

World's biggest study of wildfire smoke impact reveals alarming long-term health impacts

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As North America recovers from some of the worst air quality in decades due to wildfires, one of the largest and most comprehensive

studies into the long-term health impact of smoke exposure raises significant concerns about the long-term health impact of the Canadian wildfires.

The study found that a $10 \mu\text{g}/\text{m}^3$ increase of wildfire-related $\text{PM}_{2.5}$ exposure was associated with a 0.4% higher risk of all-cause and nonaccidental [mortality](#), and a 0.5% increase in risk of dying from neoplasms. On June 8, at the peak of the wildfire pollution, levels of $\text{PM}_{2.5}$ reached $460 \mu\text{g}/\text{m}^3$

The research, led by researchers at Monash University in Australia and published in the *Journal of Hazardous Materials*, is the first to look at the relationship between long-term exposure, with a 11 years follow-up, to wildfire-related fine [particulate matter](#) ($\text{PM}_{2.5}$) and mortality.

Importantly the study found no significant associations of wildfire-related $\text{PM}_{2.5}$ exposure with mortality from cardiovascular, respiratory, and mental diseases.

To date, studies into the health impacts of wildfire-related $\text{PM}_{2.5}$ exposure have shown an increased risk of all-cause, cardiovascular and respiratory mortality, however, according to lead researcher Associate Professor Shanshan Li, from the School of Public Health and Preventive Medicine, most of the evidence focused on short-term impacts. "We aimed to estimate the long-term impacts of wildfire-related $\text{PM}_{2.5}$ exposure on mortality in adults using a large-scale national cohort database from the UK Biobank," she said.

"To the best of our knowledge, this is the first population-based prospective cohort study to quantify the associations between long-term exposure to wildfire-related $\text{PM}_{2.5}$ and mortality."

The data came from a subset of the UK Biobank, involving 492,394

participants enrolled from 2004 to 2010, that are followed up regularly in the UK, collecting [biological samples](#), surveys regarding lifestyle—all of which was then linked to their health-related records. The researchers then extracted mortality data, including underlying (primary) cause of death and date of death, which was mapped to wildfire-related PM_{2.5} exposure one to five years before death.

According to Associate Professor Li, the study's findings "show that wildfire-related PM_{2.5} exposure has long-lasting adverse impacts on all-cause, nonaccidental, and neoplasm mortality."

"Given the recent pollution levels in North America caused by the Canadian [wildfires](#), our study linking long-term exposure to wildfire-related PM_{2.5} and mortality suggest that further research is urgently needed to provide more scientific evidence on this topic."

More information: Yuan Gao et al, Association between long-term exposure to wildfire-related PM_{2.5} and mortality: A longitudinal analysis of the UK Biobank, *Journal of Hazardous Materials* (2023). [DOI: 10.1016/j.jhazmat.2023.131779](https://doi.org/10.1016/j.jhazmat.2023.131779)

Provided by Monash University

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