

Heat-Related Illness (HRI) (Heat Stress) and Heat Mortality

This metadata page provides a brief summary of these datasets. More detailed data and metadata may be available from the Louisiana Department of Health (LDH), Section of Environmental Epidemiology & Toxicology (SEET), Environmental Public Health Tracking Program and/or Occupational Health Program, as well as the US Centers for Disease Control and Prevention (CDC) Tracking Program. Please refer to the contact information on the last page under 'Questions?'

Definitions

Heat-related illness (HRI), also referred to as 'heat stress', is a preventable illness that occurs when heat exposure exceeds the human physiologic capacity to cool and the core body temperature rises. When this happens, a range of heat-related symptoms and conditions may develop. Heat-related illnesses include, but are not limited to, heat cramps, heat exhaustion, heat syncope (fainting), and heat stroke. Anyone, regardless of age, sex, or health status may be at risk for HRI, especially workers who are exposed to extreme heat or work in hot environments.

Extreme Heat, a period of high heat and humidity with temperatures above 90 degrees for at least two to three days (Ready.gov).

Heat Wave, a period of abnormally hot weather generally lasting more than two days (National Oceanic and Atmospheric Administration).

Data Source(s)

- [LDH Bureau of Health Informatics](#)
- LDH [Section of Environmental Epidemiology & Toxicology \(SEET\) Environmental Public Health Tracking Program](#) and SEET [Occupational Health Program](#)
- [U.S. Census Bureau](#)

Data Measure(s)

These HRI measures were developed through data collection, aggregation and stratification in partnership with the SEET Occupational Health Program following similar but not exact protocols as the CDC Standards for Nationally Consistent Data and Measures (NCDMs) within the Environmental Public Health Tracking Network. The purpose of NCDMs is to ensure compatibility and comparability of data and measures useful for understanding the impact of our environment on our health. Therefore please note that these data may not be directly comparable, or may differ slightly in count and rate as data available through CDC Tracking. Please carefully consider these limitations and metadata.

The LDH Health Data Explorer contains the following measures for heat morbidity (emergency department visits and hospitalizations) and heat mortality (deaths), with an HRI diagnosis.

9-year Emergency Department data by Louisiana Climate Division (2010-2018)

- Cumulative age-adjusted rate of ED Visits for Heat Stress Illness per 100,000 Population by Louisiana Climate Division (2010-2018)
- Cumulative crude rate of ED Visits for Heat Stress Illness per 100,000 Population by Louisiana Climate Division (2010-2018)
- Cumulative ED Visits (Counts) for Heat Stress Illness per 100,000 Population by Louisiana Climate Division (2010-2018)
 - Data Stratifications:
 - All Ages and Age Breakdowns (Ages 0-19, Ages 20-44, Ages 45-64, Age 65+) by Gender. All Genders, Male, and Female by All Race/Ethnicity.

10-year Hospitalization data by Louisiana Climate Division (2010-2019)

- Cumulative age-adjusted rate for hospitalizations for Heat Stress Illness per 100,000 Population by Louisiana Climate Division (2010-2019)
- Cumulative crude rate for hospitalizations for Heat Stress Illness per 100,000 Population by Louisiana Climate Division (2010-2019)
- Cumulative hospitalizations (counts) for Heat Stress Illness per 100,000 Population by Louisiana Division (2010-2019)
 - Data Stratifications:
 - All Ages and Age Breakdowns (Ages 0-19, Ages 20-44, Ages 45-64, Age 65+) by Gender. All Genders, Male, and Female by All Race/Ethnicity.

6-year Heat Mortality Data by Louisiana State and Louisiana Climate Division (2011-2016, 2017-2022)

- Number of Heat-Related Fatalities
 - Data Stratifications:
 - All Ages and Age Breakdowns (Ages 0-19, Ages 20-39, Ages 40-59, Age 60+) by Gender. All Genders, Male, and Female by All Race/Ethnicity.
 - All Ages and Genders by Race: Black, White, Other
 - All Ages and Genders by Ethnicity: Hispanic, Non-Hispanic

Explore Data

The LDH Health Data Explorer (<http://ldh.la.gov/tracking>) is an online query tool which allows health, environmental hazard, exposure and population data to be explored and viewed side-by-side in tables, charts, and maps. These data can be downloaded, viewed and further analyzed.

To Explore Data on the query tool:

1. Select Criteria
2. Category: Health Outcomes
3. Topic: **Heat-Stress Illness** OR Topic: **Heat-Related Deaths** > Focus: **Heat Mortality**
4. Additional Options: choose from the available Reporting Periods, Geography, Measures and Time Periods.

Heat and your Health

Heat-related illness (HRI), also known as heat stress, is a preventable illness that occurs when heat exposure exceeds the physiologic capacity to cool and the core body temperature rises. When this

happens, a range of heat-related symptoms and conditions may develop. HRI affects everyone differently. At particular risk are adults who are older, people working indoors or outdoors in high temperatures if no precautions are taken, athletes or student athletes, homeless individuals, individuals with underlying chronic disease(s), women who are pregnant, and children and individuals who are taking drugs that affect temperature regulation (e.g., beta-blockers, diuretics, and major tranquilizers). Their increased metabolism places pregnant women and babies at risk, potentially leading to premature labor or other adverse birth outcomes. Healthy teens and middle-aged adults are at risk if they engage in vigorous physical activity (work indoor or outdoor or athletics) and do not take proper precautions. Anyone, regardless of age, sex, or health status may be at risk for heat stress illness, but it is commonly seen in male workers who are exposed to extreme heat or work in hot environments.

Extreme temperatures can overwhelm the human body's ability to regulate its temperature and cool down. Prolonged exposure to very high temperatures can result in serious illnesses or even death. Certain medical conditions such as diabetes, cardiovascular disease, respiratory disease, and cerebrovascular disease (e.g. stroke) can be exacerbated by exposure to extreme heat.

Heat and the Environment

A sequence of days over the daily highs, such as temperature of 95°F (35°C) and a heat index of 100°F (~38°C) have been shown to be a strong indicator of expected health impacts from heat. During extended periods of summer heat, a sequence of days where nightly temperatures (daily lows) do not fall below 75°F-80°F interfere with the body's ability to recover from high daytime temperatures, thereby introducing higher risk of heat-related illness emergency department visits and hospitalizations (see **Data Citations**, below).

The Fifth National Climate Assessment (U.S. Global Change Research Program, 2023) summarizes the current status of climate variability in the United States and outlines potential impacts for the future. Among other impacts specifically related to the Southeast United States and Louisiana, increased temperatures and an associated increase in extreme heat events will increasingly impact the public's health. Increased heat illness, heat-related emergency department visits and hospitalizations, and a forecasted increase in deaths from heat stroke could occur, if we don't take precautions now to adequately prepare and protect the most vulnerable in the population from heat exposure. Increased frequency, intensity, and duration of extreme heat events is expected to affect not only public health, but the natural and built environments, energy, agriculture, and forestry.

According to recent climate data, northern Louisiana has been registering a greater number of days where the maximum temperature exceeds 95°F. Southern Louisiana is somewhat more humid, so it may 'feel' oppressively hot, but not always reach high temperatures. Wetlands and naturally occurring bodies of water in South Louisiana actively regulate outdoor temperatures as they absorb heat through evaporation. Recent data have demonstrated that northern Louisiana registered a greater number of days than Southern Louisiana when the nighttime temperature did not fall below 80°F (27°C) as well. This is an important factor which may contribute to heat illness, particularly without adequate hydration and air conditioning, because the human body isn't able to cool down each day (see **Data Citations**, below).

In Louisiana, thousands of workers are at risk of heat-related illness (HRI). Many industries and occupations are vulnerable, but those most affected by outdoor heat include construction, agriculture, and oil and gas well workers, comprising about 12.8% of Louisiana's workforce. As an example, males accounted for 81% of

all ED visits; their rate was 4.5 times the female rate, and the rate for males was highest in the 30-39 year-old age group (see **Data Citations**, below). Males aged 20-44 and 45-64 were the most frequent visitors to the Emergency Room (2010-2018) in Louisiana ([Extreme Heat in Louisiana: Staying Protected](#)).

Data Methods

Louisiana Climate Divisions. To conceptualize heat and temperature, nine weather stations were selected to represent each of Louisiana's Climate Divisions.

Climate Division	Weather Station Name	Weather Station ID
Northwest	Shreveport Regional Airport	13957
North Central	Monroe Regional Airport	13942
Northeast	Tallulah-Vicksburg Regional Airport	03996
West Central	Fort Johnson	165266
Central	Alexandria International Airport	13934
East Central	Baton Rouge Metropolitan Airport (Ryan Field)	13970
Southwest	Lake Charles Municipal Airport	03937
South Central	Lafayette Regional Airport	13976
Southeast	New Orleans International Airport	12916

[Climate Data Portal](#) station of interest ID codes include: Alexandria – 13935, Baton Rouge – 13970, Fort Polk – 03931, Lafayette – 13976, Lake Charles – 03937, Monroe – 13942, New Orleans – 12916, Shreveport – 13957, Tallulah-Vicksburg – 03996.

Data by Climate Division. Louisiana has nine climate divisions. The parishes within each climate division have nearly homogenous characteristics regarding temperature, precipitation and humidity. One weather station in each climate division was selected as a representative station enabling HRI data to be viewed side-by-side with temperature characteristics such as maximum and minimum temperature, heat index, and other measures for climate.

Data Privacy and Suppression

Heat-Related Illness (HRI), Heat Stress, and Heat Mortality are rare. HRI data are therefore aggregated over several years and by climate division on the LDH Health Data Explorer. Annual parish-level heat health data often may not be shared otherwise (are suppressed) due to requirements for privacy protection, to accommodate HIPAA privacy protection rules¹. Many additional heat data are still available by parish on the [CDC Tracking Data Explorer](#) and are available for download on both sites. HRI data by state and by climate division aggregated over 6-10 years are not suppressed due to temporal and geographic data aggregation resulting in the population denominator >100,000.

¹[Health Insurance Portability and Accountability Act \(HIPAA\)](#)

Figure 1. Louisiana Climate Divisions with Climate Station by city



Data Limitations and Important Considerations

Data Preparation. HRI hospitalizations, ED visits and Heat Mortality data were prepared in a partnership between the SEET LDH Tracking and Occupational Health Programs. Vital Records Data are reviewed and approved by BHI prior to release.

Heat-Related Fatality Case Definition (Updated 8.2023). ICD code listed as a primary or secondary Cause of Death X30 Exposure to excessive environmental heat; T67.X (include T67.0 – T67.9) Effects of Heat & Light; P81.0 Environmental hyperthermia of newborn; OR Keyword in any Cause of Death field Heat; Hyperthermia. All cases with keyword(s) and no supporting heat-related ICD mortality code will be manually reviewed to confirm heat-related (e.g., “Heat” may be written instead of “heart”).

The following *data limitations* may exist for this dataset:

- Records are selected using primary or any secondary discharge diagnosis or cause of injury code and admission date. For the hospitalization data set, only persons admitted to hospital as inpatients (admitted for at least 24 hours) are included. Periods of extreme heat are frequently associated with increases in hospital visits or admissions and deaths for many causes. These measures may not capture the full spectrum of heat-related illness, where exposure to excess heat is not explicitly documented.
- Rates and numbers of hospitalizations, emergency department visits, and deaths in this dataset exclude cases of exposure to man-made sources of heat.
- Emergency department data includes both inpatient and outpatient records. Patients who visit the emergency department may be treated and released, or they may be admitted to a hospital through the emergency department. Therefore, there is an overlap between emergency department and hospitalization indicators. Due to this overlap, emergency department counts and hospitalization counts cannot be combined to create a total count of events.
- Hospitalization and Emergency Department data should not be considered complete until the subsequent year of data has been published. Since the source data capture hospital discharges (rather than admissions), patients admitted toward the end of the year and discharged the following year will

be omitted from the current year dataset. This may lead to the number of hospitalization admissions in the most recent year of published Tracking data to be understated.

- Data is generally updated on an annual basis. There is usually a one to two year lag period before data are available from the data owner.
- Fluctuations in rates from year to year between parishes may occur, that do not reflect a true change in health outcomes over time or geography. These can complicate trend analysis. Distortion may occur from several identified quality controls related to data entry, transfer, or extraction; hospital closure or reorganization; incomplete hospital reporting; limitations of the geocode; major population shifts due to hurricanes; and other possible factors. Rate fluctuations have been found to impact both populous and rural parishes. Work is ongoing to identify and improve both the data source(s) and processing steps along the workflow.
- Counts and rates based on 5 or fewer cases are suppressed where population is less than 100,000. Suppressed rates are indicated with an asterisk (*). Suppression is a statistical practice that is used to protect patient confidentiality and potentially identifying information by withholding or excluding small numbers within a specific demographic or geography. This is a standard procedure used to comply with the federal Health Insurance Portability and Accountability Act's Privacy Rule.
- Numbers and rates may differ slightly from those contained in other publications or between programs. These differences may be due to file updates, differences in calculating rates, diagnostic techniques reported, NCDMs standards for processing, and updates in population estimates.
- Practice patterns and payment mechanisms may affect diagnostic coding and decisions by health care providers to hospitalize patients.
- Records for persons receiving care at home and in outpatient settings are not included in these data. Not all hospitals report data from emergency departments.
- Veterans Affairs, Indian Health Services and institutionalized (e.g. prison) population records are also not included in these data.
- Records for persons in Louisiana may not be included if the event occurred out of state.
- Patients may be exposed to environmental triggers in multiple locations, but hospital discharge geographic information is limited to patient residence and hospital location.
- Differences in rates by area may be due to different socio-demographic characteristics and associated behaviors. When rates across geographic areas are compared, many non-environmental factors, such as access to medical care, personal behaviors, health status and diet can affect the likelihood of a person being hospitalized. Differences in rates by time or area may reflect differences or changes in diagnostic techniques and criteria in the coding.
- Persons hospitalized multiple times throughout the year may be counted for each hospitalization, thereby raising the rates. Although duplicate records are excluded, the measures are based upon events, not individuals. When multiple admissions are not identified, the true prevalence will be overestimated.
- The measure of all heat related hospitalizations may include some transfers between hospitals for the same person for the same event. Thus, variations in the percentage of transfers or readmissions for the same event may vary by geographic area and impact rates.
- Because census data are only available every ten years, the postcensal population estimates are used when calculating rates for the intervening years. These estimates may not accurately reflect demographic changes for years in which large population shifts occur.

Data Re-release

This is a public dataset which can be freely shared. Personally identifiable health information have been removed. Please refer to the Data Methods section of these metadata from more information.

Data Citations

Please cite the US CDC, LDH Environmental Public Health Tracking Program Cooperative Agreement NUE1EH001490, and any data source(s) listed on Page 1 when re-sharing or applying these data in analyses or publications. References for this metadata include the following sources:

[Extreme Heat in Louisiana: Staying Protected. Alexis Williams, Louisiana Department of Health.](#)

[Louisiana Morbidity Report, November 2019. Vol 1, No. 1.](#)

[USCDC Tracking Program](#) Metadata Pages. Suggested Citation: Accessed From:

<https://ephrtracking.cdc.gov/DataExplorer>. Accessed on [enter date].

Disclaimer

Data are intended to spur further research and should be used only as a starting point to understanding how the environment and other contributing factors may be connected to disease. Datasets presented on the LDH Health Data Explorer site are intended to answer some basic questions, but should ultimately lead to further inquiry and more detailed study.

Data limitations should be noted if conducting exploratory ecological studies with these data. Limitations may include data gaps, reporting discrepancies (for example, a disruption of reporting or instrument recording) and insufficient data on all potentially confounding factors. There are numerous additional factors which may contribute to disease onset. These include genetics, access to health care, existing health conditions, medicines, other chemical substances we come into contact with or ingest, nutrition, route and duration of exposure, level of activity, level of stress, and others.

Responsible use of this data requires exercising caution when drawing conclusions based solely on views of the limited available data. Any perceived relationship, trend, or pattern apparent in the data should not be interpreted to imply causation; may in fact be unrelated; and should be regarded as preliminary, and potentially erroneous, until more in-depth study and if applicable, statistical evaluation, can be applied.

The LDH Bureau of Health Informatics and Environmental Public Health Tracking Program cannot guarantee the completeness of the information contained in these datasets and expressly disclaim liability for errors and omissions in their content.

Additional Information

Please visit the following links for more information.

- [Extreme Heat in Louisiana: Stay Protected | LDH Tracking Program](#)
- [Occupational Safety and Health Administration \(OSHA\) OSHA - Working in Outdoor and Indoor Heat Environments](#)
- [National Institute for Occupational Safety and Health \(NIOSH\) - Occupational Safety and Health Administration \(OSHA\) Heat Safety Tool](#)

Questions?

- Email: healthdata@la.gov
- Website: <http://ldh.la.gov/tracking>
- Toll free Phone: 1-888-293-7020