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Altering the course of asthma: Introduction

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Despite significant progress in our understanding about asthma, much remains unknown, especially about effective treatment, particularly in young children. Unfortunately, with an increase in prevalence of more than 70% in the last 2 decades, asthma is now recognized as the most common chronic childhood disease. Understanding the early natural history of asthma and translating that knowledge into early and effective treatment must be a priority. This supplement to the *Journal of Clinical Allergy and Immunology* focuses on the potential for altering the course of the natural history of asthma.

How can asthma be identified as early as possible in a person's life? Researchers have long recognized that asthma comprises specific genetic components, primarily a predisposition for atopy and a family history, especially a maternal history, of asthma. However, not all children with atopy or a maternal history of asthma will have asthma. Identifying the pathogenic mechanisms should enable clinicians to identify children at high risk and treat childhood asthma more effectively. Recent and ongoing investigation into the role that respiratory syncytial virus infection, atopy, and other factors play in the pathogenesis of childhood asthma will provide information for identification of those children at risk and result in optimal approaches for prevention and treatment. Dr Robert Lemanske, Professor of Pediatrics and Medicine

at the University of Wisconsin School of Medicine in Madison, Wisconsin, discusses disease evolution and inception and reviews the current understanding of the influence of environmental factors in asthma.

Recent data confirm the importance of several factors in asthma development and suggest new mechanisms in asthma pathology. Atopy also has been linked directly to asthma. Recent reports of possible protective effects of specific environmental conditions suggest that the exposure to certain stimuli and the timing of sensitization may reduce or block asthma development and progression. For example, attendance at a day care center early in life appears to offer protective effects against wheezing, as do early episodes of rhinitis, herpes, and measles. Children raised on a farm also have a decreased prevalence of atopic diseases. The protective effect of contact with livestock and poultry is consistent among several studies. In her review, Erika von Mutius, MD, Head of the Asthma and Allergy Outpatient Clinic of the University Children's Hospital in Munich, discusses how defining the intricacies of allergen-specific responses in children could provide ways to prevent the development of asthma and atopy and improve long-term asthma treatment.

Allan Becker, MD, Professor in the Section of Allergy and Clinical Immunology in the Department of Pediatrics and Child Health at the University of Manitoba in Canada, examines how differences in patients' and care givers' perceptions can complicate not only how treatment goals are implemented but also how asthma control is assessed. He also reviews benefits and pitfalls associated with common and experimental asthma outcome measures in the pediatric setting. Ensuring that the patient and care giver share common treatment goals and choosing appropriate treatment outcome measures are fundamental but often elusive steps essential for attaining effective asthma control in the pediatric setting.

Asthma treatment requires the ability to diagnose and treat asthma effectively, balancing the efficacy and safety of various asthma medications, facilitating patient and

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family education, and developing a supportive treatment network. When the second set of guidelines was published in 1996, the first choices in medications for young children were cromolyn and nedocromil. Noticeably absent from the guidelines were two medications introduced in the last several years, namely, the leukotriene antagonists and nebulized budesonide, and it is safe to say that a number of categories of medications probably will be introduced in the next few years.

Current treatments are not always adequate. Oral and inhaled corticosteroid therapies do not control inflammation for many young patients, and the addition of long-acting β_2 -agonists or doubling the steroid dose has not produced significant benefits. Although data about children are lacking in the exploratory techniques such as bronchoscopy, bronchoalveolar lavage, and sputum induction, both chronic inflammation and airway remodeling are involved in the development and progression of asthma in children, for whom airway restructuring occurs early. This can lead to permanent and sometimes threatening airway obstruction. Ratko Djukanovic, MD, Senior Lecturer in Medicine at Southampton General Hospital in the United Kingdom, reviews data about disease in children that correlate with data from autopsies or studies conducted in adults and may better define optimal therapeutic strategies.

Next, I review how the understanding of asthma pathophysiology has evolved during the past 4 decades and how treatment has progressed with that evolution. Continued progress in defining asthma and targeting treatment toward specific pathophysiologic mechanisms should lead to better-defined optimal strategies for treat-

ing asthma in children. I describe several methods currently used to discern status and to recognize individual differences in the heterogeneous disease that is asthma. Pharmacogenetics is an emerging field that may help to incorporate several different treatment aspects as well as develop new therapies.

Without long-term adherence, no medication can help to control a chronic disease such as asthma. Inadequate patient adherence to prescribed treatment regimens is a major cause of poor clinical outcomes in asthma treatment. Maintaining adherence is particularly important and challenging in young children with asthma, with their vulnerability to airway restructuring and in whom adherence rates often fall below 50%. Bruce Bender, MD, Head of the Division of Pediatric Behavioral Health at the National Jewish Medical and Research Center in Denver, Colorado, explores the extent of nonadherence in children and the major barriers to adherence in asthma treatment and also suggests strategies for promoting adherence.

Finally, LeRoy Graham, MD, Associate Clinical Professor of Pediatrics at the Morehouse School of Medicine in Atlanta, Georgia, reviews the efficacy and safety profiles of common controller medications used in treating pediatric asthma and discusses some of the challenges faced in treating this disease in certain pediatric subpopulations, including preschoolers and inner city children. In such subpopulations with special needs, treating asthma requires a comprehensive approach that includes a supportive patient-physician relationship and the involvement of schools, churches, and neighborhood outreach programs that will identify children with asthma and promote quality care.