Black and White: Does Race Matter for Infant Health Outcomes among Hispanics?

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Abstract

The Hispanic population in the United States is racially diverse. There is little published socio-demographic research that examines the racial heterogeneity of the Hispanic population and its effect on the physical health of that population. And, there is no work that examines race and health among Hispanic infants. In this paper, I examine if and to what extent the racial heterogeneity of the Hispanic population in the United States has disparate effects on infant health outcomes. Using the National Center for Health Statistics Linked Birth and Infant Death Cohort Files for births occurring during the years 1995-2004, I test for racial disparities in low birth weight and infant mortality within the US Hispanic population, comparing Hispanic blacks and Hispanic whites. I find that Hispanic black infants have greater odds of being born with low birth weight relative to Hispanic white infants, with additional evidence that this racial disparity in health increases with maternal age. I also find that Hispanic black infants experience a greater risk of death during the first year of life than Hispanic white infants. This disparity does not increase with maternal age. These findings suggest that racial stratification does indeed exist within the Hispanic population and is a factor in health outcomes among Hispanic infants. These results further suggest that the social experience for Hispanic blacks and whites is different and that this difference affects health outcomes.

Keywords: Infant Mortality, Low Birth Weight, Hispanics, Race/Ethnicity, Health Disparities, Weathering

Introduction

The aim of this paper is to understand the implications of race for physical health among infants born to Hispanic women ages 18 to 45 years old in the United States. I first determine if racial disparities in infant health and mortality exist within my population of infants born to Hispanic women, and if so, to what extent. Second, I analyze some of the reasons underlying race differences in health outcomes among infants born to Hispanic women.

The Hispanic population in the United States is growing. As of 2009, there were over 48 million Hispanic individuals in the United States; by 2050, the US Hispanic population is expected to be comprised of over 130 million individuals (CDC 2010). There have also been several studies showing that heterogeneity within the Hispanic population in the US has important implications for health (Borrell and Crawford 2009; Hummer et al. 1999; Singh 2001), but the current literature commonly compares US racial groups with people who claim Hispanic ethnicity, the latter of whom are comprised of multiple racial groups. There is little published socio-demographic research that examines the racial heterogeneity of the Hispanic population and its effect on the physical health of that population. And, there is no work, to my knowledge, that examines race and health among Hispanic infants.

The main hypothesis for this paper is that racial inequality will result in inequalities in health outcomes by race among infants born to Hispanic women. Specifically, I hypothesize that infants born to Hispanic whites experience better health outcomes when compared to infants born to Hispanic blacks, measured using birth weight and risk of infant mortality. Second, I expect to find evidence of weathering among infants born to Hispanic blacks (Geronimus 1992).

That is, I expect to find larger black-white differences in health among infants born to older Hispanic women than among those infants born to younger Hispanic women.

Background

Black-White Differences in Infant Health Outcomes

Racial differences in health in the US are well documented (Hayward et al. 2000; Hummer and Chinn 2011; Williams and Sternthal 2010). While these disparities show modest signs of closing (Hummer and Chinn 2011), they remain wide. For example, the most basic measure of a country's health and well-being, the infant mortality rate, exhibits vast racial disparities in the US. A recent report shows that the US infant mortality rate is 6.86 deaths per 1000 live births. For non-Hispanic whites, this rate is even lower at 5.76/1000. However, for non-Hispanic blacks, this number shoots up to 13.63 infant deaths per 1000 births (Mathews and MacDorman 2006). At more than double the rate of non-Hispanic whites, the infant mortality rate for non-Hispanic blacks in the US would rank 64th, if placed internationally; this rate is similar to that of a number of developing countries. Meanwhile the non-Hispanic white infant mortality rate would rank 28th (United Nations Report 2005). These infant mortality rates are not only an indication of the relatively poor health of the US population, but speak specifically to the relatively poor health of women in the US (since infant mortality is a direct reflection of maternal health).

Focusing on black-white health and mortality disparities in the United States, a series of papers by Geronimus (e.g. Geronimus 1992; Geronimus et al. 1996) propose that these black-

white racial disparities in health are a direct effect of the social environment, racial politics, and racial stratification that exists within the United States. These contexts have real consequences for physical health that result in a more rapid aging process experienced by US Blacks, which Geronimus has termed the weathering hypothesis. In the weathering hypothesis, Geronimus purports that racial discrimination, institutionalized and personalized, manifests itself in the premature deterioration (weathering) of the physical health of those who are not members of the dominant racial group, particularly blacks in the US white dominated society. It is this idea of weathering that she posits as the explanation of the large gaps in black-white health outcomes.

Infant Health Outcomes among Hispanics

There is a considerable literature examining the birth outcomes of infants born to Hispanic women (Hummer et al. 2007; Hummer et al. 1999; Powers 2012; Ruiz et al. 2008). It is well documented that there is a health advantage for infants born to Hispanic women relative to non-Hispanic whites and blacks in the US (Forbes and Frisbie 1991; Hummer et al. 2007; Markides and Eschbach 2005), which is especially pronounced at the younger maternal ages (Powers 2012). These advantages also vary by nativity, time spent in the US, and country of origin, with lower infant mortality rates for infants born to immigrant women, women who have spent less time in the US, and women with origins from Cuba, Mexico, Central America, and South America (Forbes and Frisbie 1991; Hummer et al. 2007; Kaestner et al. 2009; Landale et al. 2000; Lara et al. 2005; Markides and Eschbach 2005).

Wildsmith (2002) specifically tests Geronimus' weathering hypothesis with data from the Mexican origin population. Using 1989-1991 National Center for Health Statistics (NCHS) linked birth/infant death files, she focuses on multiple infant and adult health measures. She finds evidence of weathering when analyzing neonatal mortality rates but finds only weak support when looking at maternal health. I build upon this work by using several years of data, more recent data, and I use data from women from multiple countries of origin. More recently, Collins et al. (2012) found no evidence of weathering in rates of low birth weight and preterm birth when comparing infants born to first generation and those to established US born Mexican American mothers. The data used in that research was restricted to women whose mothers lived in Chicago at the time of their own birth. The data I use in this analysis are US population level data and are more representative of the complete US Hispanic population. Moreover, moving beyond earlier work in this area, I focus on racial disparities in health outcomes among Hispanic women and infants, rather than comparing Hispanics to non-Hispanics.

Hispanic Ethnicity, Race, and Health Outcomes

There is a modest-sized literature that examines skin color and health outcomes among Hispanics in the US, most of which shows that dark-skin Hispanics have less favorable health and health outcomes than light-skin Hispanics. Landale and Oropesa (2005) showed that skin color is a significant predictor of low birth weight among Puerto Rican women; that is, as skin color darkens among Puerto Ricans, the odds of low birth weight increases. Their findings

varied across geographic setting. They looked at three geographic areas: women living on the island of Puerto Rico, living in New York City, and living in other eastern US cities. There was a significant interaction between living in other eastern US cities and skin color in predicting low birth weight. Thus, the authors show fluidity in the meaning of race based on social context and how this has implications for physical health outcomes.

Although I will not be able to take phenotype into account, research findings that have done so are useful for the overall understanding of race and health outcomes among Hispanics. Phenotype often serves as a primary or preliminary marker of racial distinction. However, skin color is very different than actual racial identification. US racial classification is largely based on a Black-White dichotomy, even while there are five official racial categories. Unlike many of the sending countries where Hispanics experienced a continuum gradient that moves progressively from White to Black (while recognizing and distinguishing racial gradations in between), the US context largely forces this population to choose Black or White. This may be even more difficult for the Mexican origin population, who are more accustomed to recognizing the White and Indigenous heritage which created the Mestizo race recognized in Mexico. The black-white dichotomy imposed in the US stratification system may be even more complicated to navigate or understand because they are more accustomed to a White-Indigenous distinction (Massey and Denton 1992; Villarreal 2010). Regardless, race is a socially based construct that is defined in part by the society in which it is contextualized.

Explicit racial identification among Hispanics is not as common as it is in other US race/ethnic groups; in fact, 42% of Hispanics identified their racial category as “other” in the

2000 US Census (Saenz 2005). This means that just under 60% of Hispanics chose to identify themselves with a specific racial category(ies). In the 2010 census, 36.7% of Hispanics identified themselves as "some other race" (US Census Bureau 2011). Hispanics are often referred to as people of color, yet in the 2010 census more than half (53%) chose to identify as white. The question remains regarding what implications this has for short and long term health outcomes.

The literature examining race and health among Hispanics is minimal. In fact, no study exists that examines infant health among Hispanics by race. However, there are a few studies that examine the relationship between race and health among Hispanics using health outcomes among adults. Borrell and Crawford (2006) conducted research using self-rated health status as the health outcome. Differences in health by race among Hispanics are evident. Hispanic blacks reported a higher prevalence of low self-rated health when compared to Hispanic whites. These authors' primary finding is that race matters when examining health outcomes among the heterogeneous Hispanic population in the US. Borrell and Dallo (2008) later assessed self-rated health reports among Hispanics by race. They find Hispanic blacks are more likely to rate their health as fair or poor compared to Hispanics whites.

In a recently published article, Elo et al. (2011) use the 5% Public Use Micro Data Sample from 2000 to examine disability among blacks in the US, including Hispanic blacks. Though this research does not compare Hispanic blacks to Hispanic whites, their findings have implications regarding the heterogeneity of the US Hispanic population and what this means for Hispanic health outcomes. They find that Hispanic blacks have higher levels of disability than non-Hispanic blacks. Recognizing the racial diversity of the Hispanic population, these results call

into question the overall Hispanic health advantage (Markides and Coreil 1986) and if this is experienced by both Hispanic blacks and whites.

Overall previous research indicates that there remains much to be analyzed and understood regarding the relationship between race and health within the Hispanic population in the US. While some evidence suggests that race has implications for health outcomes among Hispanics, that evidence is far from complete. Furthermore, none of the work to date has focused specifically on race and health outcomes among Hispanic infants. Moreover, the above literature on race and health among Hispanics is sparse. Of the studies that exist, most, but not all, show that Hispanic blacks have worse health outcomes when compared to Hispanic whites. The analyses I perform for this research will add to the existing literature by examining racial differences in infant health among Hispanics. In the next section of this paper, I give a description of the data, measures, and methods I use to answer the question, does race matter for infant health outcomes among Hispanics?

Data and Methods

Data and Measures

I use the National Center for Health Statistics Linked Birth and Infant Death Cohort Files (BID) for births occurring during the years 1995 – 2004. The BID is a collection of birth certificate data linked to corresponding death certificate data (where applicable) for infants who die before one year of age in the United States, Puerto Rico, US Virgin Islands, or Guam. For the purpose of this analysis, I use data for the United States and do not include US

territories. These data are population data and sampling weights are used to correct for small state level data linkage biases only.

I restrict these data to infants born to mothers of Hispanic origin between the ages of 18 and 45 years at the time of birth. The analytic dataset consist of 10 years of data, containing 7,510,622 births and 40,928 infant deaths. The ten years of data I use maximizes the number of cases, utilizes the most currently available data, and provides enough low birth weight births and infant deaths to provide stable parameter estimates.

The data are restricted to infants born to women of Hispanic origin for two key reasons. First, the aim of this paper is to understand the health implications of the racial heterogeneity of the Hispanic population. An analysis comparing the physical health of Hispanics and non-Hispanics does not fulfill this aim. Second, I use the race and ethnic identity of the mother and do not include the race/ethnic identity of the father for two key reasons: a) infant health is known to be a reflection of maternal health (Eberstein 1989; Geronimus 1987). Because I am seeking to understand the implications of structural racism on infant health, I argue that this is reflective of the mother's social experience(s). Therefore, I use the mother's racial and ethnic identity. And, b) paternal race and ethnic identification is more limited and I need to maximize the number of infant births in my dataset. Last, I limit these data to infants born to Hispanic women ages 18-45 to allow time for mothers to have completed their high school education. If I include mothers aged 15-17, the mothers will not have add time to complete their education as I measure it (less than high school, or completed high school or more).

The focal independent variable I use to predict infant health in my analyses is maternal race as reported on the birth certificate. I use three race categories: white, black, and other. The "other" race category is not solely individuals who indicate their race as "other" but is inclusive of all responses to the race question other than black or white.

In the attempt to best understand how social mechanisms influence racial differences in Hispanic health outcomes, I control for basic demographic characteristics, maternal birth history (parity and plurality), socioeconomic status measures, and geographic variables. I dichotomize parity as first birth/not first birth. For plurality of birth, I use two categories, singleton birth and multiple birth.

I operationalize socioeconomic status as maternal education and maternal marital status (Hummer and Hamilton 2010). Maternal education is dichotomized as less than a high school education and a high school education or more. Maternal marital status is dichotomized as married and unmarried. I control for geographic variables. These include nativity, region of residence in the US, and country of origin. Nativity is divided into two categories: foreign born and US born, with island born Puerto Ricans classified as foreign born and mainland born Puerto Ricans classified as US born. Region of residence is divided into five categories, Northeast, West, South, Midwest, and other, as defined in the National Health Interview Survey (NHIS), a widely used, nationally representative, health survey. The data allow for four country of origin categories: Mexico, Puerto Rico, Cuba, and All Other Countries.

Maternal age is associated with infant birth weight (Khoshnood et al. 2005). Increased maternal age increases the odds of low birth weight (Geronimus and Korenman 1993),

particularly among African Americans and Puerto Ricans (Khoshnood et al. 2005). I control for age in my models. Age is measured categorically, 18-19 years, 20-24 years, 25-29 years, 30-34 years, and 35-45 years. Furthermore, I center the age variable on the mean age for my sample (Aiken and West 1991).

I use birth weight and infant mortality as indicators of infant health. First, I use a dichotomous measure of infant birth weight. I distinguish between low birth weight (< 2500 grams) and normal birth weight (≥ 2500 grams). I then use infant mortality risk as a measure of infant health. I use an infant death occurring at or before the age of 364 days as my measure of infant mortality. Last, I use the infant mortality rate and infant mortality rate ratios by race as a measure of infant health.

Methods

I use a progressive additive modeling approach to test my first hypothesis that Hispanic blacks are disadvantaged in infant health outcomes when compared to Hispanic whites. I report my findings in Tables 2 and 3. Both tables contain four statistical models. Model 1 is the most basic model consisting of only demographic variables: age, race, and region of the US (Landale and Oropesa 2005; Logan 2003). It is in this model that I expect to see the most pronounced differences in infant health by maternal race. In Model 2, I assess for evidence of weathering (my second hypothesis) in the racial differences of the health outcome being evaluated. More specifically, I build upon model 1 by adding interaction terms between race and age. Model similarly 3 builds upon model 2 with the addition of measures of

socioeconomic status. Model 4 is my full model. I include geographic origin measures, country of origin and nativity in my final model. It is here that I expect to see race differences in health outcomes and evidence of weathering among Hispanic blacks, net of demographic, socioeconomic, and geographic variables.

I perform logistic regression analysis using Statistical Analysis Software (SAS) to model the odds of a low birth weight infant born to women of Hispanic origin. I use ordinary least squares regression to compute the change in birth weight in relation to demographic, birth history, socioeconomic, and geographic risk factors. I use Cox proportional hazard models to assess the risk of infant mortality among the infants in my population. An infant's exposure time in my models is measured by the age at death (in days). Infants who live to the age of 365 days are right censored.

Last, I report the infant mortality rate for each race group as well as for all infants regardless of maternal race. I estimate these infant mortality rates for five maternal age groups: 18-19 years, 20-24 years, 25-29 years, 30-34 years, and 35-45 years.

Results

Descriptive Statistics

Table 1 displays the weighted descriptive statistics for infants born between the years 1995 and 2004 in the United States to women of Hispanic origin ages 18 to 45 years. Less than 2 percent of mothers in my population are identified racially as black. This is lower than the 2000 census estimate that 3 percent of Hispanics in the US are black (US Census Bureau 2001).

Similarly, approximately 2.5% of my population is identified racially as something other than white or black, which is considerably less than the census estimate of 40 percent. This may be due to reporting differences. While the census is self-reported racial identification, there does not appear to be a set standard for the reporting of maternal race on birth certificates. Given this lack of standardization, I can only assume that there are unique and distinct characteristics of the 4.2% of mothers in this population who do not identify racially as white.

Seventy-seven percent of Hispanics in this population reside in the Midwest and Southern regions of the US, yet 65% of Hispanic blacks live in the Northeast region. Hispanic blacks are the highest educated, but are also the least likely to be married. Hispanic other races are on average older than Hispanic blacks and whites by more than one year and are the least likely to have a high school education. For 2/3 of the Hispanic whites in my population, this is not the mothers' first birth; this number is reduced slightly, to approximately 62% for Hispanic blacks and other races.

The average infant birth weight is higher for Hispanic whites and infants born to Hispanic white mothers are less like to have a birth weight of less than 2500 grams. Given the literature on Hispanic infant health and mortality (Markides and Coreil 1986; Singh and Yu 1995; Hummer et al. 2007), as expected Hispanic white and other race infant mortality rate is better than the US average IMR. Hispanic whites experience an infant mortality rate of 5.5 infant deaths per 1000 live births over the time period 1995-2004 and the IMR for Hispanic other races is 5.8 infant deaths per 1000 live births. As of 2010, the US overall IMR is 6.5 deaths

/ 1000 births (World Bank 2011). Hispanic black infants experience an IMR of 7.7, about 20% higher than the US average.

Regression Analyses of Infant Health

Tables 2 and 3 display the results of regression analyses performed to assess racial differences in infant health, net of covariates. In Table 2, I report the odds ratios for low birth weight among infants born between 1995 and 2004 to women of Hispanic origin ages 18-45 years. Model 1 of Table 2 (the most basic model) shows that Hispanic blacks and other races on average have greater odds of low birth weight than Hispanic whites, net of covariates. Here, Hispanic blacks exhibit even greater odds than Hispanic other races when both groups are compared to infants born to Hispanic white mothers. Infants born to Hispanic black mothers have 16% higher odds of a birth weight lower than 2500 grams than infants born to Hispanic white women. The birth history characteristics perform as expected: multiples have a significantly lower birth weight than singleton births and higher order births show higher birth weights than infants whom are the first birth (Gardner et al. 1995; Zhang and Bowes, J. 1995).

In model 2, I add an interaction term between race and maternal age to test for evidence of weathering, the premature aging of Hispanic blacks and other races. Maternal age was centered on the mean age of my population of 26.5 years. Both interaction terms are statistically significant. However, they operate in different directions. For every year increase in maternal age, Hispanic blacks have increased odds of low birth weight compared to Hispanic whites. This is consistent with the weathering hypothesis (Geronimus 1992). For Hispanic

other races, for each one year increase in maternal age, they show lower odds of having a low birth weight infant. This does not mean that Hispanic other races have a health advantage over Hispanic whites. It is important to note that the main effects for both Hispanic other races and blacks are statistically significant and greater than one. Therefore, at the mean maternal age, both Hispanic blacks and other races are more at risk for low birth weight infants than their white counterparts.

Model 3 reports the effects of socioeconomic status (in addition to demographic predictors) on the odds of low birth weight. Hispanics of lower socioeconomic status (not married, less than a high school education) have higher odds of a low birth weight infant. The addition of socioeconomic covariates into the model reduces the main effects of race on low birth weight. However, once geographic covariates are introduced in model 4, the main effects of black maternal racial identity and the interaction of black maternal racial identity with age increase while the main effects of other race and the interaction between other race and age are both below one. This shows that Hispanic other races show lower odds of low birth weight than infants born to Hispanic whites. Additionally, in model 4 there are wide differences in low birth weight by country of origin. Mothers with origins in Cuba have more favorable infant health outcomes compared to mothers with origins in Mexico. Puerto Rican mothers and mothers with origins in countries other than Cuba have less favorable odds compared with Mexican origin mothers. This is especially true for Puerto Rican mothers. Infants born to Puerto Rican women have 45.3% greater odds of low birth weight than infants born to Mexican/Mexican American women.

Thus, Table 2 shows that there is clear evidence of black-white differences in birth weight among Hispanics. There is also support for the weathering hypothesis, when comparing the birth weight of infants born to Hispanic whites and blacks. For Hispanics of other races, the evidence isn't as clear. There is strong support that other race-white differences exist in infant birth weight. However, I cannot make a definitive conclusion regarding the existence of weathering among Hispanics of other race with regard to infant health.

Table 3 reports the hazard ratios of infant mortality obtained after performing Cox proportional regression analysis on my infant mortality data. In the most basic model, model 1, maternal birth history performs as expected. Multiples are at a much greater risk of infant mortality than singleton births. Similarly, first births have a slightly elevated risk of mortality than infants of higher birth order. Of particular interest in this model are the racial differences in risk of infant mortality. Infants born to Hispanic black women have a 30.8% higher risk of mortality than those born to Hispanic white women. Infants born to Hispanic women who are other races do not experience a risk of mortality that is statistically different than that of infants born to Hispanic white women. In model 2, terms for the interaction of race and maternal age are added to the regression equation. Neither the interaction of black racial identity and maternal age nor the interaction between other race and maternal age are significant; this remains consistent across all models. Thus, these data do not show statistically significant evidence of a difference in race and the risk of mortality by maternal age. There is very little, if any, change in the hazard ratios in model 2 from model 1.

In model 3, I add the socioeconomic status variables in to the model. The negative risks associated with black racial identity remain. Infants born to Hispanic black women continue to exhibit a 30% higher risk of mortality when compared to those born to Hispanic whites. Infants born to unmarried women have a 22.4% higher risk of mortality than those born to married women. Additionally, mothers who have less than a high school education have infants with risk of mortality that is 8.7% higher than infants born to higher educated mothers, net of covariates, before controlling for nativity. The risks associated with region of residence were reduced with the introduction of socioeconomic controls.

Model 4 is my full model which includes nativity and geographic origin variables as covariates in the estimation of risk of infant mortality by maternal race. Infants born to Hispanic black women have a 36% higher risk of mortality after controlling for age, country of origin, education, birth history, region of residence, nativity, and marital status than infants born to Hispanic white women. In fact, their relative risk of mortality increased with the addition of geographic origin control variables. Puerto Rican infants have a 34% greater risk of mortality when compared to infants born to Mexican origin women. Cuban infants actually display a health advantage over Mexican origin infants, with Cuban infants having a 15% lower risk of mortality than Mexican origin infants.

Infant Mortality Rate

I report the infant mortality rates for my data in Table 4. At every age group, Hispanic blacks experience a higher IMR than Hispanic whites. This is most pronounced among infants

with mothers in their early twenties or in the oldest age category (ages 35-45). The lowest IMR experienced by Hispanic blacks is 6.8 infant deaths/ 1000 live births for the age group 25-29 years. This is only slightly lower than the lowest IMR experienced by Hispanics whites, 7.0 deaths/1000 births at ages 35-45 years and 6.9 deaths/1000 births at ages 35-45 years experienced for Hispanic others. For every age category, excluding teen mothers, Hispanic other races have a higher IMR than Hispanics whites. However, the rate ratios comparing Hispanic others and whites do not deviate too far from 1.0. On the other hand, excluding teens, the rate ratios comparing Hispanic blacks and whites are all higher than 1.35. At the given age groups, Hispanic blacks experience infant mortality rates that are between 35% and 44% higher than Hispanic whites. The rate ratios reported are confounded by nativity status, and would be higher if only IMR for US born mothers were reported. For example, for ages 20-24 the black/white rate ratio for infants born to US born women is 1.68 (not shown), whereas overall (US and non-US born combined) this rate ratio is 1.43.

Discussion and Conclusion

The research conducted for this paper fully supports my first hypothesis. Race matters for infant birth weight and infant mortality among Hispanics. Hispanic blacks are particularly disadvantaged in infant health outcomes relative to Hispanic whites. I find modest support for my second hypothesis. I find that the infant birth weight disadvantage experienced by Hispanic blacks magnifies with age relative to the infant birth weight of Hispanic whites. I do not find support for the weathering hypothesis in infant mortality.

In my analyses, I show that Hispanic blacks are particularly vulnerable in terms of both infant birth weight and infant mortality when compared to Hispanic whites. These analyses demonstrate that Hispanics are indeed stratified by race, on a black-white dichotomy, in the United States. While previous studies have documented black-white disparities in adult health among Hispanics (Borrell 2006; Borrell et al. 2007; Borrell and Crawford 2009), this is the first and only study to document black-white disparities in infant health among Hispanics. It is also one of the only studies to document black-white health disparities among Hispanics using regression based analyses; it clearly shows that infants born to Hispanic black women have statistically higher risks of infant mortality and low birth weights when compared to their white counterparts, even when controlling for a wide range of demographic, geographic, and socioeconomic covariates.

My results for Hispanic other races were more tenuous. The data are inconclusive for birth weight. Using a dichotomous measure of birth weight, infants born to Hispanic other race women have a slight advantage compared to infants born to Hispanics white women after controlling for nativity, SES, country of origin, birth history, and demographic variables. The hazard ratios for risk of infant mortality do not help clarify the relationship between other race and infant health outcomes among Hispanics. I do not produce statistically significant results to answer the question of whether weathering exists among Hispanic other races relative to Hispanics whites. Furthermore, the main effects show a slight advantage in the risk of mortality for infants born to Hispanic other race women. Additionally, US born infants of Hispanic other race women have infant mortality rates that are higher than infants born to Hispanics white

women whereas the opposite is true for infants born to foreign born women. It is important to recall that Hispanic other races consists of all racial identities except black and white. This heterogeneity may contribute to the muddled results. This is an area that will require more research.

My results confirm country of origin differences in infant health among Hispanics that are well documented in the literature (Hummer et al. 1992; Hummer et al. 1999; Khoshnood et al. 2005). That is, Puerto Rican infants demonstrate compromised health outcomes relative to Mexican origin infants. Also, infants of Cuban descent display more favorable health outcomes than Mexican origin infants.

Results for infants in which key information was missing or not reported are an interesting group. For almost every health outcome they are significantly, substantively, and statistically disadvantaged relative to the comparison group. While it is difficult to interpret what this means, it is worth noting that there is a group that exists for which data has been difficult to collect but which needs to be monitored.

One of the main limitations of this study is understanding what is captured in race questions using administrative and survey data. There is an ongoing debate regarding the purpose of this question. Some argue that it is meant to capture race so that racially discriminatory practices can be captured in later analyses while others argue that it is about self- identification and perception (Farley and Haaga 2005). It is unclear if people respond to this question based on phenotype, perception by others, family history, socioeconomic position, or other reasons. What does it mean to check the “black” race box on a survey

question or to be identified as black, whether by oneself or someone else, on an administrative record? Further, Jones et al. (2008) find that being ascribed as white by others was more predictive of positive health outcomes regardless of self-identification.

Regardless, race is a stratification tool in the United States. Physical health is not exempt from the effects of race and racism. My analyses show that the Hispanic population is not a racially homogenous group and the racial heterogeneity that exists within this Hispanic population has important implications for health outcomes, more specifically, infant health outcomes. I have documented, through multiple measures, the consistent and pervasive disadvantage experienced by infants born to Hispanic black women ages 18-45 years in comparison to infants born to Hispanic white women age 18-45 years in the United States. It is crucial that researchers and policy makers recognize the heterogeneity of this ethnic group and understand that the diversity of racial identity that exists within this group has serious implications for infant health. The current method of comparing all Hispanics as one pan-ethnic group to non-Hispanic blacks and whites is not sufficient to adequately understand the implications of race for health outcomes.

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Table 1: Weighted Descriptive Statistics
Data for Infants born to Women of Hispanic Origin, Ages 18 - 45 Years
Linked Birth and Infant Death Cohort Files 1995 - 2004

Variable	Hispanic White	Hispanic Black	Hispanic Other	Overall
Maternal Age (Mean Years)	26.4	26.6	27.9	26.5
Ages 18-19	10.3%	10.6%	8.8%	10.3%
Ages 20-24 (ref.)	32.3%	31.6%	27.5%	32.2%
Ages 25-29	28.6%	26.9%	24.8%	28.5%
Ages 30-35	18.8%	19.4%	21.3%	18.9%
Ages 35-45	10.0%	11.5%	17.7%	10.2%
Region of US				
South (ref.)	32.6%	17.9%	37.9%	32.5%
Northeast	11.6%	65.5%	21.8%	12.8%
West	46.0%	10.8%	37.5%	45.2%
Midwest	9.3%	5.7%	2.8%	9.1%
Missing Region	0.4%	0.0%	0.1%	0.4%
Marital Status				
Married	60.4%	39.7%	54.1%	59.9%
Unmarried	39.6%	60.3%	45.9%	40.1%
Missing Married Info	0.0%	0.0%	0.0%	0.0%
Education				
High Sch or More	52.2%	69.4%	24.8%	51.8%
Less Than High Sch	45.9%	29.1%	74.7%	46.3%
Missing Education	1.9%	1.5%	0.5%	1.9%
Nativity				
US Born	36.0%	34.4%	43.5%	36.2%
Foreign Born	63.8%	65.3%	55.9%	63.6%
Missing Nativity	0.2%	0.3%	0.6%	0.2%
Country of Origin*				
Mexico	72.6%	12.0%	39.7%	70.7%
Puerto Rico	6.6%	15.0%	16.6%	7.0%
Cuban	1.7%	2.4%	5.3%	1.8%
Other Country	19.1%	70.6%	38.4%	20.5%
Parity				
First Birth	33.4%	37.3%	37.1%	33.6%
Not First Birth	66.1%	62.4%	62.0%	65.9%
Missing Parity	0.5%	0.2%	0.8%	0.5%
Plurality of Birth				
Singleton	97.9%	97.3%	97.7%	97.8%
Multiples	2.1%	2.7%	2.3%	2.2%
Birth Weight				
Mean Birth Weight (grams)	3,326	3,265	3,286	3,324
Low Birth Weight	6.4%	8.3%	7.2%	6.4%
Normal Birth Weight	93.6%	91.7%	92.8%	93.6%
Missing Birth Weight	0.0%	0.0%	0.0%	0.0%
Infant Survival				
% Survive	99.4%	99.2%	99.4%	99.4%
% Died	0.6%	0.8%	0.6%	0.6%
Infant Mortality Rate	5.5	7.7	5.8	5.6
UnWeighted N	7,191,632	133,069	185,921	7,510,622

Source: National Center for Health Statistics 2011

Table 2: Effects of Predictors on Odds of Low Birth Weight (2500 grams or less)
Data for Infants born to Women of Hispanic Origin, Ages 18 - 45 Years
Linked Birth and Infant Death Cohort Files 1995 - 2004

Variable	Model 1		Model 2		Model 3		Model 4	
Maternal Race								
White (ref.)	-		-		-		-	
Black	1.161	***	1.158	***	1.135	***	1.156	***
Other	1.061	***	1.079	***	1.059	***	0.962	***
Maternal Age								
Ages 18-19	1.156	***	1.156	***	1.109	***	1.063	***
Ages 20-24 (ref.)	-		-		-		-	
Ages 25-29	0.937	***	0.937	***	0.974	***	1.001	
Ages 30-34	1.034	***	1.035	***	1.096	***	1.135	***
Ages 35-45	1.352	***	1.357	***	1.437	***	1.496	***
Region of US								
South (ref.)	-		-		-		-	
West	0.915	***	0.915	***	0.902	***	0.922	***
North	1.129	***	1.129	***	1.076	***	0.948	***
Mid-West	0.952	***	0.952	***	0.939	***	0.938	***
Missing Region	0.588	***	0.588	***	0.606	***	0.681	
Parity								
First Birth (ref.)	-		-		-		-	
Not First Birth	0.698	***	0.698	***	0.698	***	0.681	***
Missing First Birth Info	1.208	***	1.208	***	1.152	***	1.100	***
Plurality of Birth								
Singleton (ref.)	-		-		-		-	
Multiples	23.659	***	23.662	***	23.905	***	23.837	***
Maternal Race x Maternal Age								
White x Age (ref.)			-		-		-	
Black x Age			1.007	***	1.007	***	1.012	***
Other x Age			0.989	***	0.989	***	0.989	***
Marital Status								
Married (ref.)					-		-	
Unmarried					1.254	***	1.222	***
Maternal Education								
High Sch or More (ref.)					-		-	
Less Than High Sch					1.023	***	1.129	***
Missing Education					1.305	***	1.378	***
Maternal Nativity								
US Born (ref.)							-	
Foreign Born							0.794	***
Missing Nativity							1.736	***
Maternal Country of Origin*								
Mexico (ref.)							-	
Puerto Rico							1.453	***
Cuban							0.965	**
Other Country							1.096	***
Intercept (Baseline Odds)	0.069	***	0.069	***	0.061	***	0.065	***
AIC	3,259,489.7		3,259,414.8		3,254,022.8		3,244,379.0	
Unweighted N (# LBW Infants)	480,550		480,550		480,550		480,550	

+ p < 0.1, * p <.05, ** p <.01, *** p <.001

Source: National Center for Health Statistics (2011)

Table 3: Estimated Effects on the Hazard (or Risk) of Infant Mortality (i.e. Hazard Ratios)
Data for Infants born to Women of Hispanic Origin, Ages 18 - 45 Years
Linked Birth and Infant Death Cohort Files 1995 - 2004

Variable	Model 1		Model 2		Model 3		Model 4	
Maternal Race								
White (ref.)	-		-		-		-	
Black	1.308	***	1.306	***	1.299	***	1.355	***
Other	1.025		1.026		1.011		0.931	*
Maternal Age								
Ages 18-19	1.196	***	1.196	***	1.144	***	1.094	***
Ages 20-24 (ref.)	-		-		-		-	
Ages 25-29	0.911	***	0.911	***	0.947	***	0.979	
Ages 30-34	0.943	***	0.942	***	0.998		1.044	**
Ages 35-45	1.229	***	1.227	***	1.297	***	1.368	***
Region of US								
South (ref.)	-		-		-		-	
West	1.018		1.018		1.000		1.012	
North	1.110	***	1.110	***	1.060	***	0.974	
Mid-West	1.242	***	1.242	***	1.226	***	1.217	***
Missing Region	0.417	***	0.417	***	0.439	***	0.485	***
Parity								
First Birth (ref.)	-		-		-		-	
Not First Birth	0.937	***	0.936	***	0.926	***	0.902	***
Missing First Birth Info	2.475	***	2.475	***	1.991	***	1.712	***
Plurality of Birth								
Singleton (ref.)	-		-		-		-	
Multiples	5.949	***	5.949	***	6.004	***	5.918	***
Maternal Race x Maternal Age								
White x Age (ref.)			-		-		-	
Black x Age			1.004		1.005		1.010	+
Other x Age			1.000		1.000		0.998	
Marital Status								
Married (ref.)					-		-	
Unmarried					1.224	***	1.185	***
Maternal Education								
High Sch or More (ref.)					-		-	
Less Than High Sch					1.087	***	1.189	***
Missing Education					2.636	***	2.539	***
Maternal Nativity								
US Born (ref.)							-	
Foreign Born							0.784	***
Missing Nativity							4.082	***
Maternal Country of Origin*								
Mexico (ref.)							-	
Puerto Rico							1.343	***
Cuban							0.855	***
Other Country							0.987	
-2Log Likelihood	1,286,090		1,286,089		1,284,363		1,282,562	
Number of Deaths	40,928		40,928		40,928		40,928	

+ $p < 0.1$, * $p < .05$, ** $p < .01$, *** $p < .001$

Source: National Center for Health Statistics (2011)

Table 4: Infant Mortality Rate by Race and Maternal Age (# deaths per 1000 live births)
Data for Infants born to Women of Hispanic Origin, Ages 18 - 45 Years
Linked Birth and Infant Death Cohort Files 1995 - 2004

Maternal Age	Hispanic White		Hispanic Black		Hispanic Other		Overall		Rate Ratio	Rate Ratio
	IMR	N*	IMR	N*	IMR	N*	IMR	N*	(Black/White)	(Other/White)
Ages 18 - 19	6.5	739,608	8.3	14,143	6.0	16,282	6.5	770,032	1.28	0.93
Ages 20 - 24	5.4	2,323,697	7.7	42,037	5.7	51,044	5.5	2,416,778	1.43	1.05
Ages 25 - 29	5.0	2,057,773	6.8	35,825	5.2	46,170	5.0	2,139,769	1.36	1.04
Ages 30 - 34	5.3	1,354,460	7.2	25,781	5.5	39,564	5.3	1,419,805	1.37	1.05
Ages 35 - 45	7.0	716,974	10.0	15,297	6.9	32,873	7.0	765,144	1.44	0.99

N* denotes number of births
Source: National Center for Health Statistics (2011)