

Exposures to metals and diesel emissions in air linked to respiratory symptoms in children

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Exposure shortly after birth to ambient metals from residential heating oil combustion and particles from diesel emissions are associated with respiratory symptoms in young inner city children, according to a new study by researchers at the Columbia Center for Children's Environmental Health (CCCEH) at Columbia University's Mailman School of Public Health. The study is the first to analyze the effects of exposure to airborne metals in this very young population and the findings could have important public health implications.

Published in the December 2009 issue of the [American Journal of Respiratory and Critical Care Medicine](#), the study also contributes to a further understanding of how specific sources of air pollution may impact child health.

The study compared pollutant levels with respiratory symptoms of [children](#) between birth and age two living in Northern Manhattan and in the South Bronx, and found that the airborne metals nickel and vanadium, were risk factors for wheezing in young children. Residual oil combustion for heating is a major source in New York City of these metals. Elemental carbon, an indicator of diesel exhaust, was associated with increased frequency of coughing only during cold and flu season (September through April).

"It appears that exposure to ambient metals and diesel-exhaust particles

in our air may lead to several respiratory symptoms for young children living in urban areas," said Rachel L. Miller, MD, associate professor of Medicine and Environmental Health Sciences (in Pediatrics) at New York-Presbyterian/Columbia University Medical Center and co-deputy director of CCCEH at the Mailman School of Public Health and senior investigator on the study. "The effects of exposure to airborne metals had not been studied previously in children so young, and these findings could have important public health implications for members of inner-city communities in New York City and elsewhere."

"These findings increase our understanding of the effects of specific pollutants from heating oil combustion and traffic on respiratory health in very young children," said Molini M. Patel, PhD, MPH, lead author and previously a research scientist in the Division of Pulmonary, Allergy, and Critical Care Medicine at Columbia College of Physicians and Surgeons and a CCCEH investigator. "Our results are of concern especially because levels of nickel in our study area, Northern Manhattan and the South Bronx, are among the highest in New York City and in the U.S., as are the rates of pediatric asthma."

The investigators controlled for exposure to second-hand tobacco smoke, sex, ethnicity, and seasonal trends, all of which have been linked to increased [respiratory symptoms](#) and asthma in other studies.

The study is part of a broader multi-year research project launched in 1998 by CCCEH that examines the health effects of exposure of pregnant women and their children to indoor and outdoor air pollutants, allergens, and chemicals.

The Center's prior research showed that exposure to multiple environmental pollutants may be associated with an increase in risk for asthma symptoms among children. The researchers suggest that improved regulatory action directed at specific pollution sources—such

as reducing residential boiler emissions and traffic of airborne pollutants such as nickel or elemental carbon—is needed to help protect young children living in urban areas. A prospective follow-up of this birth cohort and measurement of residential levels of metals and traffic-related particles will help determine whether exposures to these pollutants are associated with increased respiratory morbidity and development of asthma at later ages, according to the researchers.

Source: Columbia University's Mailman School of Public Health ([news : web](#))

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