

ABSTRACT

Excessive heat significantly impacts the health of Californians during irregular but intense heat events. Through the 21st century, a significant increase in impact is likely, as the state experiences a changing climate as well as an aging population. To assess this impact, future heat-related mortality estimates were derived for nine metropolitan areas in the state for the remainder of the century. First, oppressive weather events were predicted for future years by first correlating past surface weather types with circulation patterns, and then predicting them in the future using projections of future atmospheric circulation at three levels. Second, we estimated heat-related mortality by initially determining historical weather-type mortality relationships for each metropolitan area. These were then projected into the future based on predicted weather types. Estimates account for several levels of uncertainty: for each metropolitan area, mortality values are produced for five different climate model-scenarios, three different population estimates (along with a no-growth model), and two different levels of acclimatization (along with no acclimatization). Results show a significant increase in heat events over the 21st century, with oppressive weather types potentially more than doubling in frequency, and with heat events of two weeks or longer becoming up to ten times more common at coastal locations. Major urban centers could have a greater than tenfold increase in heat-related mortality in the over 65 age group by the 2090s.