children during the first 2 years of life, although it was modestly effective at 2 years. Follow-up is necessary to confirm whether the intervention can actually prevent the development of asthma.

REVIEWER COMMENTS. This is a well-designed study in a primary care environment to investigate the clinical effectiveness of a multifaceted approach to prevent the development of asthma in high-risk children. It seemed that the intervention was moderately able to reduce exposure to dust mite, pet, and food allergens, but no significant effect was observed on parentally observed symptoms or allergen-specific immunoglobulin E in the first 2 years of life. Perhaps a more focused intervention or longer follow-up period would have proven more useful. The effectiveness of a variety of multifaceted randomized intervention trials on asthma prevention has yet to be determined. Although a host of epidemiologic studies have helped identify risk factors, we will all be interested in determining whether any practical interventions may be promising in preventing asthma development.

URL: www.pediatrics.org/cgi/doi/10.1542/peds.2006-0900P

Wanda Phipatanakul, MD, MS
Boston, MA

**Asthma in Remission: Can Relapse in Early Adulthood Be Predicted at 18 Years of Age?**

**PURPOSE OF THE STUDY.** To determine the frequency of asthma relapse in young adults in remission at 18 years over an 8-year follow-up period and to determine possible prognostic indicators of relapse.

**STUDY POPULATION.** A subset of 68 subjects in asthma remission at 18 years of age from of a cohort of 1037 subjects born in New Zealand from 1972 to 1973 followed from birth through the Dunedin Multidisciplinary Health and Development Study.

**METHODS.** The cohort was enrolled at 3 years old and followed every 2 years until age 15 and again at ages 18, 21, and 26. Subjects were given respiratory questionnaires and lung-function assessment by spirometry. Methacholine testing for bronchial hyperreactivity was performed at 9, 11, 13, 15, and 21 years of age in some. Atopy was assessed by skin tests at ages 13 and 21 years. Remission of asthma at 18 years was defined as no current symptoms with previous reported symptoms at ≥2 previous assessments.

**RESULTS.** At 18 years of age, there were 108 subjects with current asthma and 68 subjects with previous asthma in remission. Those in remission at age 18 had a later age of onset of asthma (6.4 ± 4.5 vs 4.7 ± 4 years for current asthma) and had better lung function. Those with current asthma at age 18 were more atopic at age 18, with higher skin-test reactivity for house dust mite and cat. They had higher bronchial hyperreactivity by methacholine at all age points between 9 and 18 than their counterparts in remission. Of the 68 subjects in remission at age 18, 44 remained in remission and 24 relapsed by age 26. Multiple logistic-regression analysis identified dust mite sensitization at age 13 (odds ratio [OR]: 2.63; 95% confidence interval [CI]: 1.23–5.61) and decreased forced expiratory volume in 1 second/forced vital capacity ratio at age 18 (OR: 0.9 per 1% higher ratio; 95% CI: 0.81–0.99). Those with better lung function had lower likelihood of asthma relapse by 16 years of age. Variables such as methacholine reactivity and tobacco smoking were not significant predictors.

**CONCLUSIONS.** Approximately one third of young adults with a history of asthma in childhood in remission at 18 years of age will relapse by 26 years of age. Most will have mild disease at relapse. There were weak associations with atopy and lower lung function at a young age as predictors of asthma relapse.

URL: www.pediatrics.org/cgi/doi/10.1542/peds.2006-0900Q

Mary Beth Bollinger, DO
Baltimore, MD

**Adult Asthma Severity in Individuals With a History of Childhood Asthma**

**PURPOSE OF THE STUDY.** Childhood asthma has a range of outcomes in adulthood. This study sought to identify clinical features and exposures associated with persistence and severity of childhood asthma in adulthood.

**STUDY POPULATION.** Subjects had been previously enrolled in the Childhood Asthma Study, a double-blind, randomized, placebo-controlled trial designed to study the role of immunotherapy as an adjunct treatment. The 121 original study members, aged 5 to 12 years at the time of randomization, had moderate-to-severe asthma and had been followed for at least 1 year before enrollment. Evaluations performed during the original study included daily medication-symptom diaries, home allergen analysis, allergy skin testing, and methacholine challenges. The cohort had varied socioeconomic status, genders, and ethnicities. For this study an attempt was made to enroll all original participants.
METHODS. Eighty-five of the original subjects participated in the adult evaluation, underwent spirometry and inhalant allergy skin testing, and completed questionnaires regarding their interim medical history, asthma symptoms, and medications. Asthma severity was classified by using a modified version of the 1997 National Asthma Education and Prevention Program algorithm. Postbronchodilator spirometry was used for severity categorization. Subjects were categorized in the most severe category for which they qualified.

RESULTS. Thirteen (15.3%) of these young adults, aged 17 to 30 years, were in remission. Another 19 (22%) had only mild intermittent asthma. There were 12 (14%) with mild persistent asthma, 25 (29%) with moderate persistent asthma, and 16 (19%) with severe persistent disease. Subjects in remission, compared with subjects with mild intermittent or persistent asthma, had lower serum immunoglobulin E in childhood (412 vs 1136 vs 968 ng/mL, respectively) and fewer positive allergy skin tests (7 vs 9 vs 10, respectively, from a panel of 18 allergens). Subjects in remission also had milder childhood atopy, indicated by lower average daily medication usage scores and lower percentage of days on inhaled corticosteroids (13.7% vs 24.7% vs 40.9%). There was no association found between current asthma severity and childhood immunotherapy.

CONCLUSIONS. The prognosis of childhood allergic asthma in adulthood is largely determined early in life. The degree of atopy seems to be a critical determinant of asthma persistence.

REVIEWER COMMENTS. The authors point out that numerous studies of the natural history of asthma have suggested associations between childhood atopy and disease severity with risk of asthma persistence and severity in later childhood and adulthood. It remains to be seen whether there is any sort of intervention at a very early phase in the disease that will more favorably alter the course of asthma. Thus far, there are no compelling candidates.

URL: www.pediatrics.org/cgi/doi/10.1542/peds.2006-0900R

Timothy Andrews, MD
James R. Banks, MD
Arnold, MD

ALLERGENS AND ENVIRONMENTAL EXPOSURES

Inner City Asthma Study: Relationships Among Sensitivity, Allergen Exposure, and Asthma Morbidity

PURPOSE OF THE STUDY. To describe the relationship between allergen sensitivities, allergen exposures, and asthma morbidity in children with moderate-to-severe asthma while also exploring geographic variations in indoor allergen levels.

STUDY POPULATION. Subjects were children aged 5 to 11 years (n = 937) from 7 inner-city and metropolitan areas across the United States participating in the Inner City Asthma Study.

METHODS. In a fully crossed factorial design, participants were randomly assigned to receive an allergen intervention, bimonthly feedback of the child’s health status to their primary care physicians, both interventions, or no intervention (control group, n = 234). At baseline, a clinical interview with the child’s primary caregiver (including demographics, asthma morbidity, home characteristics, and exposure to tobacco smoke) was conducted with skin-prick tests to aeroallergens. Morbidity was measured at 2-month intervals during a 24-month period. Home visits including a visual inspection and dust-sample collection (dust mite, cockroach, cat and dog dander) were conducted at baseline and every 6 months.

RESULTS. Of 1059 children tested, 94% had at least 1 positive skin test. Allergen sensitivities varied widely across the study sites, with cockroach (69%), dust mites (62%), and molds (50%) being the most predominant. Cockroach sensitivity was highest in The Bronx, New York, New York City, New York, and Dallas, Texas (81%, 79%, and 79%, respectively), whereas dust mite sensitivities were highest in Dallas and Seattle, Washington (84% and 78%, respectively). At least 30% of the subjects were allergic to cats at all sites. Cockroach levels were highest (>50% of homes) in Chicago, Illinois, New York City, The Bronx, and Dallas and were lower in Seattle and Tucson, Arizona (8% and 11% of homes, respectively). Dust mite levels were highest in Seattle and Dallas. Cockroach levels were higher in high-rise and low-rise apartments, whereas dust mite levels were higher in detached homes. No correlation was seen between animal dander and housing type.

CONCLUSIONS. There were significant differences between geographic study sites and the type of indoor allergen exposure and skin-test sensitivity in this study group. Cockroach predominated in the Northeast, whereas dust mite predominated in the South and Northwest. Although most children in the study were allergic to dust mite and/or cockroaches, only the children who were sensitive and exposed to cockroach had increased asthma morbidity.

REVIEWER COMMENTS. This study demonstrates the association of allergen sensitivities and exposures (particularly cockroach allergens) to increased asthma morbidity in children with moderate-to-severe asthma living in inner-city areas. Physicians can use this knowledge to identify significant risk factors in asthmatic patients, implement appropriate prevention measures (ie, environ-
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DOI: 10.1542/peds.2006-0900R

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Pediatrics 2006;118;S10
DOI: 10.1542/peds.2006-0900R

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