

Study shows surprise low-level ozone impact on asthma patients

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A new study led by UNC School of Medicine researchers indicates that ozone has a greater impact on asthma patients than previously thought. The study, published in the *Journal of Allergy and Clinical Immunology*, recruited 23 African American youth ages 12-17 with persistent asthma from the Allergy/Immunology and Pediatric Pulmonary clinics in Raleigh, NC. African American adolescents are at highest risk for morbidity among asthmatics and are a crucial population to consider when studying the health effects of ozone.

At the beginning of the study the patients' treatment plans were reviewed and optimized, and each participant was evaluated six times over a span of 15 months. At each evaluation participants had their [lung function](#) tested and blood drawn to view lipid markers as an indication of cardiovascular health. Researchers also tracked [ozone levels](#) using a monitoring station located in Raleigh, NC. Ozone levels were analyzed on each

evaluation day, as well as the four days leading up to each evaluation. Because of the Raleigh area's moderate air quality, the patients were never exposed to an amount of [ozone](#) above the Environmental Protection Agency's current eight-hour National Ambient Air Quality Standard (NAAQS) of 70 parts per billion.

"From a clinical perspective, we demonstrated that the patients' treatments resulted in adequate [asthma control](#)," said lead investigator Michelle Hernandez, MD, associate medical director of the N.C. Children's Allergy & Asthma Center. "However, despite robust anti-inflammatory care, these patients still had lung function decrements and systemic effects from their exposure to low-level ozone."

The study shows that lung function decreased when patients were exposed to ozone levels below the current EPA NAAQS and with the use of daily asthma controller therapy. Ozone was also associated with an increase in total cholesterol levels.

"Right now most physicians think that if you optimize care for a patient with asthma then that should mitigate the effects of ozone," said Hernandez. "The patients in this study had access to sub-specialty asthma care, which many other patients do not. This tells us more research is needed in larger and more diverse patient groups to learn how ozone affects lung function and cardiovascular health across the general population."

Past studies have suggested the exposure to ozone in early life was associated with the development of asthma. There are more studies currently examining the effects of early life ozone exposure on [asthma](#) development, and how cumulative effects of ozone over a lifetime may impact respiratory symptoms and lung development.

Hernandez also says the results of their study are an indication that EPA [air quality](#) standards should not be relaxed without more investigation into the health effects it could have.

Hernandez was the senior author on another paper recently published in *Respiratory Research* titled, "Age and African-American race impact the validity and reliability of The Asthma Control Test in persistent asthmatics."

More information: Michelle L. Hernandez et al. Low-level ozone has both respiratory and systemic effects in African American adolescents with asthma despite asthma controller therapy, *Journal of Allergy and Clinical Immunology* (2018). [DOI: 10.1016/j.jaci.2018.08.003](#)

Allison J. Burbank et al. Age and African-American race impact the validity and reliability of the asthma control test in persistent asthmatics, *Respiratory Research* (2018). [DOI: 10.1186/s12931-018-0858-0](#)

Provided by University of North Carolina at Chapel Hill School of Medicine

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