

EDITORIAL

The “Black Box” of Racial Disparities in Asthma

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In the United States, racial disparities in asthma have been well documented. African American children have higher rates of asthma and disproportionately worse asthma outcomes than white children including higher rates of hospitalizations and deaths.¹ The



Related article

causes of these disparities are multifactorial. It has been documented that African American children have an increased exposure to residential allergens and pollution,² overuse of rescue medications, and underuse of long-term asthma controller medications owing to clinician underprescribing, failure to fill prescriptions, or poor adherence.² They also have higher risk owing to socioeconomic and neighborhood factors such as violence and stress that accumulate over the life course.³

Disentangling reasons for racial differences in disease rates and outcomes is the subject of much study. Disparities may result from social and physical environmental exposures and opportunities related to poor health outcomes or poor access to and quality of health care received.⁴ The term *black box* is often used to refer to a system that has mysterious internal workings where the relationships between inputs and outputs are unknown. The article by Beck et al⁵ in this issue of *JAMA Pediatrics* furthers our understanding of the black box components and contributions to childhood asthma disparities.

Elucidating the Black Box of Disparities in Asthma Readmission

Beck et al⁵ sought to explain why African American children are at greater risk for asthma-related readmission than white children. They used directed acyclic graphing (DAG), which includes multiple variables that have been shown or postulated to play a role in asthma disparities and examines them in one model. They found that socioeconomic hardship variables alone explained 53% of the 2.26-times higher admission rate for African American children compared with white children. Further, when biologic, environmental, disease management, and access variables were added to socioeconomic hardship variables, they in total accounted for 80% of the readmission disparity.

The objective of this study was ambitious and important, particularly in attempting to examine the multifactorial nature of asthma hospitalization disparities. It is vital to take into account multiple, potentially interrelated asthma-relevant factors and how they contribute to, confound, or modify disparities. This is the first step in working to define potentially modifiable factors to inform targeted interventions.

Although this study is an important step in looking at a larger conceptual framework of asthma racial disparities, there were study limitations that must be considered in understanding the analyses. First, DAG, as any modeling approach, is only as good as the data and variables that are chosen to be included in the model. There were critical unmeasured or unavailable variables. For example, controller medication adherence or in-home exposures were not specifically measured but are potentially modifiable risk factors for readmission. Parent report of controller use may be affected by social desirability bias and may not have been highly correlated with pharmacy fill data. This is particularly important for African American families who have been found to have lower prescription rates as well as lower rates of filling asthma controller prescriptions.²

Second, while associations between factors and readmissions were found, elucidation of the mechanisms or pathways by which the measured factors influence readmissions is essential for action. For example, racism and implicit bias were not explicitly measured but are likely associated with many of the factors in the DAG including access to care, disease management, and environmental factors. Jones⁴ outlined 3 levels of racism: institutionalized, personally mediated, and internalized. How these contribute to each of the factors in the DAG is a missing part of the black box. Further work is necessary to understand the role of racism, particularly institutional racism, and the mechanisms by which the DAG factors lead to disparities.

Translating Research to Action

The studied factors appeared to explain 80% of the variation, which suggests a way forward in understanding the broad categories of black box components. However, much work needs to be done to translate this research to action especially because many factors in the DAG appear to be potentially non-modifiable including genes, biologic factors, and historical racism. However, the study does highlight some important directions for action.

Clinical Care

Best practices exist to address some of the identified black box components and reduce risk factors. Clinic-based interventions begin with clinicians addressing the current gaps in implementation of asthma-management guidelines particularly for African American and low-income children. Gold-standard asthma-management principles should include (1) treatment with long-term controller medications to prevent asthma symptoms and exacerbations (with a step-wise approach to asthma management), (2) ensuring availability of short-acting bronchodilators for treating exacerbations, and (3) patient-specific

disease education and discussion with families.⁶ Clinicians should provide education for families about asthma course, importance of preventive and early rescue treatment, and removal and management of asthma triggers. For example, this should include smoking cessation counseling and provision of resources, such as 1-800-QUIT-NOW and/or referral to community resources that can assist in home environmental assessment and remediation. Providing culturally competent care that takes into account the family's needs, beliefs, and health literacy has been shown to improve care quality and increase patient satisfaction.⁷

Further, pediatric clinicians can address health disparities in their practice by screening families for social determinants of health and connecting them with resources,⁸ increasing comprehensiveness of services, and moving outside the clinic to the community.⁷

Community Action

Asthma prevention and management must extend beyond the clinic with a multifaceted approach for children and caregivers, especially those in low-income communities.⁹ Highlighting this importance, the Institute of Medicine¹⁰ Vital Signs: Core Metrics for Health and Health Care Progress report defines one of the core healthy community metrics to be the childhood asthma rate. The National Asthma Education and Prevention Program Expert Panel guidelines state that to improve asthma outcomes there must be a strong emphasis on community-based approaches, including asthma self-management education and reduction of environmental triggers.⁶

Research has found that building trusting relationships, assessing environmental triggers, checking medications, providing culturally competent caregiver education, and accessing home visitation by nurses or community health workers

can improve asthma control, reduce emergency department use, decrease home allergens, reduce missed school and work days, and lessen caregiver stress.^{11,12}

Community-based environmental interventions, such as home remediation and home-based implementation of strategies to reduce the indoor pollutants such as smoking cessation and high-efficiency particulate air purifiers, have been shown to improve asthma control.¹³ School-based asthma education and management, such as a nurse directly observing administration of daily controller medications, improve appropriate use of health care, school attendance, academic performance, and quality of life.^{12,14}

Health Policy

Socioeconomic hardship variables explained more than half of the observed disparity in asthma readmission. Childhood poverty and its disproportionate rates among racial and ethnic groups must be addressed. Although difficult to modify, renewed approaches to address these exposures must be a part of the advocacy agenda to reduce disparities.

Payment reform to incentivize comprehensive services that extend into the community is also vital to address asthma health disparities. Reimbursement models should cover evidence-based preventive innovations such as community health workers for in-home asthma education; home remediation, including pest management; home high-efficiency particulate air filters; and school-based administration of asthma controller medications.

Finally, a review¹⁵ of health equity research noted that although asthma was a health condition associated with marked disparities, it was relatively underrepresented in funded research. Research focused on deconstructing the black box of disparities and particular emphasis on asthma is critical for needed action.

ARTICLE INFORMATION

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