



Wildfires, air pollution, and health

Wildfires are increasing around the world due to higher temperatures, more arid seasons, and dry vegetation and soil. The frequency, intensity, and duration of wildfire season is increasing and contributing to health problems. Moreover, a feedback system of climate change and wildfires plays out in a self-reinforcing loop where climate change creates fire-prone conditions and wildfires release emissions into the atmosphere fueling more climate change that perpetuates this cycle.

The findings presented in this factsheet are derived from research conducted by three projects: the Belmont Forum-funded project, Arctic Community Resilience to Boreal Environmental change: Assessing risks from fire and disease (ACRoBEAR), the Belmont Forum-funded project, Health effects and associated socio-economic costs of increasing temperatures and wildfires: a global assessment (HEATCOST), and the EU Horizon 2020-funded project, Exposure to heat and air pollution in Europe – cardiopulmonary impacts and benefits of mitigation and adaptation (EXHAUSTION). These three projects focus on the health risks from heat, air pollution, and wildfires.

The purpose of this factsheet series is to showcase key findings from research on climate change and health from projects funded by the EU and Belmont Forum which are part of the ENBEL network. The series includes only findings from research produced by four EU-funded projects

and one JPI Climate-funded project in the ENBEL network as well as from projects funded through the Belmont Forum Climate, Environment and Health Collaborative Research Action (CEH1).

Key findings

- Climate change is increasing the scale, frequency, and intensity of wildfires due to rising temperatures and drier conditions as highlighted by recent wildfire events across various regions including southern Europe, North and South America, Africa, and the Arctic.
- Wildfires emit a complex mixture of pollutants into the atmosphere including fine particulate matter (PM2.5) and gaseous pollutants, some of which contribute to secondary air pollutants such as ozone.
- Poor air quality resulting from these pollutants has been linked with various health problems including respiratory issues (i.e., asthma, impaired lung function, chronic obstructive pulmonary disease), cardiovascular diseases, stroke, dementia, adverse pregnancy outcomes, and can cause premature death.
- A study in northern Sweden found that wildfires in 2018 contributed to poor air quality during a short time-period and increased daily health care visits and hospitalizations for asthma and other respiratory diseases.
- A 2021 multi-country study including 749 cities in 43 countries and regions during 2000–2016 found that short-term exposure to wildfire-related PM2.5 pollution was associated with an increased risk of mortality, particularly from cardiovascular and respiratory causes.
- The average surface temperature increased three times as fast in the Arctic as compared to the global average increase in the period 1979–2019 which is leading to critical changes including increased temperature extremes, thawing permafrost, ice loss, changes in precipitation patterns, and shifts in vegetation.
- Unprecedented fire activity in the Arctic areas of Scandinavia, Siberia and Alaska in recent years has led to unhealthy air quality in local towns and cities, as well as health

impacts at lower latitudes due to long-range atmospheric transport of smoke emissions.

- The rising incidence of Arctic wildfires may be leading to changes in vector-borne diseases like Lyme disease due to changing ecological conditions that facilitate the spread of disease-carrying organisms.
- The significance of tundra fires is often underestimated as tundra fires further diminish pasture areas for reindeer, exacerbating an already severe issue of overuse in places such as northwest Siberia.
- In Europe, there has been a steady increase in fire-related mortality rates (excess deaths from particulate matter (PM2.5) from forest fires in comparison to overall PM2.5 deaths) during the last 30 years. Notably, countries in Eastern Europe exhibited significantly higher fire mortality rates and experienced more pronounced increases compared to those in Western and Central Europe.

Implications of the research

- Climate change is intensifying the scale, frequency, and intensity of wildfires worldwide increasing threats to human health, ecosystems, and the environment.
- Wildfires emit pollutants that worsen air quality and are associated with an increased risk of respiratory and cardiovascular effects and adverse pregnancy outcomes.
- Research studies from northern Sweden and the Arctic highlight the direct, immediate health consequences of wildfire-related pollution on humans.
- Increasing risk of wildfires and associated emissions of air pollutants make it harder to reach national air quality targets around the world.

Who is most at risk?

- Indigenous populations with strong cultural ties to the land often rely on traditional livelihoods. Rapid changes in the environment such as increased wildfires and shifts in disease patterns can disrupt this traditional way of life and have significant physical and mental health impacts.
- Older adults may be more susceptible to the health effects of poor air quality and vector-borne diseases that can exacerbate existing health conditions and decrease well-being.
- Children, especially those living in high latitude towns and cities, are particularly vulnerable to the impacts of unhealthy air quality and changing disease patterns, as their developing bodies may be more sensitive to environmental stressors.
- Lower-income communities have limited resources and infrastructure to adapt to and cope with climate change-related health risks.

Conclusion

This research highlights the complex interplay between climate change, wildfires, air quality, health, ecosystems, and socio-cultural aspects. It emphasizes the necessity for coordinated efforts to mitigate climate change, manage wildfire risks, safeguard air quality, and address impacts on society and the environment.



For more information

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Alexandros Michailidis



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🌐 enbel-project.eu

✉ ENBELmanagement@cicero.oslo.no



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