Excess heat-related mortality in micro-urban heat islands: A case-only study in barcelona

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Abstract

Background: Extreme heat events (EHE) are of increasing health concern. In urban areas, the identification of micro-urban heat islands (MUHI) raises the possibility of increased mortality risk in these areas. This study identified MUHI in the city of Barcelona, Spain, using Landsat 7 thermal infrared imagery. Addresses of at-home deaths over a four-year period were geocoded using the Google geocoding API and overlaid with the MUHI and matched to daily temperature data from weather stations. The resulting data were analyzed with a case-only design, using a logistic regression model adjusted for spatial autocorrelation using an eigenvector filtering technique.

Results: In the period between 2000-2003, at-home deaths in a MUHI were associated with a 15% greater odds of death on hot days, defined as days above the 90th percentile of historic temperatures.

Conclusions: MUHI were a potentially significant risk factor during extreme heat events in the early part of the last decade in the city of Barcelona. In urban areas facing similar conditions (limited use of air-conditioning, among others), residents of MUHI would be at increased risk during extreme heat events.

Keywords: GIS, micro-urban heat islands, spatial autocorrelation, eigenvector filtering, heatrelated mortality