

Environmental Pollution and Its Effect on Children

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ENVIRONMENTAL AIR POLLUTION is a major public health concern with significant consequences in children, especially those with asthma. Chronic exposure in school-aged children can have permanent adverse effects on lung function as demonstrated by deficits in growth of FEV1 measurements over time.¹ Traffic is a major contributor to environmental air pollution. Traffic-related air pollution (TRAP) refers to mixtures that can include variable concentrations of carbon monoxide, carbon dioxide, hydrocarbons, nitrogen oxides, particulate matter and mobile source air toxins.² TRAP can be affected by changing environmental conditions including wind patterns. Systematic review and meta-analysis of birth cohort studies looking at the impact of early childhood exposure to TRAP on the development of asthma found that early childhood exposure to TRAP was associated with the development of asthma in children up to 12 years of age.³ Exacerbations in individuals with asthma have been shown to have a sufficient causal relation with NO₂.² Factors contributing to increased risk of exposure to airborne pollutants during childhood include: developing respiratory systems, higher respiratory rates, and increased likelihood of exposure associated with outdoor play and exercise. However more recent data has shown that genetics also play a role. The TAG study, based on six birth cohorts reported that children with GSTP1, rs1138272, or rs1695 minor alleles may be a susceptible population at increase risk for asthma associated with air pollution.⁴

In an effort to gain additional insight into the question of how children respond to TRAP, Dr. Rosser and colleagues at the Children's Hospital of Pittsburgh of UPMC studied the effect of TRAP on the immune response in a cross sectional study of 577 children ages 6–14 years with and without asthma living in Puerto Rico.⁵ Increased asthma prevalence has been previously reported in this ethnic group.

Residential distance to major roads was analyzed against a panel of plasma cytokines. They found increased plasma levels of IL-31 in all children participating in the study who lived in close proximity to major roads. Interestingly, asthma modified the estimated effect of residential distance to a major road on plasma TNF α . Children with asthma had significantly higher levels of IL-1 β , IL-22, and IL-33 compared to controls. The authors concluded that TRAP is associated with increased levels of pro-inflammatory cytokines in children living in Puerto Rico.

In this issue you will also find a follow up to White et al.'s EIPEN4SCHOOLS project from our previous issue.⁶ Here White et al. present a comprehensive view of the results of the EIPEN4SCHOOLS project.⁷ Since anaphylaxis can occur without warning in children without identified allergies as well as in those with a history of anaphylaxis, the authors highlight the critical importance of public access to epinephrine.

We have received comments from readers with varying opinions on the role of written asthma action plans, resulting from Dr. Kelso's paper entitled "Do Written Asthma Action Plans Improve Outcomes?"⁸ In this issue our colleagues in France weigh in on the topic. Beydon et al. conducted a multicenter study involving six pediatric emergency departments in France, caring for 107 children with acute asthma over an eight-month period.⁹ The focus of their study was to look at potentially avoidable emergency room visits in this group of patients. They defined "potentially avoidable visits" in those cases where the child had not received adequate pre-hospital treatment at home, who received no more than three doses of nebulized bronchodilator in the emergency department, and who did not relapse within 48 hours. In their study they found that the existence of a written asthma action plan did not independently influence avoidable visits. Feelings of fear and anxiety however were identified as independent risk factors in the decision to come to the emergency department. Based on their findings they have identified an ongoing educational gap in written asthma action plans and the need for improvement to better assist parents to feel confident in recognizing and appropriately managing the early warning signs of an acute exacerbation.

I hope that these and each of the original research articles and updates included in this issue will be useful to you in your clinical practice, as well as bring new information to prompt discussion and stimulate further research into important topics affecting children with allergic, immunologic, and respiratory diseases. Our December issue will feature atopic dermatitis. We are honored to have Norito Katoh, M.D., Ph.D., serve as our guest editor for this issue. Dr. Katoh is Professor, Director and Chairperson at the Kyoto Prefectural University of Medicine in Kyoto, Japan. He has brought together an impressive panel of experts from around the world to address important clinical and research topics focusing on atopic dermatitis in children.

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