

Pediatric Asthma Health Disparities: Race, Hardship, Housing, and Asthma in a National Survey



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ABSTRACT

OBJECTIVE: We sought to determine if racial disparities in pediatric asthma are explained by material hardship and home ownership.

METHODS: We performed a secondary analysis of the 2011 American Housing Survey. A total of 33,201 households with children age 6 to 17 years were surveyed regarding childhood asthma diagnosis and emergency department (ED) visits for asthma (for the youngest child with asthma in the household). Material hardship included poor housing quality, housing crowding, lack of amenities, and no vehicle access. We used logistic regression to determine the association between race, material hardship, and asthma diagnosis or ED visits, adjusting for potential confounders.

RESULTS: Non-Hispanic black heads of household had a higher odds of having a child diagnosed with asthma in the home compared with non-Hispanic white heads of household (odds ratio, 1.72; 95% confidence interval [CI], 1.50–1.96), and a higher odds of ED visits for asthma (odds ratio, 3.02;

95% CI, 2.29–3.99). The race–asthma association was decreased but not eliminated after adjusting for material hardship and home ownership (ED visit adjusted odds ratio [AOR], 2.07; 95% CI, 1.50–2.86). Poor housing quality was independently associated with asthma diagnosis (AOR, 1.45; 95% CI, 1.28–1.66) and ED visits (AOR, 1.59; 95% CI, 1.21–2.10). Home ownership was associated with a lower odds of asthma-related ED visits (AOR, 0.62; 95% CI, 0.46–0.84).

CONCLUSIONS: Observed racial disparities in pediatric asthma are lessened after controlling for material hardship. Poor housing quality in particular is strongly associated with asthma morbidity. Policy makers could target improving housing quality as a means of potentially reducing asthma disparities.

KEYWORDS: asthma; health care disparities; housing; pediatrics; poverty

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WHAT'S NEW

In this national data set, material hardship—housing quality and home ownership specifically—is strongly associated with pediatric asthma. Racial disparities were reduced after controlling for material hardship. Policy makers could target improving housing quality as a means of reducing asthma disparities.

ALTHOUGH RACIAL/ETHNIC DISPARITIES in pediatric asthma are well documented,¹ few interventions have been shown to effectively bridge these disparities.² Non-Hispanic black children have higher rates of asthma diagnosis, asthma morbidity, hospitalizations for asthma, and asthma mortality than non-Hispanic white children.^{3,4} Multiple factors have been proposed to explain these inequities including health care access, health literacy, parental stress or depression, clinician bias, and genetic risk factors.⁵ It has also been suggested that most of the observed racial/ethnic disparities might stem from socio-

economic differences between groups, and that the observed contribution of race/ethnicity to poor asthma outcomes would diminish if we could more accurately capture socioeconomic status (SES).^{6,7}

It is increasingly recognized that SES is a multidimensional concept and that adjusting for a single measure of SES (eg, income) might not be sufficient to capture variation in SES between racial and ethnic groups.⁶ For example, although non-Hispanic black workers have made modest income gains since the 1960s, the net worth (wealth) of black households has actually decreased in the past 3 decades, whereas the net worth of non-Hispanic white households has increased by 11%.⁸ Recognizing the limitations of using income as a sole measure of SES, some studies have attempted to characterize the financial hardships that families face using more robust experiential measures, sometimes termed material hardship.^{9,10} Although there is no universally accepted definition of material hardship, most indices aim to capture families'

daily experiences, living conditions, and whether basic needs are met.⁹ Material hardship might include poverty-related conditions that lead to known asthma triggers (eg, poor housing quality leading to pest exposure) as well as measures of deprivation that might contribute indirectly to poor asthma control (eg, lack of access to transportation). Home ownership, or lack thereof, is not typically considered a marker of material hardship, but because homes are the primary asset for many Americans, home ownership is an easy, although imperfect, proxy for wealth.^{11–13}

There is a rich literature describing the relationship between race/ethnicity, SES, and poor health outcomes (particularly asthma). For example, material hardship has been linked to poor health in children,¹⁴ whereas home ownership has generally been shown to be associated with improved health outcomes.^{15,16} Asthma specifically has been linked to poor housing quality, particularly in regional studies and studies of young children.^{17–19} Previous research has shown that low-income black families have higher rates of material hardship than low-income white families, and that there are substantial racial/ethnic gaps in home ownership.^{10,11}

Although racial/ethnic disparities in asthma outcomes have been thoroughly studied, the following questions are unresolved: Can socioeconomic factors explain racial/ethnic disparities, or are they related to inherent factors (eg, genetic predisposition) that differ between racial/ethnic groups? Our ability to understand the reasons for racial/ethnic disparities is limited by how well we can measure the material hardships that might explain these differences. With more accurate measurements of material hardship, we might better understand the broader socioeconomic context surrounding children with asthma and the reasons that asthma disparities remain such a persistent problem. Wright and Subramanian proposed a framework to conceptualize these socioeconomic dynamics.²⁰ In this framework, asthma disparities are explained by a complex interplay between structural factors (eg, low income), physical conditions (eg, dilapidated housing), and social processes leading to differential exposures and host interactions that increase the risk of asthma and asthma-related morbidity. Many of the factors identified in their framework fall under the umbrella of material hardship.

No studies to our knowledge have examined the intersection of race, material hardship, and home ownership in pediatric patients with asthma on a national scale. The 2011 American Housing Survey (AHS) provides a unique opportunity to study these relationships, because it is a nationally representative survey that includes robust housing and hardship metrics as well as data related to pediatric asthma, race/ethnicity, and SES. The primary aim of this study was to examine race/ethnicity-related pediatric asthma disparities in the context of broader experiential measures of SES (material hardship) and home ownership on a national scale. We hypothesized that income and education would incompletely explain the asthma-race relationship, and that material hardship and home ownership would explain an additional proportion of these disparities.

Our secondary aim was to identify potential targets for intervention to improve health disparities—specifically, to determine which measures of material hardship and home ownership, if any, are independently associated with childhood asthma diagnosis and morbidity. We hypothesized that material hardship measures (poor housing quality, crowding, lack of amenities, and no vehicle access) would be associated with increased rates of asthma diagnosis and morbidity independent of race, income, and education, whereas home ownership would be associated with lower rates of diagnosis and asthma morbidity.

METHODS

STUDY DESIGN AND POPULATION

We performed a secondary analysis of publicly available data from the 2011 AHS.²¹ This survey was funded by the Department of Housing and Urban Development and conducted by the US Census Bureau. It is the most comprehensive national housing survey in the United States. The 2011 survey was chosen for analysis because it is the only year to include questions related to pediatric asthma. The survey included data from 155,000 units, selected to represent a cross-section of all housing in the United States and weighted to be representative of US housing units. The overall response rate was 87%.²² Respondents were interviewed between July and December 2011. Census employees performed data collection via telephone or in-person via a laptop survey questionnaire.²¹ Housing units were included in our analysis if heads of household answered questions regarding pediatric asthma. These questions were asked of units occupied by families who had at least 1 child age 6 to 17 years living in the home.

VARIABLES OF INTEREST

The outcome variables of interest included questions related to pediatric asthma on the 2011 AHS. Respondents living in households with children 6 to 17 years of age were asked the following: “Has a doctor or other health professional ever told you that any of your children who have lived in the home have asthma?” and “During the past 12 months, has the youngest household member [who has been diagnosed with asthma] had to visit an emergency room because of asthma?”

Material hardship measures were selected by identifying variables within the survey that served as markers for material hardship as defined by the US Department of Health and Human Services.⁹ Material hardship variables included poor housing quality (the presence of any of the following—cracks in walls/floors/windows, broken plumbing, or exposed wires), housing crowding (>2 people per bedroom), lack of household amenities (whether the unit lacked any of the following: a working washing machine, dishwasher, or refrigerator), and no vehicle access (no vehicle available for household use). Home ownership status was determined by asking whether the unit was “owned or being bought by someone in your household.”

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