

Air pollution from trucks and low-quality heating oil may explain childhood asthma hot spots

March 27 2012

Where a child lives can greatly affect his or her risk for asthma. According to a new study by scientists at Columbia University, neighborhood differences in rates of childhood asthma may be explained by varying levels of air pollution from trucks and residential heating oil. Results appear online in the *Journal of Exposure Science and Environmental Epidemiology*.

In New York City, where the study was conducted, asthma among school-age children ranges from a low of 3% to a high of 19% depending on the neighborhood, and even children growing up within walking distance of each other can have 2- to 3-fold differences in risk for asthma. Helping explain these disparities, the researchers found that levels of airborne black carbon, which mostly comes from incomplete combustion sources like [diesel trucks](#) and oil furnaces, were high in homes of children with asthma. They also reported elevated levels of black carbon within homes in neighborhoods with high [asthma prevalence](#) and high densities of truck routes and homes burning low-grade or "dirty" heating oil.

"This study adds to the evidence that further public health interventions on oil and [truck emissions](#) standards and the use of dirty oil may be warranted. This is especially timely as New York City considers regulations to further reduce the burning of low-grade oil for domestic heating," says the study's senior author, Matthew Perzanowski, PhD, associate professor of [Environmental Health Sciences](#) at Columbia

University's Mailman School of Public Health .

The study may be the first to show an association between airborne black carbon in the home and proximity to buildings burning dirty oil (low-grade, types 4 and 6). "Because of its history as a shipping and oil refining center, New York City burns more dirty oil for residential and commercial heating than any other city in the country," says study co-author Steven Chillrud, PhD, Lamont Research Professor at Columbia's Lamont-Doherty Earth Observatory . "These fuels produce more byproducts of incomplete combustion than cleaner oil or natural gas and contribute substantially to [air pollution](#). Buildings that burn dirty oil are unevenly distributed throughout the city, which could help explain disparities in health."

The research team collected air samples from inside the homes of 240 7- and 8-year-old children from middle-income neighborhoods throughout New York City. These children also took breathing tests to measure exhaled nitric oxide, an indicator of lung inflammation.

"Airway inflammation plays an important role in the development of asthma and can contribute to more frequent symptoms among children with the disease," says study lead author Alexandra Cornell, MD, assistant professor in pediatrics at Dartmouth Medical School and previously a pediatric pulmonology fellow at Columbia University Medical Center/NewYork-Presbyterian Hospital. "Children in this study with higher [black carbon](#) in the air of their homes had higher exhaled nitric oxide, suggesting that they were at greater risk for asthma exacerbations. That this increased risk comes from air pollution lends weight to New York City's efforts to improve air quality, including phasing out the use of dirty [oil](#), which is a large contributor to local air pollution. "

Provided by Columbia University

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