

Acute exposure to higher ozone levels linked to higher risk of cardiac arrest

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Exposure to higher ozone concentrations in the air is significantly associated with a higher risk of out-of-hospital cardiac arrest (OHCA), according to preliminary research to be presented at the American Heart Association's Resuscitation Science Symposium 2020.

Previous studies have shown acute exposure to [ozone](#) and [particulate matter](#) in the air is associated with the development of chronic diseases. A 2010 scientific statement from the American Heart Association deemed ambient air pollutants a "modifiable factor that contributes to cardiovascular morbidity and mortality."

"Air pollutants have been associated with increased mortality in the U.S., however, it is unknown whether ozone and particulate matter in the air on any given day are associated with a higher risk of an individual experiencing [cardiac arrest](#) outside of the hospital," said Ali Malik, M.D., M.Sc., a clinical cardiology and cardiovascular outcomes research fellow at Saint Luke's Mid America Heart Institute in Gladstone, Missouri, and lead author of the study.

Researchers used data from the Cardiac Arrest Registry to Enhance Survival to examine if higher concentrations of ozone and particulate matter were associated with incidents of cardiac arrest. This study included 187,000 individuals with non-traumatic OHCA during 2013-2016. Participants were age 63 years on average, 61% were men and 53% were non-white. Individual exposures to particulate matter and ozone were estimated using data from the U.S. Environmental Protection Agency's atmospheric models that predict daily ozone levels by census tract.

The results of the analysis found that for every 12 parts per billion (ppb) increase in the ozone level, the odds of a OHCA increased by 1%, which is statistically significant. However, there was no association between particulate matter concentration and OHCA, and no difference in risk for air-quality-related OHCA tied to age, sex or race.

"We found that a higher concentration of ozone on the day the out of hospital cardiac arrest occurred was significantly associated with a higher risk," Malik said. "Importantly, we found that the relationship between ozone and risk of OHCA was present even at concentrations below the EPA air quality standard. These findings may have important public health implications."

Malik added, "Mechanisms by which acute ozone exposure increases the risk of cardiac arrest need to be better defined. It is important to limit exposure to high ozone levels, and we need more aggressive measures to decrease ambient air ozone concentrations."

Malik noted that this is an observational study and exposure to air pollutants was derived from outdoor estimates. Further study is needed to determine the exact relationship between air pollution and cardiac arrest.

Provided by American Heart Association

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