Young men more likely to die in summer, older people in winter despite local climate

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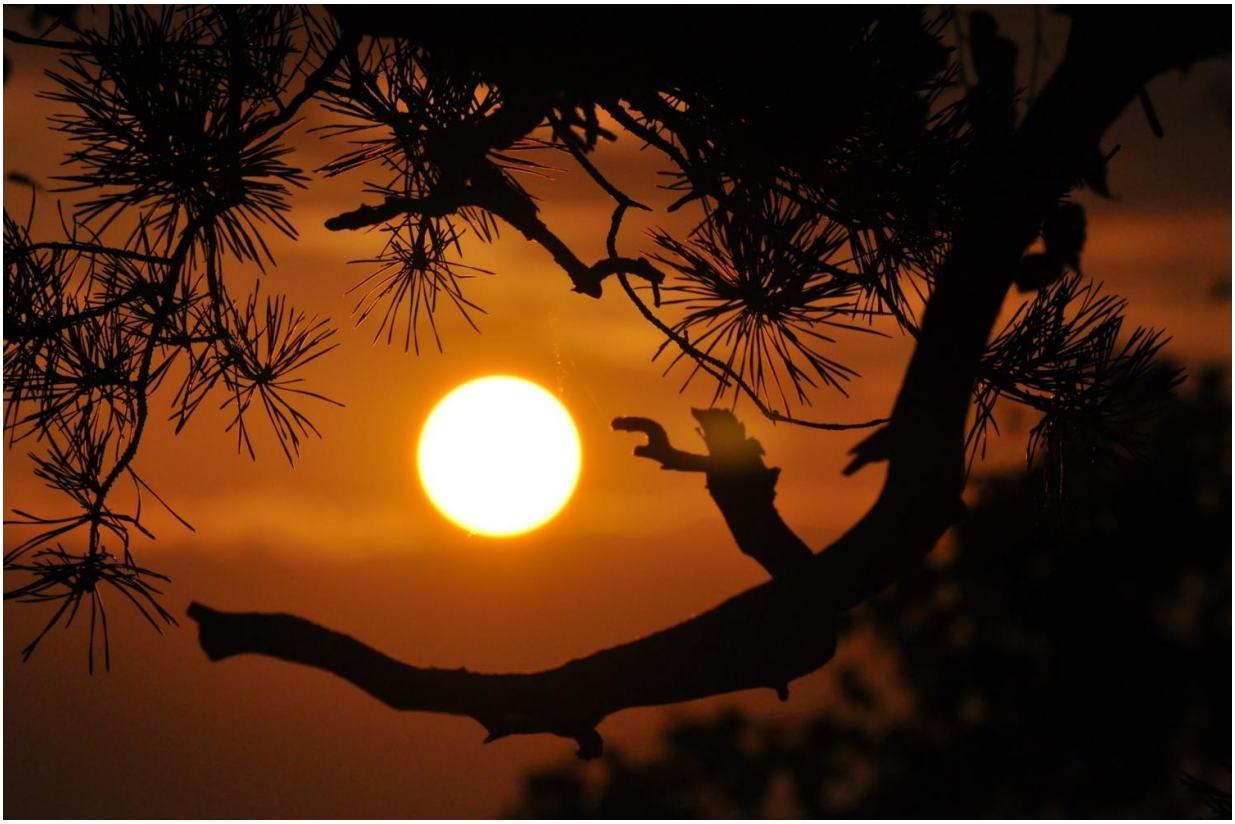

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Young men living in the US are overall more likely to die in the summer months, according to a new study in *eLife*.

The trend is just one of several highlighted in an analysis spanning nearly four decades, which will help inform public health strategies to reduce deaths now and in the future.

"It is well established that death rates vary throughout the year, but there is limited information on how this seasonality varies by local climate and how it has changed over time for different diseases and at different ages," explains lead author Robbie Parks, Ph.D. student at the MRC-PHE Centre for Environment and Health, Imperial College London, UK. "In this study, we set out to comprehensively characterise the patterns of death over different time periods and geographical areas to understand when and where death rates are at their highest and lowest."

The study used data on 85,854,176 deaths in the US between 1980 and 2016 from the vital registration. It was analysed using a technique called wavelet analysis, where death rates are studied through a kind of 'moving window' over time, revealing changes.

Using this approach, the research team identified several distinct seasonal patterns in relation to age and gender:

- Deaths from overall mortality (any cause of death) in men aged 45 years and older and women aged 35 years and older peaked in December, January or February, and were lowest in June to August
- Deaths from heart and lung diseases were highest in January and February and lowest in July and August regardless of age
- Deaths in children younger than five were highest in February and lowest in August
- By contrast, deaths from overall mortality peaked in June and July for males aged between five and 34 years old
- Deaths from injuries were highest in the summer for both men and women younger than 45 years old

Over the 37 years, the per-cent differences in seasonal death rates changed little for people aged 45 and older. But there was a marked decline in the per-cent difference between summer and winter deaths in younger people of both sexes, especially in boys: more than a 25% decline between summer and winter deaths in males in the five-to-14 and 15-to-24-year-old age groups, mainly due to injury death rates throughout the year becoming more similar.

Surprisingly, these seasonal trends were independent of geography, which is noteworthy considering the differences in temperature across the regions studied. For example, in men and women aged 65-74 years old, deaths from all causes peaked in February in the northeast and southeast regions of the US, even though the average temperatures for those regions were different by more than 13 degrees Celsius (24 degrees Fahrenheit). Moreover, in people aged over 45, there was little variation in the seasonal peaks of deaths across regions, despite the large differences in temperature between the summer and winter months.

"We have identified distinct seasonal patterns relating to age, sex and disease, including higher summer deaths in young men," concludes senior author Majid Ezzati, Professor of Global Environmental Health at Imperial College London. "We also showed that this seasonality is similar in terms of timing and magnitude across diverse climates with substantially different temperatures. The persistent peak in winter deaths observed in older people demonstrates the need for environmental and health service interventions targeted towards this group, irrespective of geography and local climate."

More information: Robbie M Parks et al, National and regional seasonal dynamics of all-cause and cause-specific mortality in the USA from 1980 to 2016, *eLife* (2018). DOI: 10.7554/eLife.35500

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