

Exposure to both traffic, indoor pollutants puts some kids at higher risk for asthma later

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New research presents strong evidence that the "synergistic" effect of early-life exposure to both outdoor traffic-related pollution and indoor endotoxin causes more harm to developing lungs than one or the other exposure alone.

Environmental health scientists at the University of Cincinnati (UC) College of Medicine have shown that children exposed to both high levels of traffic-related particles and indoor endotoxin during early life are six times more likely to experience persistent wheezing than children exposed to low levels of traffic and indoor-related pollutants.

They report their findings in the Dec. 1, 2009, edition of the [American Journal of Respiratory and Critical Care Medicine](#). This is believed to be the first study to look at the combined effects of traffic-related exposures and sampled endotoxin in children during infancy as an indicator of asthma later in life. Endotoxin, a component of bacteria thought to trigger an immune response in humans, was measured from dust samples collected prior to age 1.

Based on a long-term study of children deemed at high risk for allergies later in life, UC environmental health researchers have found that 36 percent of the children studied who were exposed to high levels of both traffic-related pollution and indoor endotoxin demonstrated persistent wheezing at age 3, an early warning sign of [asthma](#) and other pulmonary conditions. Only 11 percent of children exposed to low levels of both indoor and outdoor allergens experienced wheezing; 18 percent of

children exposed to low levels of indoor endotoxin and high levels of traffic-related particles experienced persistent wheezing. Endotoxin exposure alone appeared to have little effect.

"There is a clear synergistic effect from co-exposure to traffic-related particles and endotoxin above and beyond what you would see with a single exposure that can be connected to persistent wheezing by age 3," explains Patrick Ryan, PhD, lead author of the study and a research assistant professor of environmental health at UC. "These two exposure sources—when simultaneously present at high levels—appear to work together to negatively impact the health of young children with developing lungs."

To conduct this study, Ryan and his colleagues utilized land-use regression modeling to calculate study participants' exposures to traffic-related particles, such as diesel exhaust. The model was designed to capture exposures at locations where the child spent more than eight hours a week between birth and age 3; for example, in their homes or at day care.

"Traffic-related particles and endotoxin both seem to trigger an inflammatory response in the children monitored in this study. When put together, that effect is amplified to have a greater impact on the body's response," adds Ryan. "The earlier in life this type of exposure occurs, the more impact it may have long term. Lung development occurs in children up through age 18 or 20. Exposure earlier in life to both endotoxin and traffic will have a greater impact on developing lungs compared to adults whose lungs are already developed."

Source: University of Cincinnati Academic Health Center

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