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HAPPI-Health: The Paris Agreement avoids substantial extreme heat-related mortality

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Extreme heat is associated with increased risks of human mortality. In a warming climate, extreme heat events are projected to intensify and become more frequent, potentially adversely affecting human health. The Paris Agreement aims at limiting global mean temperature rise this century to well below 2°C above pre-industrial levels, but mitigation ambition as established in nations' initial Nationally Determined Contributions still implies ~3°C warming. Quantifying the differences in extreme heat-related mortality between 1.5, 2 and 3°C warming is essential to understanding the public health impacts of climate policies and how societies may adapt to a warming climate.

In this talk, I will show a new approach to projecting extreme heat-related mortality using the Half a degree Additional warming, Prognosis and Projected Impacts (HAPPI) large ensemble and health models. The large ensemble of HAPPI simulations of the 1.5, 2 and 3°C warmer worlds allows extreme heat events and their health impacts in these worlds to be examined, rather than the mean climates. Using published case studies of the United States and Europe; I will demonstrate that limiting global mean warming from 3°C to 2°C or 1.5°C above pre-industrial levels could reduce heat-related mortality associated with extreme heat events, with the 1.5°C limit being substantially more beneficial to public health than 2°C. In addition to climate change, I will discuss the roles of urbanisation, population changes and adaptation in future extreme heat exposure and heat-related mortality.