

Paradigms and perspectives

Moving beyond medication: Assessment and interventions on environmental and social determinants are needed to reduce severe asthma

Erika Garcia, PhD, and Frank Gilliland, MD, PhD *Los Angeles, Calif*

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Asthma remains the most common chronic lung disease in children, significantly affecting children and their families and contributing to unacceptable mortality. The majority of children with asthma have mild or moderate disease and respond to treatment with medications and appropriate environmental interventions. Children with more severe disease that requires hospitalization or treatment with systemic corticosteroids and children who have uncontrolled asthma symptoms present a clinical and public health challenge as they are at increased risk for short-term and lifelong adverse health outcomes. The reasons for severe and uncontrolled asthma include lack of treatment, difficult-to-treat asthma, and refractory asthma.¹ Severe asthma also includes asthma for which control is maintained only with the highest level of recommended treatment.¹

Most of the attention in asthma treatment plans is directed at maximizing therapy with medications, with less emphasis on reducing modifiable environmental and other social determinants of asthma exacerbations and control (ie, factors that contribute to asthma exacerbations and control). Although classification algorithms for severe asthma include consideration of modifiable environmental and other social factors, the primary focus is on improving short-term control with medications.^{1,2} This is a missed opportunity to reduce morbidity and mortality due to childhood asthma by intervening on environmental and social determinants. Additionally, higher drug doses and higher-frequency use of oral corticosteroids cause short- and long-term adverse effects.³ Thus, complementary interventions on environmental and social risk factors can reduce unnecessary adverse outcomes associated with high-dose medication therapy. A conceptual model showing the pathways by which environmental and other social determinants can contribute to severe asthma (eg, through asthma exacerbations and control) is presented in Fig 1. The social determinants of severe asthma include some environmental exposures; however, we separate and emphasize environmental risk factors,

given their well-established effects on pediatric asthma and potential for targeted interventions. Given the issues of environmental justice surrounding environmental exposures as well as national and international differences in the social determinants of asthma exacerbations and control (including treatment access), broadening the spectrum and emphasis of interventions would provide a more inclusive and more just approach to addressing severe uncontrolled asthma in children. This strategy allows for the opportunity to “treat” patients with currently untreated asthma without requiring access to costly medications that may not be available to all children.

There is a large body of literature demonstrating the adverse effect of environmental exposures on severe asthma—often measured in epidemiology studies with emergency department visits, hospitalizations, and oral corticosteroids use. Additionally, environmental exposures may reduce the effectiveness of medication for asthma control.⁴ These modifiable environmental factors are important targets in the efforts to reduce asthma morbidity, including in the evaluation of control for severe asthma. Several intervention strategies exist to reduce children’s exposure to secondhand tobacco smoke, which is a known environmental risk factor for severe asthma. For example, legislation banning smoking in vehicles with children has been found to reduce severe asthma exacerbations requiring hospital admission among young children.⁵ Exposure to ambient air pollutants—another well-documented risk factor—can be reduced with better air quality regulations in the long term, air filtration units in the home and schools in the interim, and high-pollution public alert systems. Interventions for indoor air include reduction of targeted allergens (after assessment of patients’ allergy status) from pests, pets, and mold. For example, dust mite-impermeable bed encasings have been shown to reduce emergency hospital visits for asthma exacerbations for mite-sensitized children.⁶

Consideration of social determinants of asthma exacerbations and control beyond environmental exposures is a crucial component of management of severe asthma. A patient’s economic and community context can create barriers to health care and medication access and may identify potential interventions. Housing and neighborhood factors may promote or inhibit healthy behaviors and exposure to risk factors. Availability of safe parks and recreational facilities through increased physical activity may reduce childhood obesity, which is a risk factor for asthma. Contextual factors, including housing conditions and environmental exposures (eg, inadequate ventilation, poor indoor air quality), can increase the risk of respiratory viral infections, which trigger most asthma exacerbations. For some social (including environmental) factors, effects on asthma may be mediated or even moderated (ie, modified) through physiologic and/or psychologic stress responses. Comprehensive assessment of the social determinants of severe

From the Department of Population and Public Health Sciences, Keck School of Medicine, University of Southern California, Los Angeles.

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Corresponding author: Erika Garcia, PhD, Keck School of Medicine, University of Southern California, 2001 N Soto St, SSB1, Rm 225F, MC 9237, Los Angeles, CA 90089-9237. E-mail: garc991@usc.edu.

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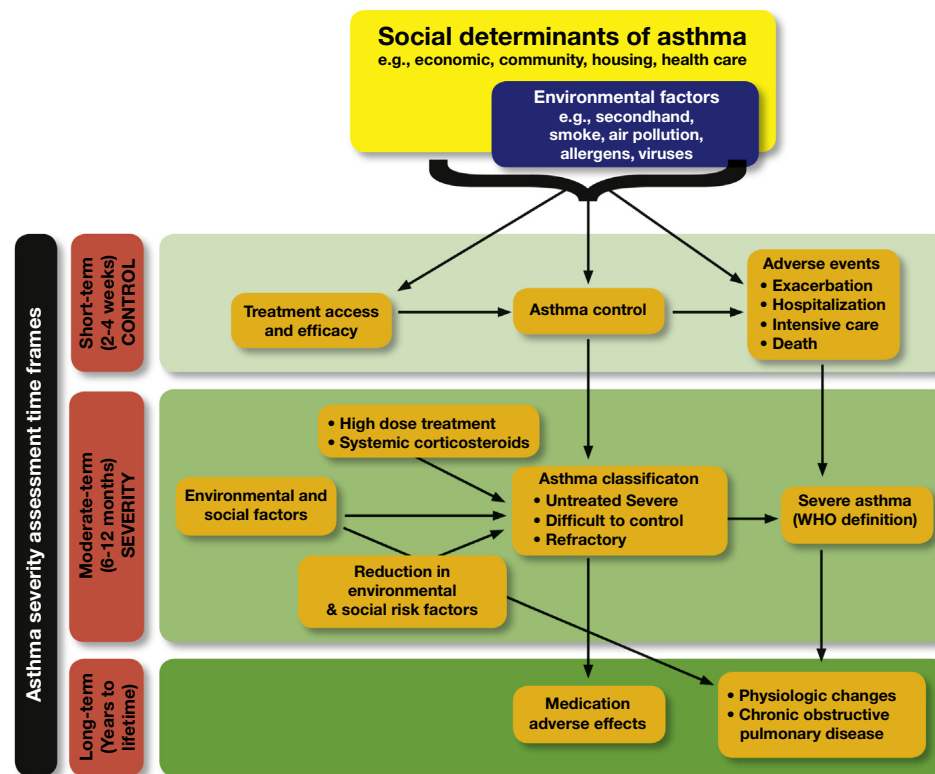


FIG 1. Conceptual model depicting pathways by which environmental exposures and social determinants can contribute to severe asthma. These factors can have an impact on asthma control (*top box*) by affecting treatment access and medication efficacy and increasing the risk of adverse events, such as exacerbation, hospitalization, intensive care, and death. Asthma control then informs assessment of asthma severity, which is assessed over several months (*middle box*). Environmental and social factors contribute to severe asthma beyond short-term effects on control in this moderate-term time frame. Lastly, there may be long-term effects of severe asthma (*bottom box*), including adverse effects of long-term and/or high-dose use of medications, as well as possible physiologic changes (eg, in lung function) and increased risk of chronic obstructive pulmonary disease. *WHO*, World Health Organization.

asthma, including the home environment, and subsequent interventions have been shown to decrease medication use and health care utilization in pediatric populations with severe asthma.⁷ Such interventions could include making recommendations to improve the home environment or connecting patient families with community, health, and social services available in their community (eg, tenant rights, housing services, integrated pest management, legal assistance, food quality and security, etc), with appropriate follow-up.

It must be recognized that the distribution of the social determinants of asthma exacerbations and control is a product of the current as well as the historical social and structural factors that exist in our society. A recent study demonstrated the ongoing health consequences of historical discriminatory policies: racist redlining practices from the 1930s (ie, systematic denial of mortgage loans and/or insurance in Black neighborhoods) are still associated with increased asthma emergency department visits in the modern day, even after accounting for current levels of poverty and air pollution.⁸ The recent increased awareness in the scientific community of our insufficiently critical use of race and/or ethnicity in our health studies (ie, using race and/or ethnicity as a deterministic catch-all for everything from social economic status to percent muscle mass) is important in the context of severe asthma. A rigorous scientific approach is needed when considering severe asthma morbidity statistics by

race and/or ethnicity (and other demographic factors) in clinical settings to avoid perpetuating structural racism and fatalistic thinking or simplification of asthma risk factors. This requires that we search for modifiable factors occurring at higher rates in communities with higher asthma morbidity. To maintain focus on the environmental and other social factors underlying disparities in severe asthma, we purposefully do not include race and/or ethnicity in our conceptual model; however, we also recognize the disparity in exposure to these environmental and social risk factors across race and/or ethnicity. Further, clinicians and researchers need to consider the importance of intersectionality (ie, discrimination and disadvantage are experienced differently across the overlapping identities around race and/or ethnicity, sex, and class⁹). Many patients—particularly members of historically marginalized communities—have multiple co-occurring adverse risk factors for severe asthma and increased exposure to psychological and physiologic stressors due to discrimination and disadvantage through multiple pathways. Interventions for severe asthma must be multifactorial because the contributing factors are multifactorial.

Possible interventions on environmental and social determinants of severe asthma span from the individual level to the much wider-reaching community and/or societal level. The former are analogous to individual patient treatment plans and may be

relatively more straightforward to implement, whereas the latter (as well as some interventions in the middle range [eg, connecting patients with community social services—which first need to exist for such an intervention to work]) are more typical of public health interventions. Clinicians and researchers wanting to address society-level problems need to be actively involved in groups that contribute to such public health and policy efforts. Additionally, we acknowledge disparate abilities and resources among patients and their families to engage in interventions, further highlighting the need to target upstream barriers to health.

To reduce the burden of severe asthma in communities across the world, we must increase recognition of social and environmental determinants of asthma exacerbations and control and include these determinants in the assessment of and treatment plan for severe asthma. Consideration of social determinants has been recommended in for other health outcomes—for example, in recommendation statements of the US Preventive Services Task Force (eg, recommendations targeting food insecurity, housing instability, and education).¹⁰ From a broader perspective, prevention of the development of childhood asthma by intervening on environmental and social determinants is a critical need and would likely reduce the burden due to asthma-related morbidity and mortality. Reductions in environmental exposures and improvements in social determinants of severe asthma are likely to have central roles in asthma prevention interventions and would produce cobenefits for many other health outcomes.

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