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The heat-health relationship in New York City: an assessment of morbidity and mortality data using distributed-lag models with a synoptic climatological approach

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This research assesses the relationship between heat events and morbidity and mortality in New York City for the period 1991-2004. Heat events are defined based on the Spatial Synoptic Classification. Morbidity data include hospitalizations for heat-related, respiratory, and cardiovascular causes; mortality data include these subsets as well as all-cause totals. Distributed-lag models are used to assess the relationship between variables, and subsets are created to assess the differences between early and late summer impacts, as well as how these impacts have changed over the 14-year period.

Results show a stronger relationship between mortality data than morbidity data, with the exception of direct heat-related hospital admissions. Heat-related mortality is most substantial during longer heat events (on the 4th day or longer) and during the middle of summer (June to August), when increased mortality is still statistically significant after accounting for displacement. Early-season heat waves have short term mortality increases that are largely countered by displacement and thus generally do not have statistically significant increases. Heat-related mortality has decreased over time, with cumulative relative risks on >3-day events falling from 1.34 to 1.16 between the first and second halves of the study period. Conversely, heat-related hospital admissions have increased during this time, especially during the earlier days of heat events, suggesting that greater awareness may contribute to an increase in hospitalizations before death occurs.