

Air pollution primes children for asthmarelated cockroach allergy

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An allergic reaction to cockroaches is a major contributor to asthma in urban children, but new research suggests that the insects are just one part of a more complex story. Very early exposure to certain components of air pollution can increase the risk of developing a cockroach allergy by age 7 and children with a common mutation in a gene called GSTM may be especially vulnerable.

Researchers at the Columbia Center for Children's Environmental Health at the Mailman School of Public Health published the findings, the first on this interplay of risk factors, in the February 6 online edition of the *Journal of Allergy and Clinical Immunology*.

"Allergy to cockroach is one of the greatest <u>risk factors</u> for asthma in low-income urban communities," says lead author Matthew Perzanowski. PhD. "Our findings indicate a complex relationship between <u>allergen</u> and <u>air pollution</u> exposures early in life and a possible underlying <u>genetic susceptibility</u>. Combined, these findings suggest that exposures in the <u>home environment</u> as early as the <u>prenatal period</u> can lead to some children being at much greater risk for developing an allergy to cockroach, which, in turn, heightens their risk of developing asthma."

Dr. Perzanowski and his co-investigators looked at 349 mother-child pairs from the Center's Mothers & Newborns study of environmental exposures in Northern Manhattan and the Bronx. During the mother's pregnancy, exposure to cockroach allergen (protein in feces, saliva or



other remnants of the insects) was measured by collecting dust from the kitchen and bed. Researchers also sampled air to measure the mother's exposure to polycyclic aromatic hydrocarbons, or PAH (combustion products that are harmful components of air pollution). Presence of the GSTM1 mutation was determined through blood samples. At ages 5 and 7, the children had blood tests to identify the presence of IgE antibodies—an immune marker of allergy.

The researchers found that 279 or 80% of homes tested positive for high levels of cockroach allergen. By age 7, 82 of 264 children tested, or 31%, had cockroach allergy. Presence of higher levels of cockroach allergen led cockroach allergy only in children whose mothers also had been exposed to higher levels of PAH during pregnancy. This result, the authors say, suggests that PAH enhances the immune response to cockroach allergen.

The combined impact of the two exposures was even greater among the 27% of children with a common mutation in the GSTM gene. This mutation is suspected to alter the ability of the body to detoxify PAHs.

The study suggests that minimizing exposure to PAH during pregnancy and to cockroach allergen during early childhood could be helpful in preventing cockroach allergies and asthma in <u>urban children</u>.

"Asthma among many urban populations in the United States continues to rise," says senior author Rachel Miller, MD. "Identifying these complex associations and acting upon them through better medical surveillance and more appropriate public policy may be very important in curtailing this alarming trend."

Provided by Columbia University's Mailman School of Public Health



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