE	β	SE	β	SE
Proportion who waited 30 minutes or more								
Proportion who waited 30 minutes or more	90.39 **	34.23	33.75	22.10	-1.38	20.98	3.87	21.16
Mother's race					-197.11 ***	2.78	-179.55 ***	7.31
Proportion who waited 30 minutes or more * race							44.21 **	17.00
Proportion unable to vote								
Proportion unable to vote	-3.60	225.39	136.68	167.73	156.35	157.19	262.30	158.58
Mother's race					-197.08 ***	2.78	-187.23 ***	3.49
Proportion unable to vote* race							-531.91 ***	113.95
Proportion unable to vote because the line was too long								
Proportion unable to vote because the line was too long	-992.36	573.02	-751.42 *	347.39	-539.92	327.76	-665.80 *	333.81
Mother's race					-197.04 ***	2.78	-199.81 ***	3.14
Proportion unable to vote because line too long * race							364.89	192.37
Proportion unable to vote because did not receive absentee ballot								
Proportion unable to vote because did not receive absentee ballot	-6.39	461.83	-369.05	277.98	-228.33	261.00	-195.68	266.39
Mother's race					-197.09 ***	2.78	-196.47 ***	2.95
Proportion unable to vote because did not receive absentee ballot * race							-111.22	178.72
Proportion unable to vote but tried								
Proportion unable to vote but tried	177.76	416.17	-26.44	259.84	90.92	243.16	149.44	245.53
Mother's race					-197.11 ***	2.78	-195.34 ***	3.02
Proportion unable to vote but tried * race							-292.67	193.15
Preclearance								
Preclearance	-41.96 **	15.21	-4.93	11.13	-13.22	10.32	-11.90	10.44
Mother's race					-197.12 ***	2.78	-195.33 ***	3.42
Preclearance * race							-4.43	4.92
Proportion intimidated								
Proportion intimidated	-35.94	116.51	-13.69	75.64	10.29	63.83	13.13	64.47
Mother's race					-197.11 ***	2.78	-196.43 ***	3.55
Proportion intimidated * race							-13.40	43.21

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1
Model 1 is the bivariate model of the voter suppression item and the outcome. Model 2 builds from the previous model by adding county-level covariates. Model 3 builds from the previous model by adding infant-level covariates. Model 4 builds upon the previous model by adding an interaction term between the voter suppression item and race ('1' Black, '0' White).

Table F3. Summary of the relationships between county-level voter suppression items and gestational age: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 5-year Data (N=96 Counties, 416,916 infants). Each set of voter suppression items controlled for the same covariates across models, which are included in the Appendix.

	Model 1		Model 2		Model 3		Model 4	
Voter suppression item Mother's race Voter suppression * race	β	SE	β	SE	β	SE	β	SE
Proportion waited 30 minutes or more								
Proportion waited 30 minutes or more	0.02	0.12	0.05	0.10	0.02	0.11	0.04	0.11
Mother's race					-0.36 ***	0.01	-0.31 ***	0.03
Proportion waited 30 minutes or more * race							-0.12 *	0.05
Proportion unable to vote								
Proportion unable to vote	-0.50	0.76	0.67	0.94	0.70	0.96	0.83	0.96
Mother's race					-0.36 ***	0.01	-0.35 ***	0.01
Proportion unable * race							-0.1.22 *	0.53
Proportion unable to vote because line was too long								
Proportion unable to vote because line was too long	-1.83	2.00	-2.68	1.58	-2.49	1.64	-2.36	1.64
Mother's race					-0.36 ***	0.01	-0.36 ***	0.01
Proportion unable to vote because line was too long * race							-0.73	0.99
Proportion unable to vote because did not receive absentee ballot								
Proportion unable to vote because did not receive absentee ballot	1.82	1.12	2.97 **	0.92	2.86 **	0.94	2.89 **	0.95
Mother's race					-0.36 ***	0.01	-0.36 ***	0.01
Proportion unable to vote because did not receive absentee ballot * race							-0.29	1.01
Proportion of people unable to vote but tried								
Proportion of people unable to vote but tried	-3.38	1.98	0.02	1.68	-0.87	1.73	-0.61	1.75
Mother's race					-0.36 ***	0.01	-0.36 ***	0.01
Proportion of people who were unable to vote but tired * race							-0.91	0.85
Previously covered by Preclearance								
Preclearance	-0.19 ***	0.06	0.07	0.05	0.06	0.06	0.08	0.06
Mother's race					-0.36 ***	0.01	-0.34 ***	0.01
Preclearance * race							-0.06 ***	0.02

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1. Model 1 is the bivariate model of the voter suppression item and the outcome. Model 2 builds from the previous model by adding county-level covariates. Model 3 builds from the previous model by adding infant-level covariates. Model 4 builds upon the previous model by adding an interaction term between the voter suppression item and race ('1' Black, '0' White).

Table F4. Summary of the relationships between county-level voter suppression items and gestational age: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=94 Counties, 332,642 infants). Each set of voter suppression items controlled for the same covariates across models, which are included in the Appendix.

	Model 1		Model 2		Model 3		Model 4	
Voter suppression item Mother's race Voter suppression * race	β	SE	β	SE	β	SE	β	SE
Proportion waited 30 minutes or more to vote								
Proportion waited 30 minutes or more to vote	0.14	0.12	-0.019	0.11	-0.09	0.10	-0.06	0.10
Mother's race					-0.34 ***	0.01	-0.27 ***	0.03
Proportion waited 30 minutes or more * race							-0.17 *	0.07
Proportion unable to vote								
Proportion unable to vote	-0.29	0.79	0.78	0.78	0.58	0.71	0.62	0.72
Mother's race					-0.34 ***	0.01	-0.33 ***	0.01
Proportion unable to vote * race							-0.22	0.47
Proportion unable to vote because line too long								
Proportion unable to vote because line too long	-2.22	2.01	-1.98	1.68	-1.13	1.52	-1.41	1.54
Mother's race					-0.34 ***	0.01	-0.34 ***	0.01
Proportion unable to vote because line too long * race							0.83	0.79
Proportion unable to vote because did not receive absentee ballot								
Proportion unable to vote because did not receive absentee ballot	-0.21	1.61	-0.62	1.33	-0.21	1.20	-0.31	1.22
Mother's race					-0.34 ***	0.01	-0.34 ***	0.01
Proportion unable to vote because did not receive absentee ballot * race							0.31 ***	0.73
Proportion unable to vote but tried								
Proportion unable to vote but tried	0.55	1.45	0.68	1.23	1.16	1.11	1.35	1.12
Mother's race					-0.34 ***	0.01	-0.33 ***	0.01
Proportion unable to vote but tried * race							-0.95	0.79
Preclearance								
Preclearance	-0.14 **	0.05	0.01	0.05	-0.02	0.05	-0.02	0.05
Mother's race					-0.34 ***	0.01	-0.33 ***	0.02
Preclearance * race							-0.02	0.02
Proportion intimidated								
Proportion intimidated	0.53	0.40	0.71 *	0.32	0.62 *	0.29	0.66 *	0.2891
Mother's race					-0.34 ***	0.01	-0.33 ***	0.01
Proportion intimidated * race							-0.20	0.18

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1. Model 1 is the bivariate model of the voter suppression item and the outcome. Model 2 builds from the previous model by adding county-level covariates. Model 3 builds from the previous model by adding infant-level covariates. Model 4 builds upon the previous model by adding an interaction term between the voter suppression item and race ('1' Black, '0' White).

Appendix G. Aim 2 - Tables for State-level Mixed Regression Models with All Covariates

Table G1. Relationships between state-level voter identification requirement and gestational age: 2008-2009 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2008 3-year Data (N=12 states, 378,081 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
State voter identification requirement								
No identification required	No observations		No observations		No observations		No observations	
Non-strict non-photo	ref		ref		ref		ref	
Non-strict photo	0.02	0.16	-0.07	0.08	-0.08	0.10	-0.09	0.10
Strict non-photo	0.02	0.16	-0.08	0.08	-0.09	0.11	-0.09	0.11
Strict Photo	-0.03	0.16	-0.02	0.08	-0.06	0.10	-0.06	0.10
State-level covariates								
Proportion Black			-1.49 ***	0.37	-0.77	0.48	-0.77	0.48
Proportion 65 years or older			7.80 **	2.58	6.54 *	3.29	6.54 *	3.29
Proportion unemployed			13.84 *	6.23	14.91	7.98	14.91	7.99
Proportion with college degree or higher			4.73 ***	0.98	4.18 **	1.23	4.18 **	1.27
Proportion uninsured			0.09	0.76	-0.26	0.97	-0.26	0.97
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-0.35***	0.01	-0.35 ***	0.01
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.07 ***	0.01	-0.07 ***	0.01
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.04 **	0.01	0.04 **	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.047 **	0.01	0.05 **	0.01
Some college					0.05 **	0.01	0.05 **	0.01
College degree					0.09 ***	0.02	0.09 ***	0.02
More than college					0.06 **	0.02	0.06 **	0.02
Mother's age (range 1-9)					-0.05 ***	0.00	-0.05 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-0.88 ***	0.03	-0.88 ***	0.03

Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-0.48***	0.01	-0.48***	0.01
Total birth order					-0.10 ***	0.00	-0.10 ***	0.00
Pre-pregnancy diabetes					-0.73 ***	0.05	-0.73 ***	0.05
Gestational diabetes					-0.27 ***	0.02	-0.27 ***	0.02
Pre-pregnancy hypertension					-0.76 ***	0.03	-0.76 ***	0.03
Gestational hypertension					-0.92 ***	0.02	-0.92 ***	0.02
Eclampsia					-2.05 ***	0.09	-2.05 ***	0.09
Total cigarettes smoked during pregnancy					-0.00	0.00	-0.00	0.00
Cross-level Interaction								
Voter identification * race								
No identification required	No observations		No observations		No observations		No observations	
Non-strict non-photo	ref		ref		ref		ref	
Non-strict photo							0.01	0.23
Strict non-photo							-0.00	0.03
Strict photo							0.03	0.04
Constant	38.66***	0.05	36.44 ***	0.67	37.33 ***	0.85	37.33 ***	0.85
AIC	1,708,144		1,708,131		1,693,444		1,693,449	
-2 Log Likelihood	1,708,132		1,708,109		1,693,388		1,693,387	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

Table G2. Relationships between state-level voter identification requirement and gestational age: 2012-2013 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 5-year Data (N=22 states, 762,404 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
State voter identification requirement								
No identification required	No observations		No observations		No observations		No observations	
Non-strict non-photo	ref		ref		ref		ref	
Non-strict photo	-0.04	0.09	0.03	0.06	0.01	0.07	0.02	0.06
Strict non-photo	-0.01	0.11	-0.03	0.08	-0.01	0.09	0.00	0.09
Strict Photo	-0.14	0.09	-0.09	0.06	-0.12	0.06	-0.12	0.0
State-level covariates								
Proportion Black			-1.12 ***	0.25	-0.39	0.28	-0.39	0.28
Proportion 65 years or older			-0.90	1.08	-0.49	1.21	-0.47	1.21
Proportion unemployed			4.02	2.32	5.24 *	2.60	5.17 *	2.59
Proportion with college degree or higher			1.89 *	0.81	1.39	0.92	1.40	0.92
Proportion uninsured			-1.29	0.70	-1.07	0.79	-1.06	0.79
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-0.41 ***	0.01	-0.39 ***	0.01
Infant sex								
Female	ref		ref		ref		ref	
Male					-0.08 ***	0.01	-0.08 ***	0.01
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					0.09	0.01	0.09 ***	0.01
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					0.05 ***	0.01	0.05 ***	0.01
Some college					0.10 ***	0.01	0.10 ***	0.01
College degree					0.15 ***	0.01	0.15 ***	0.01
More than college					0.11 ***	0.01	0.11 ***	0.01
Mother's age (range 1-9)					-0.05 ***	0.00	-0.05 ***	0.00
No prenatal care								
Prenatal care	ref		ref		ref		ref	

No prenatal care					-1.00 ***	0.02	-1.00 ***	0.02
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-0.46 ***	0.01	-0.46 ***	0.01
Total birth order					-0.09 ***	0.00	-0.09 ***	0.00
Pre-pregnancy diabetes					-0.71 ***	0.03	-0.71 ***	0.03
Gestational diabetes					-0.24 ***	0.01	-0.24 ***	0.01
Pre-pregnancy hypertension					-0.73 ***	0.02	-0.73 ***	0.02
Gestational hypertension					-0.98 ***	0.01	-0.98 ***	0.01
Eclampsia					-1.82 ***	0.05	-1.82 ***	0.05
Total cigarettes smoked during pregnancy					-0.00 ***	0.00	-0.00 ***	0.00
Cross-level Interaction								
Voter identification * race								
No identification required	No observations		No observations		No observations		No observations	
Non-strict non-photo	ref		ref		ref		ref	
Non-strict photo							-0.05 **	0.02
Strict non-photo							-0.05 *	0.02
Strict photo							0.02	0.02
Constant	38.75 ***	0.05	38.61 ***	0.27	39.14 ***	0.30	39.13 ***	0.30
AIC	3,482,040		3,482,028		3,449,310		3,449,299	
-2 Log Likelihood	3,482,028		3,582,006		3,449,254		3,449,237	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

Table G3. Relationships between state-level voter identification requirement and birth weight: 2012-2013 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2012 5-year Data (N=12 states, 378,081 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
State voter identification requirement								
No identification required	No observations		No observations		No observations		No observations	
Non-strict non-photo	ref		ref		ref		ref	
Non-strict photo	-3.4701	30.9122	15.89	23.98	-2.52	25.65	-3.30	25.68
Strict non-photo	-8.2361	42.0616	7.64	33.30	20.66	35.76	20.10	35.80
Strict Photo	-22.4452	31.9670	-2.17	23.85	-4.30	25.61	-2.62	25.64
State-level covariates								
Proportion Black			-343.63 **	104.02	2.70	111.74	1.65	111.81
Proportion 65 years or older			-577.63	450.66	-56.52	483.55	-61.80	483.87
Proportion unemployed			-50.88	938.83	231.50	997.65	235.86	998.25
Proportion with college degree or higher			-250.20	345.40	-594.53	371.29	-594.69	371.54
Proportion uninsured			-495.42	290.10	-320.04	309.62	-320.72	309.82
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-207.00 ***	1.79	-206.66 ***	2.74
Infant sex								
Female	ref		ref		ref		ref	
Male					120.69 ***	1.27	120.69 ***	1.27
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					59.53 ***	1.62	59.44 ***	1.62
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					43.96 ***	2.29	43.99 ***	2.30
Some college					80.54 ***	2.33	80.62 ***	2.33
College degree					101.75 ***	2.76	101.83 ***	2.76
More than college					90.61 ***	3.25	90.71 ***	3.25
Mother's age (range 1-9)					0.14	0.71	0.17	0.71

No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-198.82 ***	5.34	-198.66 ***	5.34
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-62.10 ***	1.37	-62.09 ***	1.37
Total birth order					4.88 ***	0.46	4.88 ***	0.46
Pre-pregnancy diabetes					131.11 ***	7.35	131.14 ***	7.35
Gestational diabetes					63.85 ***	3.10	63.84 ***	3.10
Pre-pregnancy hypertension					-183.12 ***	4.83	-183.16 ***	4.83
Gestational hypertension					-230.08 ***	2.68	-230.15 ***	2.68
Eclampsia					-510.06 ***	12.14	-510.15 ***	12.14
Total cigarettes smoked during pregnancy					-4.85 ***	0.05	-4.85 ***	0.06
Cross-level Interaction								
Voter identification * race								
No identification required	No observations		No observations		No observations		No observations	
Non-strict non-photo	ref		ref		ref		ref	
Non-strict photo							4.84	4.30
Strict non-photo							2.80	4.97
Strict photo							-8.18	4.31
Constant	3,299.08 ***	16.55	3,528.06 ***	113.51	3,350.63 ***	122.00	3,351.18 ***	122.09
AIC	11,857,443		11,857,437		11,795,696		11,795,693	
-2 Log Likelihood	11,857,431		11,857,415		11,795,640		11,795,631	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

Table G4. Relationships between state-level voter identification requirement and birth weight: 2016-2017 National Center for Health Statistics Infant Birth Cohort Data, and American Community Survey 2016 5-year Data (N=30 states, 748,243 infants).

	Model 1		Model 2		Model 3		Model 4	
VARIABLES	β	SE	β	SE	β	SE	β	SE
State voter identification requirement								
No identification required	No observations		No observations		No observations		No observations	
Non-strict non-photo	ref		ref		ref		ref	
Non-strict photo	-33.24	24.91	1.07	11.05	-1.85	13.06	-3.36	13.04
Strict non-photo	-14.18	41.96	-6.61	18.34	-7.23	21.83	-7.27	21.77
Strict Photo	-42.86	25.94	0.58	11.69	2.73	13.88	3.79	13.86
State-level covariates								
Proportion Black			-451.22 ***	60.5625	-81.64	71.71	-81.07	71.47
Proportion 65 years or older			-596.57 *	258.52	-187.21	306.25	-187.71	305.21
Proportion unemployed			633.47	709.04	1168.02	834.42	1177.49	831.59
Proportion with college degree or higher			371.45 *	162.69	203.93	193.38	203.80	192.70
Proportion uninsured			-332.66 *	160.44	-220.67	190.22	-221.19	189.56
Infant-level covariates								
Mother's race								
White	ref		ref		ref		ref	
Black					-223.66 ***	1.78	-226.14 ***	4.14
Infant sex								
Female	ref		ref		ref		ref	
Male					124.65 ***	1.28	124.66 ***	1.28
Mother's marital status								
Not married	ref		ref		ref		ref	
Married					66.88 ***	1.63	66.78 ***	1.63
Mother's education level								
Less than high school	ref		ref		ref		ref	
High school degree					46.65 ***	2.47	46.69 ***	2.47
Some college					79.66 ***	2.51	79.76 ***	2.51
College degree					108.24 ***	2.89	108.37 ***	2.89
More than college					97.23 ***	3.31	97.29 ***	3.31
Mother's age (range 1-9)					-1.63 *	0.72	-1.62 *	0.72

No prenatal care								
Prenatal care	ref		ref		ref		ref	
No prenatal care					-193.34 ***	4.88	-193.22 ***	4.88
Type of birth								
Vaginal	ref		ref		ref		ref	
Caesarean section					-67.43 ***	1.39	-67.44 ***	1.39
Total birth order					4.74 ***	0.46	4.75 ***	0.46
Pre-pregnancy diabetes					122.73 ***	6.88	122.77 ***	6.88
Gestational diabetes					54.23 ***	2.90	54.22 ***	2.90
Pre-pregnancy hypertension					-215.32 ***	4.31	-215.23 ***	4.31
Gestational hypertension					-232.13 ***	2.45	-232.10 ***	2.45
Eclampsia					-458.86 ***	11.59	-458.88 ***	11.59
Total cigarettes smoked during pregnancy					-4.81 ***	0.07	-4.81 ***	0.06
Cross-level Interaction								
Voter identification * race								
No identification required	No observations		No observations		No observations		No observations	
Non-strict non-photo	ref		ref		ref		ref	
Non-strict photo							8.36	4.76
Strict non-photo							0.20	6.82
Strict photo							-3.50	4.95
Constant	3,317.83 ***	15.41	3379.02 ***	61.67	3180.58 ***	73.24	3180.52 ***	72.99
AIC	11,639,356		11,639,315		11,570,617		11,570,612	
-2 Log Likelihood	11,639,344		11,639,293		11,570,561		11,570,550	

Note: Reported p-values from t-tests. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

Appendix H. Aim 2 - Figures of Interaction Effects between Voter Suppression and Race on Birth Outcomes

Figure H1. Plot of the interaction effect of county-level proportion of people who requested but did not receive an absentee ballot and mother's race on gestational age: 2008 Cooperative Congressional Election Study, 2008-2009 National Center for Health

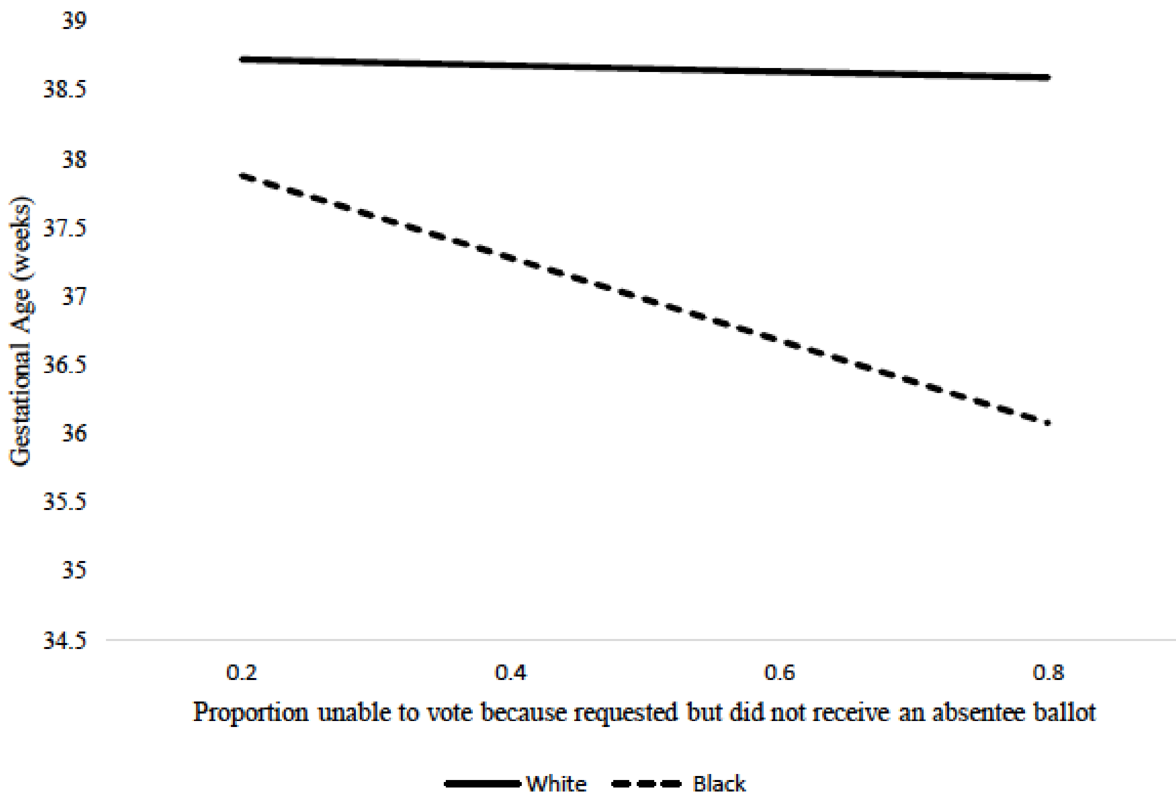


Figure H2. Plot of the interaction effect of Preclearance and mother's race on gestational age: 2008 Cooperative Congressional Election Study, 2008-2009 National Center for Health Statistics Infant Birth

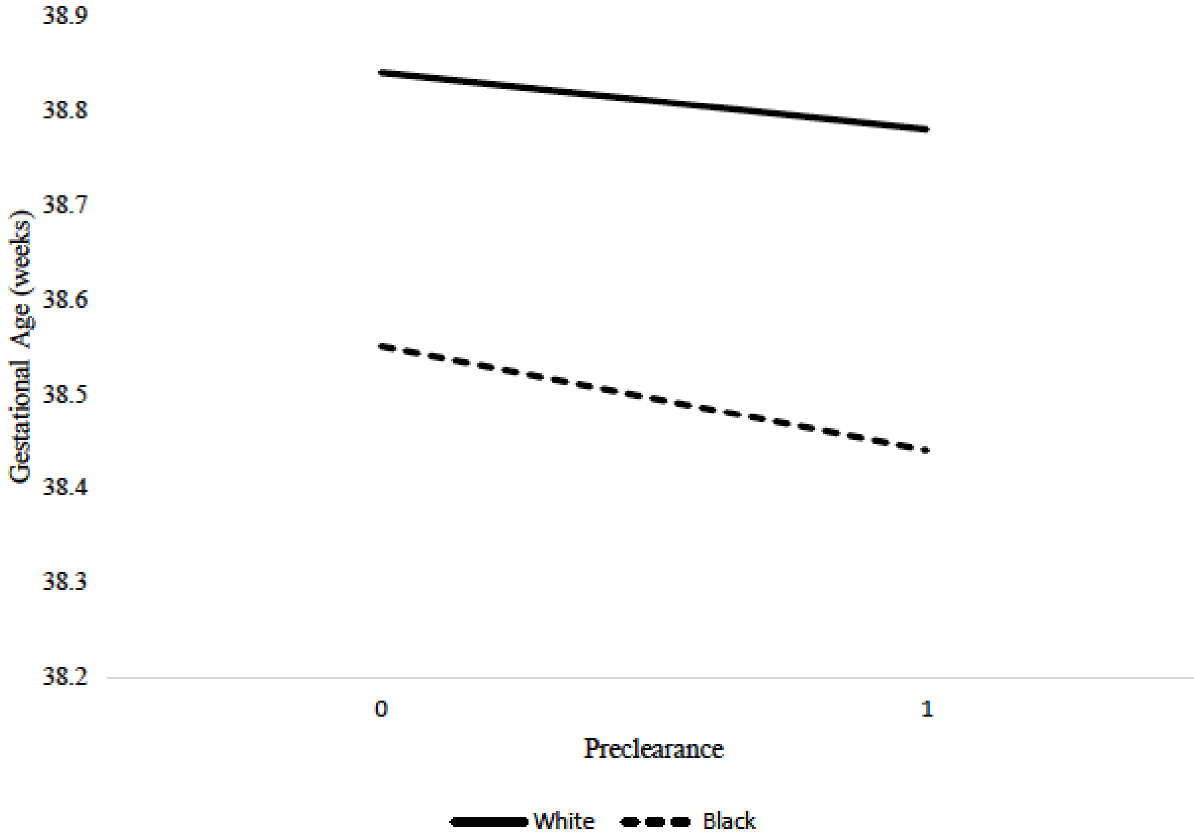


Figure H3. Plot of the interaction effect of county-level proportion of people were unable to vote and mother's race on gestational age: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth

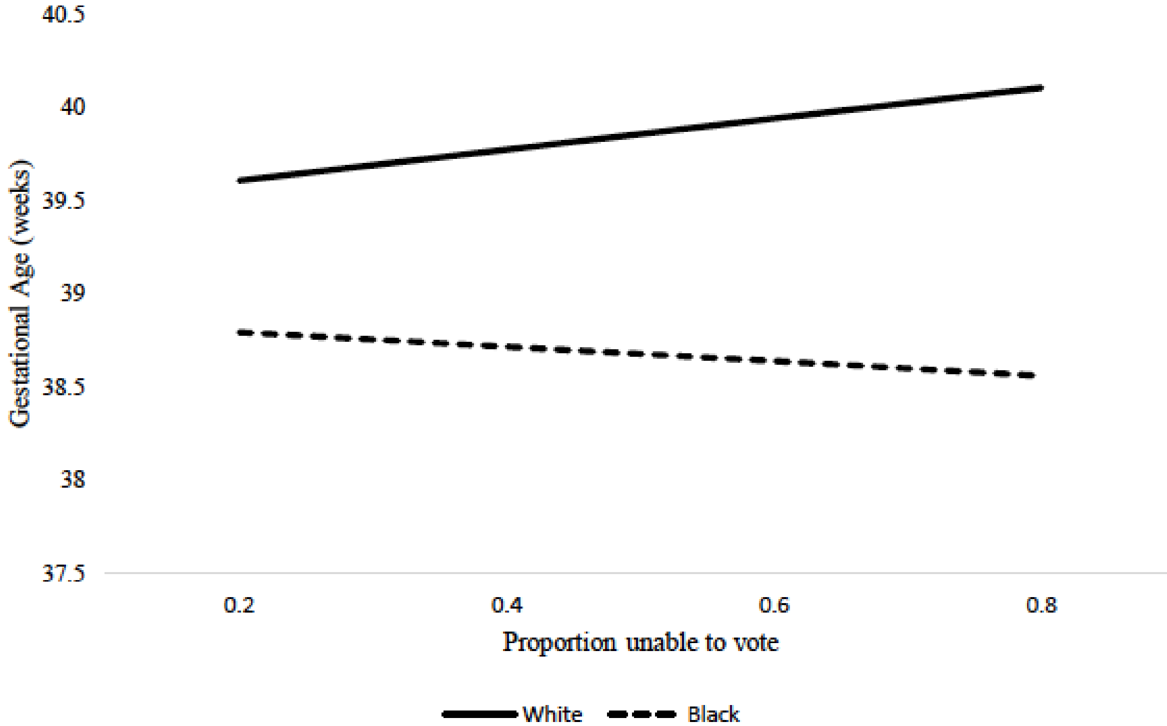


Figure H4. Plot of the interaction effect of county-level proportion of people who were unable to vote and mother's race birth weight: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth

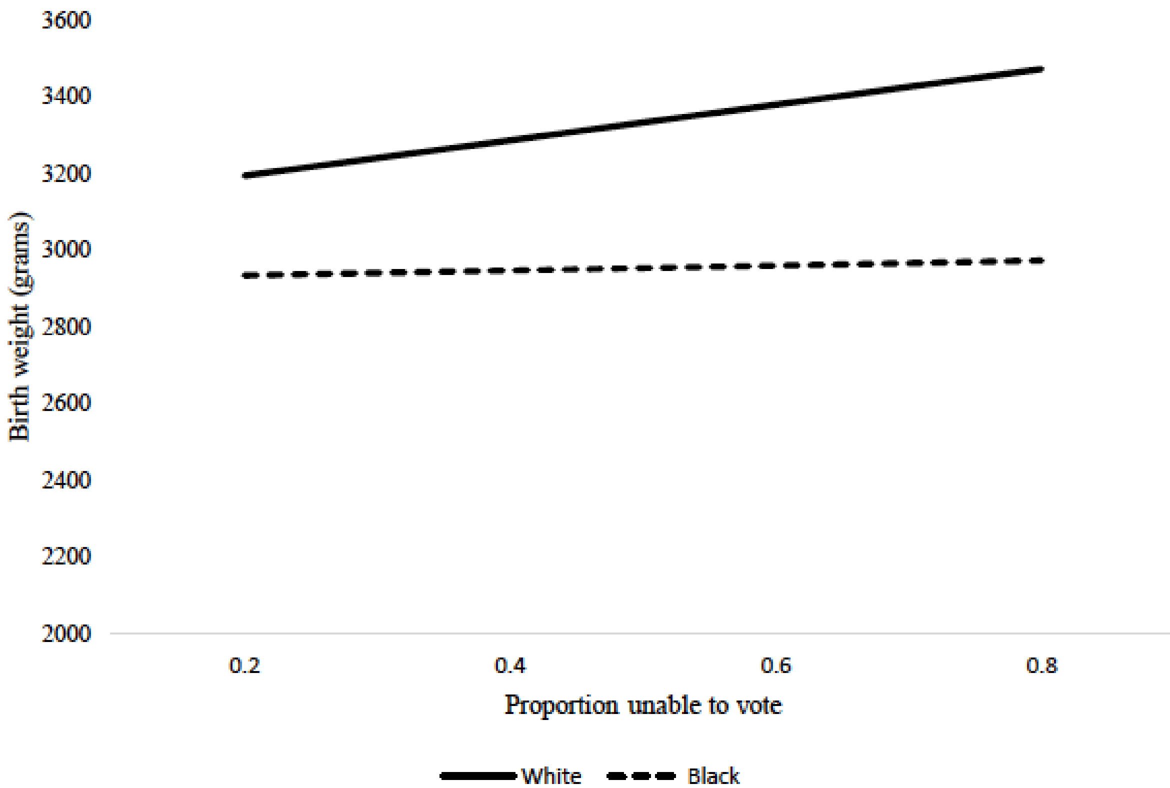


Figure H5. Plot of the interaction effect of county-level proportion of people who were unable to vote but tried and mother's race on birth weight: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Bir

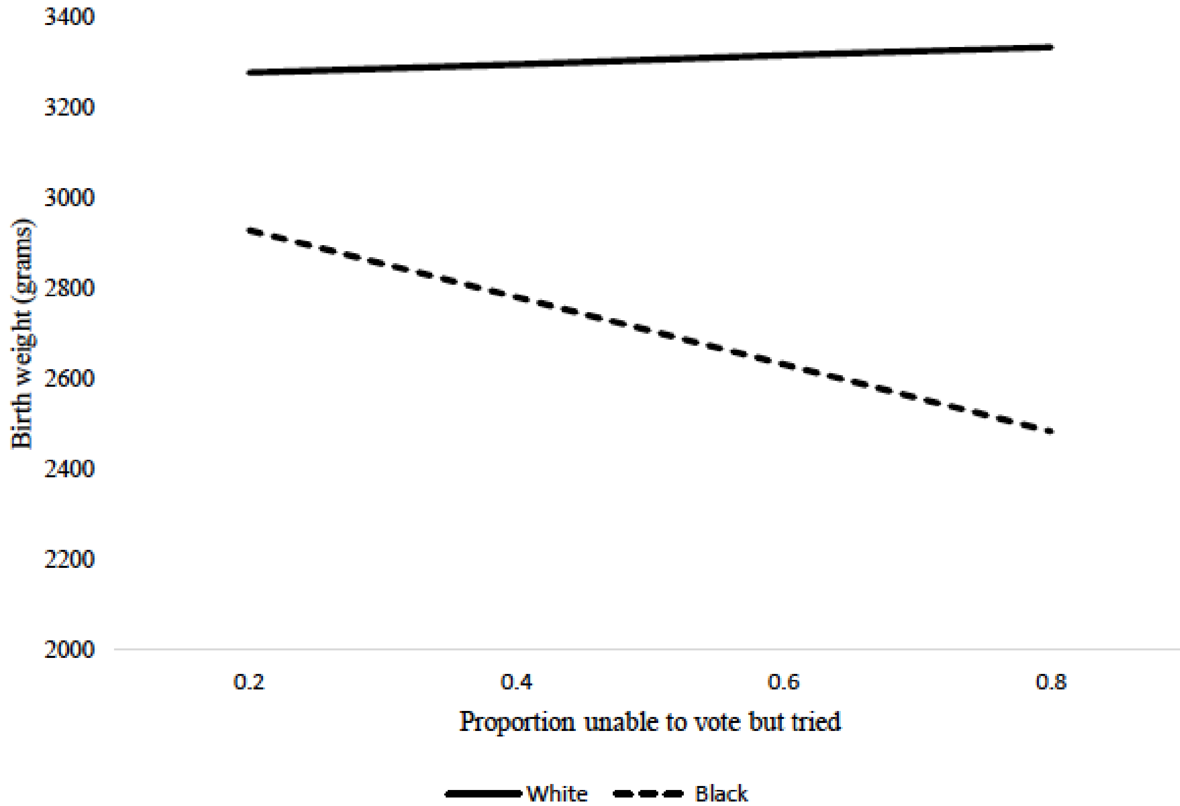


Figure H6. Plot of the interaction effect of Preclearance and mother's race on gestational age: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth

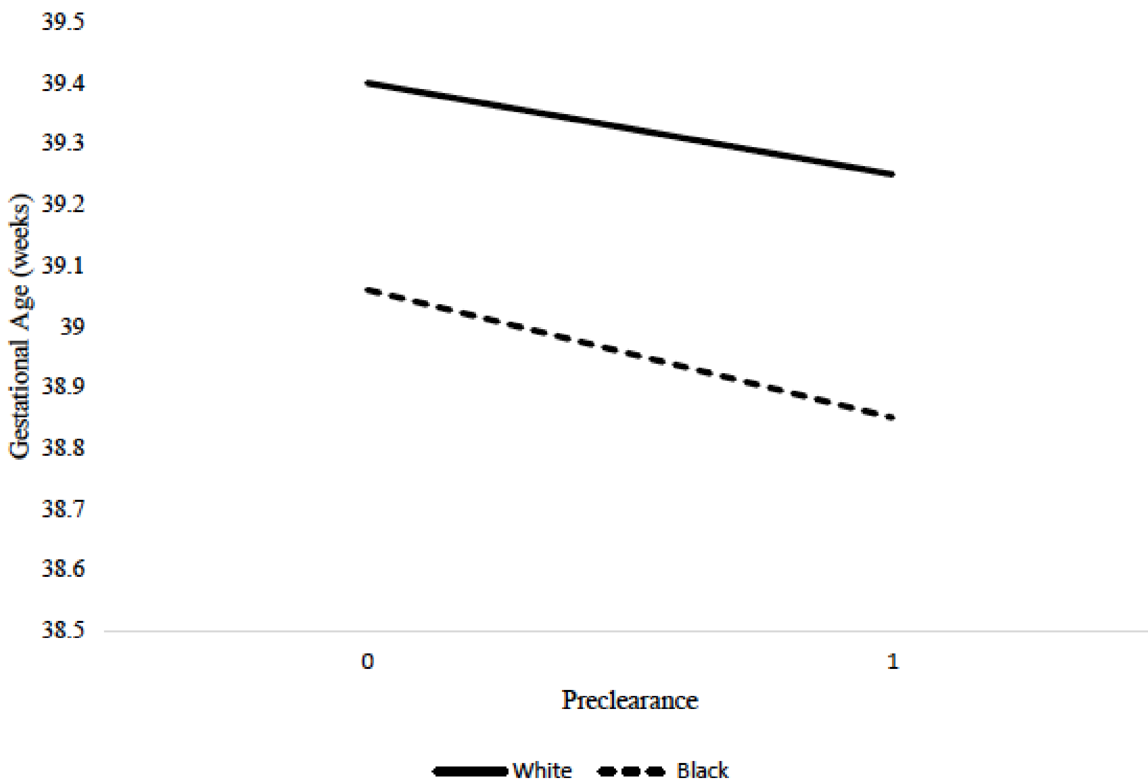


Figure H7. Plot of the interaction effect of Preclearance and mother's race on birth weight: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth

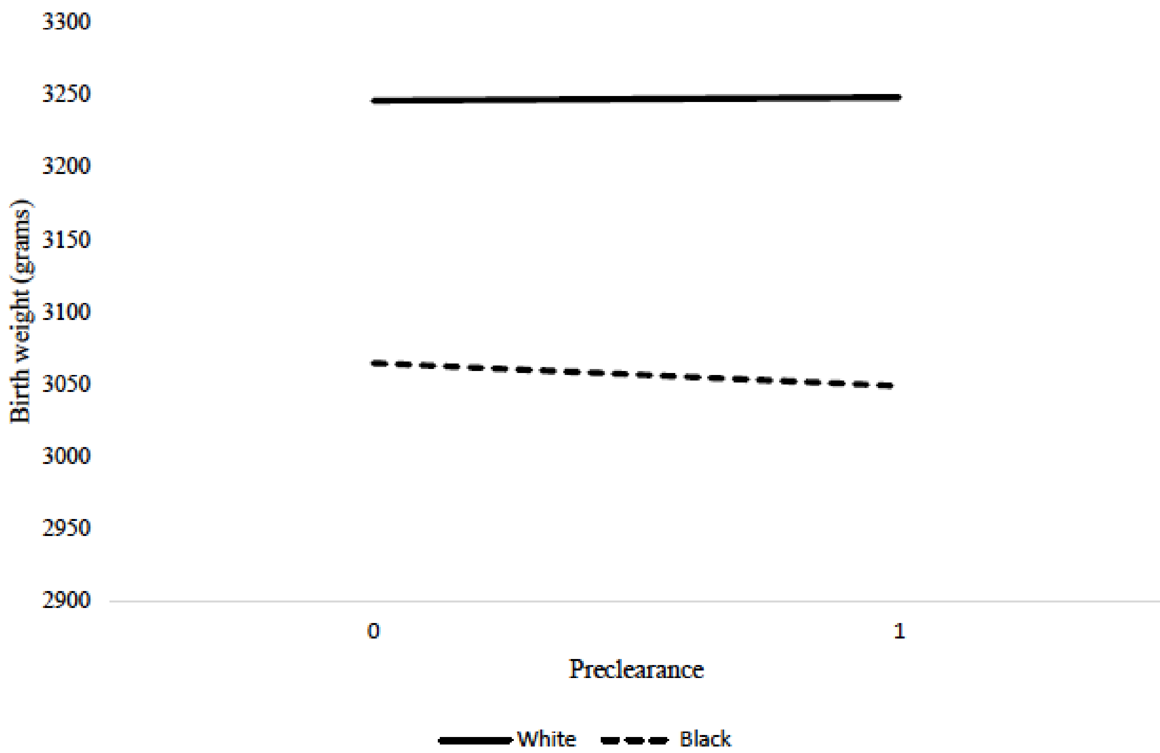


Figure H8. Plot of the interaction effect of county-level proportion of people who waited 30 minutes or more and mother's race on birth weight: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth

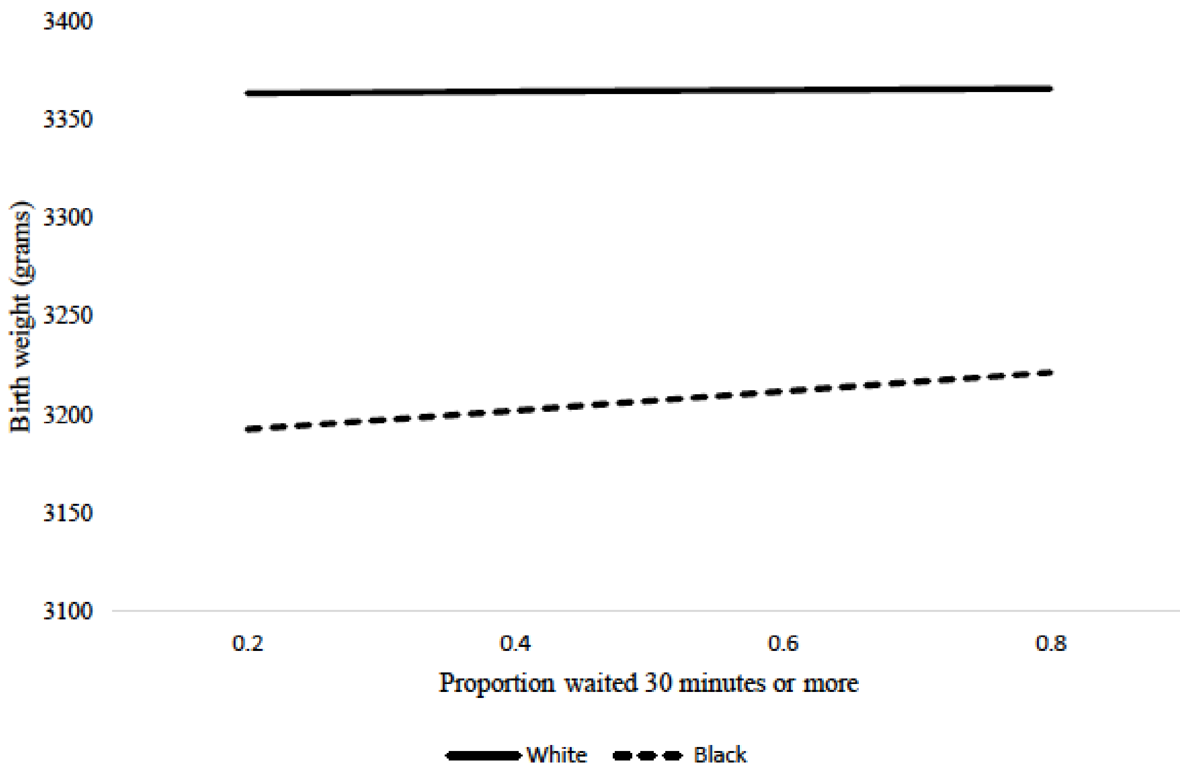


Figure H9. Plot of the interaction effect of county-level proportion unable to vote and mother's race on birth weight: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Health Statistics Infant Birth

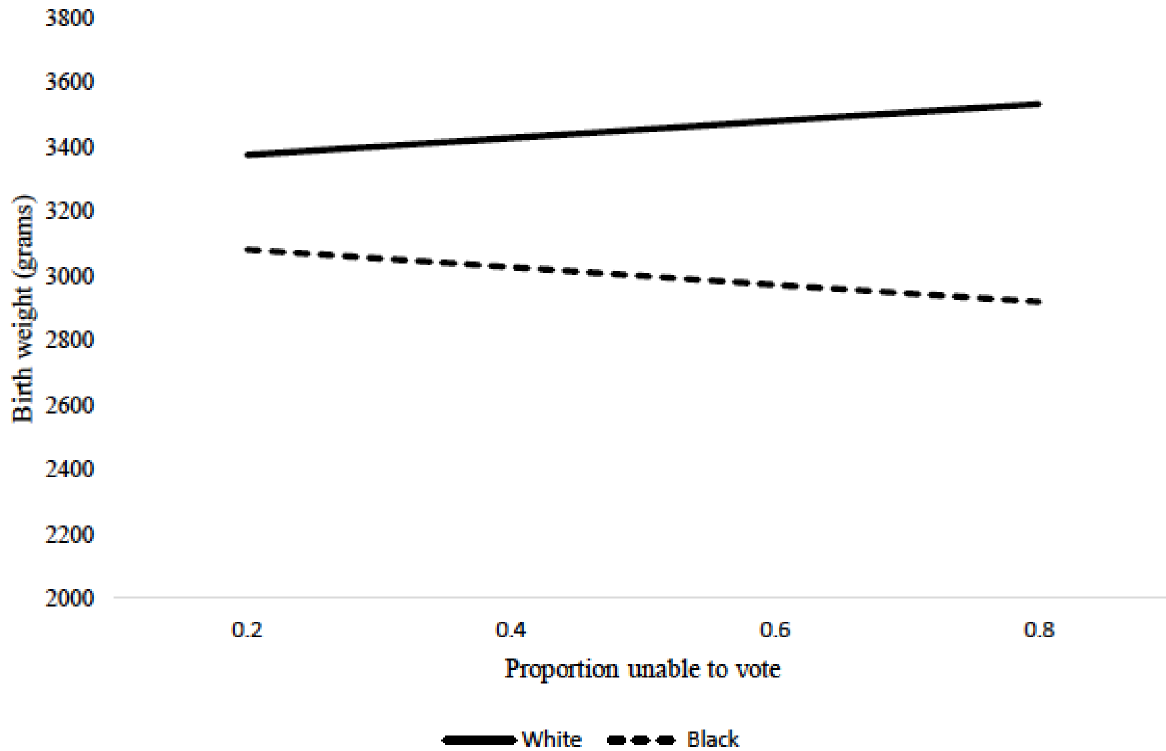


Figure H10. Plot of the interaction effect of county-level proportion of people who requested but did not receive an absentee ballot and mother's race on gestational age: 2016 Cooperative Congressional Election Study, 2016-2017 National Center for Healt

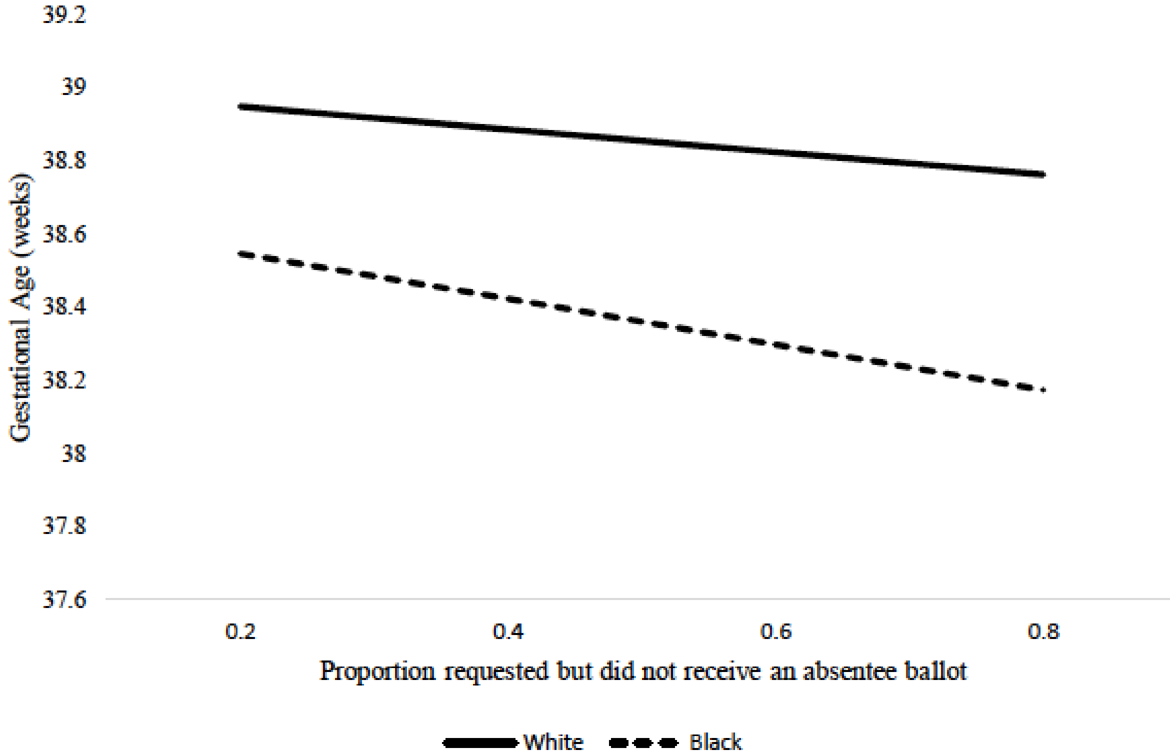
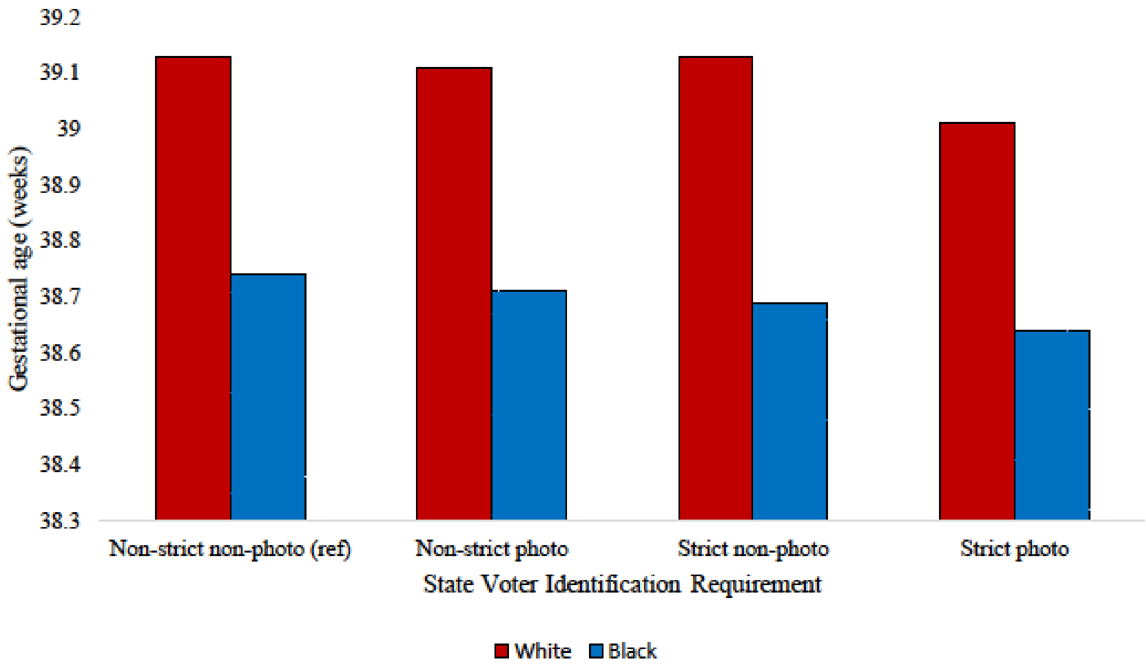


Figure H11. Plot of the interaction effect state voter identification requirements and mother's race on gestational age: 2012 Cooperative Congressional Election Study, 2012-2013 National Center for Health Statistics Infant Birth



Appendix I; Investigation of Differences Between Analytic Sample and Full Sample of Births During Study Time

When considering voting behaviors and experiences, some variation across years and between the analytic sample compared to the full is observed. For 2008, the analytic sample reported slightly higher percentages for indicators of voter suppression compared to the full sample. For example, the average percentage of people waiting more than 30 minutes was examined, these numbers were 57% and 53%, respectively. For 2012, more people waited for more than 30 minutes in the analytic sampled as compared to the full samples, 45% vs. 40%. For 2016, similar patterns were observed (44% compared to 40%). More people waited for more than 30 minutes (44% vs. 34%) and more people reported intimidation (5% vs. 2%). The analytic sample had more counties previously covered by Preclearance (22% vs. 26% in 2008; in 2012; 35% vs. 27% in 2016). Voting rates varied across time but were the same for both the analytic and full samples for 2008, (89%) and 2012 (92%). Voting rates varied slight between the samples in 2016 (91% compared to 92%).

When considering county-level covariates, in 2008, the analytic sample has a lower percentage of Black residents (13%) compared to the full sample (16%), is similar in age (with 11% of the population over 65 years compared to 12%), and similar percent of college graduates (21% for both). For 2012, the analytic sample and full samples were similar in percent of Black mothers (16%), were slightly younger in age (11% over 65 years in the analytic sampled compared to 12%) similar in percent of college graduates (22% for both), and slightly more uninsured (16% vs 15%). For 2016, counties reported an average Black population of 16% in the analytic sampled compared to 13% in the full, fewer adults over the age of 65 (13% vs. 14%), and somewhat higher percentage of college graduates (25% vs. 24%).

For level-1 characteristics, we see similar percentages of Black mother's (20% vs 22%) in 2008 and percent of male infants (51% for both in 2008). In 2008, we observe slightly higher education levels in the analytics sample (35% with a college degree or more compared to 30% in 2008) similar rates of prenatal care (98.5% for both in 2008) and slightly higher Caesarean section rates (34% for the analytic sample compared to 33% in the full in 2008). In 2012, the analytic sampled has more Black mothers compared to the full sample (24% vs 22%), same percent of male births for both samples (51%), higher percent with college degree or more (29% compared to 33%), same access to prenatal care (99%), and similar rates of Caesarean section (33%). In 2016, the analytic sample, 26% of mothers were Black compared to 22% in the full sample, percents of male infants were the same (51%), 41% had a college degree or more compared to 35%, prenatal care was the same (98%) and Caesarean section rates were the same (32%). Thus, this sample is fairly representative of the nationally-representative samples from which it drew.