

HIGHLIGHTS

The State of Childhood Asthma and Future Directions: Strategies for Implementing Best Practices

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Truly remarkable progress has been achieved in understanding Childhood Asthma and how it can be managed. Yet much work remains to close the gap between recommended and actual treatment and management of this widespread condition. To address this issue, the Merck Childhood Asthma Network, Inc. (MCAN) assembled thought leaders from multiple disciplines to identify and recommend research, clinical care and policy approaches to begin to improve life for the millions of children in the United States with asthma. The Supplement, which accompanies the March 2009 issue of *Pediatrics*, the Journal of the American Academy of Pediatrics, examines the magnitude of the problem, the current standard and barriers to care and possible reasons for development and triggers of the disease. A review of the 12 articles reveals a central theme: improving outcomes for children with Childhood Asthma requires a systematic approach that includes implementing evidence-based methods and access to high-quality care.

Highlights from the Supplement include:

Millions of Children Affected, But Many Are Not Receiving Adequate Care

- In 2007, 6.7 million children, or 9.1% of all children in the United States, had asthma, a historically-high level that has not declined despite advances in research, treatment and management.
- Racial/ethnic disparities continue to exist, with minority children shouldering the burden of the disease and, alarmingly, experiencing apparent increases in relative risk for asthma mortality rates. Children of racial minorities admitted for urgent/emergent care for asthma exacerbations were less likely than white children to have taken anti-inflammatory medications and be prescribed a nebulizer for home use at discharge.
- [Consensus guidelines](#), which were recently updated in 2007, were established more than 15 years ago by the National Heart, Lung, and Blood Institute of the National Institutes of Health. Yet, in 2001, two-thirds of children with moderate or severe asthma did not receive recommended treatment. Also, even with guidelines in place, Childhood Asthma has not improved uniformly.
- While manageable for most children, some still struggle even with proper care. For example, 30% of children taking asthma controllers to decrease acute asthma exacerbations have one or more "asthma attacks" per year, requiring oral corticosteroid treatment. Additional studies are needed to identify those children who continue having frequent attacks and new approaches that can control exacerbation of asthma symptoms. Current studies on treatment modalities offer hope that asthma attacks can be either reduced or eliminated soon.

Childhood Asthma is a Complex Puzzle that Researchers Must Continue to Study

Gene-Environment Interactions

- The interaction between genes and the environment plays a complex role in the development and severity of asthma. Novel research on how genetics contribute to asthma should go beyond linkage and candidate gene analyses to include comparative genomic (e.g., mice and men) and epigenetic analyses. Understanding the dynamism between the environmental and the individual is necessary to clarify how to prevent vulnerable children from developing asthma.

The Development of Immunological Responses to Pollutants and Allergens

- To understand better the development and worsening of asthma symptoms in children, we must learn more about the development of immunological responses to pollutants and allergens. It has been found that while these factors can provide protection against the development of asthma in children at one point in time, they can be risk factors for an attack at others.

Living Conditions Matter – Living in Certain Communities is Linked with Increased Risks of Developing Asthma and Suffering Disproportionate Levels of Adverse Outcomes

- Living in communities with high levels of local traffic emissions is shown to be associated with new onset of asthma in children. Residences within 75 meters of a major roadway can result in a 1.5 fold increased risk of lifetime asthma and wheeze, as well as a three-fold increase in respiratory-related school absences. Improvement in lung function and reduction of asthma symptoms result not only from reduced exposure to polluted air, but may also be positively influenced by inducing antioxidant defenses through diet.
- Children with asthma that live in high poverty and "low-opportunity" communities have disproportionately high adverse outcomes. Further, among children in families with incomes less than half of the poverty level (approximately \$10,000 for a family of four), black children have twice the risk of asthma, compared with white children in the same financial situation. To break down barriers to quality care and improve asthma morbidity rates for these children, we must learn more about the impact of social determinants as risk factors that trigger asthma symptoms or affect lung function.

Evidence-Based Interventions Provide Hope

- The complex relationships of factors associated with development and worsening of asthma dictate the need for system changes toward implementing science-based approaches in asthma management. Evidence-based interventions that tailor care to individual risks and sensitivities, as well as to community-wide characteristics, have been developed and await full implementation into health care systems and communities. Wider dissemination and implementation of known science-based approaches are needed to ensure high standards of asthma care among all children with asthma and to decrease disparities in asthma morbidity among racial and ethnic minorities.

A Need for Standardization and Collaboration

- There is a need for well-designed studies of pediatric asthma that assess cost-benefit ratios for improving asthma care, implementing science-based approaches, and using more appropriate asthma treatment facilities (e.g. hospitals, urgent care facilities). Asthma investigators and funding agencies must develop a coordinated strategy to standardize outcome measures to permit comparisons across studies and clinical trials.

Childhood Asthma is the Ideal Model to Test a Performance-Based System

- Since there is some association between health care financing and the quality of care and health outcomes, great care and informed dialogue must occur around incentivization strategies. A rational approach to health care financing that is linked to quality health care can only be beneficial to children with asthma. Childhood Asthma is an ideal "chronic" disease model to study the effect of performance-based care on closing the gap between what is currently being done and what is acceptable evidence-based clinical care. The reform of the United States health care system rests in part on our ability to implement performance standards that are appropriately aligned with quality care for chronic conditions and the elimination of health disparities.

Additional details, including presentations from the Supplement authors, can be found on <http://www.mcanonline.org/projects/direction/preliminary.html>. The presentations were part of an MCAN conference that was convened in December 2006. The entire supplement can be viewed on: <http://www.mcanonline.org/pediatrics>