

FOR IMMEDIATE RELEASE 9:00 AM EDT July 6, 2017
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***STUDY FINDS NO HEART EFFECTS OF OZONE EXPOSURE IN HEALTHY OLDER ADULTS;
LUNGS AFFECTED AT RELATIVELY LOW EXPOSURES***

(Boston, June 28, 2017) The largest systematic study ever conducted of human volunteers exposed to ozone air pollution has found no evidence of effects on the heart in its healthy, older participants, but did find effects on the volunteers' ability to breathe, even at low ambient levels.

HEI Research Report 192, *Multicenter Ozone Study in oldEr Subjects (MOSES): Part 1. Effects of Exposure to Low Concentrations of Ozone on Respiratory and Cardiovascular Outcomes* - published today by the Health Effects Institute (HEI)¹ at www.healtheffects.org - measured a large number of cardiovascular and respiratory endpoints in 87 healthy, older participants who were exposed to 0, 70, or 120 parts per billion ozone for 3 hours while exercising moderately.

Although ozone has been documented to have respiratory effects, MOSES was designed to test a question which has been less well understood: whether ozone has short-term cardiovascular effects at present-day ambient levels (70 parts per billion is the current US National Ambient Air Quality 8-hour Standard). Led by Dr. John Balmes (University of California San Francisco), Dr. Phil Bromberg (University of North Carolina), and Dr. Mark Frampton (University of Rochester), and conducted in the largest number of volunteers ever tested, the study followed rigorous, standardized protocols, and all statistical analyses were conducted at a central data center. It was subjected to detailed oversight by the HEI Research Committee and staff, the MOSES Data Monitoring Board, separate data quality audits, and intensive independent peer review by the HEI MOSES Review Panel.

The Review Panel concluded, in its Commentary accompanying the Investigators' report, that:

- There was no convincing evidence that ozone exposure in this large study of older, healthy adults affected the primary cardiovascular endpoints identified by the investigators. Also, no responder subgroups could be identified in which ozone elicited cardiovascular effects that were not evident in the group as a whole.

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¹ The Health Effects Institute is an independent, nonprofit research institute funded jointly by the U.S. Environmental Protection Agency, industry, foundations, and development banks to provide credible, high-quality science on air pollution and health for air quality decisions.

- The observed lack of cardiovascular effects may not be generalizable to the overall adult population, which includes people who are less healthy and who are exposed to multiple pollutants for long periods of time.
- There were moderate effects on lung function and on two markers of lung injury and inflammation in these healthy, older adults (a population that had not often been studied in the past), a result that provides confirmation of ozone effects on the lung at concentrations similar to the current air quality standard.

“The MOSES study adds substantially to our understanding of the potential effects of ozone exposure in healthy older adults,” said HEI President Dan Greenbaum. “It importantly did not find cardiovascular effects in this population, but did confirm effects on the lung, even at the low levels of ozone exposure at which the study was conducted.”

The complete HEI Research Report 192, *Multicenter Ozone Study in oldEr Subjects (MOSES): Part 1. Effects of Exposure to Low Concentrations of Ozone on Respiratory and Cardiovascular Outcomes*, along with extensive background data and other supplemental material, is available for download at www.healtheffects.org.