

CLIMATE CHANGE, WILDFIRES AND HUMAN HEALTH

Wildfires and air pollution related to wildfire smoke have an impact on our health. This policy brief summarises new evidence on how climate change will increase the health risks from wildfires across the world.



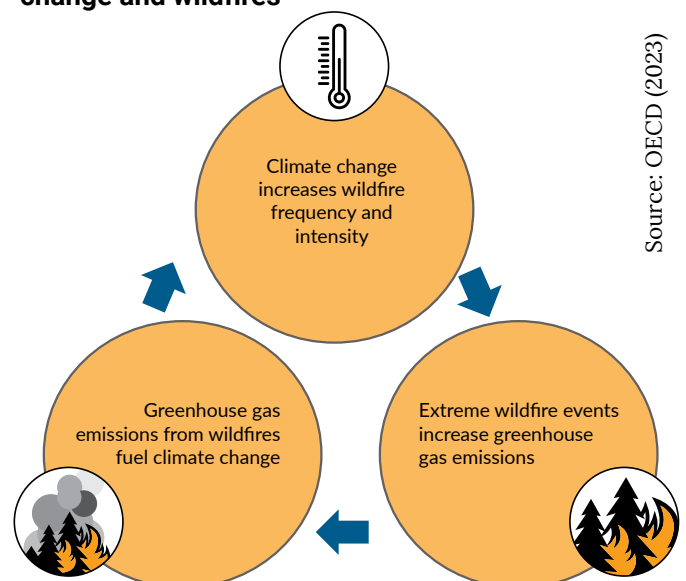
Key messages

- Wildfire pollution is an important and increasing impact of climate change on human health that affects populations globally.
- Wildfire pollutants contribute to respiratory, cardiovascular, and pregnancy-related health effects, increasing premature deaths.
- Wildfire pollution is increasing globally, making it more difficult for countries to reach their National Air Quality Standards.
- Wildfire smoke can be much more toxic to human health as compared to air pollutants from other sources such as industry or power generation.
- In the last two decades, exposure to wildfire particulate matter (PM_{2.5}) increased by 60% globally, and by 40% over Europe.
- Smoke from wildfires can be transported over long distances. Large fires in remote regions such as the Arctic can have substantial health impacts in neighbouring more densely populated areas.

Climate change threatens to increase the frequency, extent, and severity of wildfires in some regions by raising the average temperature, intensifying droughts, prolonging the dry season and reducing soil moisture.

More than 90% of fires are caused by humans, either deliberately, or accidentally. When human-induced fire starts, the warmer and drier conditions driven by climate change help to spread them leading to larger more deadly fires that are difficult to control.

Fig.1 Feedback between climate change and wildfires



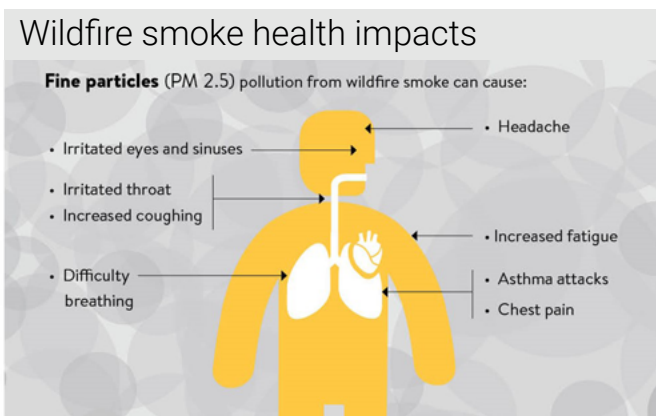
Source: OECD (2023)

Wildfires have the potential to harm property, livelihoods, and emit large amounts of pollutants impacting human health. Wildfires also cause death and injury directly, may disrupt access to health services, and large numbers of people are displaced for months. Mental health impacts are common in the aftermath of wildfires. It is crucial to understand how wildfire risk may change in a future warmer climate to guide plans for adaptation and reduce disaster risk.

In this policy brief, we summarise research conducted by the ACroBEAR and HEATCOST projects funded by the Belmont Forum and the EXHAUSTION project funded by the EU's Horizon 2020 programme.

Health impacts from wildfires

The severity of health risks from wildfires can vary depending on factors such as the size and intensity of the wildfire, proximity to the fire, underlying health conditions, effectiveness of emergency response, and access to healthcare.



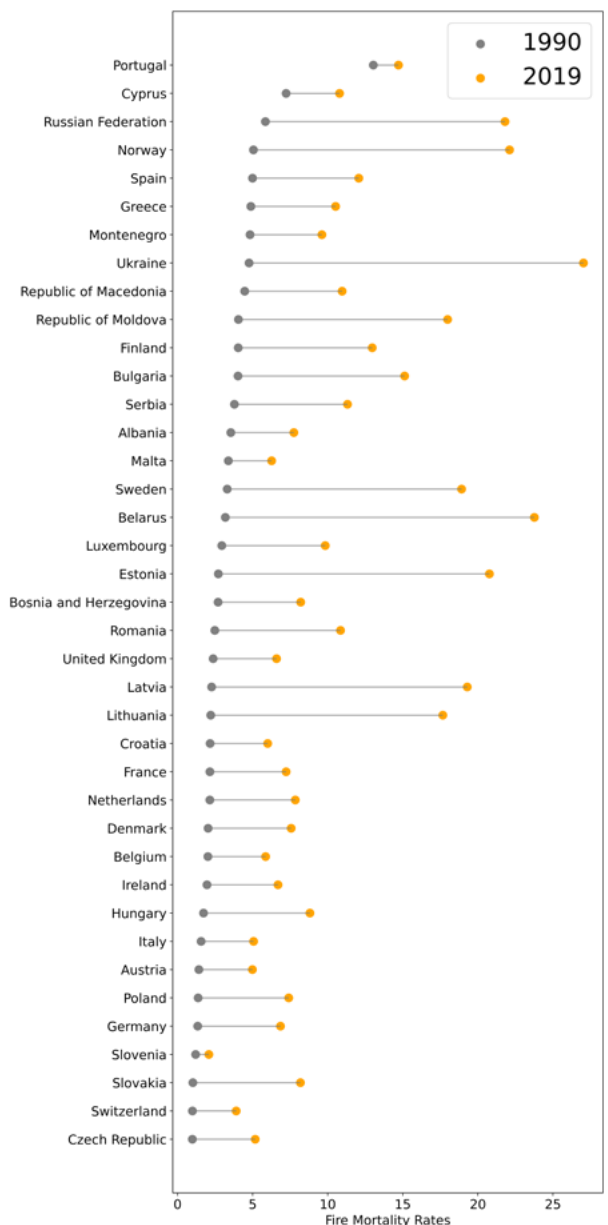
Wildfire Smoke - Minnesota Department of Health, USA

Increase in respiratory and cardiovascular diseases:

Wildfires produce vast amounts of smoke contributing to unhealthy air quality. The smoke, which contains fine particulate matter (PM_{2.5}), can travel deep into the lungs causing respiratory problems or exacerbating pre-existing respiratory and cardiovascular illnesses. A study conducted by the ACroBEAR project in Sweden (Jämtland and Härjedalen) in 2018 found that wildfires with short periods of poor air quality increased the risk of respiratory morbidity and an increased burden on number of patients at hospitals and health care centres.

Premature deaths: According to the HEATCOST and EXHAUSTION projects, an estimated 37000 excess deaths occurred due to wildfires globally in 2017 (an increase of 35% since 1990). The majority of deaths occurred in Africa and America. In Europe, contribution from wildfires to deaths associated with exposure to particulate matter (PM_{2.5}) is on a steady rise (fig.2). Emissions from wildfires can be up to ten times more toxic compared to other sources of PM_{2.5}. If this is considered, wildfires may contribute to more than 13% of total excess deaths in Europe attributed to PM_{2.5} pollution.

Fig. 2: Fire mortality rates (excess deaths from wildfire emissions per 1000 deaths from all fine particulate matter) for countries in Europe (1990 and 2019)



Source: EXHAUSTION project.

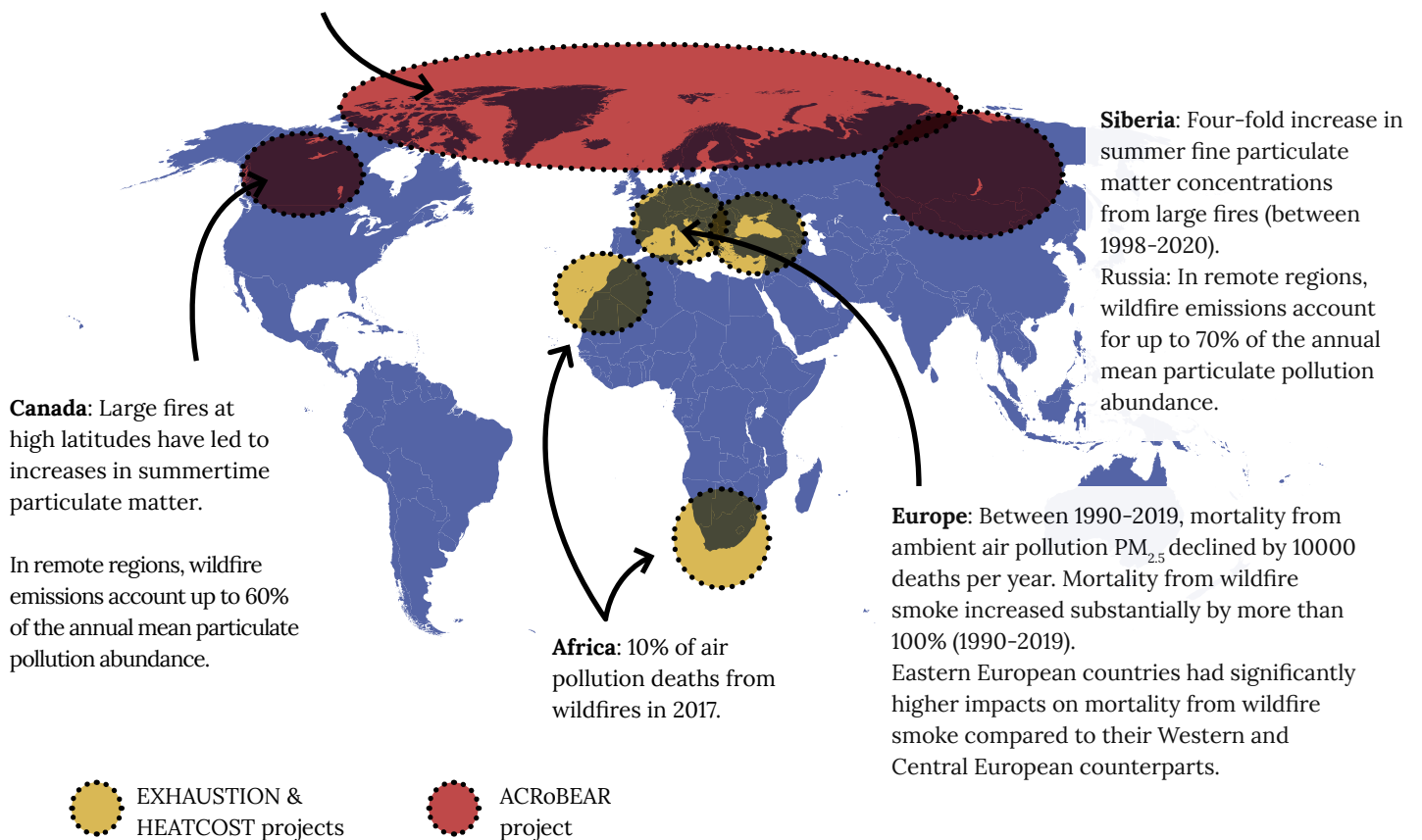
The ACROBEAR project reported approximately 10000 premature deaths per year (2001-2020) due to wildfire smoke in Arctic Council countries (Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, United States). About the same number of premature deaths were estimated in non-Arctic nations from trans-boundary smoke transport outside the Arctic Council region.

Change in patterns of infectious diseases:

Wildfires are driving changes in the landscape and vegetation patterns, which may lead to changes in vector-borne diseases such as Lyme disease. Fire activity is intrinsically linked to changes in vector-borne disease risk through changing the habitat conditions for vectors and their host. For example, landscapes are changing in the high latitudes as vegetation shifts are occurring as the climate warms.

Fig. 3: Impact of wildfires by geographical area from EU and Belmont projects

Arctic region: Overall, population exposure to smoke from high latitude wildfires is decreasing as climate change is causing wildfire to migrate northwards away from more populated lower latitudes.



Recommendations

Key messages for policy makers

- Strengthen capacity for monitoring and assessing the health impacts of wildfires e.g., establishing surveillance systems to track respiratory illnesses and other health conditions related to wildfire smoke exposure.
- Prioritise the development and implementation of comprehensive wildfire management strategies that focus on prevention, early detection, and rapid response.

Recommendations for research

- More research is needed on understanding the specific health risks associated with different types of vegetation fires.
- There is need for improved modelling and forecasting techniques to accurately predict the emissions and dispersion of pollutants from wildfires.
- Collaboration and data sharing amongst researchers, policy makers and stakeholders should be strengthened to advance knowledge on wildfires and air pollution, and ensure findings are effectively translated into policy actions.

Future projections of impacts of wildfires due to climate change

- Wildfire risk associated with meteorological conditions will increase substantially at high latitudes under a warmer climate.
- At high latitudes, climate change impact on fire risk is largest in Canada, where the number of days with moderate or high fire weather index doubles in a future with +4°C global warming compared with +1°C global warming.

- By 2100, global population exposure to wildfires will double compared to 2015–2019 levels under the worst-case scenario.
- Greatest future impacts are projected to be in Andean Latin America and Central Africa.
- Landscapes are changing in the high latitudes; vegetation shifts are occurring as the climate warms. Over 20000km² of northwest Siberia, fire-damaged regions display greater climate-driven vegetation shifts to species with higher biomass. In this region, fire may have an important role in modifying habitat availability for vectors and disease hosts.

References

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