

A CASE-CROSSOVER ANALYSIS EXAMINING TEMPERATURE AND EMERGENCY ROOM VISITS IN CALIFORNIA

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Background and Aims: The association between temperature and mortality has been widely researched over the past decade. Temperature and morbidity outcomes, however, have been far less studied. We examined the association between mean daily apparent temperature and emergency room (ER) visits in California.

Methods: We used a time-stratified case-crossover design for data analysis during the warm season of May through September 2005 to 2008 in all 16 climate zones in California. The study population included only cases residing within 10 kilometers of meteorologic monitors. Conditional logistic regression models with apparent temperature were applied by climate zone, and these estimates were combined in meta-analyses to create overall estimates. Our analyses considered the effects of various disease subgroups, race/ethnic groups, and age groups, and air pollutants (nitrogen dioxide, ozone, carbon monoxide, and sulfur dioxide). The California Irrigation Management System and U.S. Environmental Protection Agency provided the meteorologic and air pollution data, while the California Office of Statewide Health Planning and Development supplied the ER data.

Results: Our study population included nearly one million ER visits. Significant ($p < 0.05$) positive associations were found for same-day apparent temperature and ischemic heart disease (excess risk per 10F = 1.7%), ischemic stroke (2.8%), cardiac dysrhythmia (2.8%), hypotension (12.7%), diabetes (4.3%), intestinal infection (6.1%), dehydration (25.6%), acute renal failure (15.9%), and heat stroke (393.3%). Hemorrhagic stroke and hypertension had significant negative associations. These estimates remained robust to the adjustment for air pollutants. Hispanics exhibited greater risks than Whites for many outcomes, including ischemic stroke, ischemic heart disease, diabetes, and dehydration. Risks were generally higher among the elderly. Some outcomes had strong disparities between coastal and non-coastal regions.

Conclusions: To prevent heat-related ER visits, persons with pre-existing CVD disease, the elderly, and racial minorities should be targeted. Mitigation strategies should be region-specific, and require an immediate response.