

Challenges in Childhood Asthma Mortality Persist Despite Advances in Care



Anne L. Fuhlbrigge, MD, MS *Aurora, Colo*

An improved understanding of the underlying inflammatory nature of asthma and the efficacy of inhaled corticosteroids, as well as the potential risks of overuse of poorly selective β -agonists, was associated with a reduction in asthma mortality during the 1990s to the early 2000s. However, despite these advances, childhood asthma continues to be associated with significant morbidity and mortality. In addition, ethnic disparities persist.¹

Concern about asthma mortality is underscored by a recent estimate of global asthma mortality rates among persons with asthma, 5 to 34 years of age. Ebmeier et al² highlight that although the asthma mortality rate has continued to decrease in some countries and regions, asthma mortality rates in North America, dominated by the larger population of the United States, appear to have plateaued.

In the current issue of *JACI: In Practice*, Arroyo et al³ confirm that despite significant improvements in asthma treatments, asthma mortality rates in children may have stalled, and continued disparities exist across racial and/or ethnic subpopulations in the United States. To understand this concerning trend, Arroyo et al investigate the location of death among children who died from asthma. The authors propose that where children die may suggest differential causes; understanding those differences can guide future efforts to improve this concerning trend. If a child dies out of the hospital, we may need to focus more on patient education regarding when to seek care and access to care. If a child dies in the outpatient setting, we may need to focus on improving acute care and appropriate assessment of clinical severity. If a child dies in the inpatient setting, we may need to focus on improving inpatient and pediatric intensive care.

There are data to suggest that there may be inherent differences in the mechanism of asthma exacerbations between the children who died and those who survived, and certain

characteristics of asthmatic children may place them at greater risk for death due to their asthma.⁴ However, whether the location of death can further differentiate the contributing factors is unknown. Importantly, Arroyo et al did not have access to medical charts of these patients who died nor the ability to interview family members regarding events around the time of death. Therefore, they were not able to assess preventable factors behind the deaths.

Prior analyses have attempted to identify the preventable factors associated with deaths from asthma in children of which 3 have focused on US populations. In the United States, Barger et al⁵ found that most young patients who died clearly had asthma and died suddenly during severe attacks. In contrast, Strunk et al⁶ outlined that asthma deaths can be divided into 2 types: (1) slow onset, late arrival for care, and poor use of steroids because of psychological, social, and cultural factors; and (2) sudden onset of severe airway closure. More recently, Rosenman et al⁷ reviewed all asthma deaths in Michigan residents, aged 2 to 34 years, occurring from 2002 to 2004. Expert panels reviewed information from death certificates, autopsies, next-of-kin interviews, and medical records and reached consensus on causal factors and potential preventive action for each death. Consistent with prior international reports,⁸ the authors identified multiple factors that contributed to asthma deaths; patient-related factors (adherence and trigger avoidance, bronchodilator overuse, inadequate use of steroids), physician-related factors (inadequate prescription of steroids, needed referral for high-risk patients, inadequate diagnosis and inadequate inhaled steroids in emergency department), and system-related factors (lack of adequate adult supervision, psychosocial and psychiatric issues, no regular maintenance health care visits, and repeated refill of bronchodilators) were identified to have contributed to the death. Although the underlying causes of racial and/or ethnic disparities in asthma outcomes are complex, many factors that have been previously identified as associated with asthma disparities were identified as casual factors in asthma deaths.⁹

In addition, discrepancy between patient perception of asthma control, the level of symptoms, and degree of obstruction may be a factor that contributes to delays in presentation and mortality rates for asthma. Price et al¹⁰ published evidence that asthma control in Europe remains poor. Many patients regard their asthma as not serious despite experiencing symptoms and exacerbations. Similarly, in an online survey of asthma from patients with asthma in the UK, Fletcher and Hiles¹¹ observed continued discrepancy between patient perception of asthma control and that many patients accept symptoms as the norm. As above, Arroyo et al³ did not have information to help clarify if this contributed to these deaths.

School of Medicine, University of Colorado, Aurora, Colo

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Corresponding author: Anne L. Fuhlbrigge, MD, MS, School of Medicine, University of Colorado, 13001 E 17th Place, Room E-1304, Mail Stop C290, Aurora, CO 80045. E-mail: anne.fuhlbrigge@ucdenver.edu.

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Of note, Arroyo et al³ calculated mortality rates using bridged-race population estimates from the US census general population. They were not able to calculate case fatality rates based on an at-risk population. Akinbami et al¹ have previously demonstrated that using at-risk rates adds a different assessment when exploring racial disparities in asthma outcomes. In their analysis, population-based rates showed that disparities in some asthma outcomes (deaths) increased, whereas the use of at-risk rates, which account for differences in asthma prevalence, showed that disparities in these same asthma outcomes (deaths) remained stable. In addition, concerns about the reliability of death certificate data for assessing cause of death have been reported. However, among children, a lower risk of confounding from other respiratory and comorbid conditions commonly seen among older persons with asthma has been reported.¹²

The findings by Arroyo et al, combined with recognition that about half of asthma deaths might be preventable if recommended guidelines are followed,⁸ support the call to action put forth by Jenkins¹³ in her recent commentary on the analysis by Ebmeier et al. As we focus on identification of phenotypes and/or endotypes and a “personalized” approach in the management of asthma, our “personalized” approach must include “the psychosocial aspects of targeting treatment, and the inadequacy of doctors and health systems in addressing behavioral factors that so frequently underlie poorly controlled, near-fatal, and fatal asthma, despite the fact that these socioeconomic, personal, and other social determinants of health have been known for decades.”

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