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Area Racism and Birth Outcomes Among Blacks in the United States

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Abstract

There is increasing evidence that racism is a cause of poor health outcomes in the United States, including adverse birth outcomes among Blacks. However, research on the health consequences of racism has faced measurement challenges due to the more subtle nature of contemporary racism, which is not necessarily amenable to assessment through traditionally used survey methods. In this study, we circumvent some of these limitations by examining a previously developed Internet query-based proxy of area racism (Stephens-Davidowitz, 2014) in relation to preterm birth and low birthweight among Blacks. Area racism was measured in 196 designated market areas as the proportion of total Google searches conducted between 2004–2007 containing the "n-word." This measure was linked to county-level birth data among Blacks between 2005–2008, which were compiled by the National Center for Health Statistics; preterm birth and low birthweight were defined as <37 weeks gestation and <2500 grams, respectively. After adjustment for maternal age, Census region, and county-level measures of urbanicity, percent of the Black population, education, and poverty, we found that each standard deviation increase in area racism was associated with relative increases of 5% in the prevalence of preterm birth and 5% in the prevalence of low birthweight among Blacks. Our study provides evidence for the utility of an

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Internet query-based measure as a proxy for racism at the area-level in epidemiologic studies, and is also suggestive of the role of racism in contributing to poor birth outcomes among Blacks.

Keywords

USA; African Americans; birth outcomes; racism; big data

1. Introduction

Racial disparities in preterm birth and low birthweight represent a serious public health concern in the U.S. In 2014, preterm birth (<37 weeks gestation) among Blacks was 13.2%, compared to 8.9% among Whites; corresponding rates for low birthweight (<2500 grams) were 13.2% and 7.0%, respectively (Hamilton, Martin, Osterman, Curtin, & Matthews, 2015). These poor birth outcomes have both short- and long-term ramifications, increasing the risk of adverse developmental outcomes in infancy, as well as deleterious health trajectories through childhood, adolescence, and later adulthood.

Factors associated with racism have been posited to contribute to racial disparities in birth outcomes (Alio et al., 2009; Carty et al., 2011; Collins, David, Handler, Wall, & Andes, 2004; Dominguez, Dunkel-Schetter, Glynn, Hobel, & Sandman, 2008; Giurgescu, McFarlin, Lomax, Craddock, & Albrecht, 2011). For example, racism, conceptualized as a system or ideology that reifies inequitable distributions of power and access to resources along racial lines, has generated distinct patterns in racial residential segregation (Chae, Nuru-Jeter, Lincoln, & Francis, 2011; Krieger, 2003). Largely rooted in a historical legacy of racism and forced separation, a consequence of racism is the geographic isolation of Blacks into poorer environments compared to Whites, characterized by higher poverty, crime, and worse physical conditions (Masi, Hawkley, Piotrowski, & Pickett, 2007; Massey, 2001; Williams & Collins, 2001). One study found that racial isolation (an index of racial residential segregation) accounted for 28% of the geographic variation in very preterm birth (<32 weeks gestation) (Kramer, Cooper, Drews-Botsch, Waller, & Hogue, 2010). Another study found that the effect of racial isolation on preterm birth was partially accounted for by poor quality of the built environment, indexed by measures of housing quality, occupancy, and crime (Anthopolos, Kaufman, Messer, & Miranda, 2014). These area-level factors may influence the risk of poor birth outcomes indirectly through behavioral pathways and via diminished socioeconomic attainment (Gould & LeRoy, 1988; Phelan & Link, 2015; Williams & Collins, 2001). The segregation of Blacks into resource-poor neighborhoods shapes health behaviors, such as exercise, diet, and substance use, all of which have been associated with birth outcomes (Auchincloss, Riolo, Brown, Cook, & Diez Roux, 2011; Boslaugh, Luke, Brownson, Naleid, & Kreuter, 2004; Corral et al., 2012; Duncan, Kawachi, White, & Williams, 2012; Galea, Nandi, & Vlahov, 2004; Kwate, 2008; Lopez, 2006; Williams & Collins, 2001). For example, one study found that living in a highly segregated area was associated with a 27% increase in the odds of smoking during pregnancy (Bell, Zimmerman, Mayer, Almgren, & Huebner, 2007). Racial residential segregation has also been consistently found to adversely affect access to quality medical care, which also impacts birth outcomes (Gaskin, Dinwiddie, Chan, & McCleary, 2012; Osypuk & Acevedo-Garcia,

2008; White, Haas, & Williams, 2012; Williams & Collins, 2001). Systemic disadvantage experienced at the area-level can also impact birth outcomes more directly through the direct physiologic effects of environmental toxins and other pollutants which are disproportionately more present in Black and poor areas (Gray, Edwards, Schultz, & Miranda, 2014; Morello-Frosch & Jesdale, 2006). Collectively, this research points to the role of area-level factors in generating racial disparities in birth outcomes.

These patterns in racial residential segregation and concentrated disadvantage are perpetuated by current racial discrimination in housing markets, as well as in other domains such as in employment contexts, which continue to occur despite the existence of protective legislation (Kau, Keenan, & Munneke, 2011; Williams & Mohammed, 2009). Experiences of racial discrimination, in addition to impacting birth outcomes through aforementioned area-level effects and socioeconomic pathways, can also have direct effects on health (Bell, Zimmerman, Almgren, Mayer, & Huebner, 2006; Mendez, Hogan, & Culhane, 2014; Phelan & Link, 2015; Williams & Collins, 2001). For example, Black women's experiences of discrimination in health care contexts, including in the receipt of prenatal care, may contribute to poorer birth outcomes (Salm Ward, Mazul, Ngui, Bridgewater, & Harley, 2013). The risk of preterm birth and low birthweight is also heightened due to stress experienced during the prenatal period, as well as through the accumulation of maternal chronic stress and allostatic load over the lifecourse (Geronimus, Hicken, Keene, & Bound, 2006; Hedegaard, Henriksen, Secher, Hatch, & Sabroe, 1996). Along these lines, both acute and chronic experiences of racial discrimination, as sources of psychosocial stress, may contribute to adverse birth outcomes among Blacks (Lu & Halfon, 2003; Massey, 2004; Williams, Neighbors, & Jackson, 2008). An early study found that racial discrimination partially explained the greater risk of both preterm birth and low birthweight among Black compared to White women (Mustillo et al., 2004). Other studies have found evidence for similar associations in samples of exclusively Black women (Collins et al., 2004; Giurgescu et al., 2012; Rosenberg, Palmer, Wise, Horton, & Corwin, 2002). Studies suggest that racial discrimination may also impact birth outcomes through its impact on health conditions that increase the risk of adverse birth outcomes, such as hypertension, weight gain, diabetes, and sleep difficulties, and also poor mental health (Johnson et al., 2016; Kwate & Goodman, 2015; Reid et al., 2016; Szanton et al., 2011). Racial discrimination may also increase the risk of adverse birth outcomes through its impact on biological systems engaged in the stress response (Geronimus et al., 2006; Giurgescu et al., 2011; Jackson, Phillips, Hogue, & Curry-Owens, 2001; Mustillo et al., 2004; Szanton et al., 2011). For example, racial discrimination has been linked to cortocotropin-releasing hormone, which some studies suggest may increase the risk of preterm delivery (Hobel, Arora, & Korst, 1999; Rich-Edwards et al., 2001). Self-reports of racial discrimination have been associated with a number of biological markers of health among Blacks, including indicators of inflammation such as C-reactive protein and interleukin-6, which have also been correlated with poorer birth outcomes (Christian, Glaser, Porter, & Iams, 2013; Lewis, Aiello, Leurgans, Kelly, & Barnes, 2010).

1.1. Measurement of Racism in Health Research

There is increasing evidence for the negative health consequences of racism, as measured at both the individual- and area-levels, including for birth outcomes (Carty et al., 2011; Collins

et al., 2004; Williams & Mohammed, 2009). Specifically, as described above, interpersonal experiences of racial discrimination may contribute to heightened risk of adverse perinatal outcomes among Black women (Earnshaw et al., 2013; Giurgescu et al., 2011; Jackson et al., 2001; Mustillo et al., 2004; Rankin, David, & Collins, 2011; Rosenberg et al., 2002). The vast majority of these studies have relied on respondents' self-report of their experiences of racial discrimination (Blank, Dabady, & Citro, 2004; Krieger et al., 2011; Paradies, 2006; Williams & Mohammed, 2009). However, in contrast to more traditional forms of racial discrimination that have tended to be more overtly racially motivated, contemporary and present-day forms of racism have been found to operate more covertly (Dovidio & Gaertner, 2000; Krieger, Smith, Naishadham, Hartman, & Barbeau, 2005). More routine experiences of unfair treatment, including instances of being treated with less respect or courtesy, being followed in stores, receiving poorer service at restaurants, and being perceived as less intelligent of inferior, may not be overtly motivated by racial bias but instead occur more subtly (Williams, Yu, Jackson, & Anderson, 1997).

Accordingly, measuring racism through traditional survey methods is particularly challenging given that contemporary forms are often ambiguous in nature and attributions of intent are less clear (Krieger et al., 2005; Paradies, 2006). Self-report measures are also insensitive to "invisible" discrimination that occurs without an identifiable perpetrator and when people are unaware that they are discriminated against (e.g., when employers systematically reject resumes from job applicants with "Black-sounding" names) (Bertrand & Mullainathan, 2004; Dovidio & Gaertner, 2000). Further, the psychological factors that influence reporting of discrimination have also been investigated as risk factors for poor birth outcomes; consequently, if these same factors simultaneously lead to both underreporting of discrimination and to adverse birth outcomes, this would create a negative bias in studies (Sawyer, Major, Casad, Townsend, & Mendes, 2012; Williams & Mohammed, 2013). These measurement issues may account for inconsistent, counterintuitive, and negative findings in studies of self-reported discrimination and health more broadly, as well as those pertaining to birth outcomes specifically (Alhusen, Bower, Epstein, & Sharps, 2016; Chae et al., 2011). For example, some studies have found no significant main effect relationship between self-reported racial discrimination and birth outcomes (Giurgescu et al., 2012; Murrell, 1996; Shiono, Rauh, Park, Lederman, & Zuskar, 1997). Other studies that have examined indicators of racial segregation, such as dissimilarity and isolation, as proxies of institutionalized racism, are less subject to these reporting biases (Bobo & Zubrinsky, 1996). However, while current discriminatory practices and the racial "preferences" of Whites influence these area-level indicators, such measures may only indirectly capture attitudes towards Blacks in geographic areas.

Internet query-based measures to ascertain population-level characteristics is one promising new method to circumvent these measurement issues in social sciences research, particularly in assessing sensitive issues or attitudes that are not socially sanctioned, such as discrimination and prejudice (Scheitle, 2011; Stephens-Davidowitz, 2014). These measures are derived based on Internet search volume for terms that are relevant to the population characteristic of interest (Choi & Varian, 2012; Scheitle, 2011). For example, query volume for the word "God" explains 65% of the variation in the percent of a state's residents believing in God (Stephens-Davidowitz, 2014). Similarly, gun ownership rates are also

associated with searches for the word “gun.” Research has demonstrated that such “big data” approaches can be used to validly assess underlying population-level characteristics (Stephens-Davidowitz, 2014). These Internet query-based measures do not assume that all individuals performing searches of specific terms necessarily possess the characteristic of interest; rather, they assume only that individuals with the characteristic of interest are more likely to perform searches of the term compared to those who do not, yielding a high signal-to-noise ratio despite sources of measurement error. Geographic variation in socially unacceptable attitudes may be particularly amenable to measurement through this method, given that behavior on the Internet may be less susceptible to self-censorship, and because the perception of anonymity may in fact serve as an outlet for such beliefs (Stephens-Davidowitz, 2014).

An Internet query-based measure of area racism may serve as a proxy for racial attitudes and experiences of racially motivated bias that are subtle or unobservable, and which may not be reported in survey measures (Stephens-Davidowitz, 2014). For example, a study found that the proportion of total Google searches containing the “n-word” at the designated market area (DMA) level, used as a proxy for the degree of racism at the area-level, was strongly associated with voting patterns (the differential in 2008 votes for Barack Obama vs. 2004 votes for John Kerry) (Stephens-Davidowitz, 2014). As with other Internet query-based measures, this proxy of area racism does not presume that all searches containing the “n-word” are necessarily motivated by racism; it only assumes that: (1) racism exists; (2) that there is geographic variation in the degree of racism; and (3) that those who hold racist beliefs are more likely to conduct searches of the “n-word” (Stephens-Davidowitz, 2014). Along these lines, such measures may improve our ability to measure and monitor racism at the population-level, and to examine its influence on health outcomes, including adverse birth outcomes.

1.2. The Current Study

In this study, we examine the association between an Internet query-based measure of area racism, first developed by Stephens-Davidowitz (2014), and birth outcomes among Black women in the U.S. This study extends previous research that found significant positive associations between this measure and Black all-cause mortality rates; specifically, each standard deviation increase was associated with a 3.6% greater mortality rate (Chae et al., 2015). This measure also showed significant associations with mortality from specific causes (heart disease, cancer, and stroke). Results from this work suggest that this measure may be a useful proxy of racism at the area-level and a predictor of health outcomes. In the current study, we investigate preterm birth and low birthweight, which previous research suggests is particularly susceptible to racism-related stressors.

2. Methods

2.1. Study Population

The study population is from U.S. birth records from the National Center for Health Statistics (NCHS). Because the risk for poor pregnancy outcomes increases with multiple gestation, analyses were restricted to singleton live births. To maximize event counts data

were pooled across four years (2005–2008). We focused on pregnancy outcomes among non-Hispanic Black women. To address concern for unstable rates in geographical areas where the Black population is small, analyses were restricted to counties with >200 births to Black mothers in the study period.

2.2. Measures

2.2.1. Area Racism—The primary exposure variable in this study was an Internet query-based measure of area racism. Briefly, area racism was measured as the proportion of Internet search queries containing the "n-word" (singular or plural, i.e., ending in "-er" or "-ers", excluding variants ending in "-a" or "-as") using Google from 2004–2007. Data are obtained through Google Trends and measured at the media market or designated market area (DMA) level as defined by Nielsen Media Research, and are the smallest geographic unit of analysis publically available covering the U.S. (Stephens-Davidowitz, 2014). DMAs are geographic areas receiving common broadcasts or programming, and may also receive similar media content, such as newspapers or Internet advertising. Out of a total of 210 DMAs in the U.S., data on area racism were available for 196.

A detailed description of how this measure was constructed, in addition to psychometric evidence of its reliability and validity, has been previously reported (Chae et al., 2015). For instance, this measure has been associated with other indicators of racial bias (e.g., a measure of attitudes about interracial marriage in the General Social Survey) as well as an objective measure of racial composition at the area-level, namely, the percent of the Black population (Stephens-Davidowitz, 2014). Further supporting its validity, in addition to being correlated with voting patterns, it was also associated with Black mortality rates (Chae et al., 2015).

For the current study, our measure of area racism was standardized so that each one-unit increase indicates a one standard deviation greater proportion of Google searches containing the "n-word."

2.2.2. Birth Outcomes—Births recorded with infant weight less than 500 grams or gestational age (weeks from reported last menstrual period until delivery) earlier than 22 weeks were excluded as is common practice in perinatal epidemiology. Two primary pregnancy outcomes were assessed: low birthweight, defined as <2500 grams; and preterm birth, defined as <37 weeks gestation (Hamilton et al., 2015).

2.2.3. Covariates—All analyses adjusted for maternal age at delivery, which is strongly associated with birth outcomes. This data were extracted from birth certificates and categorized as follows: <18 years of age, 18–34 years of age, and 35 years or more. Descriptive area-level covariates included Census region (Northeast, Midwest, South, and West) (U.S. Census Bureau, 2010), and county-level information on the percent of the Black population and the percent of residents in urbanized areas (>50,000) obtained from 2005–2009 American Community Survey (ACS) Census data. Additional county-level socioeconomic covariates that were examined were the percent of Blacks 25 years of age or more with less than a high school degree or equivalent; and the percent of Blacks living below the federal poverty threshold (based on household composition: family size and

number of children). These area-level socioeconomic factors were specifically for the Black population in these counties given the primary focus on Black birth outcomes. However, examining overall county-level measures of education and poverty did not result in substantively different conclusions.

2.2. Analysis

All births were merged with the Google query-based index of area racism using the relationship between county Federal Information Processing Standard (FIPS) code of maternal residence and DMA. Log-binomial regression models were fit with generalized estimating equations (GEE) in order to estimate prevalence ratios of pregnancy outcomes while adjusting for the clustering of births within counties and DMAs (Gardner, Mulvey, & Shaw, 1995).

Three models were fit for each outcome. Baseline models included our primary independent variable of interest, area racism, and adjusted for maternal age. Model 2 further adjusted for U.S. Census region, county-level urbanicity, and percent of the Black population. Finally, Model 3 adjusted for county-level socioeconomic characteristics, namely, the percent of Blacks with less than a high school education and the percent of Blacks living below the federal poverty line. All analyses were conducted using SAS 9.4 (SAS Institute, Inc., Cary, North Carolina).

3. Results

Of 3,141 counties, 80 (including all 27 in Alaska) were not linked with DMAs. The remaining 3,061 counties were successfully linked to DMAs. In the U.S., there were 2,350,114 singleton live births to Black women from 2005–2008 (not including those with birthweight <500 grams or <22 weeks gestation, which were <0.1%). Of these, 17,898 were excluded because of residence in counties with missing data on DMA-level area racism, leaving 2,332,216 births to Black women residing in 196 DMAs. In this sample, the rate of preterm birth was 15.9% and the rate of low birth weight was 11.4%. The distribution of maternal age, U.S. Census region, and county-level descriptive characteristics (urbanicity, percent of Blacks, percent of Blacks with less than a high school education, and percent of Blacks below the federal poverty line) are presented in Table 1.

The relationship between area racism and perinatal outcomes among Black women is shown in Table 2 (preterm birth) and Table 3 (low birthweight). In models adjusting for maternal age, each standard deviation increase in area racism corresponded to a 9% increase in both preterm birth (prevalence ratio [PR]=1.09, 95% confidence interval [CI]=1.05, 1.13) and low birthweight (PR=1.09, 95% CI=1.06, 1.12). The magnitude of the association between area racism and birth outcomes did not appreciably attenuate when adjusting for U.S. Census region and county-level urbanicity and percent of the Black population, and continued to be significantly associated with preterm birth (PR=1.08, 95% CI=1.04, 1.12) and low birthweight (PR=1.08, 95% CI=1.04, 1.11). Although adjusting for county-level socioeconomic characteristics of the Black population (percent up to a high school education and percent below the poverty line) led to a larger reduction in magnitude, area racism remained significantly associated with birth outcomes. In these models, each standard

deviation increase in area racism was associated with a 5% increase in preterm birth (PR=1.05, 95% CI=1.02, 1.09) and a 5% increase in low birthweight (PR=1.05, 95% CI=1.02, 1.07).

4. Discussion

This study provides evidence for the utility of an Internet query-based measure to proxy racism at the area level. To our knowledge, it is only the second study to examine whether this measure is associated with health outcomes among Blacks, and is the first to examine its relationship with birth outcomes. We report a significant relationship between the proportion of Google searches containing the “n-word” and the prevalence of both preterm birth and low birthweight among Black women at the DMA level. Our findings are compatible with previous research demonstrating a link between search volume for the “n-word” and Black mortality rates (Chae et al., 2015). The current study extends this line of research, suggesting that factors related to racism have ill health effects, from birth to death. Although these findings do not necessarily demonstrate a causal effect of racism, the associations we found suggest that further investigation of Internet query-based proxies of underlying population-level characteristics is warranted (Scheitle, 2011; Stephens-Davidowitz, 2014). Our results are also consistent with the interpretation that racism has detrimental consequences for birth outcomes among Black women (Alio et al., 2009; Carty et al., 2011; Collins et al., 2004; Dominguez et al., 2008; Giurgescu et al., 2011).

Previous research has highlighted contextual factors related to poor quality of the physical environment (contaminants and other pollutants), the lack of availability of health-promoting resources (e.g., supermarkets, parks, recreational facilities, health care providers), as well as concentrated poverty and diminished socioeconomic opportunities, which correspond with patterns in racial residential segregation and have negative consequences for birth outcomes (Anthopolos et al., 2014; Bell et al., 2006; Grady, 2006; Gray et al., 2014; Kramer et al., 2010). Our study extends this research, suggesting that other factors related to the area-level, including social toxins such as racism, also have detrimental effects on health outcomes at the population-level. Our findings resonate with research documenting the role of broader macro-social forces in shaping birth outcomes. For example, an observational study found a heightened risk for adverse birth outcomes among women with Arab surnames six months post 9/11 (compared to the same six-month period a year earlier), presumably due to increased ethnic discrimination-related distress related to this contextual event (Lauderdale, 2006). Our interpretation of findings is also consistent with studies indicating that interpersonal experiences of racial discrimination can negatively impact birth outcomes through behavioral channels and psychobiological mechanisms (Collins et al., 2004; Giurgescu et al., 2012; Mustillo et al., 2004; Rosenberg et al., 2002).

It should be noted that our measure of area racism remained significant after controlling for maternal age, and other area-level descriptive characteristics (US Census region, levels of urbanicity, and percent of the Black population). In multivariable models, we also adjusted for pertinent county-level socioeconomic covariates, namely, the percent of Blacks with less than a high school education, and the percent of Blacks living in poverty, both of which had significant associations with birth outcomes in the expected directions. In areas

characterized by lower levels of education and higher levels of poverty among Blacks, the prevalence of both preterm birth and low birthweight was higher. The effect estimate associated with area racism was attenuated in these models but was still significant, with each standard deviation increase being associated with a relative increase in prevalence of 5% for both preterm birth and low birthweight among Blacks. This effect size, however, is likely an underestimate given that racism-related factors have been shown to influence Black residential patterns as well as socioeconomic mobility (Braveman et al., 2015; Williams & Collins, 2001).

4.1. Limitations

The results and interpretation of findings from our study should be considered in light of certain limitations. The correlational nature of the data and the observational study design limit the ability to draw causal inferences. For example, it is possible that Black women who are healthier or possess greater resources may be more likely to relocate to environments characterized by lower levels of racism. Furthermore, the association we detected between Google search volume for the “n-word” and birth outcomes among Blacks may not necessarily be due to racism (Stephens-Davidowitz, 2014). It is possible that the proportion of Internet searches containing the n-word may be reflective of a different population-level characteristic that we had not considered, such that those who possess this attribute are also more likely to conduct searches of the “n-word” compared to those who do not; and also, that this attribute explains a comparatively greater proportion of variance in searches for the “n-word” than racism. Although we could not identify a more compelling alternative explanation for geographic variations in Google searches containing the “n-word,” the possibility that one exists cannot be discounted. In addition, it is possible that the association itself is an artifact of unmeasured confounding. However, as previously noted, we did control for conceptually relevant confounders and other potential explanatory variables. In short, although not definitive, our findings are suggestive that racist attitudes may be measured using Internet query-based proxies, and that racism contributes to observed geographic patterns in preterm birth and low birthweight among Blacks. Future research in this area may be aimed at elucidating the precise pathways, including biobehavioral or stress-related psychophysiologic mechanisms, through which racism operates to negatively impact health.

5. Conclusion

Despite the limitations of our study, we provide additional evidence for the utility of Internet query-based proxies to measure social characteristics at the area-level. Specifically, our study suggests that racism may be measured at the area-level through big data approaches involving examination of Internet search volume for the “n-word.” More traditionally used survey methods to measure prejudice and discrimination, which ask respondents about their racial attitudes or experiences of racially motivated unfair treatment, have certain limitations, chiefly when attempting to measure these constructs at the population-level (Blank et al., 2004; Krieger et al., 2011, 2005; Paradies, 2006). Further, administrative data capturing dimensions of racial residential segregation, which some have considered indicators of institutionalized racism, may be relatively less precise in capturing racist attitudes, serving

as proxies to the extent to which such patterns are the result of or are perpetuated by current forms of racism. Internet query-based methods, in contrast, may represent a more direct and efficient means of assessing beliefs and behaviors at the area-level, particularly those that are not societally condoned and subsequently not always captured through questionnaires, and may also be less prone to response bias (Stephens-Davidowitz, 2014). This study therefore advances methodological knowledge on the measurement of racism, and also provides support for substantive associations with birth outcomes among Blacks. Our findings suggest that racism has negative repercussions for preterm birth and low birthweight among Blacks, and support previous research on its role in reproducing negative health outcomes in this population.

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Research Highlights

- Examines area racism measured using volume of Google searches for the “n-word.”
- Shows significant associations with preterm birth and low birthweight among Blacks.
- Demonstrates the utility of using Internet query-based proxies to assess racism.
- Provides evidence for the harmful effects of racism on birth outcomes among Blacks.

Table 1

Descriptive characteristics, National Center for Health Statistics, 2005–2008.

Total Black Births	2,332,216
Preterm Birth	15.9%
Low Birth Weight	11.4%
Maternal Age	
<18 Years	6.3%
18–34 Years	83.6%
35+ Years	10.1%
Region	
Northeast	15.3%
Midwest	19.5%
South	57.4%
West	7.8%
Urbanicity	49.2%
% Black Population	9.5%
% Black <High School	33.0%
% Black Poverty	30.0%

Note: Restricted to singleton live births and counties with >200 births to Black mothers residing in 196 DMAs; excluded births with weight <500 grams or gestational age less than 22 weeks. Preterm birth defined as <37 weeks gestation; low birthweight defined as <2500 grams. County-level covariates from the American Community Survey, 2005–2009, for urbanicity (% living in a city with >50,000 people), % Black population, % of Blacks with less than high school education, and % of Blacks in poverty.

Table 2

Prevalence ratios associated with preterm birth among Black mothers in 196 designated market areas, National Center for Health Statistics, 2005–2008.

	Model 1 PR (95% CI)	Model 2 PR (95% CI)	Model 3 PR (95% CI)
Area Racism	1.09 (1.05, 1.13)***	1.08 (1.04, 1.12)***	1.05 (1.02, 1.09)***
Maternal Age (ref: 35+ Years)			
<18 Years	0.97 (0.95, 0.99)**	0.96 (0.94, 0.98)***	0.94 (0.93, 0.96)***
18–34 Years	0.81 (0.79, 0.82)***	0.80 (0.78, 0.81)***	0.79 (0.78, 0.80)***
Region (ref: West)			
Northeast		0.97 (0.89, 1.07)	0.95 (0.86, 1.05)
Midwest		1.08 (0.98, 1.19)	1.03 (0.93, 1.14)
South		1.11 (1.01, 1.21)*	1.10 (1.01, 1.20)*
Urbanicity		0.99 (0.98, 1.00)***	1.00 (1.00, 1.01)
% Black Population		1.02 (1.01, 1.03)***	1.02 (1.01, 1.03)***
% Black <High School			1.03 (1.00, 1.07)
% Black Poverty			1.06 (1.03, 1.08)***

Note: Generalized estimating equations adjusting for clustering at designated market areas to estimate prevalence ratios (PR) and 95% confidence intervals (CI). Restricted to singleton live births and counties with >200 births to Black mothers residing in 196 DMAs; excluded births with weight <500 grams or gestational age less than 22 weeks. Preterm birth defined as <37 weeks gestation. County-level covariates from the American Community Survey, 2005–2009, for urbanicity (% living in a city with >50,000 people), % Black population, % of Blacks with less than high school education, and % of Blacks in poverty.

Table 3

Prevalence ratios associated with low birthweight among Black mothers in 196 designated market areas, National Center for Health Statistics, 2005–2008.

	Model 1 PR (95% CI)	Model 2 PR (95% CI)	Model 3 PR (95% CI)
Area Racism	1.09 (1.06, 1.12)***	1.08 (1.04, 1.11)***	1.05 (1.02, 1.07)***
Maternal Age (ref: 35+ Years)			
<18 Years	0.98 (0.94, 1.01)	0.97 (0.93, 1.00)	0.95 (0.92, 0.98)**
18–34 Years	0.81 (0.81, 0.85)***	0.82 (0.80, 0.84)***	0.81 (0.80, 0.83)***
Region (ref: West)			
Northeast		0.99 (0.93, 1.05)	0.97 (0.91, 1.02)
Midwest		1.08 (1.01, 1.15)*	1.01 (0.94, 1.09)
South		1.1 (1.03, 1.17)**	1.09 (1.03, 1.15)**
Urbanicity		0.99 (0.99, 1.00)***	1.01 (1.00, 1.01)**
% Black Population		1.02 (1.02, 1.03)***	1.02 (1.01, 1.02)***
% Black <High School			1.05 (1.02, 1.07)***
% Black Poverty			1.07 (1.05, 1.09)***

Note: Generalized estimating equations adjusting for clustering at the designated market area (DMA) level to estimate prevalence ratios (PR) and 95% confidence intervals (CI). Restricted to singleton live births and counties with >200 births to Black mothers residing in 196 DMAs; excluded births with weight <500 grams or gestational age less than 22 weeks. Low birth weight defined as <2500 grams. County-level covariates from the American Community Survey, 2005–2009, for urbanicity (% living in a city with >50,000 people), % Black population, % of Blacks with less than high school education, and % of Blacks in poverty.