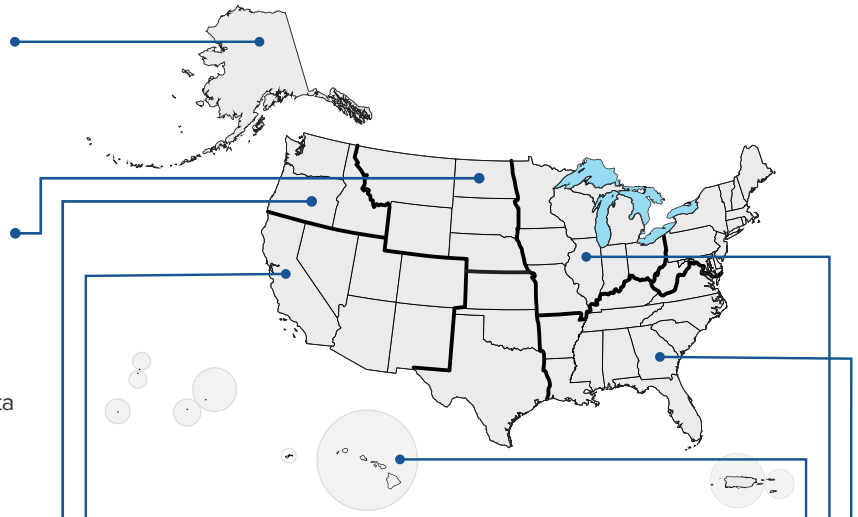
OASH | Office of Climate Change and Health Equity

Climate and Health Outlook

ISSUED JUNE 2023

The Climate and Health Outlook is an effort to inform health professionals and the public on how our health may be affected in the coming months by climate events and to provide resources for proactive action. An associated webpage includes additional resources and information, including more detail on the wildfire and drought outlooks and populations at risk.



Alaska: Drought is absent across Alaska, and no development is expected by the end of June. Above normal wildland fire* potential is forecast for much of eastern Alaska.

Northern Great Plains: One county in Montana is projected to have more than five heat exceedance days** in June. Drought is favored to persist in portions of western Montana, southeastern South Dakota and eastern Nebraska. Drought improvement and removal is likely in much of Nebraska, portions of Montana and Wyoming, and small portions of southwest North Dakota and South Dakota. Normal significant wildland fire potential is also expected.

Northwest: Counties in Idaho (1) and Oregon (2) are projected to have more than five heat exceedance days in June. Drought is favored to persist in parts of northern Idaho, much of Oregon, and a small portion of northeast Washington. Above normal wildland fire potential is forecast for much of central and eastern Washington into central Oregon.

Southwest: Counties in California (4), Utah (5), New Mexico (12), and Arizona (13) are projected to have more than five heat exceedance days in June. Drought is favored to persist in much of southern Nevada and south central Utah and small portions of southern California, northwest Arizona, and northwest New Mexico. Drought improvement and removal is likely in parts of eastern New Mexico and southeastern Colorado. Below normal wildland fire potential is forecast across much of California, northern Arizona, western New Mexico, and most of the mountains in Utah and southern Nevada.

Hawai'i and Pacific Islands: The central Pacific is forecast to experience an above-average hurricane season. Drought development is likely across parts of Hawai'i. Normal significant wildland fire potential is also expected.

Midwest: Drought is favored to persist in parts of central Missouri, western Iowa, and a small portion of northeastern Illinois. Drought development is likely in much of Iowa, Illinois, Indiana, Ohio, and parts of southern Wisconsin, southern Michigan, and northern Missouri. Above normal wildland fire potential is forecast for much of Michigan, as well as northern Wisconsin and Minnesota.

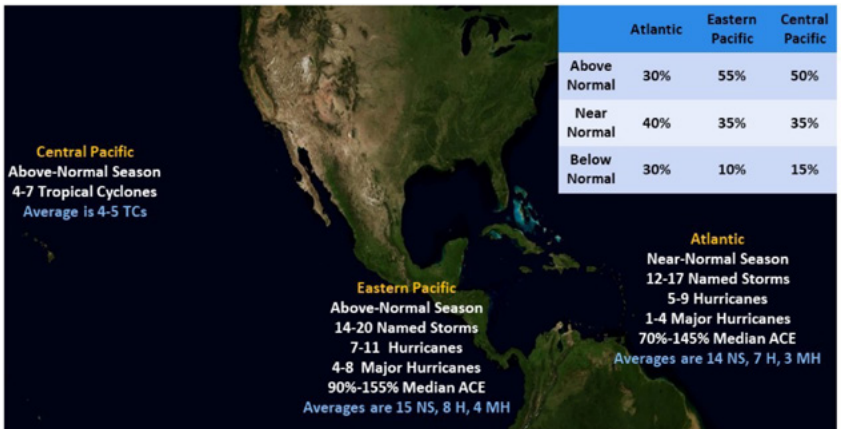
Southeast: The Atlantic basin is forecast to have a near-normal hurricane season. Drought development is likely in parts of northern Virginia. Drought is favored to persist in a small portion of northern Virginia. Drought removal is favored in parts of Florida and Louisiana. Normal significant wildland fire potential is also expected.

Drought Wildfire Hurricane Heat

*Smoke from wildfires can impact health hundreds of miles from site of the fire.
**A "heat exceedance day" is when the daily maximum temperature is above the 95th percentile value of the historical temperature distribution in that county.
Developed with data from the Centers for Disease Control and Prevention, the National Oceanic and Atmospheric Administration, and the National Interagency Fire Center.

We want to hear from you! Please send your feedback on ways to improve the Climate and Health Outlook to ocche@hhs.gov.

Outlook for the 2023 Hurricane season



	Atlantic	Eastern Pacific	Central Pacific
Above Normal	30%	55%	50%
Near Normal	40%	35%	35%
Below Normal	30%	10%	15%

Image source: https://www.cpc.ncep.noaa.gov/products/Epac_hurr/Slide1.JPG

2023 is predicted to be a near-normal hurricane season in the Atlantic basin, which includes the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico. The National Oceanic and Atmospheric Administration (NOAA) is forecasting a range of 12–17 named storms sustained with winds of 39 mph or higher, with 5–9 of those becoming hurricanes with winds of 74 mph or higher, and 1–4 becoming major hurricanes with winds of 111 mph or higher. The 30-year averages for the Atlantic basin (1991–2020) are 14 named storms, 7 hurricanes, and 3 major hurricanes. By contrast, the central Pacific, which includes Hawaii, is forecasted to have an above-normal season this year, with a forecasted range of 4–7 tropical cyclones. Tropical cyclones include tropical depressions, tropical storms, and hurricanes. On average, the central Pacific experiences 4–5 tropical cyclones annually, including 1.5 hurricanes per year.

Hurricanes Affect Health in Many Ways

Hurricanes increase the risk for a diverse range of health outcomes. For example:

- Flood water poses **drowning risks** for everyone, including those driving in flood waters. Storm surge historically is the leading cause of hurricane-related deaths in the United States.
- Winds can blow debris—like pieces of broken glass and other objects—at high speeds. Flying debris is the most common cause of **injury** during a hurricane.
- Open wounds and rashes **exposed to flood waters** can become infected.
- Using generators improperly can cause carbon monoxide [CO] exposure, which can lead to **loss of consciousness** and **death**. Over 400 people die each year from accidental CO poisoning.
- Post-flooding mold presents risks for people with **asthma, allergies**, or **other breathing conditions**.
- Power failure during or after hurricanes can **harm patients** who critically depend on electricity-dependent medical equipment.

Dengue and Hurricanes

Dengue, a viral disease spread to people through the bite of infected *Aedes* species mosquitoes, is common throughout the tropical and sub-tropical regions of the world, including some U.S. territories and freely associated states. Some continental states have also reported local dengue spread like Arizona (2022), Florida (2013, 2020, 2022), and Texas (2013, 2020). As with other pathogens carried by insects, the spread of dengue is highly dependent on environmental conditions.

While *Aedes* species mosquitoes generally do not survive the high winds and flooding that hurricanes bring, mosquito eggs can survive. Natural and manmade containers filled with rain or used for water storage provide an excellent environment for eggs to hatch and larvae to grow. It is common for mosquito populations to decrease during and immediately after a hurricane, and then grow rapidly, as was seen approximately two weeks after Hurricane Maria in Puerto Rico in 2017. Increasing numbers of mosquitoes, combined with the destruction of housing and infrastructure, temporary or permanent human migration, and interruptions to mosquito control measures, can raise the risk of dengue transmission in the weeks that follow a hurricane.

People can take steps to protect themselves and their families from mosquito bites by using Environmental Protection Agency-registered insect repellent; wearing loose-fitting, long-sleeved shirts and pants; controlling mosquitoes in and around their homes; and having children 9–16 years old who live in dengue-endemic areas and have laboratory confirmation of a previous dengue infection get a dengue vaccine.

Which parts of the country are at high risk from hurricanes?

The Federal Emergency Management Agency (FEMA) provides information on the risk of different climate hazards across the 50 states and Washington, D.C., through the National Risk Index (NRI) platform. The Risk Index leverages available data for natural hazard and community risk factors to develop a baseline relative risk measurement for each United States county and census tract.

318 counties across **20 states and D.C.** are estimated to have "very high," "relatively high," or "relatively moderate" hurricane risk. In these counties, the total population at risk is **100,504,829 people.**

Risk factors vary across the 318 counties identified by FEMA. Of these counties:

46 (14%) have a high number* of people aged 65 or over, living alone.

109 (34%) have a high number of people without health insurance.

62 (19%) have a high number of uninsured children.

11 (3%) have a high number of people living in rural areas.

225 (71%) have a high number of Black or African American persons.

81 (25%) have a high number of people with frequent mental distress.

109 (34%) have a high number of people living in poverty.

53 (17%) have a high number of people spending a large proportion of their income on home energy.

195 (61%) have a high number of people with severe housing cost burden.

187 (59%) have a high number of people with electricity-dependent medical equipment and enrolled in the HHS emPOWER program.

97 (31%) have a high number of people in mobile homes.

53 (17%) have a high number of people with one or more disabilities.

138 (43%) are identified as highly vulnerable by CDC's Social Vulnerability Index.

*"A high number" indicates that these counties are in the top quartile for this indicator compared to other counties

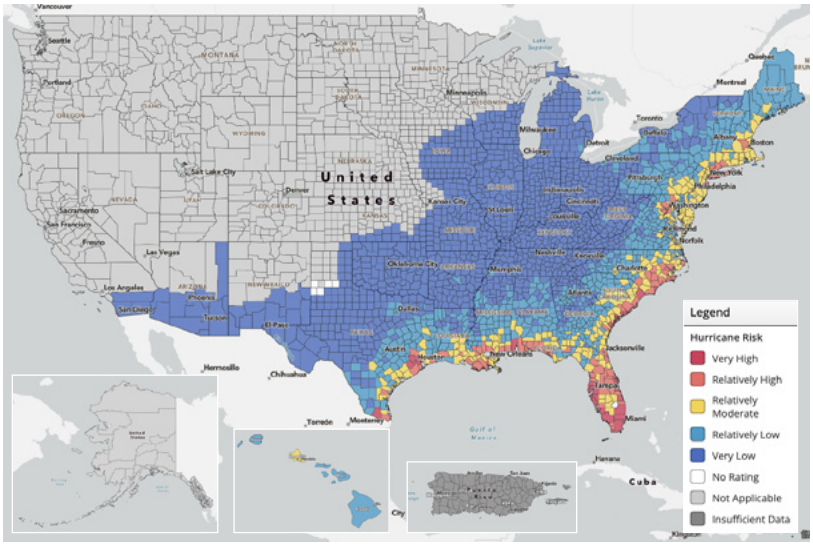


Figure: This map of the United States is colored by the relative Risk Index rating for the Hurricane hazard. The characterization of risk across these counties are based on historical records on hurricane paths and intensity.

Resources to Reduce Health Risks Associated with Hurricanes

The Office of the Assistant Secretary for Preparedness and Response Technical Resources, Assistance Center, and Information Exchange's (ASPR TRACIE's) Hurricane Resources at Your Fingertips, Centers for Disease Control and Prevention's (CDC) Hurricanes and Other Tropical Storms, Ready.gov Hurricanes site, and Ready Business hurricane toolkit include resources on hurricane preparedness for a variety of stakeholders and audiences.

The Substance Abuse and Mental Health Services Administration Helpline and Text Service is available 24/7, free, and staffed by trained crisis counselors. Call or text 1-800-985-5990 to get help and support for any distress that you or someone you care about may be feeling related to any disaster.

The U.S. Food and Drug Administration's Hurricanes: Health and Safety site covers multiple topics to help consumers, industry stakeholders and medical providers prepare for hurricanes. If you have Medicare and your medical device is damaged or lost due to an emergency or disaster, Medicare may cover the cost to repair or replace your equipment or supplies.

The CDC has information on preventing carbon monoxide poisoning in case of a power outage. Generators should be used at least 20 feet away from your home.

Image source

Where are extremely hot days expected in June?

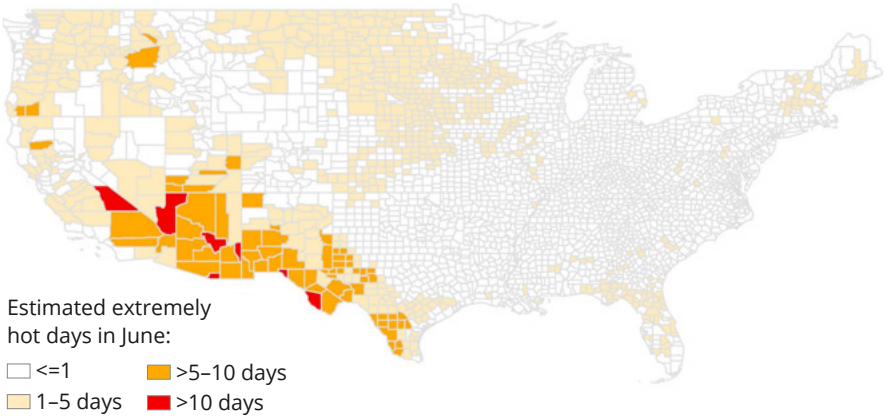


Figure: This map shows the expected number of extremely hot days in June in each county in the contiguous United States. The forecast is based on the NOAA Climate Prediction Center's probabilistic outlook of temperatures being above, below, or near normal in June. A county's 'normal' temperature is based 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 June, **74 counties** across **8 states** are estimated to have more than five expected extremely hot days. In these counties, the total population at risk is 14,628,589 people. Climate projections indicate that extreme heat events will be more frequent and intense in coming decades. In the U.S., an average of 702 heat-related deaths occur each year.

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.

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 74 counties estimated to have more than 5 expected extremely hot days in June. Of these counties:

18 (24%) have a high number* of people aged 65 or over, living alone.

40 (54%) have a high number of people without health insurance.

47 (64%) have a high number of uninsured children.

16 (22%) have a high number of people living in rural areas.

18 (24%) have a high number of people with frequent mental distress.

10 (14%) have a higher number of people with diabetes.

22 (30%) have a high number of people employed in construction.

32 (43%) have a high number of people living in poverty.

10 (14%) have a high number of people spending a large proportion of their income on home energy.

21 (28%) have a high number of people with severe housing cost burden.

25 (34%) have a high number of people with electricity-dependent medical equipment and enrolled in the HHS emPOWER program.

41 (55%) have a high number of people in mobile homes.

4 (5%) have a high number of people living in areas without adequate tree cover.

43 (58%) are identified as highly vulnerable by CDC's Social Vulnerability Index.

*"A high number" indicates that these counties are in the top quartile for this indicator compared to other counties

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

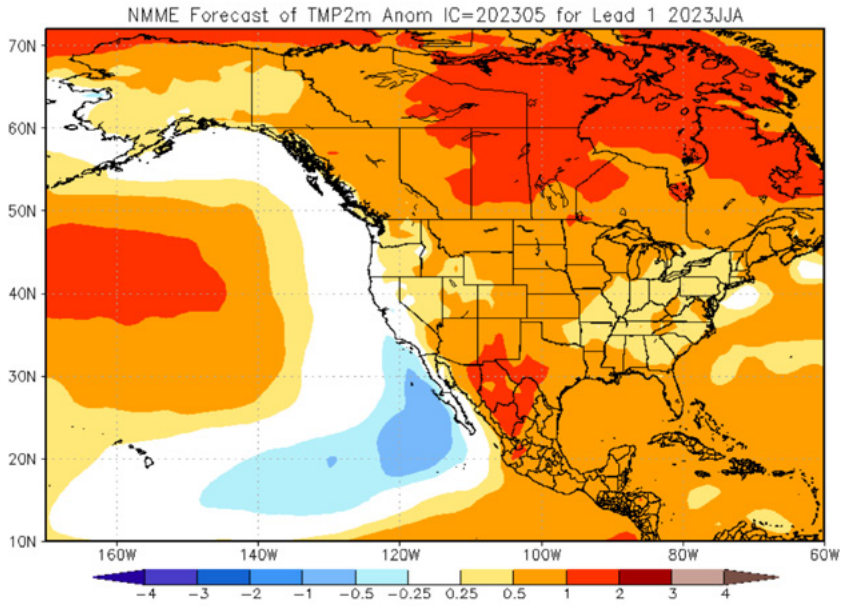


Figure: The North American Multi-Model Ensemble (NMME) predicts that the average temperature over the next 3 months (June–August) will be 0.45–1.8°F (0.25–1°C) hotter than average across much of the contiguous U.S. For more information about this model or prediction, please refer to the NMME website.

For June–August, the North American Multi-Model Ensemble (NMME) predicts that the average temperature will be 0.45 to 1.8°F (0.25 to 1°C) above normal for most of the continental United States. However, portions of the Midwest, Southwest, and the Southern Great Plains regions may experience a higher 90-day average that is 0.9–3.6°F (0.5 to 2°C) above the normal average temperature for this period. The NMME integrates multiple forecasts of the next 90 days to build the best estimate of temperatures and precipitation over that time frame. Note that although many regions across the continental United States may expect a warmer 90-day average temperature, this is not the same as your local weather forecast, in which large fluctuations in temperature may be predicted from day to day.

Pediatric Heatstroke Prevention

Between 1998 and 2022, a total of 937 children died due to heatstroke when left in a vehicle alone, with an average number of 37 deaths each year (see noheatstroke.org for more information). More than half of the deaths (54%) are children under 2 years of age. All of these fatalities were preventable. In 10 minutes, a car can heat up by as much as 20 degrees Fahrenheit and become life threatening for a child trapped inside. Rolling down a window does little to keep a vehicle cool. Since the body temperature of a child rises three to five times faster than that of an adult, a hot vehicle can become dangerous within a short period of time.

Among the reported fatalities, 53% of children were forgotten by their caregivers, 25% gained access to the car on their own, and 20% were knowingly left in the car by the caregiver. Three tips to remember to prevent children from dying in a hot car: never leave a child in a car unattended, make it a habit to look in the backseat every time you exit, and always lock the car and put the keys out of reach.

Image source: https://www.trafficsafetymarketing.gov/get-materials/child-safety/heatstroke-prevention

Protecting Vulnerable Patient Populations from Climate Hazards: A Referral Guide for Health Professionals

The Office of Climate Change and Health Equity's new Referral Guide summarizes federal resources that can address patients' social determinants of health and mitigate health harms related to climate change. These resources include social services and assistance programs to which patients can be referred, as well as references for anticipatory guidance and counseling to help patients prepare for potential hazards.

The Guide also includes case stories illustrating how these resources can be used in practice. For example, La Maestra Community Health Centers cared for a patient who, because of her utility insecurity, age, and social isolation, was at risk for health harms from extreme heat exposure. She also required access to refrigeration for essential medications, making her additionally vulnerable to utility disruptions. The patient's health risk from these climate-related hazards was reduced by La Maestra's care team's interventions to address her unmet health-related social needs, including referrals to HHS's Low Income Home Energy Assistance Program, Department of Energy's Weatherization Assistance Program, and Medicare resources for essential equipment.

THANK YOU to the partners who provide invaluable information, expertise, and data for the Climate and Health Outlook series: