Data Brief

Occupational Heat-Related Illness Emergency Department Visits, California, 2016-2021

Key Findings

- ☑ During 2016-2021 there were 4,357 emergency department visits for work-related heat illness, with 4.3 visits for every 100,000 California workers occurring per year on average.
- ☑ Latino patients accounted for the greatest proportion of visits among racial and ethnic groups.
- ☑ The highest rate of ED visits per 100,000 workers was in Imperial County, which experienced 8 times the statewide average rate.

Key Messages

- ☑ Occupational heat-related illness is preventable.
- ☑ California employers are required to comply with Cal/OSHA standards for preventing heat illness.

Introduction

Exposure to heat and hot weather can cause heat-related illnesses (HRI) such as heat exhaustion, heat cramps, and heat stroke. Heat stroke is a life-threatening medical emergency which can lead to death if not treated promptly. HRI is a significant, but preventable, source of occupational (work-related) illness and death. People who work outdoors such as those in the agriculture and construction industries are at elevated risk of HRI, as well as indoor workers in non-air-conditioned environments like warehouses and kitchens. Occupational HRI can be prevented with adequate hydration, rest breaks, and acclimatization (allowing the body to gradually adjust to working in high heat).

Two regulations enforced by the California Division of Occupational Safety and Health (Cal/OSHA) protect workers from HRI. Since 2006, all employers with outdoor workers have been required to comply with the regulation for heat illness prevention in outdoor places of work, Title 8 CCR Section 3395. This requires employers to implement protections including adequate shade, water, and rest breaks as well as training, recordkeeping, and additional procedures for exposure to extreme heat. Since July 24, 2024 employers with indoor workers have been required to comply with Title 8 CCR Section 3396, which mandates similar protections. The California Department of Industrial Relations maintains information about both standards on their website Cal/OSHA Heat Illness Prevention Guidance and Resources.

Some cases of HRI are mild and can be treated with rest, hydration, and cooling, but others are more severe and may require an emergency department (ED) visit for adequate treatment. This report summarizes a study that the Occupational Health Branch (OHB) of the California Department of Public Health (CDPH) performed to help understand risk factors for ED visits for occupational HRI among California workers.

Study Methods

In California, all EDs must submit summary information for each visit to the Department of Health Care Access and Information. This data includes codes for the diagnoses received by the patient and personal information about the patient including age, race and ethnicity, and county of residence. OHB searched these data for the years 2016-2021 for ED visits with HRI diagnostic codes that were accompanied by either a code indicating that the patient required care for an event occurring at work or that the medical bill was expected to be paid by Workers' Compensation insurance. HRI includes heat exhaustion, heat stroke, heat syncope (fainting), heat cramps, heat fatigue, heat edema (swelling of extremities), other or unspecified effects of heat and light, and exposure to heat of man-made origin. OHB followed CDPH guidelines on data de-identification and did not include identifying information in any results presented in this report.

Results

During the years 2016-2021, there were 30,293 ED visits with an HRI diagnosis among people aged 16 to 80 years. Of these visits, 4,357 (14.4%) were occupational (work-related). Figure 1 shows the number of ED visits for occupational HRI in each year. Fewer people visited EDs during 2020 and 2021 due to the COVID-19 pandemic, so it is not possible to tell whether the true number of HRI cases declined from 2017 to 2021.

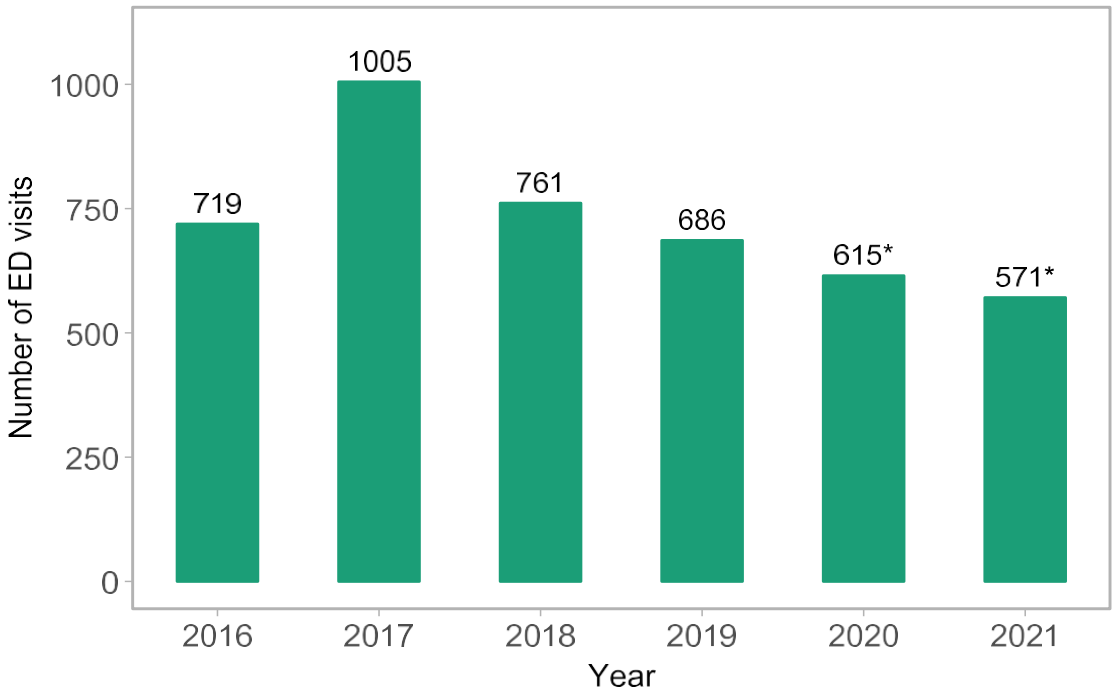


Figure 1. *Emergency department visits for occupational heat-related illness, California, 2016-2021. *2020-2021 data subject to bias caused by reduced emergency department utilization during the COVID-19 pandemic.*

Not all groups of people are at equal risk of occupational HRI. Research in California and the US shows that Latino, Black, and immigrant workers are more likely to become ill or die from heat exposure at work.[1] In our data, Latino workers of any race were more likely to experience HRI than non-Latino workers; 44.7% of occupational HRI visits were by Latinos, who make up only 40% of California's population. More occupational HRI visits occur among men than women, possibly because some of the jobs with highest risk for HRI like construction are predominantly held by men. Half of occupational HRI patients are 16-33 years old. Table 1 shows the demographics of occupational HRI patients.

Table 1. Demographic characteristics of occupational heat-related illness emergency department patients

	N = 4,357[a]
Age (years)	33 (26, 46)
Sex	
Male	3,375 (77.5%)
Female	981 (22.5%)
Race and Ethnicity	
Hispanic, any race	1,949 (44.7%)
White, non-Hispanic	1,733 (39.8%)
Black, non-Hispanic	262 (6.0%)
Other or multiracial, non-Hispanic	214 (4.9%)
Asian or Pacific Islander, non-Hispanic	120 (2.8%)
Race/ethnicity unknown	79 (1.8%)

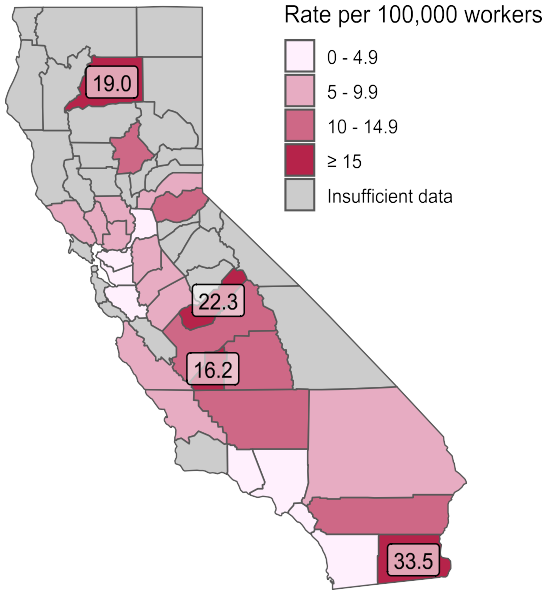
[a] Median (interquartile range); n (%)

During the study period, there were on average 4.3 occupational HRI ED visits per 100,000 California workers per year.[2] Figure 2 shows the rate of occupational HRI visits per 100,000 workers in each county, averaged over the six years of data. The highest rate is seen in Imperial County, with Kings, Madera and Shasta Counties also having high rates. Imperial County experiences the hottest temperatures in California and has agriculture as a major industry – potentially explaining the high rate of workers visiting the ED for HRI. It is possible that the high rate in Shasta County was caused by overlapping wildfire and heat events. Counties shown in gray reported relatively few total ED visits, preventing reliable estimates of the rate.

[1] Gibb K, Beckman S, Vergara XP, Heinzerling A, Harrison R. Extreme Heat and Occupational Health Risks. Annu Rev Public Health. 2024 May;45(1):315-335. doi: 10.1146/annurev-publhealth-060222-034715.

[2] State and county annual employment from Bureau of Labor Statistics Quarterly Census of Employment and Wages (https://www.bls.gov/cew/)

Figure 2. *Rate of occupational heat-related illness (HRI) emergency department visits per 100,000 workers by county, California, 2016-2021. *Counties with rates of HRI ≥ 15 per 100,000 workers are labeled. North to South, the counties are Shasta, Madera, Kings, and Imperial.*



Conclusions

The results summarized in this report show that occupational HRI is a significant contributor to total HRI, and that the risk does not affect all workers equally. HRI is more common among Latino and male workers, and the rates per 100,000 workers vary greatly by county. Imperial County has a particularly high rate of occupational HRI visits to the ED. The effects of the COVID-19 pandemic on ED utilization prevent an analysis of trends in HRI rates during this time period.

It is important to note that this report includes only cases of HRI that are severe enough to require emergency treatment, and there are many HRI cases that are not counted because they were treated at home, the workplace, or non-ED healthcare settings. In addition, there are likely to be occupational HRI cases that were missed because the hospital records did not include a work-related diagnostic code or list Workers' Compensation insurance as the payer.

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