

# Associations between short-term ambient temperature exposure and emergency department visits for amphetamine, cocaine, and opioid use in California from 2005 to 2019

## Background:

Substance use disorder is a growing public health challenge in the United States. People who use drugs may be more vulnerable to increases in ambient temperature because drugs can affect their body's ability to regulate temperature. Additionally, the environments in which people use drugs (ex: dance clubs, raves, festivals, etc.) may contribute to the risk of adverse heat-related outcomes.

There have been limited population-based studies of ambient temperature and drug-related morbidity.

This study examined short-term associations between daily ambient temperature and emergency department (ED) visits for use or overdose of amphetamine, cocaine and opioids in California during the period 2005 to 2019.

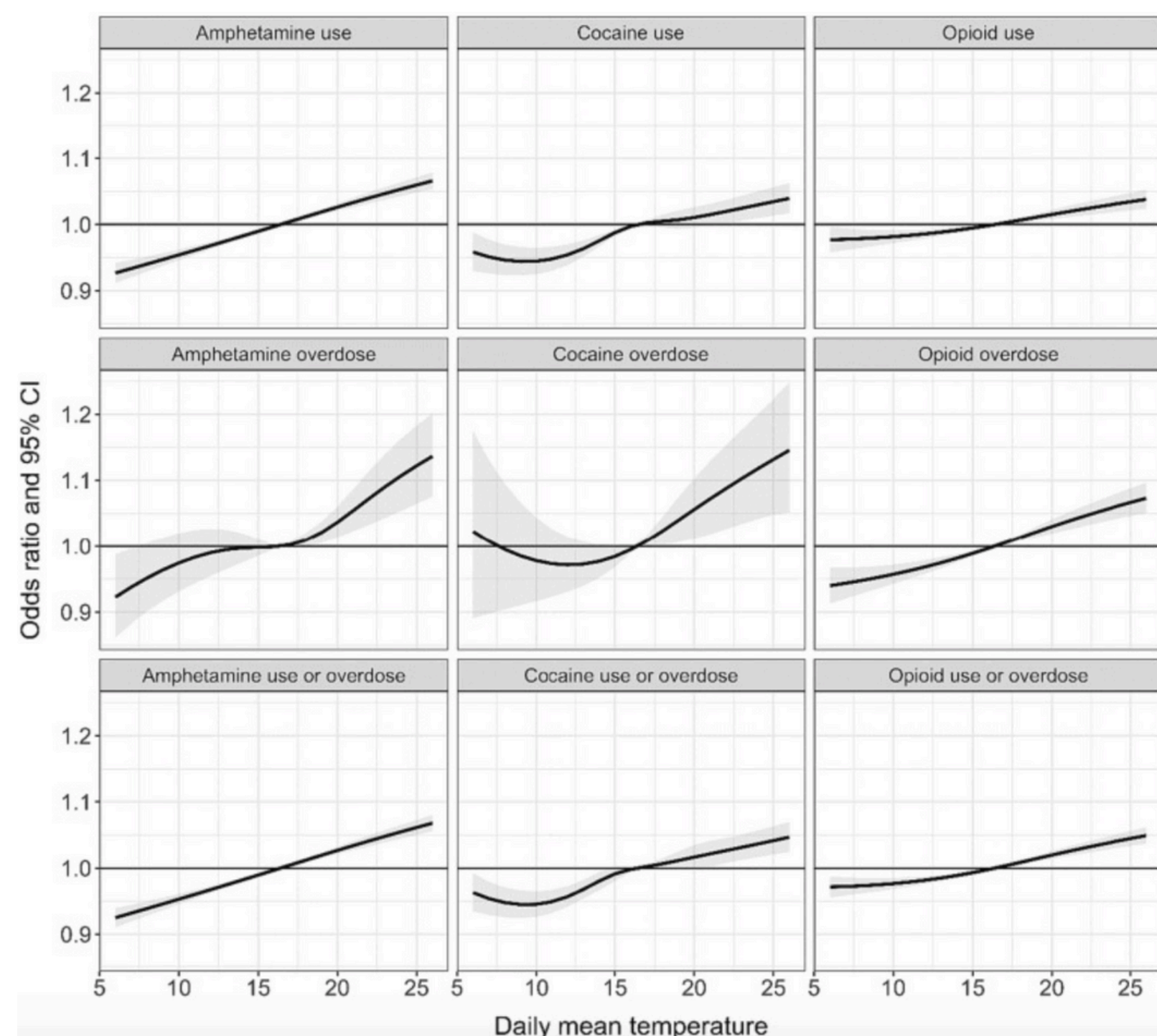
## Methods:

### Data Collection:

- Patient-level ED visits 2005–2019 were obtained from the California Office of Statewide Health Planning and Development.
  - Both primary and secondary ICD diagnosis codes were used to identify ED visits associated with substance use and overdose for amphetamine, cocaine, and opioids. ED visits with both overdose and use diagnoses were defined as overdose.
- Daily maximum and minimum temperature and water vapor pressure were acquired from recorded weather data.

### Analysis:

- Regression models were used to estimate short-term effects of temperature on ED visits for substance use, overdose, or a combined analysis of both use and overdose.



**Fig. 1.** Exposure-response curve for associations between substance use and overdose emergency department visits and 4-day cumulative daily mean temperature (°C) in California, 2005–2019. Reference exposure level is defined as the median of daily mean temperature (16.41 °C). 95% confidence intervals (CIs) are shown by ribbons around the curves.

## Findings:

- For all outcomes, the odds of ED visits generally increased with increasing daily mean temperature, with larger odds ratios (ORs) observed for overdose compared to substance use outcomes.

## Discussion:

Based on over 3.5 million ED visits in California, there were robust positive associations between higher daily temperature and ED visits related to amphetamines, cocaine, and opioids (use or overdose). Positive associations between heat and opioid ED visits suggest possible impacts of the environment on drug use behavior and the role of multi-substance use patterns. Taking an intersectional approach toward achieving population health equity, and in particular environmental justice and equitable climate resilience may require holistically examining health disparities including aspects not commonly evaluated in environmental health research, like substance use behaviors and the relationship between substance use and the environment.

## Key Takeaway

People who use stimulants and opioids may be sensitive to short-term higher ambient temperature.

Mitigating heat exposure can be considered in harm reduction strategies in response to the substance use epidemic and global climate change.

## Citation:

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