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Deteriorating Birth Weights Among Descendants of Black Immigrant Women

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Abstract

Using Florida birth records from 1971 – 2015, we link birth records of infants to the birth records of their mothers in order to compare birth weights between descendants of black immigrant grandmothers and native-born black grandmothers. We find that the daughters of black immigrant women have substantially higher birth weights than daughters of native-born black women. However, the grandchildren of foreign-born black immigrant women have a much smaller advantage, and exhibit a steep decline in birth weight relative to their mothers. These findings are consistent with the theory that lifetime exposure to psychosocial stressors and discrimination is deleterious to health. The identification of mechanisms through which these processes occur, such as maternal behaviors or maternal health complications, is important for the understanding of how the experience of life as a black woman in the United States translates into health disparities in subsequent generations.

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Introduction

Racial disparities in birth outcomes have existed for decades in the United States. In 1977-1979, the infant mortality rate and prevalence of low birth weight for black infants were twice as high for black infants as compared to white infants¹. These disparities in birth outcomes were identified as a problem in the 1979 report “Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention”, the precursor to the current Healthy People Program. Reducing health disparities has been a goal in every subsequent Healthy People initiative. However, disparities remain today. In 2014, black women had the highest prevalence of low birth weight births of all racial groups with 12.8% of births weighing less than 2,500 g, compared to only 7% of births to white women².

Simple genetic explanations for these racial disparities in birth outcomes have fallen out of favor in the literature, in part because there is substantial heterogeneity in birth outcomes within the black population in the United States. Foreign-born black women have heavier babies than US-born black women, instead having birth outcomes closer to those of white women³⁻¹¹. The prevalence of preterm birth is also lower among infants born to foreign-born black women than among births to native-born black women^{4,7,8,10}.

These results suggest that African American women in the US are not likely to be genetically predisposed to give birth to low birth weight or preterm infants, but they do not rule out epigenetic explanations. Epigenetic changes to the fetal environment, such as methylation of the DNA in the pregnant woman, have been shown to affect fetal growth and development including birth weight and prematurity. Some scholars have pointed to the potential epigenetic effects of stressors experienced during pregnancy by black women in the United States^{12,13}. One theory is that foreign-born black women did not routinely experience discrimination in their origin countries, unlike their American counterparts who regularly experience discrimination as a psychosocial stressor. Foreign-born black women with longer duration in the United States are thus expected to exhibit worse birth outcomes than more recent arrivals, and a few studies confirm this.^{14,15}

In a seminal study, Collins et. al (2002) tested whether birth outcomes deteriorated with duration in the United States as measured by generation from immigration. They compared the birth weights of women and their daughters using 41 years of Illinois birth records. They found that although the daughters of black immigrant women had favorable birth outcomes that were comparable to those of white women, the descendants of black immigrant grandmothers experienced steeper declines in birth weights across generations than descendants of native-born black grandmothers. Their conclusions were based on a sample size of only 104 infants whose grandmothers were black immigrants, and only limited covariates could be assessed.

To the best of our knowledge, since this influential study, there has been no additional research to confirm whether these trends hold in larger samples, more recent time periods and other geographic locations. Our study assesses whether birth weights of the descendants of black immigrant grandmothers deteriorate with subsequent generations in the United States using Florida birth records from 1971 to 2015.

Data and Methods

Data in this study are drawn from 1971 – 2015 birth records obtained from the Florida Department of Vital Statistics. Florida is one of the top ten states with the largest foreign-born black population, primarily of Caribbean origin, and has detailed birth records available to researchers. Use of these data was approved by the Princeton University Institutional Review Board and the Florida Department of Public Health.

We define women giving birth between 1971 and 2000 as the first generation in our study (grandmother generation or G1). Birth records from these years contain information on mother's race and nativity, which we use to define the nativity of the grandmother. We then linked birth records of female infants born between 1971 and 2000 (mother generation or G2) to birth records of infants born between 1989 and 2015 (child generation or G3) to obtain a transgenerational data set. The infant's date of birth, first name, middle name and last name in the 1971 – 2000 records were linked to the mother's date of birth, first name, middle name, and maiden name in the 1989 – 2015 records. We allow these generations to overlap to capture as many mother-child dyads as possible. Birth records were linked between the two generations using fastLink, a probabilistic matching package in R designed to link records without unique identifiers¹⁶. Of the 1,447,269 infants born in Florida between 1989 and 2015 with a mother born in Florida between 1971 and 2000, 1,383,248 (95.6%) were linked to their mothers' birth records.

Preliminary Results

Summary statistics of the linked transgenerational data set are displayed in Table 1. Because of the nature of its construction, the linked sample is not representative of all births in Florida between 1989 and 2015 nor is it representative of all women born in Florida between 1971 and 2000. It only includes infants born between 1989 and 2015 whose mothers were born in Florida between 1971 and 2000 and remained in the state as adults, and thus excludes births to women who were born outside Florida or who moved from Florida. Furthermore, because of the limited range of years available, we cannot observe all women in the mother generation through the end of their reproductive years and so we disproportionately capture women who had children at relatively young ages. The birth weights of the infants that were linked are lower than those who were not linked, suggesting that our analytic sample is slightly negatively selected compared to all births in Florida.

Table 2 summarizes selected birth outcomes for infants by grandmaternal race, grandmaternal nativity, and generation. We include families with white grandmothers for comparison. Consistent with other studies, we find a clear foreign-born advantage for black women with regard to birth weight. Daughters of foreign-born black women were on average 122 grams heavier than daughters of native-born black women in our sample, and the prevalence of low birth weight (<2500 g) was 8.2% for daughters of foreign-born black women, and 12.6% for daughters of native-born black women. Unlike prior studies, we do not find that birth weights of daughters of foreign-born black women are closer to those of daughters of white women than native-born black women; rather we find that they are in between these two groups. There is a very slight disadvantage in birth weight for daughters of foreign-born white women, though both foreign-born and native-born white women have more favorable birth outcomes than either foreign-born or native-born black women.

By the third generation, that is the grandchildren in the transgenerational data set, the birth weights of the descendants of foreign-born black women appear to be converging toward those of native-born black women, though they still enjoy a slight advantage.

Figure 1 displays the distributions of birth weights of mothers (G2) and children (G3) for the four groups defined by grandmaternal race and nativity. All four groups exhibit a significant reduction in birth weight from G2 to G3. This is consistent with trends in the full sample of Florida births and recent research documenting a secular decline in birth weight in recent decades after several decades of improvement^{17,18}. This decline is most pronounced in the descendants of foreign-born black grandmothers, whose birth weight declined by 132 grams on average.

Planned Analyses

Our future analyses will test whether observed sociodemographic and medical risk factors can explain the foreign-born advantage in birth weight in the second and third generation. We will also examine disparities in additional birth outcomes and behaviors that are available in records of the third generation, including gestation length, rates of preterm birth, infant mortality, and mother's alcohol consumption during pregnancy. We will identify risk factors that could potentially be addressed to help improve birth outcomes of African American women in the United States.

We will examine whether our findings support theories of why birth outcomes are worse for infants of black women in the United States. Our preliminary findings are consistent with the theory of negative acculturation in which more time in the United States is associated with declining health for immigrants, especially for immigrants subject to discrimination and its associated effects on health. These findings are also consistent with the weathering hypothesis proposed by Geronimus, in which the health of African American women is harmed by cumulative exposure to disadvantage¹⁹. We will also assess the degree to which selectivity of immigrants can explain the foreign-born advantage and we will consider native-born interstate migrants as an alternative comparison group.

Table 1: Summary statistics of transgenerational data set (N = 1,383,248)*

	Mean (SD) or %
<u>Grandmother characteristics</u>	
Grandmother's race	
White	61.2%
Black	38.3%
Other	0.6%
Grandmother's place of birth	
Florida	54.6%
Another US State	34.6%
US Territory	0.8%
Foreign-born	9.9%
Grandmother's education	
Less than high school	39.8%
High school or GED	41.9%
Some college, college, or above	18.2%
Grandmother's characteristics during pregnancy/birth of mother	
Married at time of birth	64.6%
Parity (not including index pregnancy)	1.19 (1.5)
<u>Mother characteristics</u>	
Mother's race	
White	58.9%
Black	38.8%
Other	0.5%
Hispanic origin of mother	
Hispanic	10.8%
Mother's education	
Less than high school	24.9%
High school or GED	37.9%
Some college	24.5%
College or more	12.7%
Health outcomes of mother	
Birth weight in grams	3,227 (548)
Low birth weight (<2,500 g)	8.4%
Very low birth weight (<1500 g)	0.73%
Characteristics during pregnancy/birth of child	
Age at birth	23.8 (5.2)
Married at time of birth	39.8%
Parity (not including index pregnancy)	0.9 (1.2)
Received any prenatal care	98.6%
Total prenatal visits	11.2 (4.0)
Consumed alcohol during pregnancy	0.4%
Risk factors during pregnancy with child	
Any diabetes (chronic or gestational)	3.3%
Chronic hypertension	1.2%
Pregnancy-related hypertension	5.3%
Other risk factors	22.0%
Pre-pregnancy weight in pounds	157 (43)
Medicaid insurance paid for birth	59.2%
Private insurance paid for birth	37.7%
Self or other insurance paid for birth	3.1%
<u>Child characteristics</u>	
Female	51.2%
Singleton	97.2%
Health outcomes of child	
Birth weight in grams	3,207 (607)
Low birth weight (<2,500 g)	9.5%
Very low birth weight (<1500 g)	1.8%
Gestation length weeks	38.4 (2.3)
Preterm birth (<37 weeks)	11.3%
APGAR score at 5 minutes	8.8 (0.8)
Any abnormal conditions	9.6%
Any congenital anomalies	0.8%
Child died by 12/31/2017	1.3%
Child born by vaginal birth	70.2%
Child born by cesarean	29.8%

* Variables are listed under each generation for which they are available. Florida birth records became much more detailed after 1989 and thus, many variables are available only for the child and the mother during her pregnancy with the child.

Table 2: Birth outcomes by race and nativity of grandmother

	Race/ethnicity of grandmother (1 st generation)	White			Black		
		Nativity status of grandmother (1 st generation)	Native-born	Foreign-born	p-value (foreign v.native)	Native-born	Foreign-born
2 nd generation (mothers born 1971-2000)	Mean birth weight (g)	3,321	3,313	0.001	3,071	3,193	< 0.001
	% Low birth weight (<2500g)	6.0%	5.2%	< 0.001	12.6%	8.2%	< 0.001
	N	396,564	56,685		213,975	17,104	
3 rd generation (infants born 1989-2015)	Mean birth weight	3,311	3,267	< 0.001	3,045	3,061	< 0.001
	% Low birth weight (<2500g)	7.0%	7.1%	0.58	13.7%	12.9%	< 0.001
	Gestation length (weeks)	38.6	38.5	< 0.001	38.1	38.1	0.27
	% Preterm birth (<37 weeks gestation)	9.4%	9.0%	< 0.001	14.5%	13.2%	< 0.001
	Died in calendar year of birth or subsequent calendar year	0.7%	0.5%	< 0.001	1.4%	1.2%	0.002
	% Female	48.7%	48.6%	0.96	49.1%	48.8%	0.23
N	738,053	100,792		493,197	30,475		

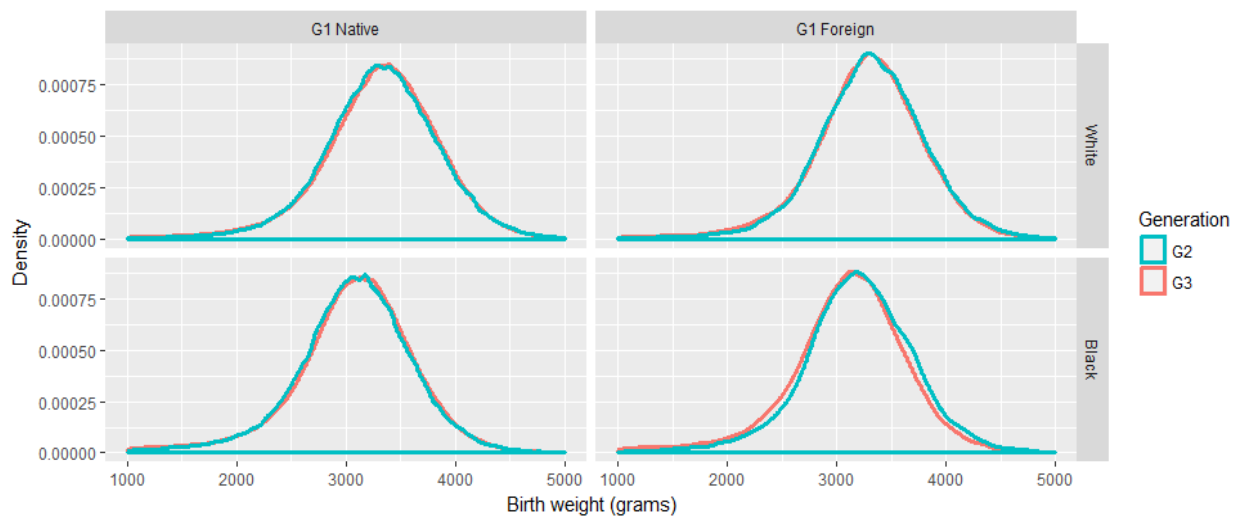


Figure 1: Distribution of G2 and G3 birth weights by G1 race and nativity

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References

1. McCormick, M. C. The contribution of low birth weight to infant mortality and childhood morbidity. *N. Engl. J. Med.* 312, 82–90 (1985).
2. Hamilton, B. E., Martin, J. A., Osterman, M. J. K., Curtin, S. C. & Matthews, T. J. *Births: Final Data for 2014*. (Centers for Disease Control and Prevention, 2015).
3. Acevedo-Garcia, D., Soobader, M.-J. & Berkman, L. F. The differential effect of foreign-born status on low birth weight by race/ethnicity and education. *Pediatrics* 115, e20–e30 (2005).
4. Cabral, H., Fried, L. E., Levenson, S., Amaro, H. & Zuckerman, B. Foreign-born and US-born black women: differences in health behaviors and birth outcomes. *Am J Public Health* 80, 70–72 (1990).
5. Collins, J. W., Wu, S.-Y. & David, R. J. Differing Intergenerational Birth Weights among the Descendants of US-born and Foreign-born Whites and African Americans in Illinois. *Am J Epidemiol* 155, 210–216 (2002).
6. David, R. J. & Collins, J. W. J. Differing Birth Weight among Infants of U.S.-Born Blacks, African-Born Blacks, and U.S.-Born Whites. *New England Journal of Medicine* 337, 1209–1214 (1997).
7. Elo, I. T., Vang, Z. & Culhane, J. F. Variation in Birth Outcomes by Mother’s Country of Birth Among Non-Hispanic Black Women in the United States. *Matern Child Health J* 18, 2371–2381 (2014).
8. Forna, F., Jamieson, D. j., Sanders, D. & Lindsay, M. k. Pregnancy outcomes in foreign-born and US-born women. *International Journal of Gynecology & Obstetrics* 83, 257–265 (2003).
9. Fuentes-Afflick, E., Hessol, N. A. & Pérez-Stable, E. J. Maternal Birthplace, Ethnicity, and Low Birth Weight in California. *Arch Pediatr Adolesc Med* 152, 1105–1112 (1998).
10. Howard, D. L., Marshall, S. S., Kaufman, J. S. & Savitz, D. A. Variations in low birth weight and preterm delivery among blacks in relation to ancestry and nativity: New York City, 1998–2002. *Pediatrics* 118, e1399–1405 (2006).
11. Vang, Z. M. & Elo, I. T. Exploring the health consequences of majority–minority neighborhoods: Minority diversity and birthweight among native-born and foreign-born blacks. *Social Science & Medicine* 97, 56–65 (2013).
12. Burris, H. H., Baccarelli, A. A., Wright, R. O. & Wright, R. J. Epigenetics: linking social and environmental exposures to preterm birth. *Pediatr Res* 79, 136–140 (2016).
13. Kuzawa, C. W. & Sweet, E. Epigenetics and the embodiment of race: developmental origins of US racial disparities in cardiovascular health. *American Journal of Human Biology* 21, 2–15 (2009).
14. Hendi, A. S., Mehta, N. K. & Elo, I. T. Health Among Black Children by Maternal and Child Nativity. *Am J Public Health* 105, 703–710 (2015).
15. Teitler, J. O., Hutto, N. & Reichman, N. E. Birthweight of children of immigrants by maternal duration of residence in the United States. *Social Science & Medicine* 75, 459–468 (2012).
16. Enamorado, T., Fifield, B. & Imai, K. *Using a probabilistic model to assist merging of large-scale administrative records*. (Technical Report. Department of Politics, Princeton University, 2017).
17. Catov, J. M., Lee, M., Roberts, J. M., Xu, J. & Simhan, H. N. Race Disparities and Decreasing Birth Weight: Are All Babies Getting Smaller? *Am J Epidemiol* 183, 15–23 (2016).
18. Donahue, S. M. A., Kleinman, K. P., Gillman, M. W. & Oken, E. Trends in Birth Weight and Gestational Length Among Singleton Term Births in the United States. *Obstet Gynecol* 115, 357–364 (2010).
19. Geronimus, A. T. The weathering hypothesis and the health of African-American women and infants: evidence and speculations. *Ethn Dis* 2, 207–221 (1992).