

# Long-term exposure to ozone has significant impacts on human health

October 11 2018

---



Credit: CC0 Public Domain

A new study has utilized a novel method to estimate long-term ozone exposure and previously reported epidemiological results to quantify the health burden from long-term ozone exposure in three major regions of the world.

The research, by Duke University (USA) and the University of York (UK), estimates that 266,000 (confidence interval: 186,000-338,000)

premature mortalities across Europe, the USA and China in 2015 were attributable to long-term [exposure](#) to ozone (O<sub>3</sub>).

It publishes today in *Environmental Research Letters*.

Karl Seltzer, from Duke University, is the study's lead author. He said: "There is strong epidemiological and toxicological evidence linking ambient [ozone](#) exposure to adverse health effects.

"Historically, much of the previous research focussed on the short-term impacts. We utilized results from the growing body of evidence that links long-term O<sub>3</sub> exposure and increased cause-specific premature mortalities, particularly from respiratory diseases."

To do this, the researchers used 2015 data from ground-based monitoring networks in the USA, Europe and China to estimate long-term O<sub>3</sub> exposure. They then calculated premature mortalities using exposure-response relationships from two American Cancer Society (ACS) cancer prevention studies.

Mr Seltzer said: "Global estimates of O<sub>3</sub> exposure are often made using state-of-the-art chemical transport models (CTMs). However, we based our study on observed air quality data, because it has several advantages over CTM modelling approaches."

Interestingly, the team's observationally-derived data shows smaller human-health impacts when compared to prior modelling results.

Mr Seltzer explained: "This difference is due to small biases in modelled results. These small biases are subsequently amplified by non-linear exposure-response curves. This highlights the importance of accurately estimating long-term O<sub>3</sub> exposure in health impact assessments. The overall findings from this study have important implications for policy

makers and the public, for several reasons.

"First, health impacts attributable to long-term O<sub>3</sub> exposure are higher when using the newest ACS CPS-II cohort analysis. Plus, the impacts are expanded further if the association between long-term O<sub>3</sub> exposure and cardiovascular mortality is indeed shown to be causal and included in the total health burden estimates.

"Second, results from the newest ACS CPS-II cohort analysis suggest that O<sub>3</sub> exposure should be considered year-round. This is particularly relevant for the three regions included in this analysis, where the seasonal cycle and regional distributions of O<sub>3</sub> have shifted over the last few decades."

"Finally, these results also highlight the importance of accurately estimating O<sub>3</sub> exposure and the consequences of high exposure bias in estimating impacts for health assessments."

**More information:** Karl M Seltzer et al. Measurement-based assessment of health burdens from long-term ozone exposure in the United States, Europe, and China, *Environmental Research Letters* (2018). [DOI: 10.1088/1748-9326/aae29d](https://doi.org/10.1088/1748-9326/aae29d)

Provided by Institute of Physics

Citation: Long-term exposure to ozone has significant impacts on human health (2018, October 11) retrieved 3 May 2024 from <https://phys.org/news/2018-10-long-term-exposure-ozone-significant-impacts.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.