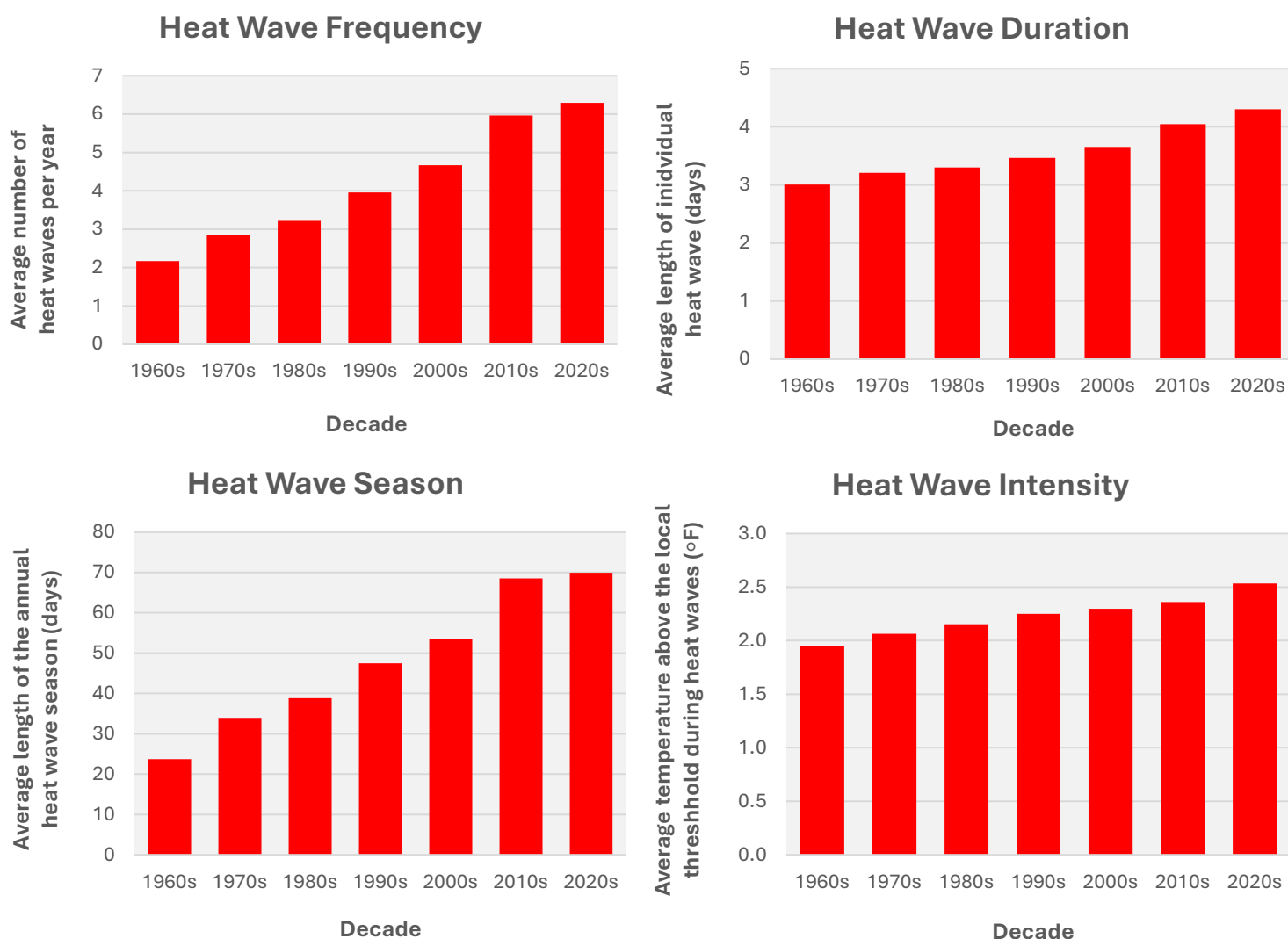




Extreme Heat in LA County: An Emerging Public Health Concern

Average temperatures continue to climb globally due to climate change, and the past ten years have been the warmest since record-keeping began in 1880. Further, 2024 set a new record for high temperature at about 2.65° Fahrenheit (F) over the average late-19th century temperatures.¹ Extreme heat days, defined locally as days when the temperature reaches 90°F or higher in downtown Los Angeles, now occur more frequently than in years past.² Heat waves, or multiday periods of extreme heat, have become hotter, more frequent, geographically more widespread, and longer lasting, as shown in Figure 1. Extreme heat is the leading weather-related killer in the United States, surpassing hurricanes, tornadoes and other severe weather events.^{3,4}

Figure 1. Heat Wave Characteristics in the United States by Decade, 1961-2023.



Note: Heat Wave Season refers to the period from the first day of the first heat wave to the last day of the last heat wave in a year.

Source: NOAA (National Oceanic and Atmospheric Administration). (2004). [Heat stress datasets and documentation](#) (provided to EPA by NOAA in April 2024) [Data set].

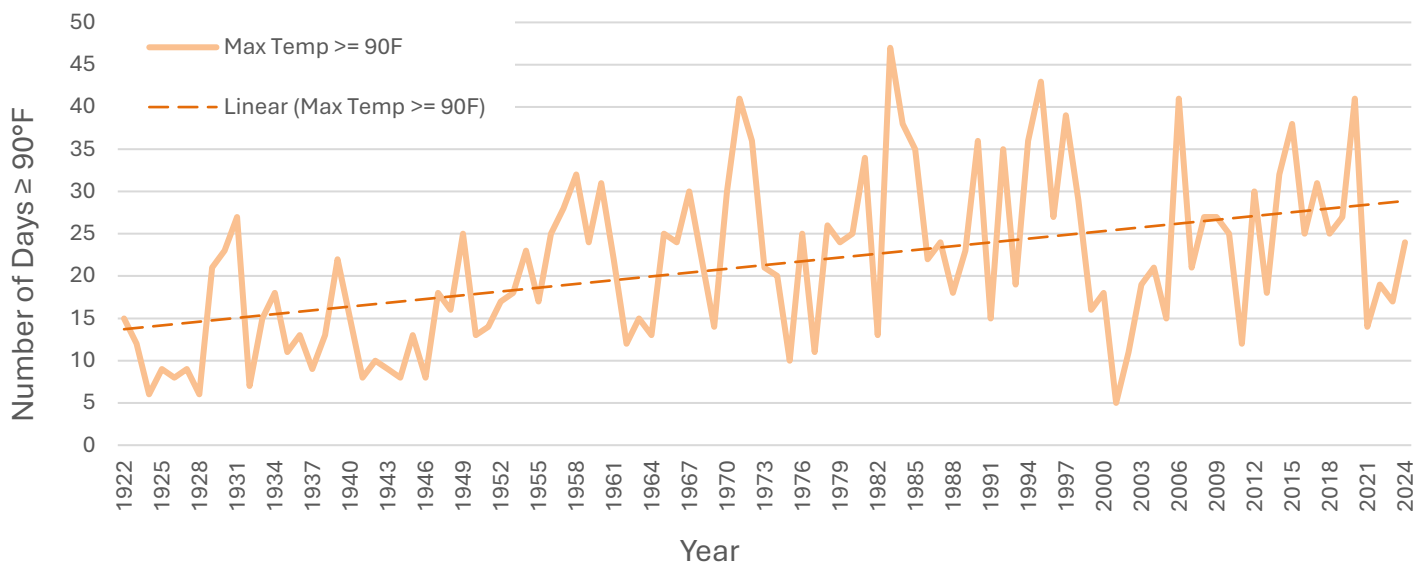
For more information, visit U.S. EPA's "Climate Change Indicators in the United States" at <https://www.epa.gov/climate-indicators/climate-change-indicators-heat-waves>.

Heat in Los Angeles County

The term “Extreme Heat” is defined as any day where the maximum recorded temperature met or exceeded 90 degrees Fahrenheit in downtown Los Angeles. This is in keeping with the U.S. Department of Homeland Security’s Extreme Heat guidance.⁵ Temperature data was queried from the Downtown Los Angeles Monitoring Station (ID: USW00093134) and represents the recorded air temperature maximums, per day, at or above 90 degrees Fahrenheit as available from National Centers for Environmental Information.⁶

Although the number of extreme heat days occurring each year varies widely, Figure 2 shows an increasing trend in the annual number of extreme heat days LA County has experienced over the past century.

Figure 2. Annual Number of Extreme Heat Days[‡], 1922 – 2024.

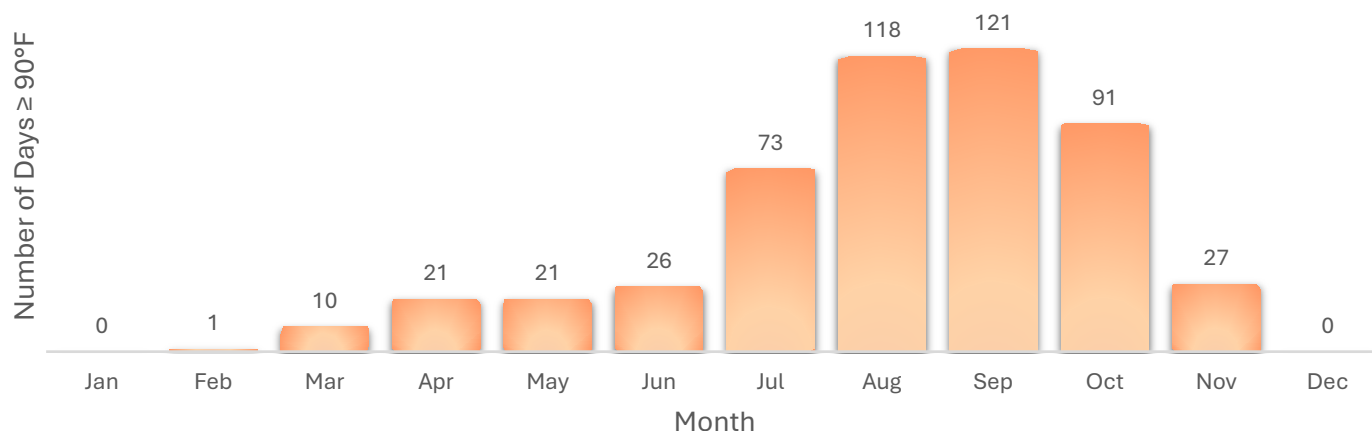


[‡]90°F or higher in Downtown Los Angeles

Source: National Centers for Environmental Information (NCEI), Los Angeles Downtown Monitoring Station (ID: [USW00093134](#))

By month, August and September had the highest total number of extreme heat days across 2005 – 2024, with almost one-quarter (23% and 24% or 118 and 121 of 509, respectively) happening in that month (Figure 3). While many agencies and surveillance systems define the “heat season,” or the annual period when extreme heat days typically occur, as May through September, LA County also has seen extreme heat days in April, October, and November. In fact, the average time from the first to the last heat wave of the season has increased by 46 days since the 1960s.⁷

Figure 3. Total Number of Extreme Heat Days[‡] by Month across years 2005 – 2024.



[‡]90°F or higher in Downtown Los Angeles

Source: National Centers for Environmental Information (NCEI), Los Angeles Downtown Monitoring Station (ID: [USW00093134](#))

How Heat Impacts Health

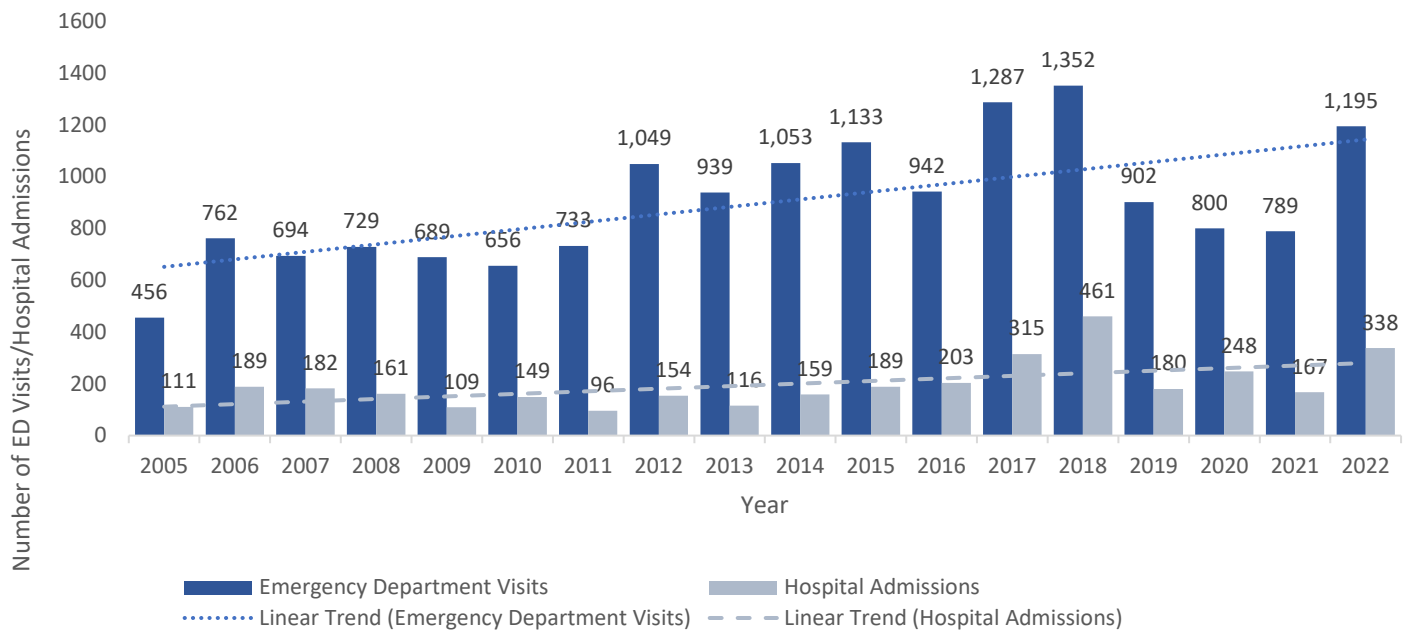
Prolonged exposure to high temperatures can exceed the ability of the human body to dissipate heat and maintain core body temperature,⁸ increasing the risk for developing heat-related illness (HRI) such as heat stroke, heat exhaustion, heat cramps, sunburn and heat rash.⁹ High heat is also associated with an increased risk of dying from pre-existing conditions such as cardiovascular, respiratory, and/or cerebrovascular diseases.¹⁰ Importantly, heat exposure impacts people differently, leaving certain groups at greater risk of HRI, including unhoused or pregnant people, those who work outdoors, older adults (i.e., aged 65 and older), infants, children, and those with chronic health conditions and/or disabilities. For instance, older adults are more sensitive to heat, while infants and young children rely on others to keep them cool and safe.¹¹

Heat-Related Illness and Mortality in Los Angeles County

Although heat-related illness is more common over the summer months, it can occur any time the outdoor temperature is relatively high, especially early or atypical to the season. Emergency department (ED) visits, hospital admissions (HA), and deaths due to HRI typically increase significantly during heat waves. Between 2005 and 2022, the most recent year these data are available, the annual number of ED visits due to HRI diagnoses across Los Angeles County ranged from a low of 456 in 2005 to a high of 1,352 in 2018, with an overall average of 898 per year, according to the most recent data available from the California Department of Health Care Access and Information (HCAI; Figure 4). HRI-related HA ranged from 96 in 2011 to 461 in 2018, averaging 196 per year. While the numbers varied widely across years, an increasing trend is notable in both ED visits and HA.ⁱ

ⁱ A similar pattern of findings emerged when analyzing rates per 100,000 population.

Figure 4. Annual Number of Emergency Department Visits and Hospital Admissions for Heat-Related Illness in Los Angeles County, 2005 – 2022.

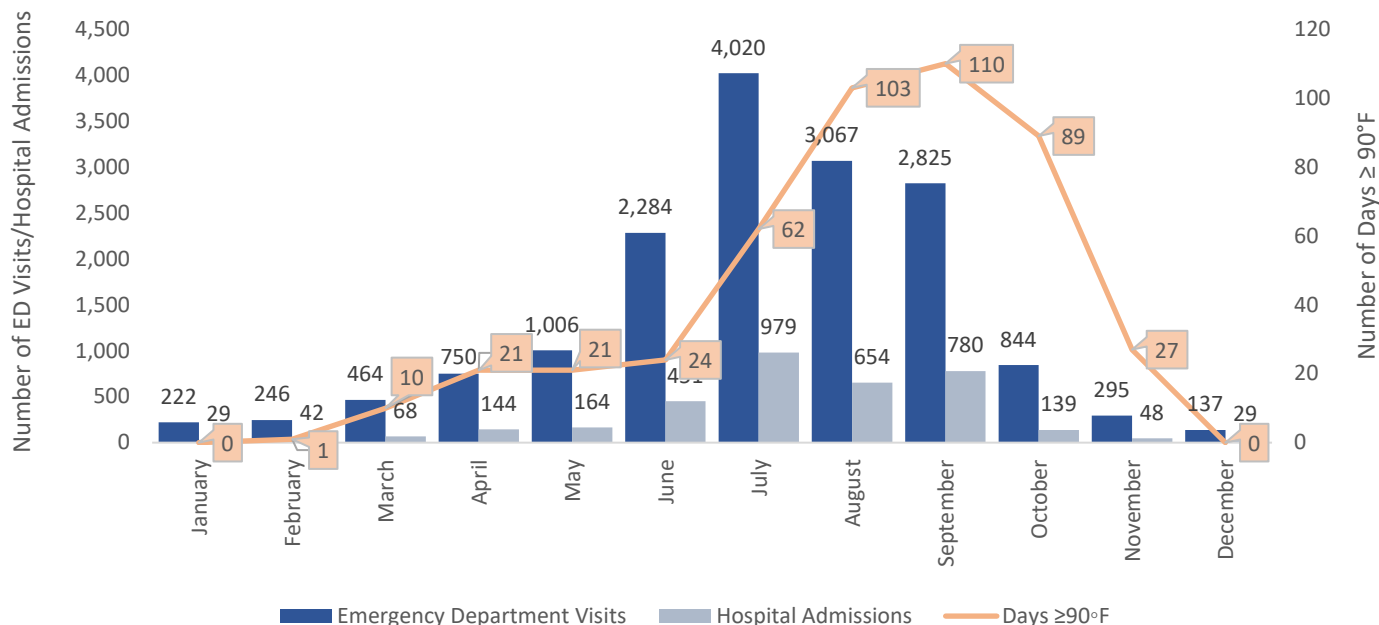


Notes: 1) Heat-Related Illness estimates for 2016-2018 have been updated to include HRI cases in infants and for other corrections; 2) Estimates for 2005-2015 don't include cases of environmental hyperthermia of newborn due to ICD-9 code limitations.

Source: California Department of Health Care Access and Information (HCAI) yearly [Emergency Department](#) (ED) and [Patient Discharge Data](#) (PDD)

Extension of the summer heat season – that is, extreme heat happening early or late in the year – may be of particular concern. Extreme heat can be unexpected in spring or fall months, catching people unprepared. Additionally, early in the season people are less likely to be acclimatized to the heat. Acclimatization happens when the body adjusts to exposure to heat over time and experiences less heat stress.¹² Early extreme heat days may increase the potential for heat-related health impacts due to lack of acclimatization, as may be suggested by Figure 5 below. Although extreme heat days were more common in August, September, and October from 2016-2022, ED visits and HA for HRI were higher in July than in any other month. Further analyses are needed to confirm suggested relationships between extreme heat and HRI.

Figure 5. Total Number of Emergency Department Visits and Hospital Admissions for Heat-related Illness and Extreme Heat Days in LA County by Month, 2005-2022.



Source, Temperature: National Centers for Environmental Information (NCEI), Los Angeles Downtown Monitoring Station (ID: [USW00093134](#))

Source, ED and HA: California Department of Health Care Access and Information (HCAI) yearly [Emergency Department \(ED\)](#) and [Patient Discharge Data \(PDD\)](#)

LA County mortality data indicate that 125 deaths occurred due to heat-related illness from 2015 to 2024¹³ with the highest annual numbers in 2018, 2020, and 2022 (22, 21, and 22 deaths, respectively). The number of heat-related deaths that occurred during the previous decade, 2005 to 2014, was much lower (34), but it is not clear if this is due to a 2015 change in how heat-related illness is recorded¹⁴ or another reason. Regardless, these figures fall well below those for inland areas such as Phoenix, Arizona (approximately 118, 213 and 238 heat-caused deaths in 2018, 2020, and 2022, respectively), and may underestimate the true local impact of heat on mortality. Although heat stress can increase the chances of dying from more common diseases like heart disease and respiratory diseases like pneumonia,¹⁵ medical and/or clinical records may not indicate heat as the contributing factor. A 2024 study compared deaths investigated by the LA County Medical Examiner in 2014-2019 across different levels of heat as measured by the National Weather Service's HeatRisk,¹⁶ a tool that ranks upcoming heat events in terms of the health risk the event may pose from none (0) to extreme risk (4), to determine if there were more deaths on days with higher HeatRisk than would be expected on days with no HeatRisk. The study found increases in deaths of 7%, 15% and 66% on days with moderate, major, and extreme HeatRisk (scores of 2, 3, and 4, respectively), compared to days with no HeatRisk. The authors further estimated that elevated heat may have led to as many as 1,265 additional deaths between 2014-2019.¹⁷ Noting that the Medical Examiner investigates approximately 15% of all deaths, the actual increase in all deaths due to heat may be higher. It is important to note that **heat-related illnesses and the deaths resulting from them are preventable.**³

How Public Health is Responding

Public Health has various programs and initiatives to improve community members' resilience to extreme heat and prevent heat-related illness.

Heat Alerts/Advisories

- In collaboration with the Office of Emergency Management, Public Health's Office of Communications and Public Affairs posts notifications about heat and the areas of Los Angeles County that are impacted, including links to resources on cooling centers, heat prevention information, and other referral services. These alerts and advisories are also available [by subscription](#) and can be received directly by text message or email.

Social Media Messaging

- Public Health collaborates with the Los Angeles Regional Collaborative for Climate Action and Sustainability (LARC) to raise awareness about local heat risk and protections through an annual summer heat messaging campaign featured on Public Health social media channels.

School Toolkit

- Public Health developed a comprehensive [toolkit for schools](#) in Los Angeles County with guidance, recommendations, and resources to help protect students from the health and learning impacts of extreme heat.

LARC-HEAT Grant

- The Office of Environmental Justice and Climate Health (OEJCH) is a sub awardee of a Regional Resilience Planning Grant funded by the California State Office of Research and Planning, with the [Los Angeles Regional Collaborative for Climate Action and Sustainability](#) (LARC) as the lead agency and partners Rising Communities and the Fernandeano Tataviam Band of Mission Indians (FTBMI). The project will combat impacts of extreme heat on health through a Heat Ambassador initiative which will include community health workers (CHWs) from the Community Public Health Teams, FTBMI, and Public Health's own CHWs working in the eight [Service Planning Areas](#) (SPAs).

Educational Materials

- The OEJCH has posted [educational materials](#) to prevent heat illness and resources to stay safe and cool during periods of extreme heat.

Cross-County Collaboration

- Public Health collaborates with the [Chief Sustainability Office](#) and other County departments on the [OurCounty Sustainability Plan](#), the [County Heat Action Plan](#), [Infrastructure LA](#), the [Community Forest Management Plan](#), and other County-wide initiatives to move strategies forward that increase community resilience and protect community members from the negative impacts of climate change.

Visit the [Office of Environmental Justice and Climate Health](#) webpage for information on heat and heat-related illness prevention.

Methodology

Cases of Heat-related conditions were identified by selected International Classification of Diseases Revision 9 (ICD-9) for years 2005 – 2015 and 10 (ICD-10) codes starting October 2015 – 2022 in primary or other diagnoses in the annual Emergency Department (ED) and Patient Discharge Data (PDD) datasets obtained from the California Department of

Extreme Heat in LA County

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Health Care Access and Information (HCAI). Table 1 displays ICD-9 and ICD-10 codes; ICD-10 added P81.0, Environmental hyperthermia of newborn.

Table 1. Selected ICD-9 and ICD-10 Codes

ICD-9 Codes (Dates 1/1/2005 – 9/30/2015)	
992 Effects of heat and light or external causes of injury and poisoning	
E90.00 Accident caused by excessive heat due to weather conditions	
E90.09 Accidents due to excessive heat or unspecified origin	
Excluding E90.01 Accidents due to excessive heat of man-made origin, man-made source of heat	
ICD-10 Codes (Dates 1/1/2015 – 12/31/2022; overlapping 1/1/2015-9/30/2015)	
T67.0 Heatstroke and sunstroke	T67.7 Heat oedema
T67.1 Heat syncope	T67.8 Other effects of heat and light
T67.2 Heat cramp	T67.9 Effect of heat and light, unspecified
T67.3 Heat exhaustion, anhidrotic	X30 Exposure to excessive natural heat
T67.4 Heat exhaustion due to salt depletion	X32 Exposure to sunlight
T67.5 Heat exhaustion, unspecified	P81.0 Environmental hyperthermia of newborn
T67.6 Heat fatigue, transient	Excluding W92 Exposure to excessive heat of man-made origin

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- ¹ NASA, [Global Temperature](#).
- ² Rogers, C.D.W., M. Ting, C. Li, K. Kornhuber, E.D. Coffel, R.M. Horton, C. Raymond, and D. Singh, 2021: Recent increases in exposure to extreme humid-heat events disproportionately affect populated regions. *Geophysical Research Letters*, 48 (19), e2021GL094183. <https://doi.org/10.1029/2021gl094183>
- ³ Keellings, D. and H. Moradkhani, 2020: Spatiotemporal evolution of heat wave severity and coverage across the United States. *Geophysical Research Letters*, 47 (9), e2020GL087097. <https://doi.org/10.1029/2020gl087097>
- ⁴ EPA, [Climate Change Indicators: Heat-Related Deaths](#)
- ⁵ U.S. Department of Homeland Security. [Disasters and Emergencies: Extreme Heat](#).
- ⁶ National Centers for Environmental Information. [Daily summaries Station Details](#).
- ⁷ EPA, Climate Change Indicators: [Heat Waves](#).
- ⁸ SC Sherwood, M Huber, An adaptability limit to climate change due to heat stress. 2010. *PNAS*, 107 (21): 9552-9555. <https://doi.org/10.1073/pnas.0913352107>
- ⁹ Centers for Disease Control and Prevention. [Symptoms of Heat-Related Illnesses](#)
- ¹⁰ Basu R, 2009. High ambient temperature and mortality: a review of epidemiologic studies from 2001 to 2008. *Environmental Health*, 8:40. <https://doi.org/10.1186%2F1476-069X-8-40>
- ¹¹ Centers for Disease Control and Prevention. [People at Increased Risk for Heat-Related Illness](#)
- ¹² Centers for Disease Control and Prevention. <https://www.cdc.gov/niosh/heat-stress/recommendations/acclimatization.html>.
- ¹³ California Department of Public Health, Vital Records Business Information System California Comprehensive Death File, 2005-2024.
- ¹⁴ Khera R., Dorsey K.B., Krumholz, H.M. (2018). Transition to the ICD-10 in the United States, An Emerging Data Chasm. *JAMA*, 320 (2):133-134.
- ¹⁵ Weisskopf, M.G., H.A. Anderson, S. Foldy, L.P. Hanrahan, K. Blair, T.J. Torok, and P.D. Rumm. 2002. Heat wave morbidity and mortality, Milwaukee, Wis., 1999 vs. 1995: An improved response? *Am. J. Public Health*, 92:830–833.
- ¹⁶ National Weather Service. <https://www.wpc.ncep.noaa.gov/heatrisk/>
- ¹⁷ Baker L., Sturm R (2024). Mortality in extreme heat events: an analysis of Los Angeles County Medical Examiner data. *Public Health*, 236, 290-296. <https://doi.org/10.1016/j.puhe.2024.08.008>