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Mortality risks of different types of extreme hot weather: Implications on the preparedness and response strategy in Hong Kong

Kevin Ka-Lun Lau (1,2,3), Dan Wang (2), Chao Ren (1,3,4)

(1) Institute of Future Cities, The Chinese University of Hong Kong, Hong Kong, (2) CUHK Jockey Club Institute of Ageing, The Chinese University of Hong Kong, Hong Kong, (3) Institute of Environment, Energy and Sustainability, The Chinese University of Hong Kong, Hong Kong, (4) School of Architecture, The Chinese University of Hong Kong, Hong Kong

The magnitude, duration and frequency of extreme hot weather are expected to increase under future climate change. In high-density cities like Hong Kong, urban heat island phenomenon exacerbates the impacts of extreme hot weather and results in increased vulnerability and risk to urban inhabitants. Previous studies suggested a close relationship between different types of prolonged extreme hot weather and mortality risk. As such, weather information services and corresponding action plan should take into account different levels and types of extreme hot weather in the future. The present study aims to present the mortality risk due to different types of extreme hot weather in Hong Kong. It employed territory-wide ecological information of mortality and hourly air temperature from 2006 to 2015 to examine the effect of different types of extreme hot weather on mortality. It also examined the interactive effect of extreme hot weather between daytime and night-time. Two indicators of extreme hot weather, namely Very Hot Day (VHD; daily maximum temperature $\geq 33^{\circ}$C) and Hot Nights (HN; daily minimum temperature $\geq 28^{\circ}$C), were used in this study. It was found that there are significant association between increased mortality risks and a single VHD (RR=1.026, 95%CI: 1.012, 1.039) and a single HN (RR=1.024, 95%CI: 1.011, 1.037). Consecutive VHDs and HNs also showed stronger effect on mortality. In addition, the mortality risks were furthered increased when HNs were found in between consecutive VHDs. Vulnerable groups such as elderly people were also found to have higher mortality risks. Findings will inform weather information services by providing a more comprehensive understanding of the impacts of extreme hot weather on mortality. It also facilitates further studies focusing on the preparedness and adaptability of citizens, especially vulnerable groups, to different types of extreme hot weather. Given there is a lack of comprehensive response plans to extreme hot weather in Hong Kong, it is important to develop a holistic strategy to take into account different scenarios and corresponding response actions by relevant stakeholders.