

Summer Heat-Related Illness Rates Have Risen About 50% Since 2017

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Key Findings:

- The intensity of heat-related illnesses peaks in the summer and has varied from year to year with a slight upward trend: in 2017, the summer rate was 24.4 per 100,000 patients and in 2025 reached a high of 36.5 per 100,000 patients.
- Heat-related illness was concentrated in the South, where average July rates were about 76.0 per 100,000 patients seen, more than three times the average rate in the West (about 22.5 per 100,000).
- As expected, heat-related illness rates and locally issued heat-alert frequency rise together across most climate regions: the South ranks highest on both, but the West is a striking exception, recording nearly as many July heat-alert days as the South while having the lowest illness rate of any region.

Extreme heat is the leading cause of weather-related death in the United States, and both the frequency and intensity of extreme-heat events have been rising.¹ Heat makes people sick when the body can no longer cool itself, often because high humidity slows the evaporation of sweat, and the resulting illness can progress from mild heat cramps to heat exhaustion and, in serious cases, life-threatening heat stroke.¹ To warn the public of increased risk, the National Weather Service (NWS) issues heat advisories and warnings based largely on the heat index, a combined measure of temperature and humidity rather than temperature alone.² There is no single, fixed temperature at which an alert is issued: the thresholds are set locally, higher where hot weather is common, and they also shift through the season as people acclimate to heat as summer wears on.³ Knowing when heat-related illness occurs across the year, how its intensity has changed over time, and how it compares with where heat alerts are actually issued can help health systems and public health agencies anticipate demand and target prevention.

We examined outpatient and emergency encounters among more than 246 million U.S. patients between January 2017 and May 2026, identifying heat-related illnesses (heat cramps, heat exhaustion, heat syncope, heat stroke, heat fatigue, and heat edema). We examined these rates overall and across the nine National Oceanic and Atmospheric Administration (NOAA) U.S. climate regions based on where care was delivered. To place the regional patterns alongside heat exposure, we paired the illness rates with counts of how many days each month a NWS heat advisory, warning, or watch was in effect anywhere in each region, drawn from a publicly available archive of NWS alerts.⁴

Heat-related illness in the U.S. follows a sharp, repeating seasonal cycle, rising from roughly 1 to 2 cases per 100,000 patients seen in the winter months to a pronounced peak each summer, almost always in July. The intensity of the summer peaks varied year to year with a slight upward trend: the summer rate (June, July, and August) was 24.4 per 100,000 patients in 2017 and reached a high of 36.5 per 100,000 patients in 2025.

Rate of Heat-Related Illness per 100,000 Patients in the Summer Over Time

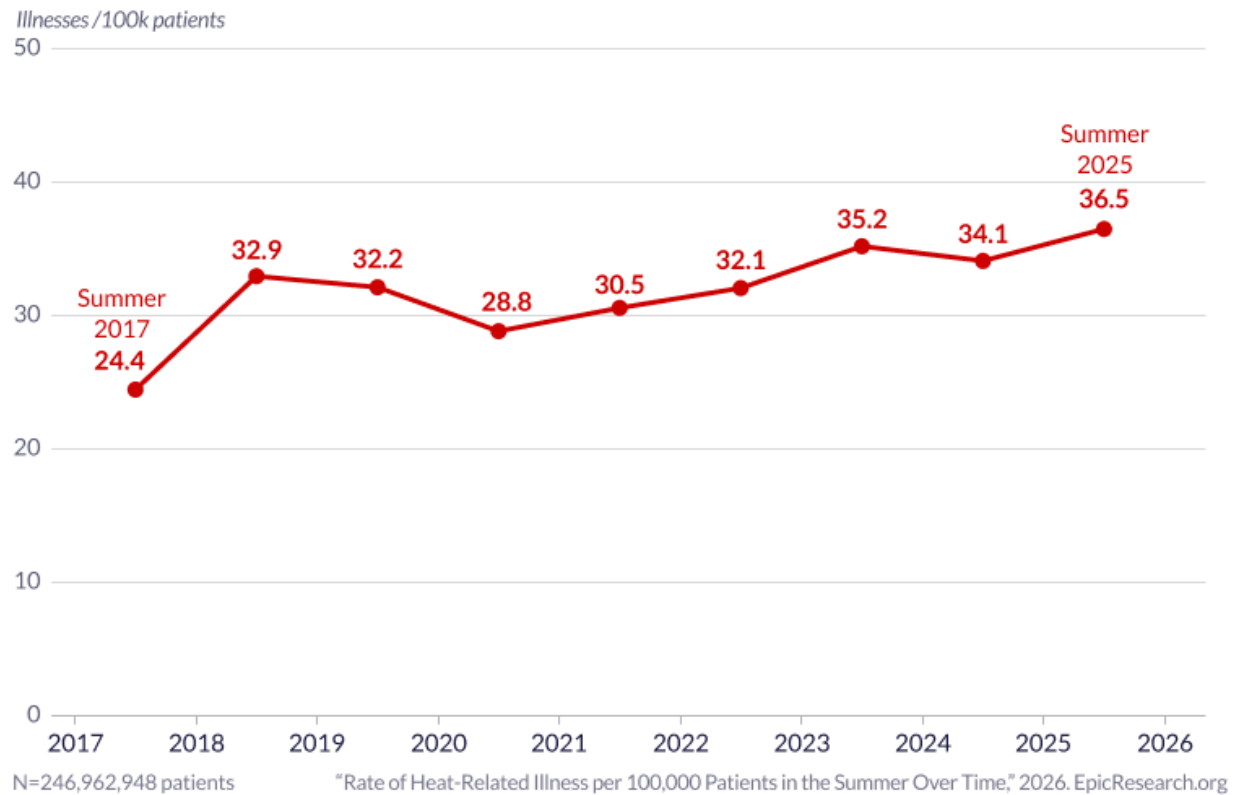


Figure 1a. The annual June to August average rate of patients with a heat-related illness per 100,000 patients seen, 2017 through 2025.

Rate of Heat-Related Illness per 100,000 Patients Seen Over Time

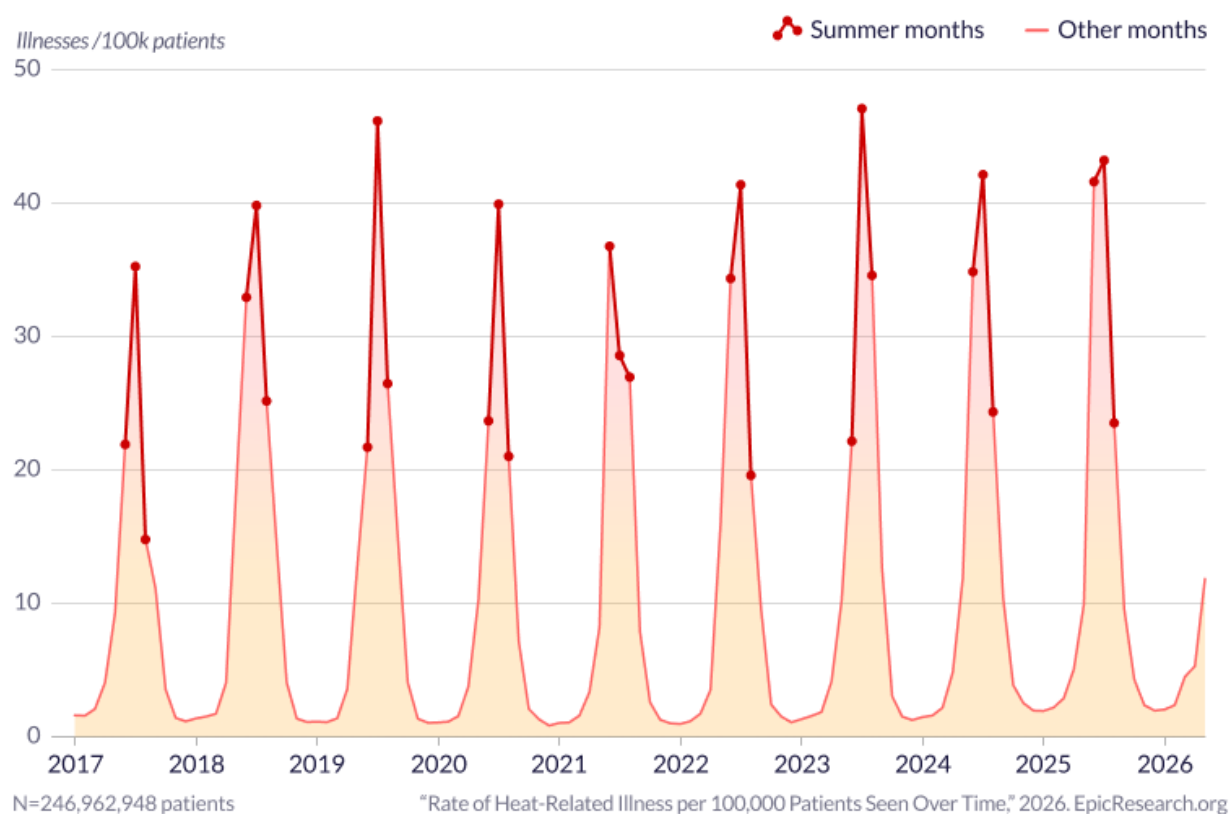
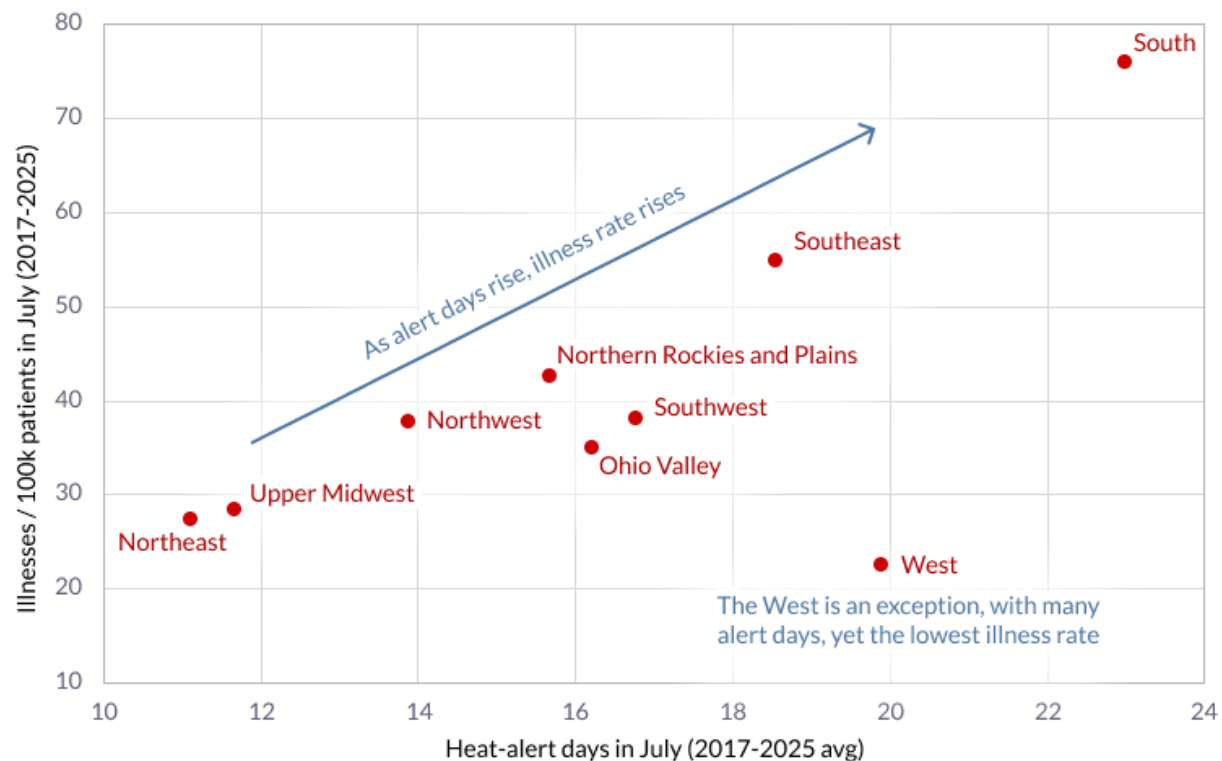


Figure 1b. The monthly rate of patients with a heat-related illness per 100,000 patients seen, January 2017 through May 2026.

Across most climate regions, heat-related illness rates and heat-alert frequency rise together, as seen in Figure 2. The South stands out on both measures, with the highest illness rates (about 76.0 per 100,000 patients seen in July) and the most July days under a heat alert (averaging about 23 of the month's 31 days), while lower illness regions such as the Northeast and Upper Midwest see correspondingly fewer alert days. The clear exception is the West, which was under a heat alert on about 20 days in July on average, yet had the lowest heat-illness rates of any region, about 22.5 per 100,000. That exception might reflect how the heat alert measure is built rather than an absence of heat risk: alert days are counted for each region as a whole, regardless of where within the region the alert applied or how many patients are seen there, so a large, geographically varied region can register many alert days on areas that contribute few patients.

Average Heat-Alert Days vs. Heat-Related Illness Rates in July by Climate Region



N=246,962,948 patients "Average Heat-Alert Days vs. Heat-Related Illness Rates in July by Climate Region," 2026. EpicResearch.org

Figure 2. July heat-related illness rates per 100,000 patients seen in 2017 to 2025, shown alongside the average number of days in July under a National Weather Service heat alert, by NOAA climate region.

These data come from Cosmos, a dataset created in collaboration with a community of Epic health systems representing more than 310 million patient records from 2,200 hospitals and more than 50,000 clinics from all 50 U.S. states, Canada, Lebanon, and Saudi Arabia. This study was completed by two teams that worked independently, each composed of a clinician and research scientist. The two teams came to similar conclusions. Graphics by Brian Olson.

References

1. Extreme Heat and Climate Change. Center for Climate and Energy Solutions. Updated May 2026. <https://www.c2es.org/content/heat-waves-and-climate-change/>. Accessed July 7, 2026.
2. Heat Information. National Weather Service. <https://www.weather.gov/lwx/heat>. Accessed July 7, 2026.
3. Heat. National Weather Service Phoenix. <https://www.weather.gov/psr/heat>. Accessed August 26, 2026.
4. IEM Web Services and APIs. (n.d.). Iowa Environmental Mesonet. Retrieved August 26, 2026, from <https://mesonet.agron.iastate.edu/api>

Data Definitions

Term	Definition
Study period	1/1/2017 to 5/30/2026

Study population: inclusion	Patient-month is the unit of observation. A patient counts for a given month if they have a qualifying encounter that month; patients can count for multiple months. Qualifying encounter types: urgent care, walk-in, emergency, office visit, emergency-to-inpatient admission.
Study population: exclusion	International patients (care delivered outside the U.S.)
Outcomes	Monthly rate of heat-related illness per 100,000 patients seen. Episode collapse: one incident per condition per 30-day window; same-condition diagnoses within 30 days of the first qualifying diagnosis are suppressed (anchored on the first diagnosis date), regardless of month boundary.
Heat-related illness	High severity: heatstroke and sunstroke: ICD-10-CM T67.01* Medium severity: heat syncope: T67.1*; heat exhaustion, anhydrotic: T67.3*; heat exhaustion due to salt depletion: T67.4*; heat exhaustion, unspecified: T67.5* Low severity: heat cramp: T67.2*; heat fatigue, transient: T67.6*; heat edema: T67.7*.
Heat alerts	Number of distinct days per month on which a National Weather Service heat warning, watch, or advisory was in effect anywhere in the climate region : Excessive/Extreme Heat Warning or Watch (VTEC phenomenon EH) or Heat Advisory (VTEC phenomenon HT). Accessed via the Iowa Environmental Mesonet archive of NWS products. https://mesonet.agron.iastate.edu/api
Climate region	The nine NOAA/NCEI U.S. climate regions, assigned by department location. https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/regional/mapping
Model specifications	Descriptive statistics; monthly rates per 100,000 patients seen and trend-over-time graphs.
Limitations	- Not all cases of the conditions studied rise to the level of seeking care (e.g., mild heat fatigue), so rates reflect only care-seeking illness. - Truly unique events are difficult to separate from recurrences of the same episode, which the 30-day episode collapse only partly addresses. - Care-seeking correlates with healthcare access, which differs systematically by urbanicity and region, and capture is conditioned on an encounter, which may confound the geographic comparison. - The denominator of patients seen varied over the study period, including a sharp decline in outpatient volume in spring 2020, which is why rates are expressed per 100,000 patients seen. - Heat-alert counts are tallied at the whole-region level without weighting by area or population, and because NWS alert thresholds are set locally, alert-day counts reflect regional warning practice as much as absolute heat and are not a standardized exposure measure across regions.

Table 1. Summer Rate of Heat-Related Illness per 100,000 Patients Seen Over Time

Year	Illnesses Per 100k
2017	24.45
2018	32.94

2019	32.17
2020	28.82
2021	30.54
2022	32.09
2023	35.21
2024	34.11
2025	36.50

Table 2. Rate of Heat-Related Illness per 100,000 Patients Seen Over Time

Year	Month	Illnesses Per 100k
2017	January	1.58
2017	February	1.54
2017	March	2.04
2017	April	4.05
2017	May	9.30
2017	June	22.04
2017	July	35.38
2017	August	14.91
2017	September	11.19
2017	October	3.55
2017	November	1.43
2017	December	1.16
2018	January	1.37
2018	February	1.49
2018	March	1.71
2018	April	4.03
2018	May	18.98
2018	June	33.31
2018	July	39.83
2018	August	25.29
2018	September	14.62
2018	October	4.08
2018	November	1.32
2018	December	1.10
2019	January	1.13
2019	February	1.08
2019	March	1.37
2019	April	3.51
2019	May	12.97
2019	June	21.83
2019	July	46.16
2019	August	26.59
2019	September	15.32
2019	October	4.09
2019	November	1.33
2019	December	1.06
2020	January	1.04
2020	February	1.13
2020	March	1.58

2020	April	3.70
2020	May	10.35
2020	June	23.56
2020	July	39.92
2020	August	21.02
2020	September	7.06
2020	October	2.12
2020	November	1.31
2020	December	0.86
2021	January	1.04
2021	February	1.10
2021	March	1.61
2021	April	3.29
2021	May	8.28
2021	June	34.81
2021	July	27.97
2021	August	26.96
2021	September	7.82
2021	October	2.59
2021	November	1.24
2021	December	1.03
2022	January	0.94
2022	February	1.18
2022	March	1.72
2022	April	3.49
2022	May	15.96
2022	June	34.47
2022	July	40.28
2022	August	19.11
2022	September	9.08
2022	October	2.39
2022	November	1.52
2022	December	1.09
2023	January	1.33
2023	February	1.56
2023	March	1.88
2023	April	4.10
2023	May	9.92
2023	June	22.15
2023	July	46.60
2023	August	34.34
2023	September	12.74
2023	October	3.02
2023	November	1.51
2023	December	1.26
2024	January	1.47
2024	February	1.58
2024	March	2.20
2024	April	4.83
2024	May	11.95
2024	June	34.86

2024	July	41.65
2024	August	24.23
2024	September	10.09
2024	October	3.81
2024	November	2.54
2024	December	1.92
2025	January	1.96
2025	February	2.23
2025	March	2.92
2025	April	5.09
2025	May	9.96
2025	June	42.35
2025	July	43.33
2025	August	23.03
2025	September	9.42
2025	October	4.26
2025	November	2.36
2025	December	1.96
2026	January	2.01
2026	February	2.35
2026	March	4.33
2026	April	5.24
2026	May	11.79

Table 3. Average Heat-Alert Days vs. Heat-Related Illness Rates in July by Climate Region

Region	Average Unique Alert Days in July	Illnesses per 100k Patients in July
Northeast	11.1	27.3
Northern Rockies and Plains	15.7	42.6
Northwest	13.9	37.7
Ohio Valley	16.2	35.0
South	23.0	76.0
Southeast	18.6	54.9
Southwest	16.8	38.1
Upper Midwest	11.7	28.5
West	19.9	22.5