Short Title: Extreme heat days  
Full Title: Projected number of extreme heat days  

Why is this important to health?  

Periods of warmer temperatures and heat waves are expected to increase in frequency, intensity, and duration throughout the 21st century. Specifically, there will be increases in annual average temperature of up to 5°F by 2030 and up to 10°F in California by the end of the century or sooner. Increased temperatures also add to the heat load of buildings in urban areas and exacerbate existing urban heat islands adding to the risk of high ambient temperatures. Sustained high heat waves directly affect human health through heat-related illnesses, such as heat stroke, heat exhaustion, and dehydration, as well as other illnesses and premature deaths from cardiovascular or respiratory diseases. Heat waves are associated with increased hospital admissions for cardiovascular, kidney (including kidney stones), mental health, diabetes, and respiratory disorders. Although warmer temperatures are likely to impact a range of individuals and populations, the vulnerable subgroups with the greatest risk of health impacts from extreme heat, or with greater difficulty preparing for extreme heat events and reduced access to care, may include the following populations: the elderly, children, those who work outdoors, those with lower socioeconomic status, those who are socially or geographically isolated, and those who lack adaptive capacity (e.g., air conditioning).

Summary of Evidence for Climate and Health  

A systematic review of epidemiological studies examining the association between high ambient heat and mortality identified increased risk among those dying from cardiovascular, respiratory, cerebrovascular, and some specific cardiovascular diseases. The association between temperature and mortality is independent of air pollution, as supported by a time-stratified cross-over study of nine California counties. Evidence also shows that significant differences in risk exist among persons with varying physical and social vulnerabilities; thus, region specific characteristics substantially influence the effect of heat on vulnerable subgroups. A study of hospitalizations and emergency department visits during the 2006 California heatwave showed significant increases in morbidity statewide, notably among children (0-4 years old), the elderly (≥65 years old), and in regions with relatively lower temperatures compared to others, suggesting acclimatization to local climate influences heat effects.
Key References


What is the indicator?

**Detailed Definition**

- Indicator = Projected number of extreme heat days above the 98th percentile of computed maximum temperature for each location using 1961-1990 baseline data
- Stratification: Time period 2050 and 2090
- Interpretation: Vulnerable communities will have higher extreme heat days

**Data Description and Description**

  - Years available: 2050, 2090
  - Geographies available: County

An extreme heat day is defined as a day in April through October where the maximum temperature exceeds the 98th historical percentile of maximum temperatures based on daily temperature data between 1961-1990. The data from Scripps Institution of
Oceanography are the results of modeled simulations, consisting of historical model simulations for 1950-1999 and climate change projections for 2000-2099 using the GFDL CM2.1 Global Climate Model under high emissions scenario.

Limitations

Climate projections tell us how weather conditions are likely to change on average, but they cannot predict the weather at a particular day and time. Climate model projections illustrate how the climate system is expected to behave under specific scenarios of greenhouse gas emissions. Since our emissions of greenhouse gases depend on a variety of different social, political, and economic factors, we cannot be certain how they will change. Therefore, projected climate data may not prove to be accurate if the actual emissions pathway we follow differs from the scenarios used to make the projections. In addition, some aspects of the climate system are less well understood than others.

Acknowledgement and Disclaimer

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Examples of Maps, Figures, and Tables:

Figure 1. Projected Number of Extreme Heat Days for Contra Costa County

![Figure 1. Projected Number of Extreme Heat Days for Contra Costa County](image)

Data Source: Cal-Adapt, Scripps Institution of Oceanography