

and asthma morbidity in children in an inner-city environment.

STUDY POPULATION. The subjects were patients from an allergy clinic ($n = 86$, mostly black, aged 4–17 years) with physician-diagnosed asthma and positive skin-test results to an indoor allergen and living in urban New Orleans, Louisiana. Most of the children were taking daily asthma medications, more than half had had an emergency department visit, almost 75% had had an urgent physician visit, and nearly 25% had had a hospitalization in the previous 4 months.

METHODS. This was a cross-sectional study. Sociodemographic factors and home characteristics were queried by using a structured questionnaire and by visual observation of the home at study entry. A revised Childhood Respiratory Health Questionnaire was used to measure frequency of health care utilization, asthma symptoms, activity limitation, and medication use during the previous 4 months. Indoor dust samples were collected and analyzed for the presence of dust mite and cockroach content. In vitro-specific immunoglobulin E to dust mites, cat, dog, and cockroach was measured.

RESULTS. Both dust mite and cockroach exposure were associated with sensitivity, but only cockroach showed a strong linear relationship between degree of exposure and sensitization (even low levels of exposure to dust mite were associated with sensitization). Multivariable regression analyses controlling for exposure, sensitization, oral steroid use, and ICU admission revealed that the only variable associated with multiple exposure variables was hospital admission. The odds of reporting a hospitalization in the previous 4 months, using 2 different statistical models, were 4.2- to 5.4-fold higher for children exposed to >2.0 U/g than for those exposed to <2.0 U/g Blag1. There was no increase in odds for hospitalization related to dust mite exposure.

CONCLUSIONS. Exposure to cockroach allergens is strongly associated with hospital admissions for asthmatic children living in the inner city regardless of sensitization.

REVIEWER COMMENTS. This study's results reaffirm the association between cockroach exposure and severe asthma morbidity and that this association is, to some degree, independent of sensitivity. The failure to show the same relationship for house dust mite might be a result of sample size and the lack of a relationship between exposure and sensitization in this group. It remains to be shown that remediation efforts directed toward cockroach infestation are helpful in decreasing this morbidity.

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Allergen-Specific IgE as a Biomarker of Exposure Plus Sensitization in Inner-City Adolescents With Asthma

Matsui EC, Sampson HA, Bahnson HT, et al; Inner-City Asthma Consortium. *Allergy*. 2010;65(11):1414–1422

PURPOSE OF THE STUDY. These researchers sought to understand the relationship between allergen-specific immunoglobulin E (IgE) levels, exposure to indoor allergens, and asthma severity.

STUDY POPULATION. There were 546 subjects, aged 12 to 20 years, with physician-diagnosed moderate-to-severe asthma enrolled at 10 centers around the United States as part of the Asthma Control Evaluation (ACE) study.

METHODS. Subjects underwent a 3-week run-in period in which asthma symptoms, medication use, pulmonary-function testing, and adherence data were collected. Skin testing was performed to a panel of 14 aeroallergens, and allergen-specific IgE levels to common indoor allergens were measured. A home visit was conducted to collect dust samples from the bed and bedroom floor. Subjects were then assigned to either a pharmacotherapy titrated according to National Asthma Education and Prevention Program (NAEPP) guidelines or pharmacotherapy titrated according to NAEPP guidelines and fractional exhaled nitric oxide (FeNO). Subjects were followed for 1 year, and data on exacerbations, health care utilization, and pulmonary function were collected at each visit.

RESULTS. Black subjects comprised 65% of the participants; 48% had an annual household income of less than \$15 000. The majority (88%) were skin-test-positive to at least 1 aeroallergen including cockroach (61%), cat (58%), mold (52%), and dust mite (47%). There were statistically significant correlations between allergen-specific IgE levels and settled dust allergen concentrations for dust mite, cockroach, and mouse. Those with higher allergen-specific IgE levels to cockroach, mouse, cat, and dust mite had higher FeNO concentrations and peripheral blood eosinophils. Higher allergen-specific IgE levels were associated with lower lung function for all allergens, although not all were statistically significant.

CONCLUSIONS. In atopic asthmatic adolescents from the inner city, allergen-specific IgE levels were positively correlated with bedroom allergen exposure for dust mite, cockroach, and mouse allergens. Higher allergen-specific IgE levels were also associated with worse clinical and biomarker outcomes.

REVIEWER COMMENTS. Indoor allergen burden has been proposed to be the reason for the increased asthma morbidity in inner-city populations. There have also been many attempts to find specific biomarkers that might better

predict disease severity in asthma. These results indicate that for most indoor allergens, allergen-specific IgE levels might be a marker of allergen exposure and disease burden.

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TOBACCO AND AIR POLLUTION

Smoke-Free Air Laws and Asthma Prevalence, Symptoms, and Severity Among Nonsmoking Youth

Dove MS, Dockery DW, Connolly GN. *Pediatrics*. 2011; 127(1):102-109

PURPOSE OF THE STUDY. To investigate the relationship between smoke-free laws and asthma prevalence, symptoms, and severity among nonsmoking children aged 3 to 15 years.

STUDY POPULATION. The data were obtained from the National Health and Nutrition Examination Survey 1999-2006 (NHANES).

METHODS. Survey sites were designated as having or not having at least 1 smoke-free work location, restaurant, or bar law at the county or state level that encompassed the entire county population. Asthma prevalence was assessed as self-reported current asthma and as ever having asthma with current symptoms. Asthmatic symptoms included persistent wheeze, chronic night cough, and wheeze-medication use. The authors also examined asthma severity defined by asthma episode or emergency department visit for asthma.

RESULTS. Smoke-free laws were significantly related with lower odds of asthma symptoms (odds ratio [OR]: 0.67 [95% confidence interval (CI): 0.48-0.93]) among nonsmoking youth. The relationship between smoke-free laws and ever having asthma with current symptoms trended to significance (OR: 0.74 [95% CI: 0.53-1.03]). Smoke-free laws were associated with lower odds of asthma episodes (OR: 0.66 [95% CI: 0.28-1.56]) and emergency department visits for asthma (OR: 0.55 [95% CI: 0.27-1.13]), but these outcomes were not statistically significant.

CONCLUSIONS. Smoke-free laws decrease asthma symptoms, including persistent wheeze, chronic nocturnal cough, and wheeze-medication use in youthful nonsmoking populations.

REVIEWER COMMENTS. This study was limited by the county-limited definition of smoke-free laws, which is only an estimate of individual exposure to secondhand tobacco

smoke outside the home. Misclassification of county smoke-free laws might not reflect individual exposure, and misclassification of current asthma is possible because self-reports were not validated by objective measures or clinical assessment. However, the findings of this study are consistent with those of other studies of secondhand smoke. In summary, the take-home message and conclusion of this important study is that smoke-free laws are associated with decreased exposure to secondhand smoke but equally with decreased respiratory symptoms as well.

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A Strong Synergism of Low Birth Weight and Prenatal Smoking on Asthma in Schoolchildren

Bjerg A, Hedman L, Perzanowski M, Lundbäck B, Rönmark E. *Pediatrics*. 2011;127(4). Available at: www.pediatrics.org/cgi/content/full/127/4/e905

PURPOSE OF THE STUDY. To study the independent and joint effects of prenatal smoking and low birth weight (LBW) on childhood asthma.

STUDY POPULATION. The study included asthmatic 11- to 12-year-old children in Sweden ($N = 3389$).

METHODS. Children were studied by questionnaire survey as part of the International Study of Asthma and Allergy in Childhood (ISAAC). A subset of 2121 children also underwent skin-prick testing.

RESULTS. Mean birth weight was 3360 g in children exposed to prenatal smoking and 3571 g in nonexposed children ($P < .001$). The association of prenatal smoking with physician-diagnosed asthma was stronger in LBW children (risk ratio: 8.8 [95% confidence interval: 2.1-38]) than in normal birth weight children (risk ratio: 1.3 [95% confidence interval: 1.0-1.8]). LBW alone was not an independent predictor of asthma.

CONCLUSIONS. There is a strong interaction of LBW and prenatal smoking on the risk of physician-diagnosed asthma, which is observed even after adjusting for known risk factors including allergic sensitization.

REVIEWER COMMENTS. This report highlights the observation that the combination of LBW and prenatal smoking increases the risk of physician-diagnosed asthma sixfold versus either LBW (no effect) or prenatal smoking (weak effect) alone. The authors speculated that smoke-induced oxidative stress in underdeveloped airways (caused by impaired fetal growth) might lead to increased asthma risk. In this regard, it has been shown that smoke exposure interacts with *ADAM33* polymor-

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