Climate and Health Outlook

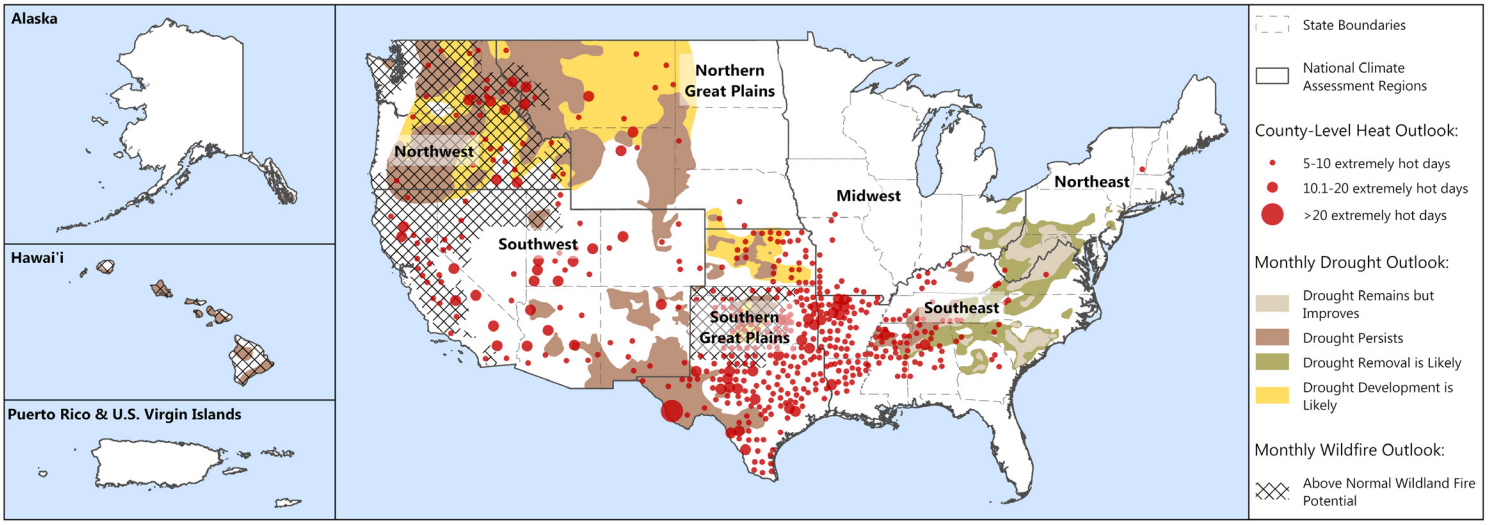
Your monthly climate forecast for health | **August 2024**

OASH | Office of Climate Change and Health Equity

Highlights for this edition:

- Forecasts for heat, drought, and wildfire along with discussion of populations at elevated risk for health impacts
- Guidance on protecting health from these climate hazards plus tornadoes, flooding, hurricanes, and *vibrio*
- A look at how the rate of heat-related illness is higher this year than last, how to protect farmworkers from increasing pesticide exposure, and new heat & health resources

August Regional Climate Hazard Forecasts:



Northwest: 18 counties in ID, eight counties in WA, and six counties in OR are expected to have five or more extremely hot days* in August. Drought persistence and development and above normal significant wildfire potential** are forecast across most of ID, WA, and OR.

Southwest: 25 counties in CA, 14 counties in UT, 11 counties in AZ, eight counties in NV, eight counties in NM, and seven counties in CO are expected to have five or more extremely hot days in August. Drought persistence is forecast to persist in existing drought regions of CA, NV, AZ, UT, CO, and NM. Above normal significant wildfire potential is forecast for much of northern and central CA and parts of southern CA, northern NV, and northwestern UT.

Northern Great Plains: 12 counties in MT, three counties in WY, three counties in NE, and one county in SD are expected to have five or more extremely hot days in August. Drought persistence is forecast for the ongoing drought areas in MT, NE, ND, SD, and WY with development most likely for areas of rapidly drying topsoil including across MT, southwestern NE, and western ND and SD. Above normal wildfire potential is forecast for parts of western MT.

Southern Great Plains: 143 counties in TX, 50 counties in OK, and 32 counties in KS are expected to have five or more extremely hot days in August. Drought persistence is forecast for the existing drought areas with development most likely for northwestern TX, southwestern to central OK, and parts of KS. Above normal wildfire potential is forecast for parts of northern TX and all of western OK.

Southeast: 48 counties in AR, 30 counties in MS, 21 counties in LA, 18 counties in AL, 12 counties in TN, six counties in KY, five counties in GA, three counties in VA, two counties in SC, and two counties in NC are expected to have five or more extremely hot days in August. Drought removal and improvement is forecast for VA, NC, SC, and GA with different areas of drought removal, improvement, or persistence forecast in TN, AL, and MS, and persistence predicted for the existing drought area in KY. The Southeast is forecast to have normal wildfire potential. The Atlantic basin is highly likely to have an above-normal hurricane season.

Hawai'i and Pacific Islands: All of the Hawai'ian islands are expected to experience equal chances of below, near, and above-normal temperatures in August. Drought persistence is forecast for ongoing drought areas of HI. Above normal wildfire potential is forecast for all of HI. The central Pacific is most likely to experience a below-normal hurricane season.

Heat Drought Wildfire Hurricane

Check out additional forecasts on our webpage.

*An "extremely hot day" is defined by having an expected temperature above the 95th percentile value of the historical temperature distribution for the month and county. For more information, check out the Centers for Disease Control and Prevention's (CDC's) National Environmental Public Health Tracking Network documentation.

**Smoke from wildfires can impact health hundreds of miles from the site of the fire.

Heat forecasts are derived from CDC's Heat & Health Tracker, wildfire forecasts from the National Interagency Coordination Center's National Outlook, drought forecasts from the National Oceanic and Atmospheric Administration's (NOAA's) Official Drought Outlook, and hurricane forecasts from NOAA's 2024 Hurricane Season Outlook.

Spotlight on Counties with Compounding Hazards Forecast for August 2024

The Secretary of Health and Human Services (HHS) declared a Public Health Emergency for Texas in July after Hurricane Beryl left more than one million residents without electricity and air conditioning amid extreme heat. In August, Montgomery County, a particularly hard-hit county north of Houston with a relatively high national risk index for hurricanes, is forecast to experience around 8 days of extreme heat (i.e., days where the maximum daily temperature is expected to exceed a dangerous level for health).

Much of OR, WA, ID, along with northern CA and western MT have extreme heat, above normal wildfire potential, and drought forecast for August. Mineral County, MT is forecast to experience all three climate hazards including nearly 16 days of extreme heat.

Find your county's forecast hazards along with its population's risk factors on our portal.

Additional Climate Hazards Without Specific Forecasts for August 2024

Tornadoes

Tornadoes can happen anywhere in the U.S., but the highest tornado threat shifts from the Southeast in the cooler months of the year, toward the southern and central Plains in May and June, and the northern Plains and Midwest during early summer. Tornadoes can also occur at any time of day or night, but most tornadoes occur between 4–9 p.m. About 1,200 tornadoes hit the U.S. yearly, and storms are generally increasing in frequency and intensity with climate change.

During a tornado, people risk being struck by flying objects. After a tornado, the damage left behind poses additional **injury risks**.

Due to their unpredictable nature, it is common to experience **emotional distress**, especially for tornado survivors, and first responders and recovery workers.

Stay informed by paying attention to emergency alerts plus real-time alerts from the Federal Emergency Management Agency (FEMA) App. Learn how to take protective actions and recover after events with guidance from CDC, Ready.gov, and FEMA. Learn more about warning signs for emotional distress and call or text 1-800-985-5990 if you need support for distress related to any disaster. This Substance Abuse and Mental Health Services Administration (SAMHSA) Helpline and Text Service is available 24/7, free, and staffed by trained crisis counselors.

Hurricanes, Severe Inland Storms, and Flooding

Climate change is leading to more intense hurricane seasons and more frequent and severe inland storms.

- NOAA has forecast that the Atlantic hurricane region, which typically includes the southern and eastern coastal U.S., will have an above-normal hurricane season in 2024. The Central Pacific hurricane region, which typically includes Hawai'i and other Pacific islands, is predicted to have a below-normal season in 2024.
- In recent years, a higher percentage of precipitation in the U.S. has come in the form of intense single-day events.

As a result of these interrelated climate hazards, coupled with drier soils, sinking land, the loss of natural barriers, and sea level rise, more U.S. communities (both coastal and inland) are experiencing flooding. These events disproportionately affect racial minorities and low-income households.

Flooding poses **drowning risks**. Floods are the second leading cause of weather-related deaths in the U.S. (after heat).

Homes damaged by floodwaters may experience the growth of mold and other microbes that can harm respiratory health and worsen **allergies** and **asthma**.

Contaminated floodwaters pose risks of **injuries**, **infections**, and more.

Loss of power during severe storms can lead to many health harms. For example, using home generators improperly can cause carbon monoxide exposure, which can lead to **loss of consciousness** and **death**.

Minimize your risk by learning more about how to stay safe during and after a flood, how to clean mold safely, and how to protect yourself from floodwaters. Learn how to stay safe from lightning and how to prepare for a hurricane with resources from CDC and FEMA. Check out specific recommendations for people with access and functional needs, with disabilities, with diabetes, and people experiencing homelessness. After a hurricane has passed, use CDC resources to safely return home and protect yourself from power outages (and use a generator properly).

Pesticides & *Vibrio* →

Pesticide Exposure: Another Growing Hazard for Farmworkers in a Changing Climate

Climate change is altering many pest populations in the U.S., including via northern expansion of blacklegged tick populations, accelerated geographic spread and population growth of the spotted lanternfly, and increased duration of active periods of the codling moth, peach twig borer, and oriental fruit moth in California. This spread of agricultural pests, along with increased susceptibility of plants to invasive pests due to elevated CO_2 and reductions in pesticide efficacy predicted with climate change, is **increasing the use of pesticides**—chemicals that are commonly used to manage pest populations.

Farmworkers, due to approximately 75% of pesticide use in the U.S. occurring in agricultural settings, and on the front lines of this increasing hazard. An estimated 10,000 to 20,000 pesticide poisonings among farmworkers are diagnosed in the U.S. annually. Workers applying pesticides face the highest exposure with their greatest exposure occurring during the mixing and loading processes (i.e., when the pesticides are in a concentrated state and there is a higher chance of spilling). Farmworkers working in sprayed fields are also at risk of high pesticide exposure and are less likely to use personal protective equipment (PPE) to protect themselves compared to those directly involved in the application process.

Acute health effects vary by pesticide type but can range from headache and dizziness to tremor and seizure. Acute occupational illnesses are tracked by the CDC-NIOSH Sentinel Event Notification System for Occupational Risk (SENSOR), a state-based surveillance program. In 2007–2011, 2,606 cases of acute occupational pesticide-related illness and injury were reported across 12 states. Of these cases, the **rate of illness and injury among agricultural workers was 37 times greater** than the rate for nonagricultural workers.

Source: USDA NIFA

What Can We Do?

The hierarchy of controls provides a method of prioritizing safeguards to protect workers from hazards. Primary exposure control methods are hazard elimination or substitution by a less toxic substance. For pesticides, this could entail substituting insecticides most commonly identified in cases of injury and illness and utilizing **integrated pest management practices** on farms to reduce the need for chemical pesticides. Methods with lower effectiveness include providing and encouraging the **use of PPE**. PPE can be effective, but only when workers use it correctly and consistently, including when using during hot weather (a time when there may be concern about the heat burden of the PPE wearer).

Currently, there is an **Agricultural Worker Protection Standard** (WPS), which requires that employers of pesticide handlers and agricultural workers receive annual pesticide safety trainings. The Pesticide Education Resource Collaborative provides a library of Environmental Protection Agency (EPA)-certified educational resources to help the agricultural industry comply with the WPS. EPA is working on other ways to protect workers from pesticide risk.

Healthcare providers can help by learning to identify symptoms and treat patients with pesticide exposure from EPA's Recognition and Management of Pesticide Poisonings manual. Unfortunately, pesticide poisoning symptoms can often be confused with symptoms of heat exhaustion, so also check out EPA's comparison chart.

Check out our stories in the May 2024 and June 2024 editions of the Climate and Health Outlook on other climate hazards that farmworkers are disproportionately exposed to.

Increasing Vibrio Threat With Warming Waters: Be Careful With Open Wounds

Source: USDA ERS

Vibrio vulnificus (*V. vulnificus*) are bacteria that live in coastal waters. They can get into an open wound of any size through salt water or brackish water (i.e., a mixture of fresh and salt water often found where rivers meet the ocean), or through drippings from raw seafood. *Vibrio vulnificus* wound infections are rare but serious. Treating these infections can require intensive care or limb amputations. About 1 in 5 people die from the infection.

V. vulnificus bacteria thrive in warmer waters—especially during the summer months (May to October)—and in moderately salty environments like estuaries. Increasing water temperatures and extreme weather events (such as heat waves, flooding, and severe storms) associated with climate change create more favorable conditions for *V. vulnificus*. **People at increased risk for V. vulnificus infection should take steps to prevent an infection when enjoying coastal activities**. CDC's *Vibrio* website provides additional information about Vibrio bacteria and the infections they cause.

Heat and Health Index

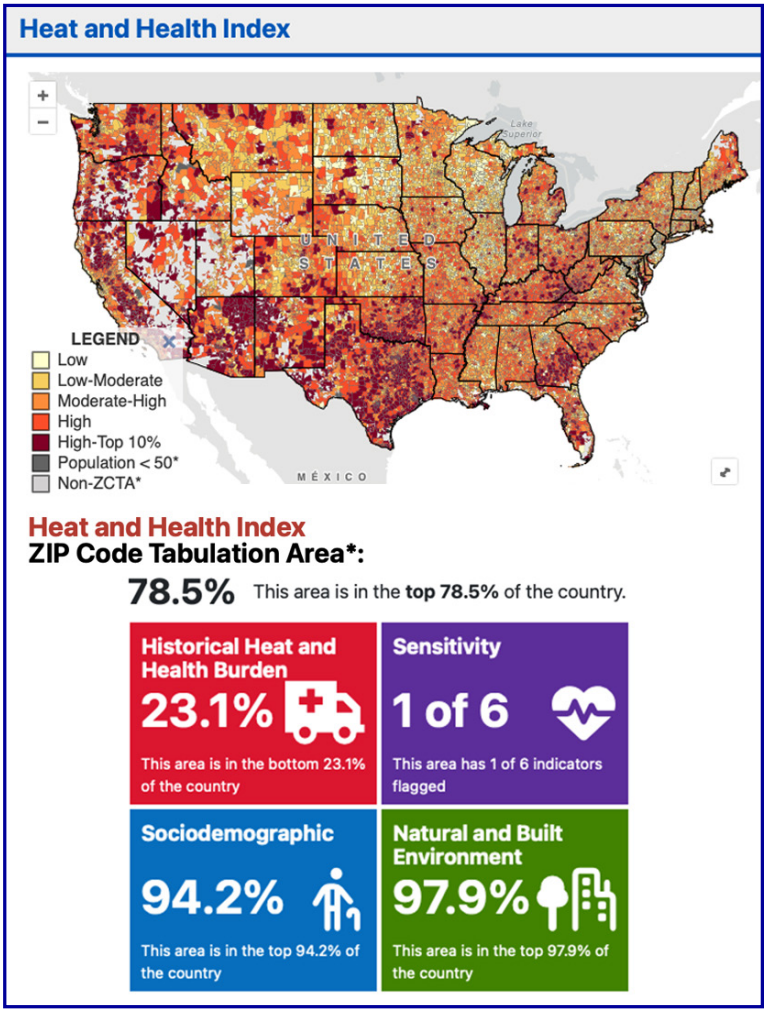
OCCHE and CDC have launched the Heat and Health Index (HHI), the first national tool to provide ZIP code-level heat-related illness and community characteristics data to measure vulnerability to heat. The HHI delivers a percentile ranking for each ZIP code so that public health officials, city planners, policymakers, and community members can identify areas that may be at increased risk of negative health outcomes from heat. It also details local factors that may be driving this risk, which can help inform interventions to protect public health and build a more heat-resilient future.

The HHI is comprised of four modules, made up of a total of 25 indicators. These modules are related to: vulnerability to heat (which provides information on historical temperatures and heat-related illness in a community); pre-existing health conditions that may increase sensitivity to negative health outcomes from heat; plus sociodemographic as well as natural and built environment characteristics that increase exposure or sensitivity to heat (or lessen one's ability to cope with heat).

The HHI can be used to:

- Educate and inform the public about heat risk in their community;
- Identify and prioritize areas that may require special attention or additional action during the heat season to reduce heat-related illness; and
- Analyze the unique, local factors driving heat-related illness to help inform interventions to reduce heat risk over time.

Check out the Heat and Health Index to learn more about how different factors influence the way heat affects your community to learn more about how different factors influence the way heat affects your community.



Source: CDC

Extreme Heat

Heat Affects Health in Many Ways

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

- An increased risk of **heart disease hospitalization**.
- **Heat exhaustion,** which can lead to **heat stroke** that, 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.
- Risk of **violence**, **crime**, and **suicide**, adding to the mental health burden of depression and anxiety already associated with climate change.

People at Elevated Health Risk From Extreme Heat Exposure

According to HEAT.gov and CDC include those who:

- Have increased exposure (e.g., are experiencing homelessness; are emergency responders; are athletes; and/or work outdoors, or indoors with insufficient cooling);
- Have increased biologic sensitivity (e.g., are under age 5; are age 65 or over; are pregnant; and/or have chronic health conditions such as a mental illness, diabetes, or cardiovascular condition); and/or
- Face high socioeconomic burden and/or barriers to accessing cooling or healthcare (e.g., live in a low-income community, and/or have one or more disabilities).

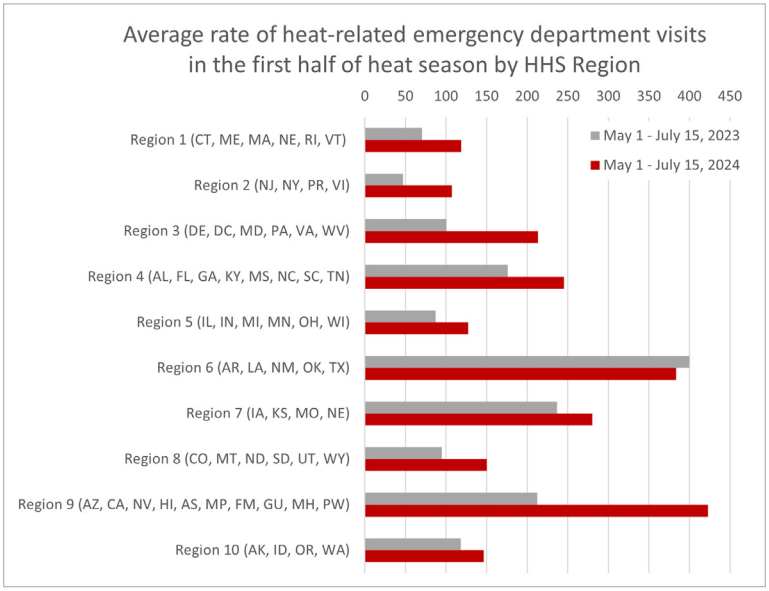
Check out your heat forecast for August along with top risk factors of concern in your county with our portal and learn how to protect people at elevated risk.

Resources to Reduce Health Risks Associated With Extreme Heat

- Check out HEAT.gov, the premier source of heat and health information for the nation to reduce the health, economic, and infrastructural impacts of extreme heat.
- Visit the CDC-National Weather Service HeatRisk Forecast Tool for a nationwide seven-day heat forecast that identifies when temperatures may reach potentially harmful levels.
- Learn the steps needed to reduce the risk of heat stress for workers from National Institute of Environmental Health Sciences' new Building Blocks for a Heat Stress Prevention Training Program.
- Discover recent actions taken to protect workers and communities from extreme weather.

For more, please review our 2-pager with curated HHS Resources on Heat and Health in 2024.

2024 Heat-related Emergency Department Visit Rates Are Higher Than Last Year



The graphic to the left compares the average rate of heat-related illnesses (HRI) per 100,000 emergency department (ED) visits from May 1 to July 15 in 2024 (red), with the average rate observed in 2023 (grey) for the same timeframe. The average HRI ED rates in 2024 are higher in 9 out of 10 HHS regions when compared to 2023. Notably, HHS region 9 (which includes most of the Southwest and Hawai'i) is at nearly twice its already high 2023 rate, and the rates for HHS regions 2 and 3 (which include the mid-Atlantic region and Caribbean) are more than twice what they were this time last year.

Figure. The CDC National Syndromic Surveillance Program (NSSP) provides daily rates of heat-related illness by HHS Regions. NSSP is a network comprising CDC representatives, state and local health departments, and academic and private sector health partners jointly collecting and sharing electronic patient encounter data. NSSP includes emergency department visit data from approximately 80% of U.S. emergency departments covering 50 states, DC, and Guam.

Drought

Drought Affects Health in Many Ways

Drought increases the risk for a diverse range of health outcomes. For example:

- Low crop yields can result in rising food prices and shortages, potentially leading to **malnutrition**.
- Dry soil can increase the number of particulates such as **dust and pollen** that are suspended in the air, which can irritate the respiratory system.
- If there isn't enough water to flow, waterways may become stagnant breeding grounds for **disease vectors** such as mosquitoes.
- Drought's complex economic consequences can increase **mood disorders, domestic violence,** and **suicide**.

People at Elevated Health Risk From Drought Exposure

According to NOAA & CDC, include those who:

- Have increased exposure to dust (e.g., are experiencing homelessness, work outdoors, or live/work in agricultural communities);
- Rely on water from private wells or small or poorly maintained municipal systems, the quality of which is more susceptible to environmental changes; and/or
- Have increased biologic sensitivity (e.g. are under age 5, are age 65 or over, are pregnant, have chronic health conditions, and/or have special needs in the event of a public health emergency).

Check out your drought forecast for August, along with top risk factors of concern in your county with our Climate and Health Outlook Portal and learn more about health impacts and how to prevent them.

Resources to Reduce Health Risks Associated With Drought

- Learn about the health implications of drought and how to prepare from the CDC Drought and Health site and Ready.gov Drought site.
- 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. This SAMHSA Helpline and Text Service is available 24/7, free, and staffed by trained crisis counselors.

Wildfire

People at Elevated Health Risk From Wildfire Smoke Exposure

According to EPA include those who:

- Have increased biologic sensitivity (e.g., are under age 5, are age 65 or over, are pregnant, and/or have chronic health conditions such as asthma or another lung disease or a cardiovascular disease); and/or
- Face economic, social, environmental, and/or other burdens that may limit their ability to reduce exposure (e.g., identify as a racial or ethnic minority, have low-income, have one or more disabilities, and/or work outdoors).

Check out your wildfire forecast for August, along with top risk factors of concern in your county with our Climate and Health Outlook Portal and learn how to protect people at elevated risk.

Resources to Reduce Health Risks Associated With Wildfire

- Learn about how to prepare for wildfires, stay safe during a fire, and return home after a fire with resources form FEMA's Ready.gov, CDC, and EPA.
- Download the FEMA App to receive real-time weather and emergency alerts from the National Weather Service and help you find a nearby shelter in case of evacuation.
- Check out EPA & CDC's Wildfire Smoke and Your Patients' Health course for actions to help patients reduce exposure.
- Discover specific recommendations for older adults, people experiencing homelessness, people with access and functional needs, and people with disabilities.

Wildfires Affect Health in Many Ways

Wildland fire increases the risk for a diverse range of health outcomes from both the fire itself and smoke. For example:

- Due to the nature of their work, firefighters are at risk of developing severe heat-related illness (such as **heat stroke**) and rhabdomyolysis (**muscle breakdown**).
- Wildfire can cause **burns** through contact with flames and hot surfaces.
- Wildfire smoke can lead to disorders including **reduced lung function**, **bronchitis**, exacerbation of **asthma**, and cardiovascular effects like **heart failure**.
- For pregnant people, smoke exposure may increase the risk of **reduced birth weight** and **preterm birth**.
- Wildfire smoke may affect the immune system, potentially leading to increased vulnerability to **lung infections**.
- Smoke from wildfires can travel downwind and affect air quality hundreds of miles away from the fire.

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