

Climate and Health Outlook: Extreme Heat

Welcome to the first edition of the Climate and Health Outlook from the Department of Health and Human Services (HHS) Office of Climate Change and Health Equity (OCCHE). The Climate and Health Outlook is an effort to inform health professionals and the public on how our health may be affected in the next 30 and 90 days by climate events and provide resources to take proactive action.

This edition focuses on the 2022 early summer season and uses the most current long-term temperature forecasts that come from the National Oceanic and Atmospheric Administration (NOAA) to illustrate how extreme heat poses a health risk for all Americans.

Where are extremely hot days expected to be most frequent in May?

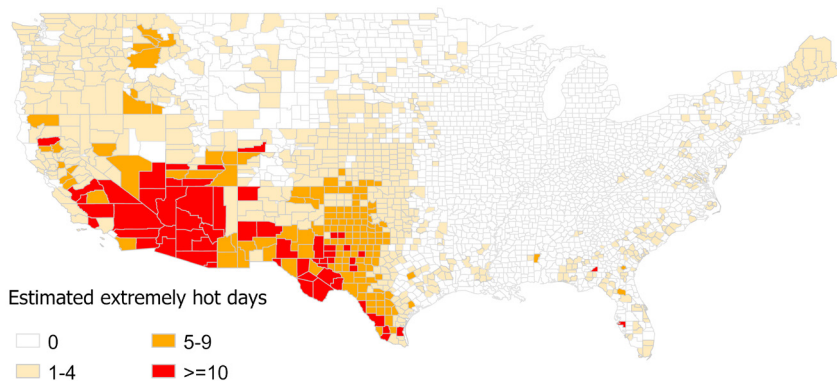


Figure: This map shows the expected number of extremely hot days in May in each county in the contiguous U.S. The forecast is based on the NOAA Climate Prediction Center’s probabilistic outlook of temperatures being above, below, or near normal in May. A county’s ‘normal’ temperature is based on the 30-year average from 1991–2020. An ‘extremely hot day’ is when the daily maximum temperature is above the 95th percentile value of the historical temperature distribution in that county. For more information on your county, please refer to the [Centers for Disease Control and Prevention \(CDC\) Heat and Health Tracker](#).

In May, 203 counties across 14 states are projected to have 5 or more extremely hot days – Texas (113), California (18), New Mexico (17), Arizona (14), Utah (9), Oklahoma (7), Kansas (5), Idaho (5), Nevada (4), Montana (3), Colorado (3), Georgia (2), Florida (2) and Alabama (1). In these 203 counties, the total population at risk is **31,877,388** people.

Who is at high risk from heat in the counties with the most extreme heat days?

Some communities face greater health risks from extreme heat given various risk factors they face. These communities include people who: are elderly and live alone, have existing health conditions, have poor access to healthcare, live in rural areas, work outdoors, make a low income, face difficulty paying utility bills, live in poor housing, and live in urban areas without adequate tree cover.

These risk factors vary across the 203 counties estimated to have 5 or more expected extreme hot days in May. Of these counties:

- **53 (26%)** have a high number of people aged 65 or over, living alone.
- **29 (14%)** have a high number of people with diabetes.
- **134 (66%)** have a high number of people without health insurance.
- **65 (32%)** have a high number of people living in rural areas.
- **61 (30%)** have a high number of people employed in construction.
- **73 (36%)** have a high number of people living in poverty.
- **33 (16%)** have a high number of people spending a large proportion of their income on home energy.
- **50 (25%)** have a high number of people with electricity-dependent medical equipment and enrolled in the HHS emPOWER program.
- **64 (32%)** have a high number of people in mobile homes.
- **48 (24%)** have a high number of people with severe housing cost burden.
- **138 (68%)** have a high number of people living in areas without adequate tree cover.
- **92 (45%)** are identified as highly vulnerable by CDC’s Social Vulnerability Index.

Decision makers in these counties should consider these various risk factors when developing and implementing heat illness prevention strategies to protect specific populations.

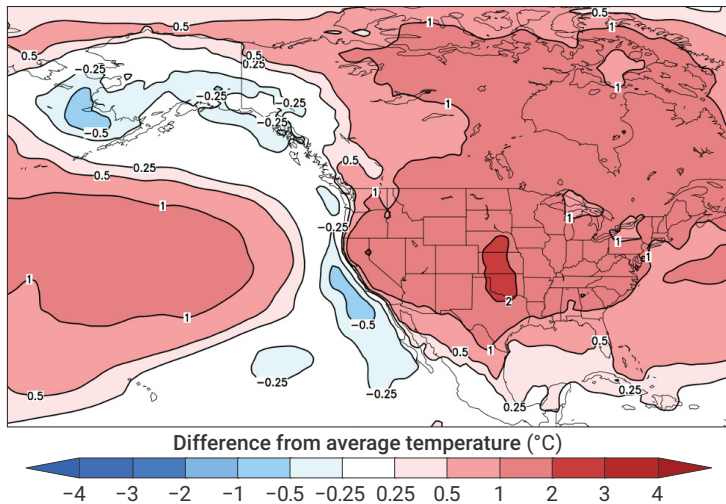


Figure: The North American Multi-Model Ensemble (NMME) predicts that average temperature over the next 3 months (May–July) will be 1.8–3.6°F (1–2°C) hotter than average across much of the contiguous U.S. For more information about this model or prediction, please refer to the [NMME website](#).

How hot will it be, and where, over the next 3 months?

For May–July, the North American Multi-Model Ensemble (NMME) predicts that the average temperature will be 1.8 to 3.6°F (1 to 2°C) above-normal for most of the continental U.S. However, regions in the central U.S., particularly within Oklahoma, Kansas, and Nebraska, may experience a higher 90-day average temperature of 3.6 to 5.4°F (2 to 3°C). The NMME integrates multiple forecasts of the next 90 days to build the best estimate of temperatures and precipitation over that time frame. This year’s 90-day NMME average temperature forecast for May–July is similar to last year’s 90-day average temperature forecast for much of the country. Note that although many regions may expect a warmer 90-day average temperature, this is not the same as the daily and sometimes significant fluctuations in temperatures that should be expected in each region.

Health Impacts During the Heat Dome of 2021

During June–July 2021, the western U.S. experienced a record-breaking heat wave that lasted for several days. Estimated heat-related deaths and illnesses demonstrate the tragic toll of the heat wave on public health. Comparing the health records from June 26–July 10 between 2021 and 2020, heat-related deaths increased from 2 to 145 in Washington, 0 to 119 in Oregon, and 12 to 25 in California. These estimates were provided by the California Department of Public Health, Oregon Health Authority, and Washington State Department of Health. For context, the CDC estimates an average of 702 heat-related deaths per year for the entire U.S. (based on 2004–2018 data). An increase in heat-related emergency department (ED) visits was also observed during the heatwave. According to a [CDC report](#), the mean daily number of ED visits due to heat-related illnesses from June 25–30, 2021, across the states of Alaska, Idaho, Oregon and Washington was 69 times higher compared to those days in 2019.

Heat Affects Health in Many Ways

Warmer temperatures increase the risk for a diverse range of health risks. For example:



An increased risk of **hospitalization for heart disease**.



Heat exhaustion, which can lead to **heat stroke** if not treated, can cause critical illness, brain injury, and even death.



Worsening **asthma** and **chronic obstructive pulmonary disease (COPD)** as heat increases the production of ground-level ozone.



Dehydration, which can lead to **kidney injury** and blood pressure problems. Some kidney damage can become irreversible with repeated or untreated injury.



Violence, crime, and suicide may increase with temperature, adding to the rates of depression and anxiety already associated with climate change.

Some medications increase the risk of heat-related illness. These include diuretic medicines (sometimes called “water pills”), antihistamine medicines (including many allergy medicines), and many antipsychotic medicines used to treat a variety of psychiatric and neurologic illnesses. Please review this [list of common psychiatric medications](#) that can impair the body’s normal ability to cool itself.

Resources for People at High Risk of Heat-Related Health Problems

Certain populations with limited resources may have restricted access to information on heat illness prevention, cool indoor environments, and government programs that provide critical support. Find more resources on heat illness prevention from the [National Integrated Heat Health Information System \(NIHHIS\)](#) and [CDC](#) websites.

OSHA
osha.gov/heat

Prevent Heat Illness at Work

Ease into Work. Nearly 3 out of 4 fatalities from heat illness happen during the first week of work.

Build a tolerance to heat by increasing intensity by 20% each day.

Day	Intensity Increase
MON	20%
TUE	40%
WED	60%
THU	80%
FRI	100%

- Drink cool water even if you are not thirsty
- Rest for long enough to recover from the heat
- Take breaks in a shady or cool area
- Wear a hat and dress for the heat
- Watch out for each other
- Verbally check on workers wearing face coverings

Image source: <https://www.osha.gov/heat>

Worker Health

Occupations that require strenuous work outdoors pose a high risk for heat-related illness. This includes construction workers, farmers, agricultural workers, delivery workers, athletes, landscapers, and others. [Learn more](#) about the dangers of working in heat. Employer responsibilities and resources for safety are also available through the Occupational Safety and Health Administration (OSHA) [Heat Illness Prevention campaign](#).

The [Heat Safety Tool](#) provides real-time heat index and hourly forecasts, specific to your location, as well as occupational safety and health recommendations from OSHA and the National Institute for Occupational Safety and Health (NIOSH).

The [National Institute of Environmental Health Sciences \(NIEHS\) Worker Training Program](#) has heat safety and health training for at-risk workers.

The Health Resource Services Administration (HRSA) funds [National Training and Technical Assistance Partners — Farmworker Justice and Migrant Clinicians Network](#) that helps clinicians prevent and treat heat-related illness among agricultural workers.

LIHEAP & WAP

WORKING TOGETHER TO PROTECT HOUSEHOLD ENERGY RESOURCES & REDUCE THE ENERGY BURDEN

LOW-INCOME FAMILIES ARE DISPROPORTIONATELY AFFECTED BY HIGH HOME ENERGY COSTS.

16.3% OF A LOW-INCOME FAMILIES' GROSS ANNUAL INCOME IS SPENT ON HOME ENERGY COSTS

3.5% OF OTHER HOUSEHOLDS' ANNUAL INCOME IS SPENT ON HOME ENERGY COSTS COMPARATIVELY

LIHEAP PROVIDES 6.7 MILLION HOUSEHOLDS WITH HEATING AND COOLING ASSISTANCE.

WAP INSTALLS ENERGY EFFICIENCY MEASURES FOR LONG-TERM SOLUTIONS.

NATIONAL ASSOCIATION FOR STATE COMMUNITY SERVICES PROGRAMS

Image source: nascsp.org/liheap-and-wap-two-sides-of-the-same-coin/

Staying Safe Indoors

The [Low Income Home Energy Assistance Program \(LIHEAP\)](#) and the [Weatherization Assistance Program \(WAP\)](#) help keep families safe and healthy through initiatives that assist families with energy costs. To inquire about LIHEAP assistance, call the National Energy Assistance Referral (NEAR) hotline at 1-866-674-6327.

Medicare Advantage (MA) plans may provide [Special Supplemental Benefits for the Chronically Ill \(SSBCI\)](#) with equipment and services that improve indoor air temperatures and quality (such as portable air conditioners) to chronically ill patients.

Spotlight on Health Equity: Urban Heat Islands

Rising temperatures and the associated health risks are not felt equally across populations. Cities tend to get much warmer than their surrounding landscapes. This localized increase in heat is known as the urban heat island effect and occurs as paved, dark surfaces found on roads and buildings trap more heat than vegetated landscapes. Highly developed urban areas can experience mid-afternoon temperatures that are 15°F to 20°F warmer than surrounding green areas. Importantly, neighborhoods that were subjected to historical redlining typically lack green space and often suffer the most from the effects of urban heat islands.

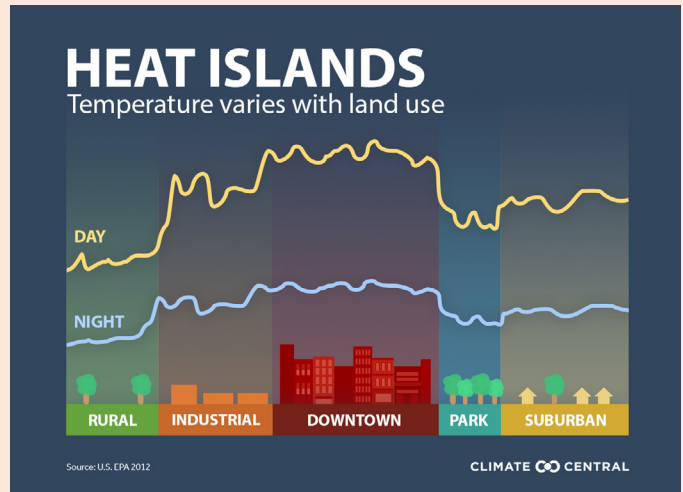


Image source: [Climate Central](#)

Best Practices for Emergency Managers

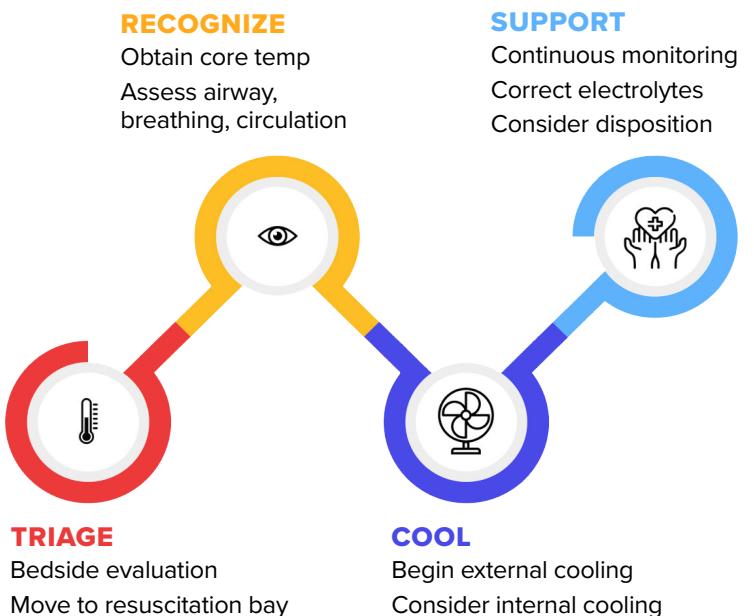
This CDC report on [Heat Response Plans](#) reviews steps emergency managers and health officials can take to develop and implement measures to protect their communities. Spikes in energy demand should be expected during summer months as air conditioning use increases. The combination of sagging power lines (copper expands as it heats up, thus increasing impedance and reducing throughput) and increased energy demands can cause power failures that make certain populations more vulnerable when the risk is highest. The HHS [emPOWER](#) collects and shares de-identified Medicare data to help response agencies take action to protect the health of Medicare beneficiaries who depend on vulnerable electrical medical equipment.

Real-time information on health impacts from extreme heat can also help decision-makers implement strategies to reduce risk. [CDC's Heat and Health Tracker](#) provides regular updates on the rate of heat-related Emergency Department visits (organized by HHS regions) and observed temperature.

If you are a local organization planning to open a cooling shelter, consider referring to [CDC guidance](#) on how to maintain a safe shelter during a heat wave.

Clinical Best Practices

A heat stroke is a medical emergency, and rapid recognition and aggressive early treatment are essential to reduce morbidity and mortality (as illustrated below).



See <https://pubmed.ncbi.nlm.nih.gov/33856299/> for the full algorithm.