unnecessary ED visits and optimize asthma management among inner-city children.

**Reviewers’ Comments.** As our understanding of the pathophysiology of asthma improves and as more maintenance medications for asthma become available, most children with asthma should be able to be managed in an outpatient setting with few hospital admissions and ED visits. However, as this study once again demonstrates, we must always evaluate children with chronic illnesses in the context of their social settings. At-risk children who are seen frequently in EDs must be identified, evaluated, and followed by multidisciplinary teams, including social workers and psychologists. Only by addressing those issues that decrease adherence with medication regimens and increase ED visits and morbidity will we be successful in providing the highest quality of care to these children and, in the long run, reducing costs.

**Kelly D. Stone, MD, PhD**
**Lynda C. Schneider, MD**
**Boston, MA**

**ENVIRONMENTAL ALLERGENS**

**COCKROACH ALLERGY APPEARS EARLY IN LIFE IN INNER-CITY CHILDREN WITH RECURRENT WHEEZING**


**Purpose of the Study.** Children living in the inner-city are at greater risk for asthma morbidity secondary to chronic exposure to indoor allergens, particularly including cockroach. This study evaluated the hypothesis that cockroach sensitization occurs early in life in inner-city children with recurrent wheezing.

**Study Population.** A total of 196 inner-city children from the ages of 6 months to 16 years who were seen between January 1995 and September 1997 at the Cook County Hospital Pediatric Allergy Clinic. Patients were assigned to 1 of 2 age groups, <4 years and 4 to 16 years. A total of 69.0% were African American, 26.5% were Hispanic, 1% were Caucasian, and 2.5% were of other ethnicity. Sixty-three of the 196 were <4 years old.

**Methods.** A retrospective review of charts was conducted. All patients had had prick skin tests to cockroach and dust mite and some were also tested to cat and dog. The children in the older age group had also been tested for other standard aeroallergens. Parents were asked to fill out a questionnaire regarding the presence of cockroaches in the home environment.

**Results.** A total of 15 (24%) of the 63 children in the group <4 years old had a positive skin test to cockroach. The youngest patient with a positive test result was 6 months old. Eight (13%) of the 63 patients had a positive skin test to dust mite. Thirty-five of the 63 were tested for cat and dog and 11% were positive to each. In the older age group, 95 (71%) of the 133 children were sensitized to cockroach and 87 (65%) were sensitized to dust mite. Monosensitization was more prevalent in the younger group, with 21.4% of the younger group versus 7.5% of the older age group being monosensitized to cockroach.

**Conclusion.** Sensitization to cockroach in inner-city children with asthma can occur early in life and may contribute to wheezing.

**Reviewers’ Comments.** The weakness of this study is that it did not include any objective measure of cockroach exposure. Nevertheless, it does clearly demonstrate the ability of some children to become sensitized to environmental allergens very early in life. In addition to the obvious contribution that this may have on asthma morbidity, it also raises the possibility that efforts to reduce cockroach exposure in high-risk infants might have preventive effects on the development of asthma.

**SALLY H. JOO, MD**
**ROBERT A. WOOD, MD**
**Baltimore, MD**

**CLINICAL IMPORTANCE OF ALTERNARIA EXPOSURE IN CHILDREN**

Downs SH, Mitakakis TZ, Marks GB, et al. _Am J Respir Crit Care Med_. 2001;164:455–459

**Purpose of the Study.** To investigate the extent to which exposure to Alternaria increases the severity of asthma.

**Study Population.** The study included 399 children from 2 inland Australian rural towns. All those children who had a positive skin test to the mold Alternaria were enrolled (n = 179) and random samples of children from each town who were allergic, but not to Alternaria, were recruited as the allergic control group. The average age of the children in both groups was 9.1 years.

**Methods.** This was a prospective cohort study. The 2 groups of children were assessed 5 times over 22 months. Questionnaires were used asking about respiratory symptoms in the month before the assessment. Airway hyperresponsiveness was assessed with histamine provocation challenges. The dose-response ratio (DRR) was used to measure the level of airway responsiveness and airway hyperreactivity (AHR) was defined as a 20% drop in forced expiratory volume in 1 second (FEV,) at or before the maximum provocation dose. Mold spores were measured throughout the study period. Four respiratory outcomes were used: DRR, AHR, wheeze, and bronchodilator use.

**Results.** There was a wide range of mold concentrations, from an average low of 2.2 spores/cubic meter of air/day to an average maximum of 307.7 spores/cubic meter/day. The highest count was 1270 spores. These molds spore counts correlated with increased temperature and grass pollen counts. Those children who had sensitization to Alternaria also had increased sensitization to another mold, Cladosporium, mixed grain, and cat dander. Sensitization to dust mites was less common in those sensitive to Alternaria. Children who were sensitive to Alternaria were more likely to have airway hyperresponsiveness. The presence of AHR was also significantly associated with mold spore concentrations. The odds ratio for AHR at a level of 100 mold spores was 1.26. The level of airway hyperresponsiveness or DRR was significantly associated with sensitization to Alternaria and to the concentration of the spore in the air. The odds ratio at 100 spores was 1.14. The proportion of children with complaints of wheeze and the number of children who needed to use a bronchodilator increased with increasing mold concentration.

**Conclusion.** The severity of airway hyperresponsiveness increased with increasing Alternaria spore concentrations more significantly in those children who were sensitized to Alternaria.

**Reviewers’ Comments.** Molds are a current topic of great concern. In the media, there are frequent reports of how molds are affecting health. This article, as the author states, is the first study to look at the effects of natural exposure to Alternaria in both sensitized and nonsensitized children using an objective measure of airway hyperreactivity. The authors used a population of children who were skin test-sensitive to mold and assessed exposure and a variety of
outcome measures. Not only were the children sensitized, but they also had significant exposure to Alternaria. When the spore counts increased, the airways demonstrated significant hyperreactivity, a hallmark feature of asthma. Their airway hyperreactivity was almost twice that of children who were not sensitive to this mold. Sensitivity to Alternaria may be one of those markers for the child with more severe asthma.

Frederick E. Leickly, MD
Indianapolis, IN

**DOG EXPOSURE IN INFANCY DECREASES THE SUBSEQUENT RISK OF FREQUENT WHEEZE BUT NOT OF ATOPY**


*Purpose of the Study.* Asthma is on the rise, and pets are a variable that may influence the TH1/TH2 response in infants and children. This study’s objective was to determine whether pet exposure, specifically dog, early in life alters the risk of frequent wheezing (>3 times per year) or allergic sensitization.

*Study Population.* Cohort of 1246 healthy infants as part of the Tucson Children’s Respiratory Study were enrolled at birth and followed until age 13 years of age.

*Methods.* Evaluations performed at birth and ages 2, 3, 6, 8, 11, and 13 years provided information regarding pet exposure, parental asthma, frequency of wheezing, and skin test sensitization. Confounding variables including smoking, day care, number of siblings, cat exposure, and ethnicity were also considered.

*Results.* From the original cohort of 1246 subjects, data regarding wheezing and pet exposure was obtained from 1076 (86%) of participants through age. Frequent wheezing was seen in 237 (22%) of the study population. Almost 400 (32%) subjects had indoor dogs. Overall, children had significantly less wheezing if they had a dog versus those children that did not have a dog (17.1% vs 24.6%), but this reduction was mainly seen for children without paternal asthma. Wheezing reduction occurred regardless of the child’s atopy state. In children with parental asthma, there was no greater or lesser risk of wheezing based on the presence or absence of a dog. However, if the dog was removed at either age 3 or 6 in children with or without paternal asthma, the child’s risk of wheezing increased. Dog skin test sensitivity was unaffected by the presence or absence of a dog in the home.

*Conclusion.* The presence of a dog in the home may reduce the risk of developing asthma.

**MEDICATION DELIVERY**

**AEROSOL THERAPY WITH VALVED HOLDING CHAMBERS IN YOUNG CHILDREN, IMPORTANCE OF A FACE MASK SEAL**


*Purpose of the Study.* The purpose of this study was to determine the relative ability of 3 different spacers with masks to obtain a tight seal. The Nebuchamber (Astra Draco AB, Lund, Sweden), the AeroChamber (Trudell Medical, London, Ontario, Canada), and the Babyhaler (Glaxo GmbH, Germany) were compared with the Hans Rudolph anesthesia mask in infants and young children. Masks are viewed as a critical interface between the valve holding chamber and the small child for providing aerosol treatments.

*Study Population.* The study population included 30 children with a mean age of 3.2 years with asthma or wheezing. These children were required to have used a spacer with mask continuously for at least 1 month after appropriate instruction. Instruction was provided in 1-on-1 educational session provided by a respiratory nurse or pediatric pulmonologist.

*Methods.* Face mask leak was investigated for the Nebuchamber, AeroChamber, Babyhaler and Hans Rudolph mask by measuring ventilation with an inline pneumotachograph with the face mask maintained in place by the parent. Parents were asked to document how they deliver medication to their children without any additional instruction. The first 10 patients performed the test with full repeat studies with each mask, and then again within 1 month. On the second occasion, the parents were coached throughout the maneuver, encouraged to maintain the mask tightly applied to the child’s face.

*Results.* The AeroChamber and Hans Rudolph mask were assessed to have the best seal as determined by the magnitude of ventilation that was measured. The Nebuchamber provided the poorest seal, with 45% less ventilation than the AeroChamber and Hans Rudolph (Hans Rudolph, Inc, Kansas City, MO) mask. Additionally, there was considerable intraindividual variability (24%–48%) for all masks; however, the variability of the Nebuchamber was twofold greater than the other masks. During the coached sessions, all ventilatory volumes were significantly increased compared with the uncoached session. Variability during the coached session was considerably less except for the Babyhaler, which was unchanged.

*Conclusions.* The authors concluded that spacers with mask designed for use in small children may provide an inadequate seal to the face that leads to reduced or more variable dose delivery. The face mask seal is critical to deliver adequate aerosol to infants and young children, and this should be emphasized to parents.

**RANDOMIZED, CONTROLLED STUDY OF CLINICAL EFFICACY OF SPACER THERAPY IN ASTHMA WITH REGARD TO ELECTROSTATIC CHARGE**


Christopher C. Randolph, MD
Waterbury, CT
Clinical Importance of *Alternaria* Exposure in Children
Frederick E. Leickly
*Pediatrics* 2002;110:455

<table>
<thead>
<tr>
<th>Updated Information &amp; Services</th>
<th>including high resolution figures, can be found at: /content/110/Supplement_2/455.1.full.html</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subspecialty Collections</td>
<td>This article, along with others on similar topics, appears in the following collection(s):</td>
</tr>
<tr>
<td></td>
<td>Allergy/Immunology</td>
</tr>
<tr>
<td></td>
<td>/cgi/collection/allergy.immunology_sub</td>
</tr>
<tr>
<td></td>
<td>Asthma</td>
</tr>
<tr>
<td></td>
<td>/cgi/collection/asthma_sub</td>
</tr>
<tr>
<td>Permissions &amp; Licensing</td>
<td>Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at: /site/misc/Permissions.xhtml</td>
</tr>
<tr>
<td>Reprints</td>
<td>Information about ordering reprints can be found online: /site/misc/reprints.xhtml</td>
</tr>
</tbody>
</table>
Clinical Importance of Alternaria Exposure in Children
Frederick E. Leickly
*Pediatrics* 2002;110;455

The online version of this article, along with updated information and services, is located on the World Wide Web at:
/content/110/Supplement_2/455.1.full.html