Cockroach allergens in homes associated with prevalence of childhood asthma in some neighborhoods

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In New York City, the prevalence of asthma among children entering school varies by neighborhood anywhere from 3% to 19%, and children growing up within walking distance of each other can have 2-3 fold differences in risk for having asthma. In the first comprehensive effort to understand what drives these localized differences, researchers at Columbia University's Mailman School of Public Health compared the household presence of cockroach, mouse, cat, dust mite and other allergens in neighborhoods with a high prevalence of asthma to that in low-prevalence neighborhoods. They found that cockroach, mouse and cat allergens were significantly higher in homes located in neighborhoods where asthma is more common and that children in these higher-exposure homes were more likely to be sensitized to cockroach antigens.

The full study is now online in the *Journal of Clinical Immunology.*

The researchers studied 239 children 7 to 8 years old who were recruited through the middle-income HIP Health Plan of New York, as part of the ongoing New York City Neighborhood Asthma and Allergy Study. A total of 120 children lived in high asthma prevalence neighborhoods and 119 were from low-prevalence areas. Based on a parent reported survey of symptoms, 128 were classified as having asthma and 111 were assigned to a control group.

Allergen exposure was measured by collecting and analyzing bed dust samples from the upper half of the children's beds. Sensitization was measured by screening blood samples for antibodies to various household allergens. Earlier studies of inner-city children have found that exposure and sensitization to cockroach and mouse allergens is associated with having asthma.

Researchers found that cockroach, mouse and cat allergens were more prevalent in the bed dust taken from homes in high asthma neighborhoods than low asthma neighborhoods, and that sensitivity to cockroach allergen was twice as common: 23.7% versus 10.8%. However, there was no significant difference by neighborhood in sensitization mouse and cat antigens.

"Our findings demonstrate the relevance of exposure and sensitization to cockroach, mouse, dust mite, and cat in an urban community and suggest that cockroach allergen exposure could contribute to the higher asthma prevalence observed in some New York City neighborhoods," said Matthew Perzanowski, PhD, associate professor of Environmental Health Sciences and senior author.

"Although the relationships between allergen levels and household demographics have been examined in the U. S. on a national level, an advantage to focusing on a single city is the decreasing likelihood of confounding by regional differences, such as building types or climate," he noted.

Dr. Perzanowski also stresses that in this study of middle-income families in New York City it was a child's neighborhood income that was more important in predicting the likelihood of exposure to pests in the home than family income.

"In summary, significant differences in allergen exposure in homes

throughout New York City have been demonstrated with this unique study cohort:

- cockroach allergen was higher in the homes of the high asthma prevalence neighborhoods,
- cockroach sensitization was higher among children living in neighborhoods with high rates of asthma,
- cockroach allergen exposure was associated with sensitization, and
- cockroach sensitization was associated with increased risk for asthma.

These findings combined point to cockroach allergen exposure potentially leading to a higher prevalence of asthma in some urban neighborhoods," said Dr. Perzanowski.

Provided by Columbia University