

# First study to globally map heat-wave-related mortality finds 153,000+ deaths associated with heat waves

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Researchers investigate heat wave deaths over recent decades. Credit: RosZie, Pixabay (CC0, [creativecommons.org/publicdomain/zero/1.0/](https://creativecommons.org/publicdomain/zero/1.0/))

A Monash-led study—the first to globally map heat wave-related

mortality over a three-decade period from 1990 to 2019—has found that an additional 153,000+ deaths per warm season were associated with heat waves, with nearly half of those deaths in Asia.

In comparison to 1850–1990, the global surface temperature has increased by 1.1°C in 2013–2022 and is expected to increase by another 0.41–3.41°C by 2081–2100. With the increasing impacts of climate change, [heat waves](#) are increasing not only in frequency but also in severity and magnitude.

The study, published in *PLOS Medicine* and led by Monash University's Professor Yuming Guo, looked at data on daily deaths and temperature from 750 locations in 43 countries or regions.

The study—done in collaboration with Shandong University in China, London School of Hygiene & Tropical Medicine in UK, and universities/research institutes from other countries- found that, from 1990–2019, heat waves led to an increase in deaths of 236 deaths per ten million residents per warm season of a year. The regions with the highest heat wave-related deaths were in:

- Southern and Eastern Europe
- Areas with polar and alpine climates
- Areas where residents had high incomes

Locations with [tropical climate](#) or low incomes were observed with the greatest decline in heat wave-related mortality burden from 1990 to 2019.

According to Professor Guo, in previous studies looking at increased deaths related to heat wave exposure, "the evidence mainly comes from limited locations."

"Our findings that heat waves are associated with substantial mortality burden that varies spatiotemporally over the globe in the past 30 years suggest that there should be localized adaptation planning and [risk management](#) across all government levels."

According to the study's authors heat waves cause an increased risk of death due to overwhelming thermal stress on human body and triggering dysfunction of multiple organs as well as heat exhaustion, heat cramps, and heatstroke. The [heat stress](#) can also aggravate pre-existing [chronic conditions](#), leading to premature death, psychiatric disorders and other outcomes.

**More information:** Global, regional and national burden of heatwave-related mortality from 1990 to 2019: A three-stage modelling study, *PLoS Medicine* (2024). [DOI: 10.1371/journal.pmed.1004364](https://doi.org/10.1371/journal.pmed.1004364)

Provided by Monash University

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