Medical Xpress

Aging population to be major driver of future climate-related deaths, predicts study

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Climate change poses profound public health threats to people of all ages. But as the climate changes, the world is facing another public health challenge: aging.

The proportion of the world's population 65 and older is projected to rise from 9% at present to 16% in 2050. As the earth's temperature becomes more extreme, population aging is expected to substantially amplify future heat- and cold-related deaths, a new study from the Yale School of Public Health (YSPH) shows.

According to the study, published in *Nature Communications*, at 1.5°C, 2°C, and 3°C of global warming, heat-related deaths in 800 locations across 50 countries and regions of the globe will increase by 0.5%, 1.0%, and 2.5%, respectively. Of these heat-related deaths, one-in-five to one-in-four can be attributed to population aging.

Despite a projected decrease in cold-related mortality due to a warming climate, an aging population, which is vulnerable to cold as well as hot temperatures, will likely counteract this trend, leading to a net increase in cold-related deaths by 0.1% to 0.4%.

"Our findings indicate that population aging constitutes a crucial driver for future heat- and cold-related deaths, with an increasing mortality burden for both heat and cold due to the aging population," said Kai Chen, Ph.D., the study's first author and an assistant professor of epidemiology (environmental health sciences) at YSPH.

"This work by Professor Chen and colleagues is a perfect example of the type of action-inspiring research we hope to support through Yale Planetary Solutions," said Julie Zimmerman, Ph.D., vice provost for planetary solutions. "With this refined understanding of the risks to aging populations in a warming world, we are better equipped to inform health-protective policies, as we strive to mitigate the worst impacts of climate change."

Older adults and extreme temperatures

Older adults are among the most vulnerable populations when it comes to extreme temperatures due to their more limited thermoregulatory responses, a relatively high prevalence of chronic conditions, and a higher likelihood that they are socially isolated. Understanding the impact of population aging and climate change can provide important insights into future health burdens, the study's authors said.

The study's findings are based on a dataset of more than 83 million deaths among populations from 50 countries/areas across five continents.

The researchers assessed the vulnerability of each population through localized temperature-mortality associations. They also used a two-stage time series analysis, the state-of-the-art methodology in multi-location assessments, to estimate the overall association between daily temperature and mortality in each location; population aging projections; and an advanced computational approach to account for uncertainty in both temperature-mortality relationships and variability across global climate models.

The researchers assessed the impact of population aging on future temperature-related excess mortality. Across the 50 countries/areas, the population 65 years and above is projected to increase by 3.0%, 7.3%, and 13.8%, by the time global warming reaches 1.5°C, 2°C and 3°C, respectively.

At the highest level, 3°C of warming, Southern Asia will have experienced the largest increase in population aging (23.6%), followed by Eastern Europe (20.1%), and Latin America and the Caribbean (17.8%), according to the study's projections. Northern Europe (6.0%) will have the lowest rate of population aging, followed by North America (6.7%), Western Europe (7.6%), and Australia (7.9%).

"Our findings strongly underline and support the need to account for a

significant shift in the number of older individuals who will die from either cold or heat globally, regardless of whether we see large or small changes in climate. Without acknowledging the shifting population and the increasing number of people exposed to non-optimal temperatures, both heat and cold, the ability to address the health impacts of temperature extremes will be hindered," the authors wrote in the study.

The world set a new warming record in 2023—close to 1.5°C of global temperature increase above pre-industrial levels, according to the European Union's Copernicus Climate Change Service. The study finds that, after taking population aging into consideration, future temperature-related deaths will be larger at 2°C than at 1.5°C in most (47 out of 50) countries and regions.

"Our findings underscore the need for ambitious and drastic climate mitigation actions to keep 1.5°C warming within reach, and targeted and efficient climate adaptation measures to prevent temperature-related health impacts under the dual threats from climate change and population aging," the authors wrote.

More information: Kai Chen et al, Impact of population aging on future temperature-related mortality at different global warming levels, *Nature Communications* (2024). DOI: 10.1038/s41467-024-45901-z

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