



Kuala Lumpur, Malaysia, and Pune, India

dishashetty20@gmail.com

Cite this as: *BMJ* 2024;385:q1052

<http://dx.doi.org/10.1136/bmj.q1052>

Published: 14 May 2024

CLIMATE EMERGENCY

A lack of quality statistics is hiding the real heatwave death toll

Heatwaves are intensifying but gaps in the data mean that the number of people who have died from rising temperatures is unclear. **Disha Shetty** reports on why—and why it matters

Disha Shetty *freelance journalist*

Malaysia's capital Kuala Lumpur is hot and humid throughout the year but this April temperatures rose to over 37°C compared with the usual low 30s. The tropical country's meteorology department published a heatwave warning for 14 areas.¹

In India millions of people headed to polling stations during April and May,² even as temperatures soared up to 44°C in some areas, with heatwaves predicted for many districts.³

Heatwaves, known as silent killers, resulted in 61 000 deaths in Europe in 2022, according to one study.⁴ In West Africa, Mali has already reported more than 100 heatwave deaths this year.⁵

Most healthcare systems are not equipped to document heatwave deaths, however. "The largest single source of mortality data should be the civil registration system. But in low and middle income countries, the vast majority of deaths are happening outside of health facilities," says Philip Setel, a vice president at Vital Strategies, a public health non-governmental organisation. In addition, certifying a death with a cause requires the presence of a healthcare worker—a condition that might not be met when deaths occur outside the system.

How heatwaves kill

Direct exposure to heat puts outdoor workers most at risk of death. But what complicates the counting of heatwave deaths is that they might not be immediate.

The way that heat affects the body is complex, says Abhiyant Tiwari, lead of health and climate resilience at NRDC-India, a private consultancy specialising in climate change solutions. Heatstroke from high temperatures is an obvious factor, but when the body is exposed to high temperatures during both the day and night stress accumulates over consecutive days. Night time should provide respite from higher daytime temperatures but, over the past two decades, night time temperatures have risen across the world.⁶

While pregnant women and those living in communities without good ventilation or cooling solutions are most vulnerable, those with existing non-communicable diseases including diabetes and heart conditions are also at higher risk. Heat can exacerbate these conditions, Bente Mikkelsen, head of the World Health Organization department of non-communicable diseases, said at the 2023 UN climate conference.⁷ Non-communicable diseases are responsible for up to 74% of all deaths globally,

according to WHO, with roughly nine out of 10 of these deaths in low and middle income countries.

For healthcare workers to attribute such deaths to heat at an individual level would require them to investigate a person's heat exposure. "The problem with heatwave deaths is that it is diagnosis by exclusion," explains Tiwari. Attributing an individual death to heat stress is complicated. "It's difficult to know if a particular person died because of underlying risk factors for heart disease, for example, or because of the heat, and so deaths are calculated at the population level," says Kristie Ebi, professor of global health at the University of Washington.

Looking at all cause mortality

To estimate the number of heatwave related deaths in a population, researchers look at mortality spikes during a heatwave and compare them with the number of deaths for that place for the same period in other years. This is the same method that was used to estimate covid-19 deaths during the pandemic.

The method works well in areas where most deaths are registered, even if not certified. But the UN says that only 68% of countries, territories, and areas register at least 90% of deaths that occur.⁸

"Until there are high levels of death registration it's going to be a challenge to do this," Setel says. There are models that estimate heatwave deaths, he says, but adds that such models can both over and under-estimate deaths, where possible direct measurements are preferable, even when data are limited or biased.

Ebi says that for many heatwaves in the past the official number of heatwave deaths was a fraction of the number of excess deaths. "It's understood that without an accurate count of deaths, the estimates are likely to be an underestimate," she says.

Heat is set to worsen

What is clear is that climate change is making heatwaves worse, says Andrew Pershing, who leads climate science activity at non-profit organisation Climate Central. "Heatwaves are the most direct outcome of the fact that we've warmed the planet. We've added 1.3°C to the air temperature," Pershing says.

Unlike birth registrations, registering a death might not have practical value for a family unless there is property to be passed on or insurance payments to claim. If the process is too cumbersome it makes it less likely that families will register deaths. Setel says

that working with national health ministries to improve death registration is an important step.

In addition, instead of requiring attendance at government offices, the ability to register deaths in the community has delivered better results in the countries Vital Strategies has helped to support. A way to do this, Setel says, is to involve community health workers, local police, and religious leaders, among other outreach workers, who can then notify the government. “It means that deaths don’t go uncounted as they can when there’s a passive, office based system in place,” he says.

For Ebi the question is not just about having accurate data on deaths but helping people. “The bigger picture is that all of these deaths are potentially preventable. We should be finding ways to increase awareness in the population that heat can kill and that people do need to take action to protect themselves.”

Competing interests: None

- 1 Malaysian Meteorological Department. Heat wave status. www.met.gov.my/en/iklim/status-cuaca-panas/#Peninsular
- 2 Thiagarajan K. Health under the spotlight in India’s 2024 election. *BMJ* 2024;385. doi: 10.1136/bmj.q844 pmid: 38636964
- 3 India Meteorological Department. Heat wave guidance. https://internal.imd.gov.in/pages/heat-wave_mausam.php
- 4 Ballester J, Quijal-Zamorano M, Méndez Turrubiates RF, et al. Heat-related mortality in Europe during the summer of 2022. *Nat Med* 2023;29:66. doi: 10.1038/s41591-023-02419-z pmid: 37429922
- 5 Extreme Sahel heatwave that hit highly vulnerable population at the end of Ramadan would not have occurred without climate change. World Weather Attribution. 18 April 2024. www.world-weatherattribution.org/extreme-sahel-heatwave-that-hit-highly-vulnerable-population-at-the-end-of-ramadan-would-not-have-occurred-without-climate-change
- 6 He C, Kim H, Hashizume M, et al. The effects of night-time warming on mortality burden under future climate change scenarios: a modelling study. *Lancet Planet Health* 2022;6:57. doi: 10.1016/S2542-5196(22)00139-5 pmid: 35932785
- 7 WHO. COP28 side event: unbearable heat and unbreathable air—finding win-win solutions for climate and health. 30 November 2023. www.who.int/news-room/events/detail/2023/11/30/default-calendar/cop28-side-event-unbearable-heat-and-unbreathable-air-finding-win-win-solutions-for-climate-and-health
- 8 UN Statistics Division. Demographic and social statistics. <https://unstats.un.org/unsd/demographic-social/crvs>