(median: 6.6 kU/L; P < .05) and adults with asthma (median: 3.0 kU/L; P < .01). There was a threefold increased risk of asthma for one half of the children with the highest IgE levels (odds ratio: 3.23 [95% confidence interval: 1.19–8.79]) by the enzyme-linked immunosorbent assay. Children with asthma also displayed significantly higher IgG4 levels than did adults with asthma.

CONCLUSIONS. Recombinant major cat allergen (rFel d 1) seems to be at least equally sensitive for in vitro diagnosis of cat allergy, compared with the current extract-based test. Elevated specific IgE antibody levels to rFel d 1 are suggested to be a risk factor for asthma in cat-allergic children.

REVIEWERS COMMENTS. In vitro diagnosis of allergic sensitization is currently confirmed by using allergen extracts derived from natural source materials. The authors previously described creation of this recombinant major cat allergen, rFel d 1. Investigation with such purified recombinant proteins is a current area of intense interest within the field of allergy and immunology, because these engineered proteins may offer improved diagnostic specificity and theoretically may offer superior therapy for type 1 hypersensitivity. Previous research showed that allergen-specific IgE levels are predictive for the likelihood of allergic disease including asthma; however, some allergen-avoidance studies failed to show significant evidence of improvement or protection. This study gives further support to cat allergy causing asthma.

TOBACCO AND AIR POLLUTION

Atopic Diseases, Allergic Sensitization, and Exposure to Traffic-Related Air Pollution in Children


PURPOSE OF THE STUDY. To assess the relationship between exposure to traffic-related air pollutants and allergic disease outcomes in a prospective birth cohort during the first 6 years of life.

METHODS. A birth cohort of 3061 children in the Munich, Germany, metropolitan area were followed with serial questionnaires of their parents inquiring about asthma, hay fever, and eczema. Specific immunoglobulin E against common allergens was determined at the age of 6 years. Air pollution measurements were made for particulate matter ≤2.5 μm in diameter and nitrogen dioxide. Distances between the children’s street address and the nearest main road were noted. Outcomes of atopic disease and allergic sensitization were compared with the children’s exposure to the pollutants.

RESULTS. Positive associations were found between the distance to the nearest main road and asthma, hay fever, eczema, and sensitization, with the highest odds ratios (ORs) for children living <50 m from busy streets. For particulate matter ≤2.5 μm in diameter, statistically significant effects were found for asthma (OR: 1.56 [95% confidence interval [CI]: 1.03–2.37]), hay fever (OR: 1.59 [95% CI: 1.11–2.27]), and allergic sensitization to pollen (OR: 1.40 [95% CI: 1.20–1.64]). Nitrogen dioxide exposure was associated with eczema, whereas no association was found for allergic sensitization.

CONCLUSIONS. The results provide strong evidence for the adverse effects of traffic-related air pollutants on atopic diseases and allergic sensitization.

REVIEWER COMMENTS. Several previous studies suggested an association between exposure to air pollution and the development of atopic sensitization and disease. This study supports that connection, even adding a “dose-response” element in which the closer you live to a busy street, the more likely you are to develop allergic disease.

Changes in Environmental Tobacco Smoke Exposure and Asthma Morbidity Among Urban School Children


PURPOSE OF THE STUDY. Using data from a large randomized trial of supervised asthma therapy in urban elementary schools, the authors of this study sought to document the relationship between changes in environmental tobacco smoke (ETS) exposure and childhood asthma morbidity.

STUDY POPULATION. There were 290 children with physician-diagnosed persistent asthma that required daily controller medication who were enrolled in 1 of 36 participating schools.

METHODS. By using data from a randomized, clinical trial of supervised asthma therapy versus usual care, asthma morbidity and ETS exposure data were collected from caregivers via telephone interviews at baseline and at a 1-year follow-up time. No smoking cessation counseling...
or ETS exposure education was provided to caregivers; however, children were given 20 minutes of asthma education, with a discussion on avoidance of asthma triggers including ETS.

RESULTS. At baseline, 28% of the caregivers reported ETS exposure in the home, and 19% reported exposure outside the primary household only. At the follow-up time, caregivers were asked whether ETS exposure had increased, decreased, or stayed the same, with results as follows: 74% reported no change, 17% reported decreased exposure, and 9% reported increased exposure. Among children whose ETS exposure decreased, there were fewer hospitalizations ($P = .034$) and emergency department visits ($P < .001$) reported in the 12 months before the second interview, compared with the 12 months before the first interview. These children were also less likely to have an episode of poor asthma control, compared with the children with no change or increased exposure (odds ratio: 0.45 [95% confidence interval: 0.23–0.88]).

CONCLUSIONS. This study demonstrated associations between ETS exposure reduction and fewer episodes of poor asthma control and fewer respiratory-related emergency department visits and hospitalizations.

REVIEWER COMMENTS. Approximately 60% of US children 3 to 11 years of age are exposed to ETS. This study demonstrated that reduction in ETS exposure improved asthma outcomes. Limitations of this study are that it was questionnaire-based, relying on caregivers’ report and that it was based on recall over the prior 12 months. It is promising that a benefit was seen even without specific counseling on ETS exposure and tobacco cessation. With more-targeted education and counseling, a greater benefit may be seen. It is important for pediatricians to play an active role in inquiring about ETS exposure and offering parents guidance on smoking cessation; this is especially important for children with asthma.

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Less Air Pollution Leads to Rapid Reduction of Airway Inflammation and Improved Airway Function in Asthmatic Children

PURPOSE OF THE STUDY. To investigate whether relocating children with asthma from an environment of high pollution to one of low pollution has an effect on short-term airway inflammation.

STUDY POPULATION. This was a case study of 37 children, ≥7 years of age, with untreated, mild, persistent asthma who were recruited from an urban asthma clinic in Italy and followed at a rural school camp for 1 week. The children came from homes that had implemented dust mite precautions, and they stayed in a local hotel at the camp.

METHODS. Environmental measurements were collected from permanent or mobile air quality–monitoring stations (recording concentrations of benzene, particulate matter of ≤10 μm in diameter, ozone, nitrogen dioxide, and carbon monoxide), portable volumetric allergen samplers (recording levels of 23 pollen species), and local meteorological sources. Clinical measurements were collected on day 0 before relocating and on day 7 in the rural environment. Data collected included nasal eosinophils, fractional exhaled nitric oxide ($\text{FE}_{\text{NO}}$), peak expiratory flow (PEF), and urinary leukotriene $\text{E}_4$ ($\text{LTE}_4$) levels.

RESULTS. Temperature and atmospheric pressure were significantly lower ($P < .0001$ and $P < .003$, respectively) in the rural environment, whereas humidity and wind speed were similar. All pollutants were significantly lower in the rural environment, with the greatest difference seen in benzene (20-fold) and nitrogen dioxide (15-fold) concentrations ($P < .0001$). Only the Fagaceae pollen species, to which no child demonstrated sensitivity, was significantly higher in the rural environmental ($P < .01$). The children had positive skin-prick test results to dust mite (100%), Gramineae (43%), Oleaceae (30%), Urticaeae (19%), and Cupressaceae and Betulaceae (3%). There was an average fourfold decrease in nasal eosinophils ($P < .002$), a decrease in mean $\text{FE}_{\text{NO}}$ ($P < .028$), and an increase in mean PEF. Urinary LTE$_4$ changes were variable and not consistent among participants.

CONCLUSIONS. Removing children with allergic asthma from a highly polluted environment can rapidly reverse airway inflammation and improve airway function. Decreases in upper and lower airway inflammatory biomarkers (nasal eosinophils and $\text{FE}_{\text{NO}}$, respectively) and an increase in PEF could not be attributed to altered exposure to aeroallergens. Changes in urinary LTE$_4$ levels were not seen; they may be slower to respond or may depend on other factors.

REVIEWERS COMMENTS. Many studies have demonstrated the negative effect of pollutants on asthma outcomes. Here, the authors attempted to mimic a real-life situation and showed that pollutant effects may be reversible in children. This study supports the theory that the increase in asthma seen in industrialized countries may be the result of crowded, polluted, urban environments. The rapidity of responses in these children has implications for clean air policies. An important next step would be to
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