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Environmental Control: The First Tenet of Allergy

Marissa Hauptman, MD, MPH^{a,b,c}, David Peden, MD, MS^d, Wanda Phipatanakul, MD, MS^{b,e}

^aDivision of General Pediatrics, Boston Children's Hospital, Boston, Mass

^bDepartment of Pediatrics, Harvard Medical School, Boston, Mass

^cRegion 1 New England Pediatric Environmental Health Specialty Unit, Boston, Mass

^dCenter for Environmental Medicine, Asthma, and Lung Biology, University of North Carolina at Chapel Hill, Chapel Hill, NC

^eDivision of Immunology, Boston Children's Hospital, Boston, Mass

Abstract

This issue of *The Journal of Allergy and Clinical Immunology: In Practice* includes a collection of review articles covering a spectrum of environmental and policy interventions to mitigate environmental determinants of allergic respiratory disease that are relevant to the practicing clinician.

Environmental factors, particularly allergens and pollutants, play a major role in both asthma and allergy development and morbidity in children. These exposures are not distributed equally, and inner-city children are disproportionately affected. Emerging studies are identifying the importance of secondary environments such as the school in asthma morbidity. The authors throughout this issue highlight a 2-tiered approach to environmental control practices, targeting primary and secondary prevention to avoid allergen sensitization, asthma development, and to mitigate asthma morbidity.

The review by Ahluwalia and Matsui¹ provides a summary of recent literature on home environmental interventions, their efficacy on specific indoor allergen levels, and asthma-related outcomes. It has been more than 10 years since the landmark study by Morgan et al² in the Inner-City Asthma Study that highlighted the importance of an individually tailored home-based environmental intervention targeting multiple allergens in predominantly low-income, minority, and urban children with asthma. The authors highlight in this issue more recent studies that suggest that single allergen interventions may be efficacious when targeting the most clinically relevant allergen for a population. The review discusses the heterogeneity of environmental intervention studies even though the majority of US-based studies are performed in low-income pediatric urban populations. Some of this lack of synergy and reproducibility between studies is due to differences in study design specifically

Corresponding author: Wanda Phipatanakul, MD, MS, Division of Allergy and Immunology, Boston Children's Hospital, 300 Longwood Avenue, Fegan Building, 6th Floor, Boston, MA 02115. Wanda.Phipatanakul@childrens.harvard.edu. .

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targeted allergens, the variability in environmental interventions, and the asthma outcomes evaluated. In addition, the authors highlight that the virulence of an allergen varies by geographic distribution, housing stock, pollution, humidity, and other ecologic and environmental factors.

The clinical management review by Wilson and Platts-Mills³ discusses the important historical context and debate that surrounded identifying dust mites as an allergen source as well as the importance of dust mite avoidance measures in reducing asthma morbidity. The authors highlight the unique and paradoxical characteristics of dust mite feces, which are most strongly associated with asthma, being invisible, nonseasonal, and not giving an acute rise to respiratory symptoms at the time of acute exposure or bronchial challenge. They highlight this important background in considering that tailored environmental control practices aimed at reducing dust mites must take this background into consideration. For example, the in-office history may not give simple evidence of the importance of dust mite exposure, and ideally will need environmental allergen levels to demonstrate exposure. Additionally, the recovery from this allergen exposure may be prolonged even after remediation.

The review by Permaul and Phipatanakul⁴ discusses that research is continuing to identify the presence of allergens and other environmental exposures in the school setting and demonstrates their association with asthma morbidity. The authors highlight that school-based environmental interventions have the potential to benefit many children with asthma at a population level. The authors highlight many organizations on the national, state, and city government level that have developed and implemented a number of school-based asthma programs addressing both school-based asthma management and environmental controls such as the Environmental Protection Agency's Indoor Air Quality Tools for School Program with the aim of improving environmental conditions in schools. The authors highlight the need for prospective, longitudinal, randomized, double-blinded controlled trials and highlight an ongoing National Institutes of Health/National Institute of Allergy and Infectious Diseases study, using environmental control strategies modeled from successful home-based interventions led by Dr. Phipatanakul.⁵ Many of the environmental interventions are consistent between the reviews, but often their clinical effectiveness varies by specific allergen suggesting different mechanistic pathways between settled allergen levels and potentially setting of application.

Abramson's review⁶ focuses on the interplay of policy issues in addressing environmental allergic triggers as an important and necessary supplement to clinical care to impact asthma and allergic morbidity. This review discusses a range of potential policy applications from existing local and national policy initiatives that exist from pollen ordinances to activating Occupational Safety and Health Administration and Americans with Disabilities Act. This review utilizes the available scientific evidence to advocate for the continued need for policy initiatives implementing scientific evidence-based environmental controls.

With the potential for new payment models to include environmental interventions, the insights in this issue are sure to contribute to in-office decision making. As stressed by Gold et al⁷ in a recent workshop report, sponsored by the National Institute of Allergy and

Infectious Diseases, National Institute of Environmental Health Sciences, the National Heart, Lung, and Blood and Merck Childhood Asthma Network, it is important that environmental health research continue to assess which interventions are most practical and result in the greatest measurable impact.

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