

# Health Among Black Children by Maternal and Child Nativity

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An increasing proportion of US children have parents who were born outside the United States.<sup>1</sup> In 2012, 24% of children younger than 18 years had at least 1 foreign-born parent. Among US Blacks, the proportion of children with foreign-born parents has increased from 9% in 2000 to 17% in 2012 because of large migration streams from Africa and the Caribbean. Despite the rapid growth of this subpopulation over the past decade—from roughly 930 000 to over 2 million children—relatively little is known about these children, mostly because of data limitations and the recency of these migration flows.<sup>2</sup>

Previous studies on the health of children of foreign-born parents (whom we refer to as foreign-origin children) have focused mostly on Hispanic and, to a lesser extent, on Asian children. Studies of Hispanic children generally report that foreign-origin children have better health than US-origin children despite Hispanic families being socioeconomically disadvantaged.<sup>1,2</sup> Studies also highlight considerable heterogeneity in the health patterns of both Hispanic and Asian foreign-origin children, including differences by type of illness and levels of parents' acculturation and region of birth.<sup>3-7</sup> Explanations for these patterns emphasize the role of selective migration, acculturation, and access to social and health-related resources.<sup>1,8,9</sup>

We examined differences in health outcomes among US Black children according to the mother's region of birth and whether the children of foreign-born mothers were born abroad or in the United States. We investigated measures of general health status (child's overall health status, activity limitations, missed school days due to illness) and highly prevalent specific illnesses (allergies, asthma). We examined the role of socioeconomic status (SES) and mother's duration of US residence as explanatory factors.

## METHODS

Our data are from the 2000–2011 waves of the National Health Interview Survey (NHIS).<sup>10</sup>

**Objectives.** We examined 5 health outcomes among Black children born to US-born and foreign-born mothers and whether differences by mother's region of birth could be explained by maternal duration of US residence, child's place of birth, and familial sociodemographic characteristics.

**Methods.** Data were from the 2000–2011 National Health Interview Surveys. We examined 3 groups of children, based on mother's region of birth: US origin, African origin, and Latin American or Caribbean origin. We estimated multivariate regression models.

**Results.** Children of foreign-born mothers were healthier across all 5 outcomes than were children of US-born mothers. Among children of foreign-born mothers, US-born children performed worse on all health outcomes than children born abroad. African-origin children had the most favorable health profile. Longer duration of US residence among foreign-born mothers was associated with poorer child health. Maternal educational attainment and other sociodemographic characteristics did little to explain these differences.

**Conclusions.** Further studies are needed to understand the role of selective migration and the behavioral, cultural, socioeconomic, and contextual origins of the health advantage of Black children of foreign-born mothers. (*Am J Public Health.* 2015;105:703–710. doi:10.2105/AJPH.2014.302343)

The NHIS is the largest annual cross-sectional in-person survey on health and is nationally representative of the US civilian noninstitutionalized population. We obtained NHIS data from the Integrated Health Interview Series, which contain a harmonized set of NHIS variables.<sup>11</sup>

Information about child health in the NHIS is asked of a knowledgeable adult in the household, usually a parent. Since 1998, the NHIS has included 2 types of questionnaires: the core questionnaire, which asks about the health of all children in a family, and the sample child questionnaire, which asks more detailed questions about the health of 1 randomly selected child per family. We drew from both questionnaires in this analysis. We focused on children aged from birth to 16 years, because there may be differential coverage of 17-year-olds because of college attendance or because these children have left the household for other reasons. In the core questionnaire, there were 49 635 children aged birth to 16 years who were identified by their parents as being Black or African American. Of these, we included only children with a biological mother present in the household

(n = 42 509). We dropped an additional 3177 children because they were missing information on 1 of the following: mother's place of birth (n = 197), 1 of the child health outcomes (n = 520), whether the child was born in the United States or abroad (n = 132), mother's marital status (n = 418), a parent's educational level (n = 482), Spanish-language interview (n = 1084), or duration of mother's residence in the United States (n = 344). We excluded an additional 394 children because their mothers were born outside of the United States, Latin America and the Caribbean, and Africa. We also excluded from the sample foreign-born children with US-born mothers (n = 117). Our final sample size from the core questionnaire was 38 938 children. Percentages of missing data in the sample child questionnaire were similar, and our final sample size based on the sample child questionnaire was 18 030 children.

## Mother's Region of Birth and Child Health Outcomes

We divided the sample into 3 origin groups on the basis of the biological mother's region of

birth: the United States, Latin America and the Caribbean, and Africa (for details, see Tables A and B, available as a supplement to the online version of this article at <http://www.ajph.org>). Among children of foreign-born mothers, we additionally distinguished between children born abroad and those born in the United States. We focused on the mother's region of birth because 64% of the final sample did not have a biological father in the household.

We assessed 5 health outcomes. Two of the outcomes (general health status, activity limitations) were from the core questionnaire and the other 3 (missed school days, asthma, allergies) were from the sample child questionnaire.

We coded general health status on an integer scale from 1 to 5, where 1 indicates excellent health and 5 indicates poor health. A knowledgeable adult in the family was asked, "Would you say [child's] health in general is excellent, very good, good, fair, or poor?" Because the Spanish translation of the question may lead to different responses, we controlled for Spanish language interview in models of general health status.<sup>12</sup> We coded a binary activity-limitations variable 1 if the child had any type of activity limitation, including limitations in play, activities of daily living, walking, learning, and remembering, or any other limitation due to physical, mental, or emotional problems. Number of missed school days is the number of days in the past 12 months that a child missed school through illness or injury. We measured it only for sample children older than 5 years. The asthma variable is a binary indicator of whether a child had ever been diagnosed with asthma by a doctor or other health professional. The binary allergy variable indicates whether a parent had been told by a health professional in the last 12 months that the child had eczema or any kind of skin or respiratory allergy. We used these 5 outcomes because they are prevalent and are core indicators of health for children across the age range birth to 16 years. They are consistently collected across survey waves and have few missing cases.

### Other Explanatory Variables

We measured SES by mother's education, family income, and family size. In 57 cases, mother's education was missing, so we used father's education. Family income was based on 5 imputations performed by the National

Center for Health Statistics. We converted it from a categorical to a continuous variable using parametric smoothing methods, with parameters estimated separately by mother's region of birth and survey year.<sup>13</sup> We included logged family income in the regressions. We additionally included mother's age (in single years) at time of survey and marital status (never married, married, or widowed, divorced, or separated). Child-specific controls included age (in single years), gender, and region of US residence (Northeast, North Central and Midwest, South, and West), because health outcomes vary by region and the regional distribution of children varies by the origin of the mother. The model for general health status additionally controlled for whether the interview was conducted in Spanish.

For foreign-born mothers, we used a categorical duration-of-residence variable that indicated how long the mother had lived in the United States. It is often theorized that longer duration of US residence leads to greater acculturation and adaptation of behaviors that impinge negatively on the mother's and the child's health and may thus moderate the health advantage associated with having foreign-born parents.<sup>8,9</sup> The 4 categories were (1) less than 5 years, (2) 5 to less than 10 years, (3) 10 to less than 15 years, and (4) 15 years or longer.

### Statistical Analysis

We present descriptive statistics of our explanatory variables by mother's region of birth. We used multivariate linear regressions to model general health status and missed school days. We used logistic regression models for the binary outcomes (activity limitations, asthma diagnoses, and recent allergies). A first set of models included all children. Model 1 adjusted for the mother's region of birth, child's age, gender, region of residence, mother's marital status, and survey year. Model 2 additionally controlled for mother's education and family income, to examine the extent to which health differences were explained by differences in SES. To further characterize health patterns among children of foreign-born mothers, we estimated a second set of models restricted to these children. We examined differences in health outcomes between Latin American–Caribbean-origin children and

African-origin children (model 1) and whether these differences could be explained by mothers' duration of US residence (model 2) or whether the child was born in the United States or abroad (model 3).

We conducted all analyses with Stata version 11 (StataCorp LP, College Station, TX). We adjusted estimates for complex survey design, imputation of family income, and clustering at the sibling level.

## RESULTS

Descriptive statistics are presented in Table 1. Approximately 12% of Black children in our sample had foreign-born mothers, which is consistent with national Census Bureau estimates over this period.<sup>2</sup> Among children with foreign-born mothers, 69% were Latin American–Caribbean origin and 31% were African origin. Eighty-seven percent of Latin American–Caribbean-origin children were US born, compared with 76% of African-origin children. Mothers born in Africa had been in the United States for less time than mothers born in Latin America or the Caribbean. For example, 18% of mothers born in Africa had been in the United States less than 5 years, compared with 6% of mothers born in Latin America or the Caribbean. Latin American–Caribbean-origin children were more likely to reside in the Northeast than African- or US-origin children. US-origin children were more likely to live in the South than children in the other groups. Both groups of foreign-born mothers had higher levels of college completion and family income than US-born mothers. US-born mothers were the least likely to be currently married.

Table 2 presents the mean values for each child health outcome by mother's and child's birthplace. All pairwise differences in Table 2 were statistically significant at the 5% level except for general health status between US-born and foreign-born children of foreign-born mothers. For all outcomes, there was a gradient such that children of US-born mothers fared worse than children of mothers born in Latin America or the Caribbean, who in turn fared worse than children of African-born mothers. Among children of foreign-born mothers, those born in the United States had poorer health outcomes than children born abroad, except for overall health status.

**TABLE 1—Sample Characteristics of Black Children (Aged From Birth to 16 Years) Born to US-Born and Foreign-Born Mothers: National Health Interview Survey, 2000–2011**

| Characteristics                                    | Mother's Region of Birth                      |  |                                       |                                       |
|--|---|--|---------------------------------------|---------------------------------------|
|  | United States (n = 34 371),<br>Mean (SD) or % | Latin America and Caribbean<br>(n = 3 151), Mean (SD) or % | Africa (n = 1 416),<br>Mean (SD) or % | Total (n = 38 938),<br>Mean (SD) or % |
| <b>Child's Characteristics</b>                     |   |  |                                       |                                       |
| Age, y   | 7.85 (5.39)                                   | 8.14 (5.71)  | 6.80 (5.29)                           | 7.84 (5.42)                           |
| Female   | 50  | 51   | 50                                    | 50                                    |
| Place of birth of children of foreign-born mothers |   |  |                                       |                                       |
| Abroad   | ...   | 13   | 24                                    | ...                                   |
| United States                                      | ...   | 87   | 76                                    | ...                                   |
| Region of residence in US                          |   |  |                                       |                                       |
| Northeast  | 14  | 50   | 23                                    | 17                                    |
| Midwest  | 21  | 4  | 23                                    | 20                                    |
| South  | 57  | 39   | 39                                    | 55                                    |
| West   | 8   | 8  | 16                                    | 8                                     |
| No. of family members                              | 4.4 (1.7)                                     | 4.5 (1.8)  | 5.0 (1.8)                             | 4.4 (1.7)                             |
| <b>Mother's Characteristics</b>                    |   |  |                                       |                                       |
| Age, y   | 33.4 (8.3)                                    | 37.1 (8.7)   | 36.4 (7.9)                            | 33.8 (8.4)                            |
| Duration of residence in US, y                     |   |  |                                       |                                       |
| < 5  |   | 6  | 18                                    | 11                                    |
| 5 to < 10  |   | 16   | 33                                    | 22                                    |
| 10 to < 15   |   | 20   | 21                                    | 21                                    |
| ≥ 15   |   | 57   | 27                                    | 47                                    |
| Marital status                                     |   |  |                                       |                                       |
| Never married                                      | 43  | 20   | 8                                     | 40                                    |
| Married  | 38  | 62   | 78                                    | 41                                    |
| Widowed, divorced, or separated                    | 19  | 17   | 14                                    | 19                                    |
| Education <sup>a</sup>                             |   |  |                                       |                                       |
| < high school                                      | 17  | 23   | 20                                    | 18                                    |
| High school  | 32  | 27   | 25                                    | 31                                    |
| Some college                                       | 37  | 32   | 29                                    | 36                                    |
| ≥ college  | 14  | 18   | 26                                    | 15                                    |
| Family income, \$                                  | 39 565 (32 985)                               | 54 348 (46 675)  | 57 536 (49 183)                       | 41 296 (35 222)                       |
| Spanish interview                                  | 0   | 11   | 0                                     | 1                                     |

Note. All sample means are weighted. Standard deviations, given in parentheses, are adjusted for imputation for family income. All pairwise differences for continuous variables are statistically significant except for the difference between Latin American–Caribbean-born mothers and African-born mothers on mother's age and family income.

<sup>a</sup>Mother's education when not missing, otherwise father's education is used (n = 57).

Table 3 presents estimates from regressions that included all children. The results confirm the pattern in Table 2, suggesting that children with Latin American–Caribbean-born mothers or African-born mothers were healthier than children with US-born mothers, although not all differences were statistically significant. In model 1, we found that the general health status of Latin American–Caribbean-origin and African-origin children was better than that of US-origin children (by 0.06 and 0.17 points on the 1–5 scale, respectively). US-origin children

missed more school days than Latin American–Caribbean-origin (1.01 more days) and African-origin children (1.58 more days). Compared with US-origin children, Latin American–Caribbean-origin and African-origin children had significantly lower odds of having had a skin or respiratory allergy in the past 12 months (32% and 64%, respectively), having ever been diagnosed with asthma (20% and 51%, respectively), or of having had any type of activity limitation (46% and 58%, respectively). As indicated by the results from model 2, very little

of these differences were explained by mother's educational attainment, family income, and family size. We got similar patterns if we treated the general-health-status and missed-school-days variables as dichotomous.

We examined whether mother's duration of US residence or child's nativity explained differences between Latin American–Caribbean-origin children and African-origin children (Table 4), using models restricted to children whose mothers were foreign born. Model 1 included all explanatory variables other

**TABLE 2—Health of Black Children (Aged From Birth to 16 Years), by Mother’s Region of Birth and Child’s Birthplace: National Health Interview Survey, 2000–2011**

|                               | General Health (n = 38 938), <sup>a</sup><br>Mean Score (SD) | Missed School Days (n = 12 346), <sup>b</sup><br>Mean (SD) | Allergy in Past 12 Months<br>(n = 18 030), <sup>c</sup> % | Ever Told Has Asthma<br>(n = 18 030), <sup>d</sup> % | Activity Limitation<br>(n = 38 938), <sup>e</sup> % |
|-------------------------------|--|--|---|--|---|
| Total                         | 1.78 (0.98)  | 3.0 (6.1)  | 23  | 19   | 8   |
| Mother’s region of birth      |  |  |   |  |   |
| United States                 | 1.80 (0.98)  | 3.1 (6.3)  | 24  | 19   | 8   |
| Latin America or Caribbean    | 1.74 (1.01)  | 2.1 (4.2)  | 17  | 16   | 5   |
| Africa                        | 1.55 (0.86)  | 1.4 (2.9)  | 11  | 9  | 3   |
| Child’s nativity <sup>f</sup> |  |  |   |  |   |
| US-born                       | 1.67 (0.96)  | 2.1 (4.1)  | 17  | 15   | 5   |
| Foreign-born                  | 1.67 (0.96)  | 1.4 (3.0)  | 9   | 8  | 2   |

Note. Standard deviations are given in parentheses for nonbinary variables. All estimates are weighted. All pairwise differences are statistically significant at the 5% level except for general health status between first- and second-generation children. General health and activity limitation estimates are based on the full sample; allergy, asthma, and missed-school-days estimates are based only on the sample child file. Children’s age range is birth to 16 years for all categories except “missed school days,” where it is 5 to 16 years.

<sup>a</sup>Reported by his or her parent (scale = 1–5, where 1 = excellent and 5 = poor).

<sup>b</sup>Refers to the number of days in the past 12 months the child missed school because of illness or injury.

<sup>c</sup>Refers to whether the child had eczema or a skin or respiratory allergy in the past 12 months.

<sup>d</sup>Refers to whether the child had ever been diagnosed with asthma by a health professional.

<sup>e</sup>Refers to whether the child was limited in play, activities of daily living, walking, learning, or remembering.

<sup>f</sup>Restricted to children whose mothers were foreign born.

than mother’s duration of US residence and child’s nativity. We then added separately mother’s duration of US residence (model 2) and child’s nativity (model 3). For all outcomes, we found that African-origin children had significantly better health outcomes than Latin American–Caribbean-origin children (model 1), with the exception of activity limitations. The differences, although somewhat attenuated, remained significant for most health outcomes when we included duration of residence (model 2) or child’s nativity (model 3). At the same time, children whose mothers had been in the United States longer were consistently less healthy than were children whose mothers were more recent arrivals.<sup>14–16</sup> We further found that across most health outcomes, children of foreign-born mothers who were born abroad had significantly better health than did those born in the United States. They missed 0.71 fewer school days (95% confidence interval [CI] = –1.15, –0.28), and they had lower odds of allergies in the past 12 months (odds ratio [OR] = 0.51; 95% CI = 0.29, 0.91), of ever having been diagnosed with asthma (OR = 0.43; 95% CI = 0.27, 0.73), and of having any type of activity limitation (OR = 0.41; 95% CI = 0.24, 0.70).

In additional analyses, we reestimated our models, controlling for mother’s health and the

smoking behavior of a family member, since secondhand smoke may place a child at risk for asthma or respiratory allergies.<sup>17,18</sup> (Table C, available as a supplement at <http://www.ajph.org>, presents descriptive statistics for mother’s health and the smoking behavior of a family member by mother’s place of birth.) If children of foreign-born mothers were healthy only because their mothers were healthy, then the association should be attenuated substantially after we controlled for maternal health. In most cases, inclusion of the mother’s health status did not explain the differences by mother’s region of birth (model 2 vs model 3; Table D, available as a supplement at <http://www.ajph.org>). Adding the sample adult’s smoking status to the model had virtually no effect on the size of the estimates by mother’s region of birth (model 4; Table D). Inclusion of these variables also did not attenuate the differences among children of foreign-born mothers by whether the child was born in the United States or abroad (model 4; Table E, available as a supplement at <http://www.ajph.org>).

## DISCUSSION

In this study, we examined variation in 5 health outcomes among Black children by

maternal and child nativity. We found that foreign-born children have significantly better health outcomes than US-born children, regardless of the nativity of the mother. We additionally document that children of African-born mothers are generally healthier than children of Latin American–Caribbean-born mothers, differences that could not be explained by the mother’s duration of US residence. Of particular note are the estimates for asthma diagnosis, which is of great concern in Black communities.<sup>19–21</sup> Children of US-born mothers are more than twice as likely as children of African-born mothers to have been diagnosed with asthma. Children of Latin American–Caribbean-born mothers, although significantly less likely to be diagnosed than children of US-born mothers, are nevertheless significantly more likely to be diagnosed with asthma than children of African-born mothers. Similar patterns are observed for the child’s general health status, missed school days, activity limitations, and skin and respiratory allergies.

We began by investigating differences between children of mothers born in the United States and children of mothers born abroad. Because higher family income, higher levels of maternal schooling, and having married

**TABLE 3—Multivariate Results for Health Outcomes of Black Children, by Mother's Region of Birth: National Health Interview Survey, 2000–2011**

| Mother's Region of Birth    | General Health Status<br>(n = 38 938), b (95% CI) |                      | Missed School Days<br>(n = 12 346), <sup>a</sup> b (95% CI) |                      | Allergy (n = 18 030),<br>OR (95% CI) |                   | Asthma (n = 18 030),<br>OR (95% CI) |                   | Activity Limitation<br>(n = 38 938), OR (95% CI) |                   |
|-----------------------------|---|----------------------|---|----------------------|--------------------------------------|-------------------|-------------------------------------|-------------------|--|-------------------|
|                             | Model 1   | Model 2              | Model 1   | Model 2              | Model 1                              | Model 2           | Model 1                             | Model 2           | Model 1  | Model 2           |
| United States (Ref)         | ...   | ...                  | ...   | ...                  | 1.00                                 | 1.00              | 1.00                                | 1.00              | 1.00   | 1.00              |
| Latin America and Caribbean | -0.06 (-0.11, -0.01)                              | -0.06 (-0.11, -0.01) | -1.01 (-1.32, -0.70)  | -1.07 (-1.39, -0.75) | 0.68 (0.57, 0.82)                    | 0.71 (0.59, 0.85) | 0.80 (0.63, 1.02)                   | 0.80 (0.63, 1.02) | 0.54 (0.43, 0.68)                                | 0.52 (0.41, 0.66) |
| Africa                      | -0.17 (-0.24, -0.10)                              | -0.20 (-0.27, -0.13) | -1.58 (-2.00, -1.16)  | -1.65 (-2.09, -1.22) | 0.36 (0.26, 0.50)                    | 0.38 (0.27, 0.53) | 0.49 (0.35, 0.70)                   | 0.51 (0.36, 0.72) | 0.42 (0.30, 0.59)                                | 0.40 (0.28, 0.56) |

Note. CI = confidence interval (adjusted for imputation, sibling clustering, and complex survey design); OR = odds ratio. Estimates for general health and activity limitation are based on the full sample, whereas estimates for allergy, asthma, and missed school days are based only on 1 sample child per family. Model 1 adjusts for child's age and gender, mother's age and marital status, family's region of residence, and survey year. General health status models are adjusted for Spanish language interview. Model 2 additionally controls for mother's education, family income, and family size.

<sup>a</sup>Estimates for missed school days are based on children aged 5 to 16 years. All other estimates are computed for children aged birth to 16 years.

parents predict better child health outcomes,<sup>22–28</sup> we hypothesized that controlling for these family characteristics would help explain variation in the observed health outcomes among children of US- and foreign-born mothers. However, controlling for family income, maternal education, and mother's current marital status did little to attenuate the health advantage of children of foreign-born mothers compared with children of US-born mothers, or differences between children of African-born versus Latin American–Caribbean-born mothers.

The foreign-born health advantage that we observed for children is similar to what has been previously documented for US Black adults. These prior studies show that Black adults born in Africa have lower levels of disability and better self-rated health than Latin American–Caribbean-origin adults and US-born Blacks—differences that are robust to controls for measures of SES similar to those included in this study.<sup>15,29–31</sup> Thus, our findings further underscore that factors other than those typically available in survey data account for differences in health between US- and foreign-born Black populations.

We also investigated health patterns among children of foreign-born mothers, who are a heterogeneous group. We found that a longer duration of US residence was associated with poorer health outcomes among children of foreign-born mothers. Relatedly, among children of foreign-born mothers, those born in the United States generally had poorer health than children born abroad. Because of the high correlation between duration of US residence and the birthplace of the child, we were unable to estimate jointly the associations between these 2 characteristics and child health outcomes (i.e., it was unlikely for a mother who was in the United States for more than 15 years to have a foreign-born child). Because of data availability, we also had to rely on a categorical measure of duration of US residence with broad cutpoints. Furthermore, the duration patterns we report are based on cross-sectional data and thus we are unable to control for maternal characteristics at the time of migration, which may vary by immigrant cohort. Nonetheless, our findings support the notion that acculturation to the US environment leads to poorer child health outcomes, the precise mechanisms of which

require further study.<sup>14,32–34</sup> At the same time, the lingering health advantage of children of migrants suggests that protective cultural traits from the cultures of origin (cultural buffering) may also play a role.<sup>32,35–38</sup>

The health advantages of Black foreign-born children compared with their US-born counterparts are similar to nativity advantages observed among Hispanic and Asian American children.<sup>5,33,39,40</sup> For these and other health outcomes, Hispanic and Asian American children who are US born tend to be worse off than those who are foreign born. The one exception to this pattern appears to be obesity among Hispanic children.<sup>3,34,41,42</sup> We did not include obesity in these analyses because data were available only for children aged 12 to 17, and only for the years 2008 through 2011; in addition, the sample size was too small.

Migrants are not a random sample of their sending country, but are positively selected on the basis of ability, motivation, and desire to migrate, characteristics not readily available in health surveys.<sup>32</sup> Although the importance of selectivity to the health of migrant adults is often noted, less attention has been given to the role of selection in influencing health among foreign-origin children. Selectivity is thought to operate directly on adults—those who most often make the decision to migrate. The health of children may be a key factor in the migration decision, and families with healthy children may be in the best position to migrate. Thus, first-generation children (i.e., those born abroad) may be healthier on average than second-generation children, who were born after migration occurred.

The advantaged health patterns of African-origin children compared with Latin American–Caribbean-origin children, which were not explained by differences in duration of US residence, may be due to the greater selectivity of the African-born mothers. Compared with Latin American–Caribbean migration streams, African migration streams are more recent, and the distance is far greater for migrants from Africa than for those from Latin America and the Caribbean. The recency of flows suggests that there are less-established familial and community networks for those born in Africa compared with those born in Latin America and the Caribbean, which may be an obstacle to obtaining visas and

**TABLE 4—Multivariate Results for Health Outcomes Among Black Children of Foreign-Born Mothers: National Health Interview Survey, 2000–2011**

|   | General Health Status (n = 4567), b (95% CI) |                      |                      | Missed School Days (n = 1508), <sup>a</sup> b (95% CI) |                      |                      | Allergy (n = 2186), OR (95% CI) |                   |                   | Asthma (n = 2186), OR (95% CI) |                   |                   | Activity Limitation (n = 4567), OR (95% CI) |                   |                   |                   |
|---|--|----------------------|----------------------|--|----------------------|----------------------|---------------------------------|-------------------|-------------------|--------------------------------|-------------------|-------------------|---|-------------------|-------------------|-------------------|
|   | Model 1                                      | Model 2              | Model 3              | Model 1  | Model 2              | Model 3              | Model 1                         | Model 2           | Model 3           | Model 1                        | Model 2           | Model 3           | Model 1                                     | Model 2           | Model 3           |                   |
| Mother's region of birth                |  |                      |                      |  |                      |                      |                                 |                   |                   |                                |                   |                   |   |                   |                   |                   |
| Latin America and Caribbean (Ref)       | ...  | ...                  | ...                  | ...  | ...                  | ...                  | 1.00                            | 1.00              | 1.00              | 1.00                           | 1.00              | 1.00              | 1.00  | 1.00              | 1.00              | 1.00              |
| Africa                                  | -0.16 (-0.25, -0.08)                         | -0.15 (-0.24, -0.06) | -0.16 (-0.24, -0.07) | -0.74 (-1.10, -0.37)                                   | -0.58 (-0.94, -0.22) | -0.60 (-0.97, -0.24) | 0.57 (0.39, 0.85)               | 0.69 (0.47, 1.02) | 0.62 (0.42, 0.90) | 0.65 (0.43, 0.96)              | 0.79 (0.53, 1.20) | 0.72 (0.48, 1.07) | 0.65 (0.42, 1.01)                           | 0.82 (0.54, 1.26) | 0.72 (0.47, 1.12) |                   |
| Mother's duration in US <sup>c, y</sup> |  |                      |                      |  |                      |                      |                                 |                   |                   |                                |                   |                   |   |                   |                   |                   |
| ≥ 15 (Ref)                              | ...  | ...                  | ...                  | ...  | ...                  | ...                  | 1.00                            | 1.00              | 1.00              | 1.00                           | 1.00              | 1.00              | 1.00  | 1.00              | 1.00              | 1.00              |
| 10 to < 15                              |  | 0.01 (-0.10, 0.12)   |                      |  | -0.22 (-0.91, 0.46)  |                      |                                 | 0.64 (0.41, 0.99) |                   |                                |                   |                   |   | 0.75 (0.47, 1.19) |                   |                   |
| 5 to < 10                               |  | -0.03 (-0.13, 0.08)  |                      |  | -0.54 (-1.10, 0.02)  |                      |                                 | 0.53 (0.35, 0.81) |                   |                                |                   |                   |   | 0.50 (0.30, 0.84) |                   |                   |
| < 5                                     |  | -0.08 (-0.20, 0.05)  |                      |  | -0.85 (-1.50, -0.21) |                      |                                 | 0.41 (0.23, 0.73) |                   |                                |                   |                   |   | 0.21 (0.09, 0.45) |                   |                   |
| Child's nativity                        |  |                      |                      |  |                      |                      |                                 |                   |                   |                                |                   |                   |   |                   |                   |                   |
| US-born (Ref)                           |  |                      |                      |  |                      |                      | 1.00                            | 1.00              | 1.00              | 1.00                           | 1.00              | 1.00              | 1.00  | 1.00              | 1.00              | 1.00              |
| Foreign-born                            |  |                      | -0.04 (-0.13, 0.05)  |  |                      |                      |                                 |                   | 0.51 (0.29, 0.91) |                                |                   |                   |   |                   | 0.38 (0.23, 0.65) | 0.41 (0.24, 0.70) |

Note. CI = confidence interval (adjusted for imputation, sibling clustering, and complex survey design); OR = odds ratio. Model 1 adjusts for child's age and gender; mother's age, education, and marital status; family's region of residence, income, and size; and survey year. General health status models are adjusted for Spanish language interview. Model 2 includes the same controls as in model 1 and additionally adjusts for mother's duration of US residence. Model 3 includes the same controls as in model 1 and additionally adjusts for child's nativity. General health and activity limitation estimates are based on the full sample, whereas allergy, asthma, and missed-school-days estimates are based only on 1 sample child per family.

<sup>a</sup>Estimates for missed school days are based on children aged 5 to 16 years. All other estimates are computed for children aged birth to 16 years.

<sup>b</sup>Number of years the child's mother has lived in the United States.

establishing oneself in the United States. A recent study in which immigrants were asked to rate their own health relative to the health of those in their country of origin concluded that, among immigrant subgroups in the United States, African immigrants are the healthiest relative to people in the country of origin.<sup>43</sup>

### Limitations

A key limitation in this study is the inability to directly measure the magnitude of health selection, as that would require data from the sending countries and health at the time of migration, neither of which are readily available. We focused on the health of Black children because of the long-standing saliency of race in shaping access to resources and its association with poverty and race-based residential segregation. Although many foreign-born Blacks migrate from countries where they form the majority racial group, they become subject to a “racial minority” status in the United States and likely face race-based discrimination.<sup>44</sup> At the same time, non-Hispanic US-born Black children have been shown to be in the poorest health among US racial/ethnic groups.<sup>4</sup> Families of US-born Blacks that have lived in the United States for many generations have been subject to discrimination over that time, and constitute a particularly disadvantaged group.<sup>44–46</sup>

This study has other limitations. All measures of child health were based on parental reports and are thus subject to reporting biases. There may be differential access to or quality of health care across the subgroups examined, biasing the observed differences for measures based on diagnoses (although binary controls for health insurance coverage and usual source of care did not alter our conclusions).<sup>47,48</sup> Reporting of ill health may differ by origin and duration of US residence. Because of sample size constraints, we did not examine Hispanic ethnicity, and the Latin American–Caribbean group includes both Hispanics and non-Hispanics. Finally, we eliminated observations from our sample if the child's biological mother was not present in the family, and thus our results are representative only of Black children with coresident biological mothers.

### Conclusions

To our knowledge, this is the first nationally representative study to assess the health of Black

children by mother's region of birth and whether the child was born in the United States or abroad. In summary, we found that Black children of foreign-born mothers display better health than children of US-born mothers, and Black children of foreign-born mothers who were themselves born abroad were healthier than children born in the United States. We also found that children of African-born mothers were healthier than children of both US-born and Latin American–Caribbean-born mothers. Observed SES characteristics did not explain these differences. Our findings contribute to research on the health of foreign-origin children in the United States, which has previously focused on Hispanics and Asians, as well as research on racial/ethnic disparities in child health.<sup>49</sup> ■

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The authors shared equally in originating the study, revising drafts, and interpreting results. A. S. Hendi wrote an initial draft of the article and conducted the data analysis.

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No protocol approval was necessary because data were obtained from secondary sources.

### References

1. Van Hook J, Landale NS, Hillemeier MM. *Is the United States Bad for Children's Health? Risk and*

*Resilience Among Young Children of Immigrants*. Washington, DC: Migration Policy Institute; 2013.

2. Federal Interagency Forum on Child and Family Statistics. *America's Children: Key National Indicators of Well-Being, 2013*. Washington, DC: US Department of Education, National Center for Education Statistics; 2013. Available at: <http://www.childstats.gov/americaschildren/index.asp>. Accessed September 25, 2013.

3. Van Hook J, Baker E. Big boys and little girls: gender, acculturation, and weight among young children of immigrants. *J Health Soc Behav*. 2010;51(2):200–214.

4. Mehta NK, Lee H, Ylitalo KR. Child health in the United States: recent trends in racial/ethnic disparities. *Soc Sci Med*. 2013;95:6–15.

5. Hamilton ER, Berger Cardoso J, Hummer RA, Padilla YC. Assimilation and emerging health disparities among new generations of US children. *Demogr Res*. 2011;25:783–818.

6. Yu SM, Huang ZJ, Singh GK. Health status and health services utilization among US Chinese, Asian Indian, Filipino, and other Asian/Pacific Islander children. *Pediatrics*. 2004;113(1 pt 1):101–107.

7. Yu SM, Huang ZJ, Singh GK. Health status and health services access and utilization among Chinese, Filipino, Japanese, Korean, South Asian, and Vietnamese children in California. *Am J Public Health*. 2010;100(5):823–830.

8. Abraido-Lanza AF, Armbrister AN, Flórez KR, Aguirre AN. Toward a theory-driven model of acculturation in public health research. *Am J Public Health*. 2006;96(8):1342–1346.

9. Alba R, Nee V. *Remaking the American Mainstream: Assimilation and Contemporary Immigration*. Cambridge, MA: Harvard University Press; 2003:384.

10. National Center for Health Statistics Office of Analysis and Epidemiology. The National Health Interview Survey (1986–2004) Linked Mortality Files, Mortality Follow-Up Through 2006: Matching Methodology. 2009. Available at: [http://www.cdc.gov/nchs/data/datalinkage/matching\\_methodology\\_nhis\\_final.pdf](http://www.cdc.gov/nchs/data/datalinkage/matching_methodology_nhis_final.pdf). Accessed September 19, 2013.

11. Minnesota Population Center and State Health Access Data Assistance Center. Integrated Health Interview Series: Version 5.0. University of Minnesota, Minneapolis, 2012. Available at: <http://www.ihis.us>. Accessed September 9, 2013.

12. Viruell-Fuentes EA, Morenoff JD, Williams DR, House JS. Language of interview, self-rated health, and the other Latino health puzzle. *Am J Public Health*. 2011;101(7):1306–1313.

13. Parker RN, Fenwick R. The Pareto Curve and its utility for open-ended income distributions in survey research. *Soc Forces*. 1983;61(3):872–885.

14. Cho Y, Frisbie WP, Hummer RA, Rogers RG. Nativity, duration of residence, and the health of Hispanic adults in the United States. *Int Migr Rev*. 2004;38(1):184–211.

15. Read JG, Emerson MO, Tarlov A. Implications of black immigrant health for US racial disparities in health. *J Immigr Health*. 2005;7(3):205–212.

16. Argeseanu Cunningham S, Ruben JD, Narayan KMV. Health of foreign-born people in the United States: a review. *Health Place*. 2008;14(4):623–635.

17. Weitzman M, Gortmaker S, Walker DK, Sobol A. Maternal smoking and childhood asthma. *Pediatrics*. 1990;85(4):505–511.

18. Martinez FD, Cline M, Burrows B. Increased incidence of asthma in children of smoking mothers. *Pediatrics*. 1992;89(1):21–26.

19. Akinbami LJ, Moorman JE, Garbe PL, Sondik EJ. Status of childhood asthma in the United States, 1980–2007. *Pediatrics*. 2009;123(suppl 3):S131–S145.

20. Akinbami LJ, Moorman JE, Bailey C, et al. Trends in asthma prevalence, health care use, and mortality in the United States, 2001–2010. *NCHS Data Brief*. 2012;94:1–8.

21. McDaniel M, Paxson C, Waldfogel J. Racial disparities in childhood asthma in the United States: evidence from the National Health Interview Survey, 1997 to 2003. *Pediatrics*. 2006;117(5):e868–e877.

22. Brooks-Gunn J, Duncan GJ, Maritato N. Poor families, poor outcomes: the well-being of children and youth. In: Brooks-Gunn J, Duncan GJ, eds. *Consequences of Growing Up Poor*. New York, NY: Russell Sage Foundation; 1997:1–17.

23. Case A, Lubotsky D, Paxson C. Economic status and health in childhood: the origins of the gradient. *Am Econ Rev*. 2002;92(5):1308–1334.

24. Elo IT. Social class differentials in health and mortality: patterns and explanations in comparative perspective. *Annu Rev Sociol*. 2009;35:553–572.

25. Bennett T, Braveman P, Egerter S, Kiely JL. Maternal marital status as a risk factor for infant mortality. *Fam Plann Perspect*. 1994;26(6):252–256, 271.

26. Angel R, Worobey JL. Single motherhood and children's health. *J Health Soc Behav*. 1988;29(1):38–52.

27. Waite LJ, Lehrer EL. The benefits from marriage and religion in the United States: a comparative analysis. *Popul Dev Rev*. 2003;29(2):255–276.

28. Turney K, Lee H, Mehta NK. The social determinants of child health. *Soc Sci Med*. 2013;95:1–5.

29. Elo IT, Mehta NK, Huang C. Disability among native-born and foreign-born blacks in the United States. *Demography*. 2011;48(1):241–265.

30. Hamilton TG, Hummer RA. Immigration and the health of US black adults: does country of origin matter? *Soc Sci Med*. 2011;73(10):1551–1560.

31. Read JG, Emerson MO. Racial context, black immigration and the US black/white health disparity. *Soc Forces*. 2005;84(1):181–199.

32. Jasso G, Massey DS, Rosenzweig MR, Smith JP. Immigrant health: selectivity and acculturation. In: Anderson NB, Bulatao RA, Cohen B, eds. *Critical Perspectives on Racial and Ethnic Differences in Health in Late Life*. Washington, DC: National Academies Press; 2004:227–226.

33. Singh GK, Yu SM, Kogan MD. Health, chronic conditions, and behavioral risk disparities among US immigrant children and adolescents. *Public Health Rep*. 2013;128(6):463–479.

34. Van Hook J, Baker E, Altman CE, Frisco ML. Canaries in a coalmine: immigration and overweight among Mexican-origin children in the US and Mexico. *Soc Sci Med*. 2012;74(2):125–134.

35. Vega WA, Amaro H. Latino outlook: good health, uncertain prognosis. *Annu Rev Public Health*. 1994;15:39–67.

36. Singh GK, Siahpush M. Ethnic-immigrant differentials in health behaviors, morbidity, and cause-specific mortality in the United States: an analysis of two national data bases. *Hum Biol.* 2002;74(1):83–109.
37. Rumbaut RG, Weeks JR. Unraveling a public health enigma: why do immigrants experience superior perinatal health outcomes? *Res Sociol Health Care.* 1996;13:335–388.
38. Landale NS, Oropesa RS, Llanes D, Gorman BK. Does Americanization have adverse effects on health? Stress, health habits, and infant health outcomes among Puerto Ricans. *Soc Forces.* 1999;78(2):613–641.
39. Subramanian SV, Jun H-J, Kawachi I, Wright RJ. Contribution of race/ethnicity and country of origin to variations in lifetime reported asthma: evidence for a nativity advantage. *Am J Public Health.* 2009;99(4):690–697.
40. Singh GK, Kogan MD, Yu SM. Disparities in obesity and overweight prevalence among US immigrant children and adolescents by generational status. *J Community Health.* 2009;34(4):271–281.
41. Popkin BM, Udry JR. Adolescent obesity increases significantly in second and third generation US immigrants: The National Longitudinal Study of Adolescent Health. *J Nutr.* 1998;128(4):701–706.
42. Balistreri KS, Van Hook J. Socioeconomic status and body mass index among Hispanic children of immigrants and children of natives. *Am J Public Health.* 2009;99(12):2238–2246.
43. Akresh IR, Frank R. Health selection among new immigrants. *Am J Public Health.* 2008;98(11):2058–2064.
44. Dominguez TP, Strong EF, Krieger N, Gillman MW, Rich-Edwards JW. Differences in the self-reported racism experiences of US-born and foreign-born black pregnant women. *Soc Sci Med.* 2009;69(2):258–265.
45. Cozier Y, Palmer JR, Horton NJ, Fredman L, Wise LA, Rosenberg L. Racial discrimination and the incidence of hypertension in US black women. *Ann Epidemiol.* 2006;16(9):681–687.
46. Waters MC. Ethnic and racial identities of second-generation black immigrants in New York City. *Int Migr Rev.* 1994;28(4):795–820.
47. Ku L, Matani S. Left out: immigrants' access to health care and insurance. *Health Aff (Millwood).* 2001;20(1):247–256.
48. Derose KP, Bahney BW, Lurie N, Escarce JJ. Review: immigrants and health care access, quality, and cost. *Med Care Res Rev.* 2009;66(4):355–408.
49. Flores G, Committee on Pediatric Research. Technical report—racial and ethnic disparities in the health and health care of children. *Pediatrics.* 2010;125(4):e979–e1020.