HEAT-RELATED ILLNESS IN REGION 8: NORTHEAST LOUISIANA

Review of Emergency Department Data from 2010-2020

OCTOBER 2024

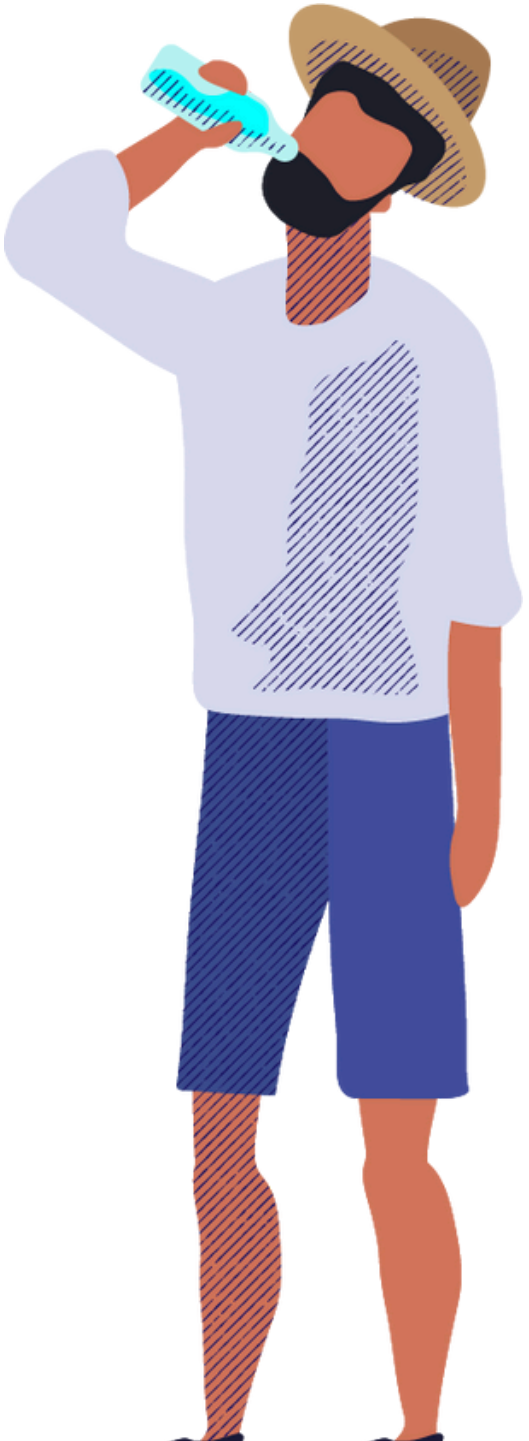
LOUISIANA DEPARTMENT OF HEALTH

AUTHORS

This report was prepared by the Louisiana Department of Health (LDH) Office of Public Health's (OPH) Occupational Heat-Related Illness Prevention Program.

Brittany Babin, MPH

Daniel Veneracion, MPH



ACKNOWLEDGEMENTS

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For more information about the report or the program, contact workerhealth@la.gov or visit ldh.la.gov/page/la-heat.

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OVERVIEW

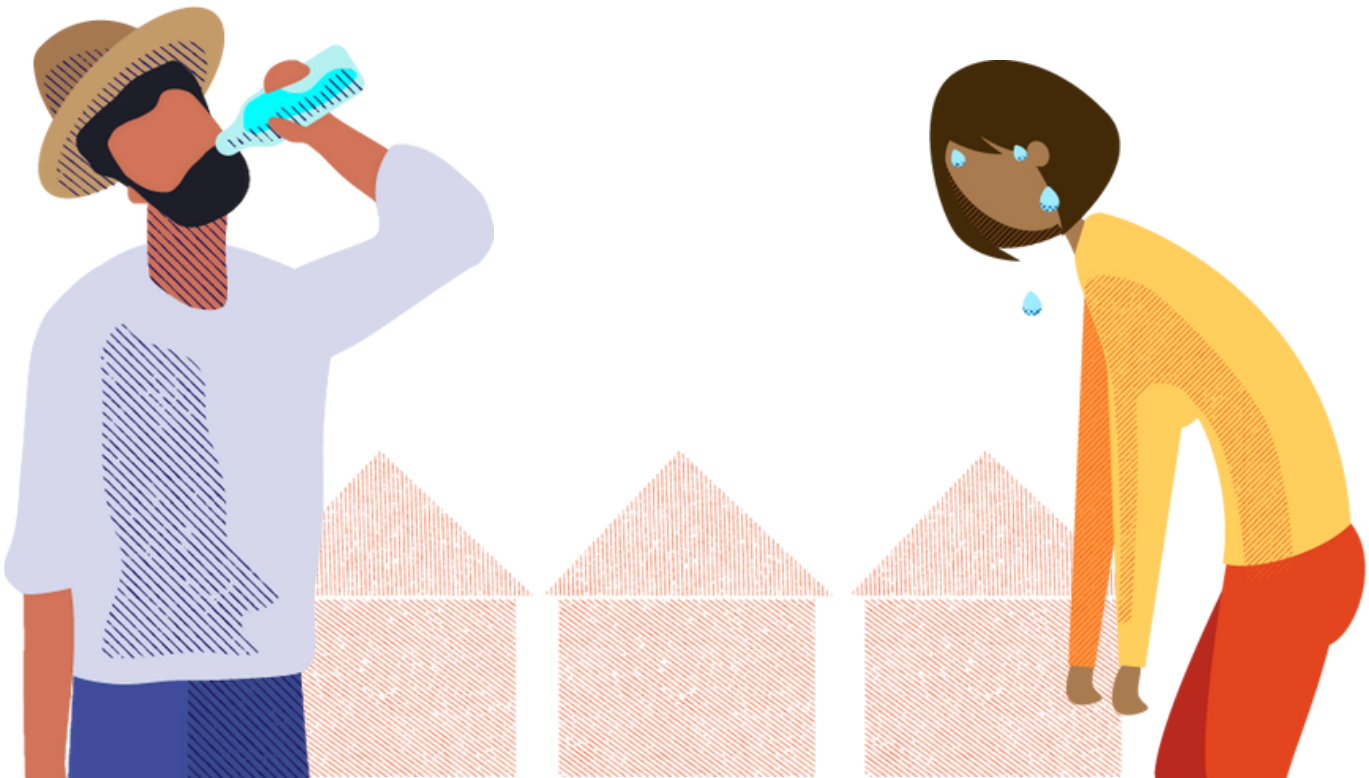
This report summarizes information about Region 8 residents and visitors who were treated in an emergency department (ED) with a diagnosis indicating heat exposure from 2010 to 2020. Region 8 encompasses twelve parishes in the Northeast section of the state: Caldwell, East Carroll, West Carroll, Franklin, Jackson, Lincoln, Madison, Morehouse, Ouachita, Richland, Tensas, and Union.

Heat exposure is intensifying as the frequency, severity, and duration of extreme heat events increases. These changes are of concern for Louisiana because the state experiences some of the highest average summer temperatures in the nation. Hot summers are compounded by high humidity which worsens the impact of heat by impairing the body's ability to cool by evaporation. **Understanding variations in heat-related ED visits can inform and target public education programs and policy and prevention efforts, such as heat-health alert protocols and action plans.**

The human body maintains an internal temperature within a very narrow range. **Heat-related illness can occur when someone is exposed to high temperatures and his or her body is unable to cool itself sufficiently through sweating.** Heat-related illness (or hyperthermia) is a broad term for conditions directly related to an increase in body temperature. These conditions occur along a continuum of severity ranging from mild cramps, swelling and rashes to potentially fatal heat exhaustion and heatstroke. Heat also has indirect health impacts: it can exacerbate chronic conditions such as respiratory, cardiovascular, and kidney disease, increase injuries and accidents, and strain mental health.

Anyone can develop heat-related illness, but some people are at greater risk.

- Workers in outdoor settings, and some indoor work settings without adequate climate-controlled environments.
- Infants and young children. They are sensitive to the effects of high temperatures and rely on others to control their environments.
- Pregnant women. They are under more bodily stress and are more likely to become dehydrated. Heat exposure can also contribute to premature birth, stillbirth, and lower infant birthweight.
- Older adults (65+). As people age, their sweat cooling mechanism becomes less efficient.
- People with chronic health conditions such as heart or kidney disease, breathing conditions, high blood pressure, diabetes, and obesity. Certain medications can also put people at risk because they interfere with their ability to thermoregulate.
- People who exercise outside.



METHODS

DATA SOURCES

Health Data

Data analyzed in this report are from ED billing records for hospitals, excluding the Veterans Affairs Hospital. The Louisiana Hospital Association provided data.

CASE SELECTION

- **Resident status:**
  - Region 8 Residents: This refers to patients who lived in Region 8 based on the address listed on their medical record and were treated in any ED in Louisiana. (Refer to Appendix A: Summary Table: Region 8 Resident Heat-Related Illness Data, 2010-2020).
  - Non-Region 8 Residents: This refers to people who did not live in Region 8 based on the address listed on their medical record but were treated in an ED located in Region 8. These people are included because heat-health safety plans need to consider individuals visiting and working in Region 8. (Refer to Appendix B: Summary Table: Non-Region 8 Resident Heat-Related Illness Data, 2010-2020).

- **Work-related:** This refers to people who were working when they developed heat-related illness. Cases were considered work-related if workers' compensation was the primary payer of the medical bill or the medical record contained a work-related diagnostic code **(Refer to External Causes of Morbidity: Work-relatedness). (Refer to Appendix C: Summary Table: Workers Region 8 Resident Heat-Related Illness Data, 2010-2020).**

- **Diagnosis:** Primary or secondary diagnosis directly indicating heat exposure. Diagnoses include those for heat-related stroke, exhaustion, syncope, cramps, fatigue, and edema **(Refer to Diagnostic codes: Heat-Related Illness).**

- **Time period:** Warm season: April through October, 2010-2020.

CALCULATIONS

Age-adjusted and crude rates were calculated to determine differences by year, sex, age, and race. Region 8 population estimates were obtained from the U.S. Census 2020 Population estimates. Worker population estimates were extrapolated and calculated using Census population estimates and American Community Survey data. Region 8 resident rates were adjusted to the U.S. 2000 standard population, while only crude rates were calculated for workers due to population estimates availability. Age-adjustment removes the influence of differing age distributions among groups, allowing for a more accurate comparison of rates.

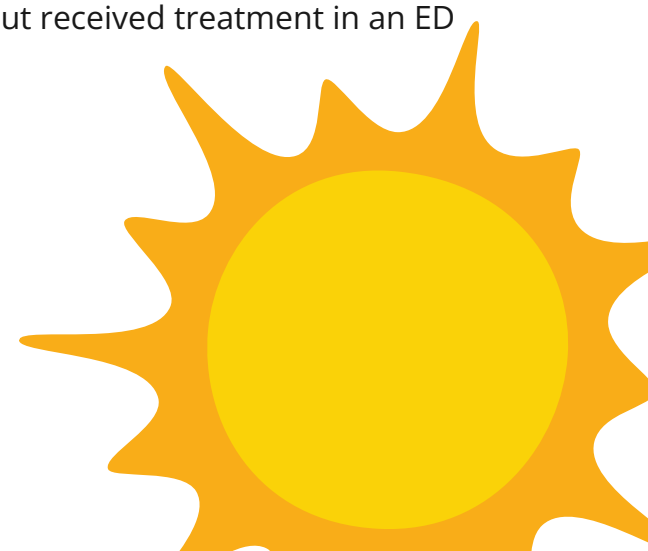
Non-Region 8 residents were included in counts by year, month, and day of the week but were excluded from age, sex, and race because the population estimates for these calculations only includes Region 8 residents.

LIMITATIONS

This report only includes information about individuals who had a diagnosis of heat-related illness listed on their medical record. This approach does not reflect the total burden of heat. Heat-related illness is underdiagnosed and underreported, and ascertainment can vary by time and place. In addition, heat can exacerbate chronic conditions, contribute to injuries such as a fall or trip, and have other indirect health impacts.

This report underestimates work-related cases. Many workers do not have workers' compensation insurance, they have workers' compensation but don't use it, or the healthcare provider doesn't record the case as work-related on the medical record.

This report may underestimate non-Region 8 residents who developed heat-related illness when they were visiting or working in Region 8, but received treatment in an ED not located in Region 8.

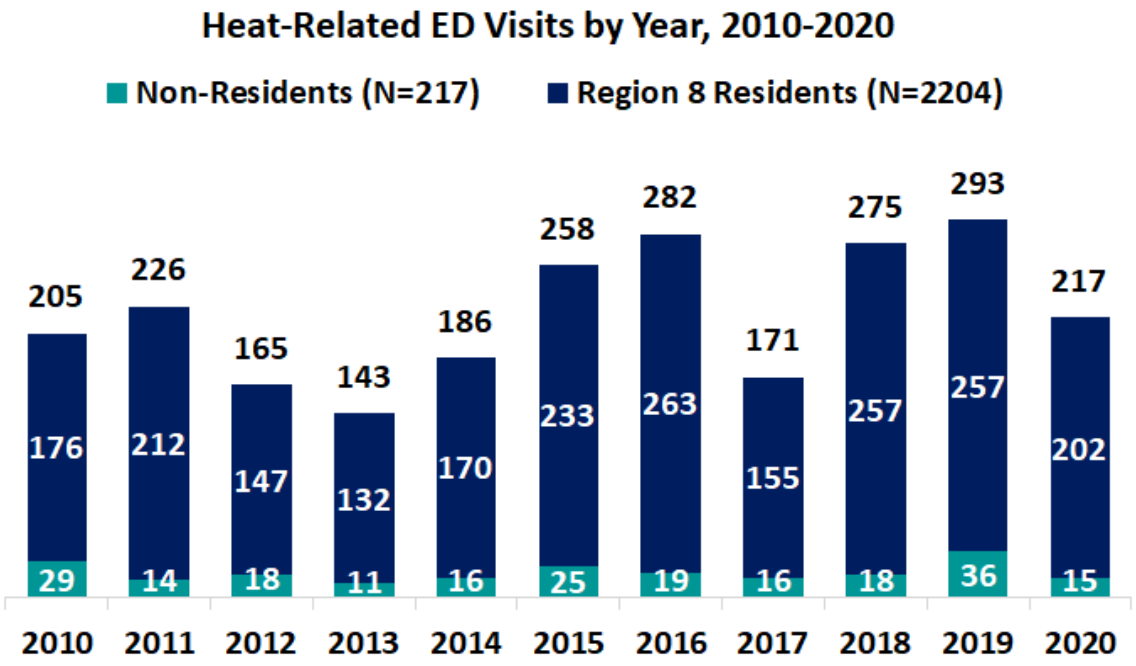


RESULTS

ANNUAL COUNTS & RATES: ALL CASES

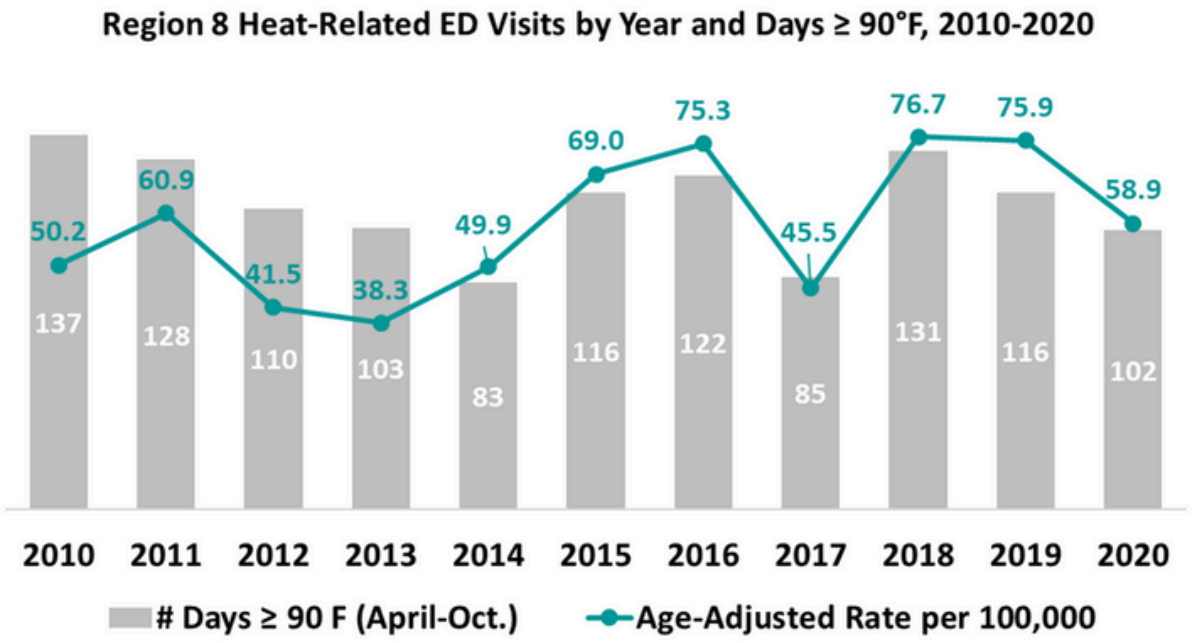
From 2010 to 2020, there were 2,421 ED visits for heat-related illness in Region 8. This includes 2,204 Region 8 residents and 217 non-Region 8 residents.

On average, there were 220 ED visits for heat-related illness every year. Most of these ED visits were for Region 8 residents (91%). There were approximately 20 ED visits every year for non-Region 8 residents (9%).



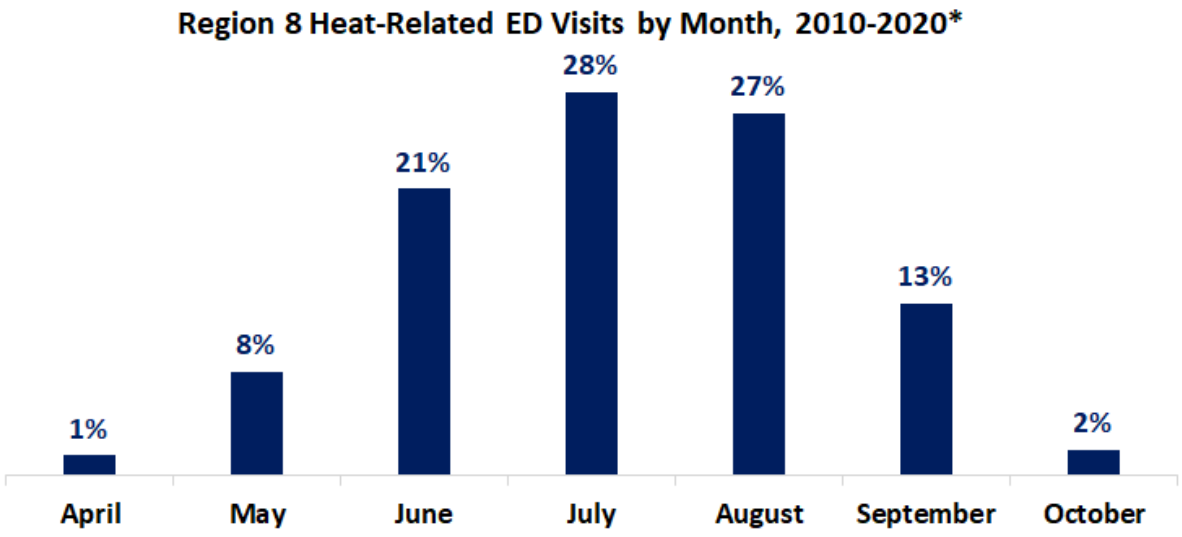
TEMPERATURE

Annual fluctuations in heat-related ED visits generally corresponded to variations in the number of hot days. The graph below shows the annual number of days greater than or equal to 90°F, from April through October, and the age-adjusted rate of heat-related ED visits for Region 8 residents. Temperature data comes from the National Weather Service stations located in Monroe and Tallulah.



MONTH

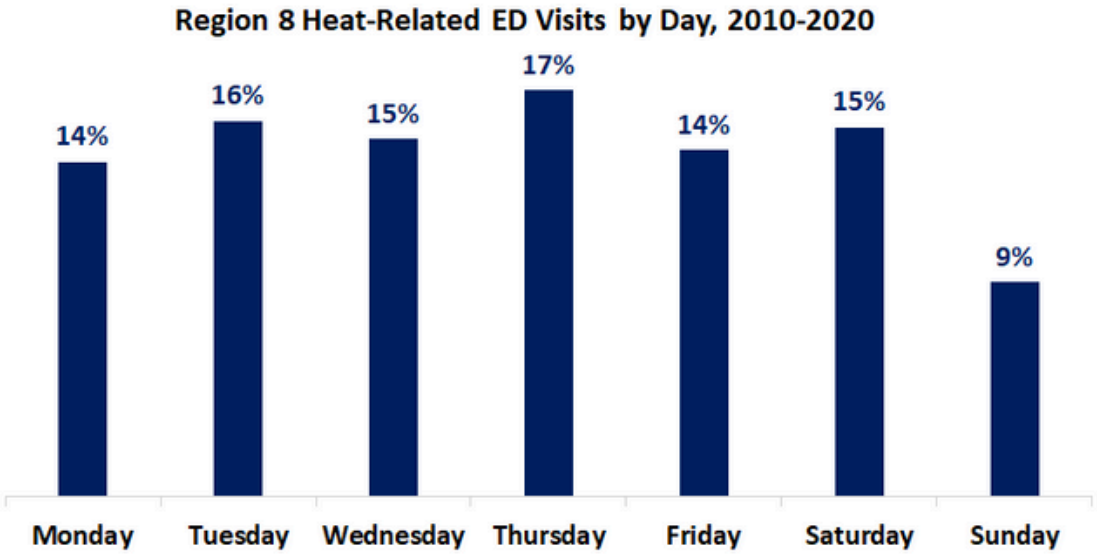
Although most cases occurred during the summer months, warm spring and fall temperatures contributed to over one-fifth of all ED visits. As the climate warms, more cases will occur in the fall and spring months.



***Note: Residents and non-residents are combined**

DAY

Heat-related ED visits were summarized according to the day of the ED visit. **There was relatively even distribution by day of the week, with the exception of Sunday.**



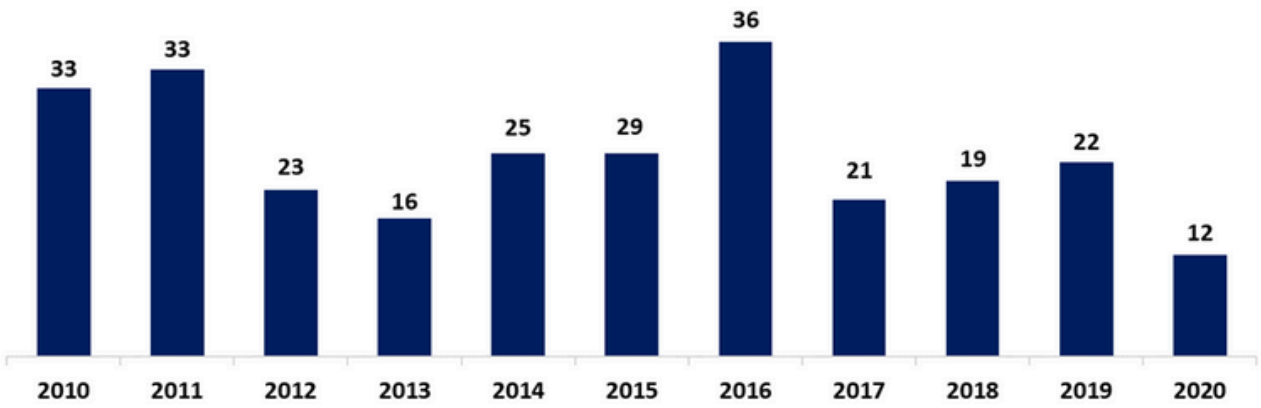
***Note: Residents and non-residents are combined**

ALL COUNTS AND RATES: WORKERS

Heat is a well-recognized occupational hazard and workers are one of the most at risk populations because their exposure and responses are largely controlled by their job requirements and employer. About one-quarter of Louisiana's workforce is at risk of heat exposure due to outdoor and physically demanding work in industries such as agriculture, construction, landscaping, transportation, utilities, and some manufacturing. Indoor workers who work in inadequately climatized settings are also at risk.

There was an annual average of 24 work-related ED visits for heat-related illness. Approximately 11% (n=30) of these visits were for workers who were not Region 8 residents.

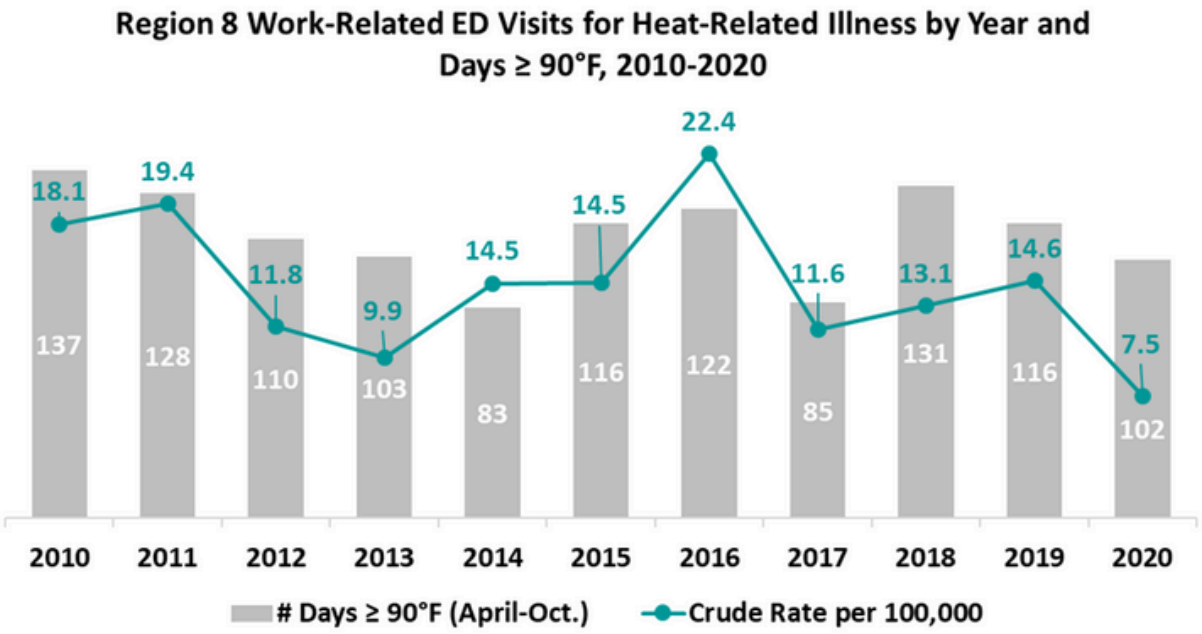
Work-Related ED Visits for Heat-Related Illness by Year, 2010-2020*



***Note: There were 30 non-resident work-related HRI ED visits from 2010-2020.**

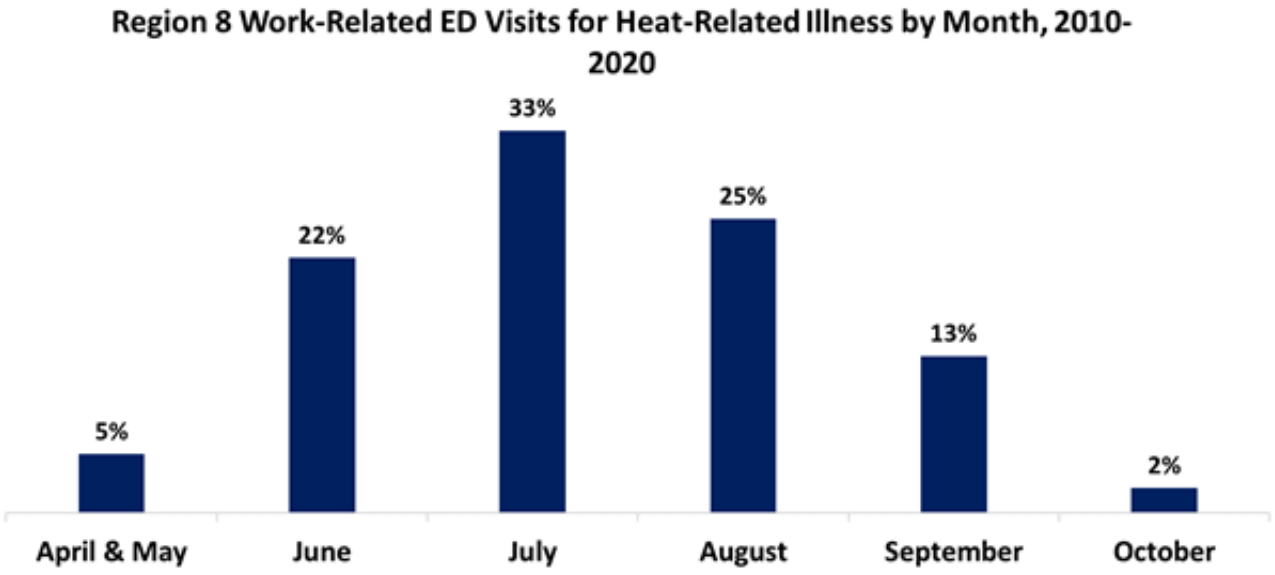
TEMPERATURE

Annual fluctuations in work-related ED visits for heat-related illness generally corresponded to variations in the number of hot days.



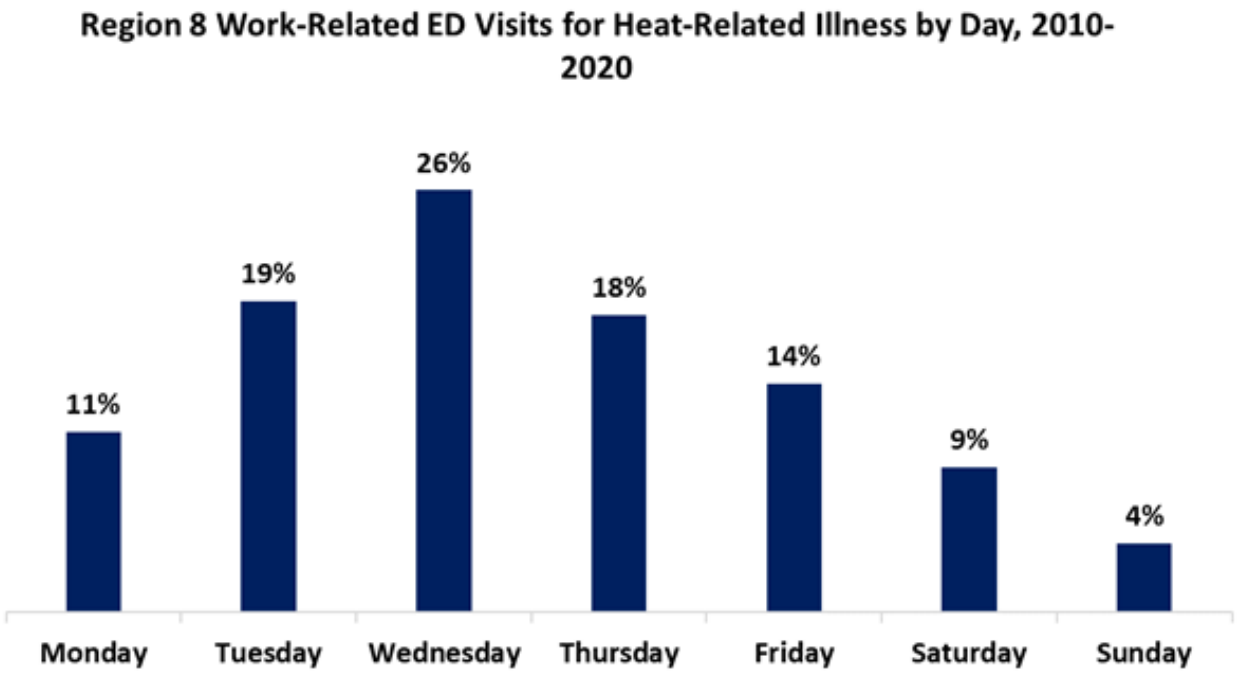
MONTH

Most work-related ED visits for heat-related illness occurred during the summer months with a peak in July at 33%. Spring and fall accounted for 20% of ED visits.



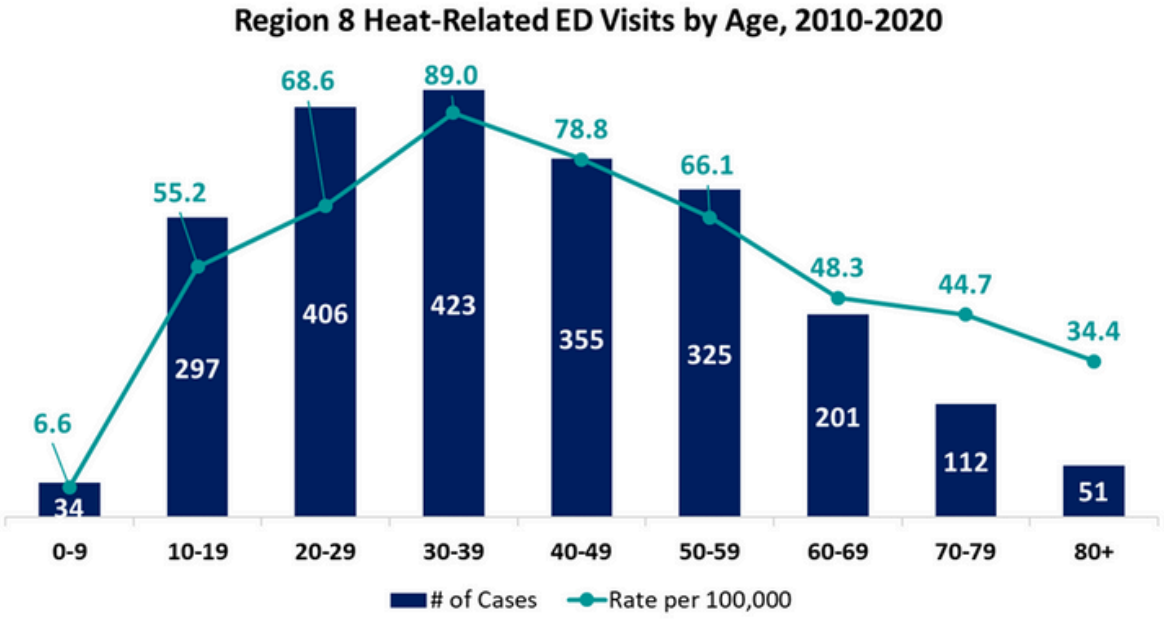
DAY

Wednesday accounted for more than one-quarter of all work-related ED visits. Sunday had the fewest cases accounting for 4%.



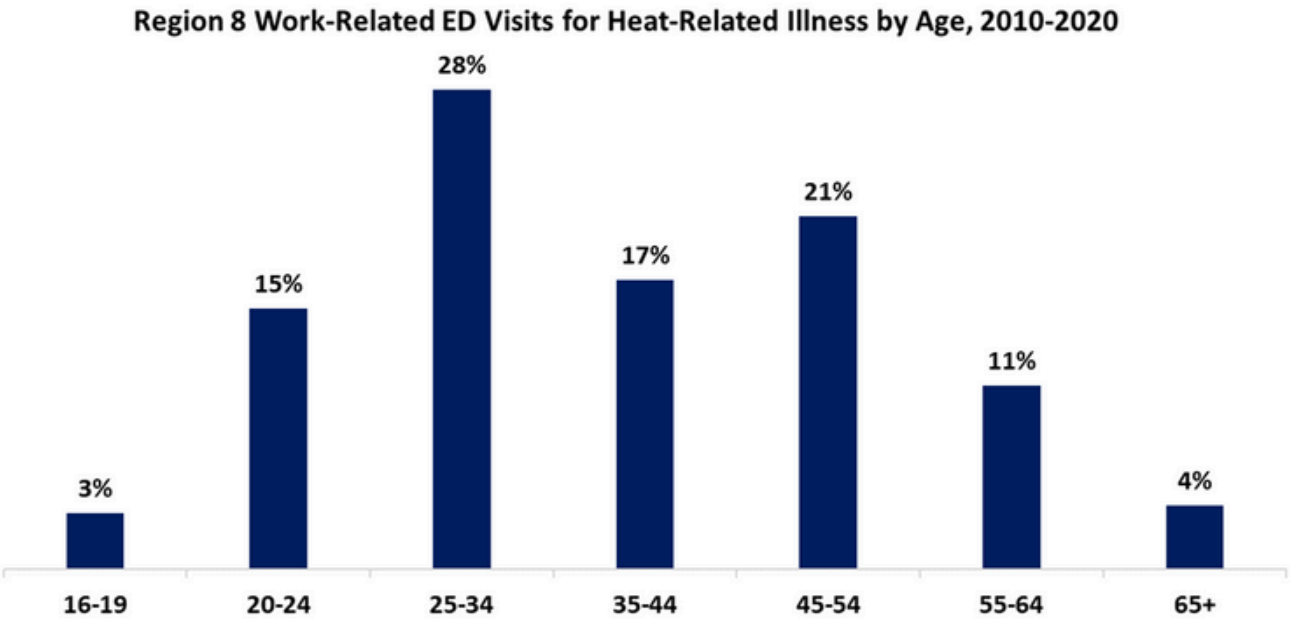
AGE: ALL CASES

Individuals 30 to 39 years old had the highest age-adjusted rate, followed by the 40 to 49 age group. The smallest number and rate were for children under 10 years of age.



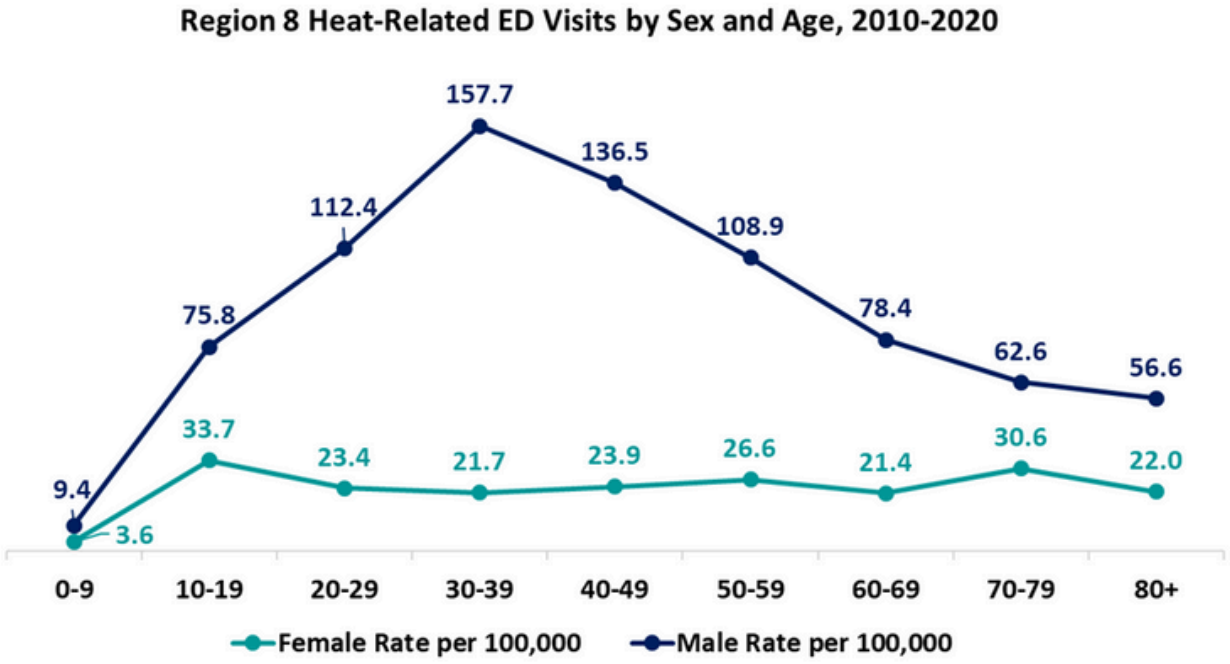
AGE: WORKERS

Workers ages 25 to 34 had the most ED visits at 28% followed by ages 45 to 54 at 21%.



SEX: ALL CASES

Males made up 79% of all ED cases for heat-related illness and had a higher rate than females for every age group. The average annual rate for males was 4.2 times the female rate: 95.4 cases per 100,000 vs 22.5 cases per 100,000. Males have an increased risk of heat-related illness due to employment in outdoor occupations, activities such as yardwork and house repair including post-storm clean up, and outdoor sports such as football and golf. The difference in rates is less acute for the youngest age group.

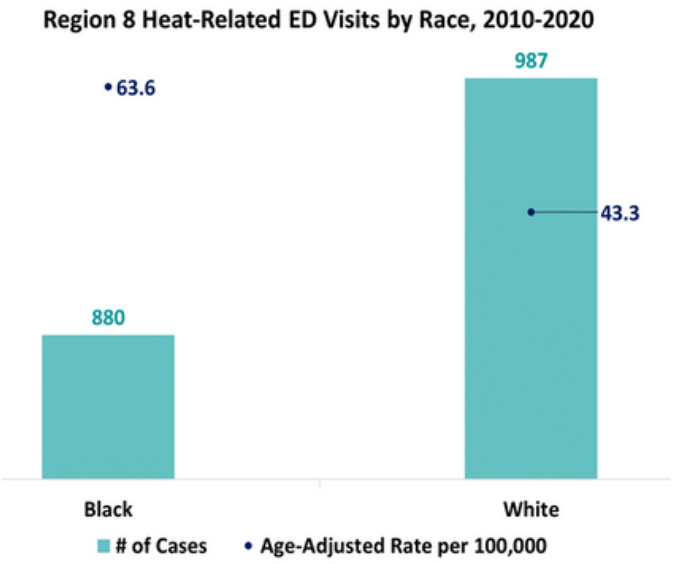


RACE: ALL CASES

Black residents had higher rates of ED visits for heat-related illness than white residents (63.6 vs 43.3). Other races are not shown due to low numbers.

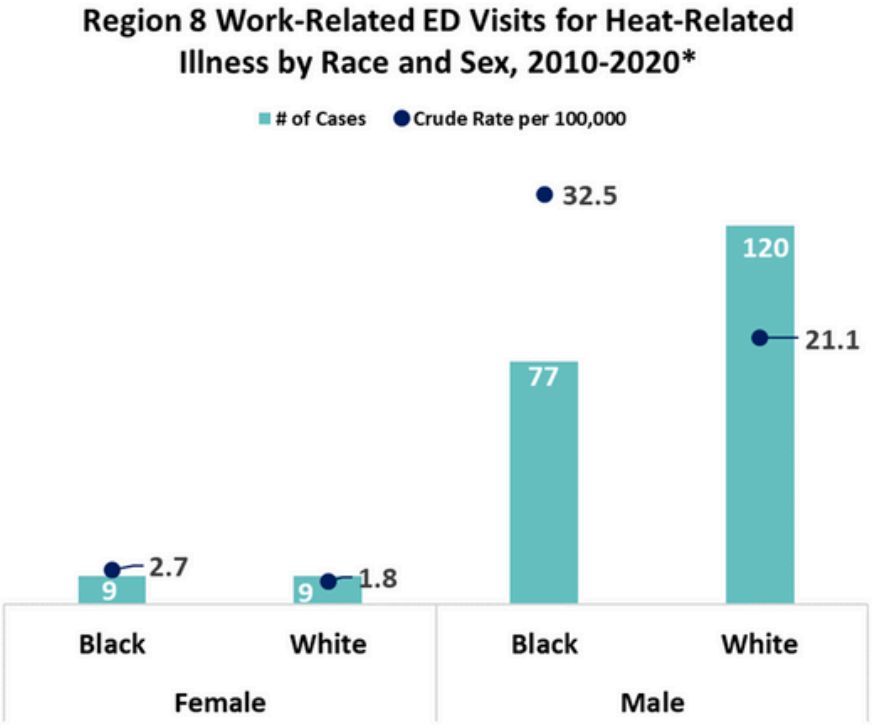
Racial inequities in heat illness, and other health outcomes, are influenced by social determinants of health including income and housing.

Communities that experienced historical redlining experience hotter temperatures than neighboring areas due to factors like proximity to large roadways and industry and lack of tree cover. Neighborhoods with less trees have more sun exposure, resulting in hotter temperatures.



RACE BY SEX: WORKERS

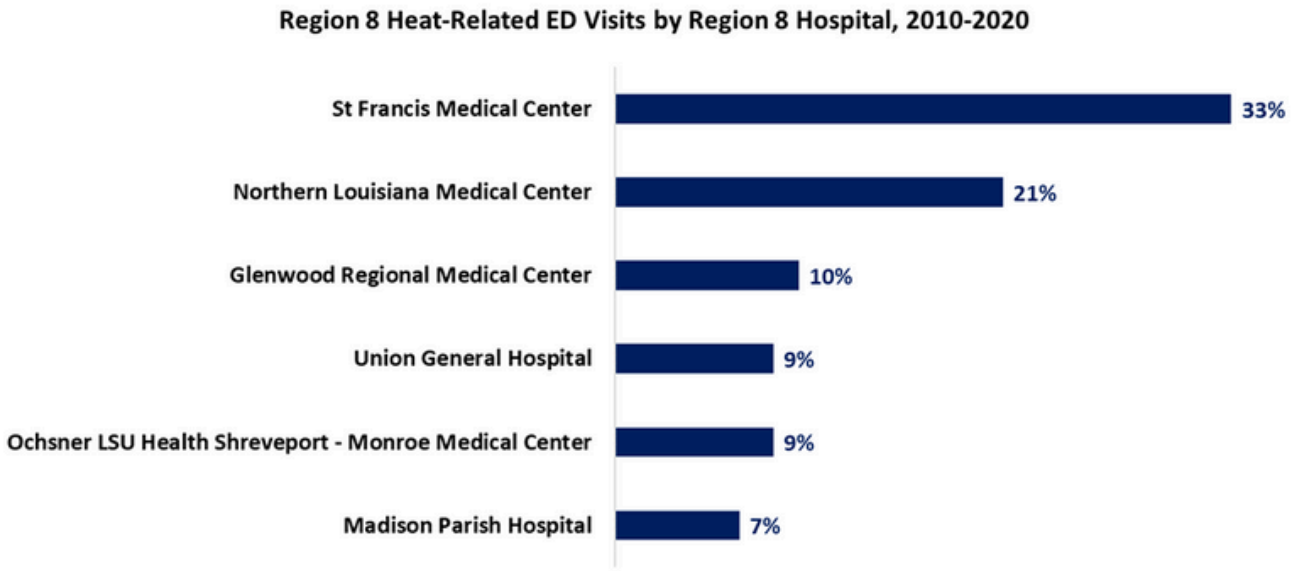
Workers were analyzed by sex and race to identify high risk subgroups. **Black male and Black female workers had higher rates than their white counterparts.**



***Female rates by race are unreliable due to small numbers of HRI ED visits.**

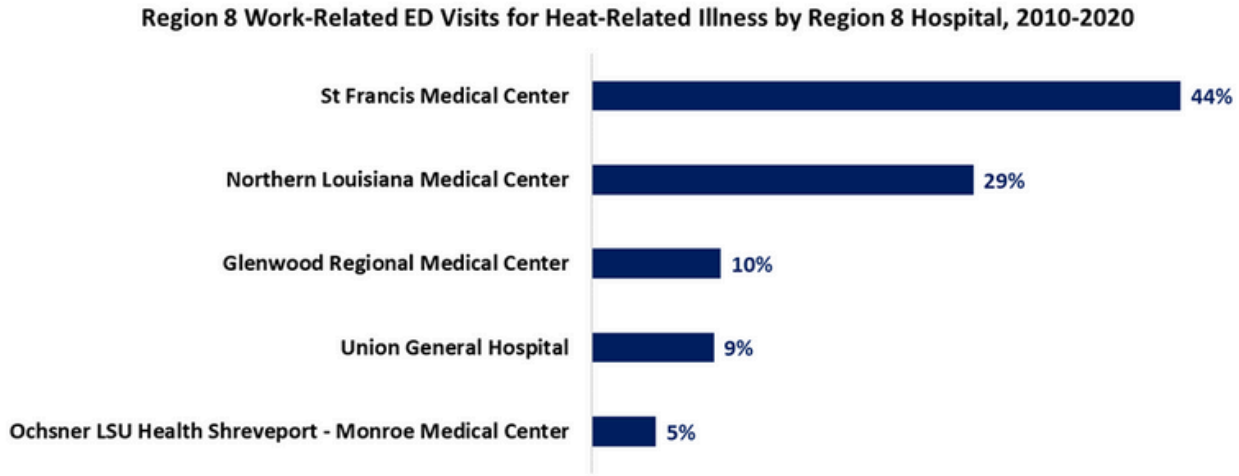
HOSPITAL: ALL CASES

The figure shows hospitals in Region 8 that had 5% or more ED visits for heat-related illness. **St. Francis Medical Center had the greatest percent of ED visits at 33% followed by Northern Louisiana Medical Center at 21%.**



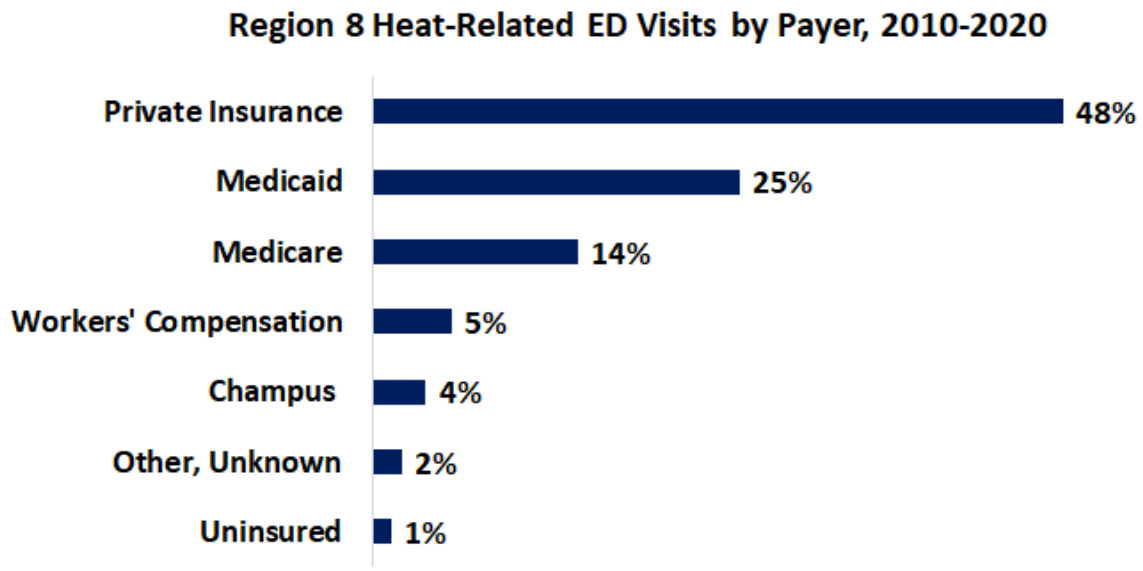
HOSPITAL: WORKERS

The figure shows hospitals in Region 8 that had 5% or more work-related HRI ED visits. **St. Francis Medical Center had the most visits at 44%.**



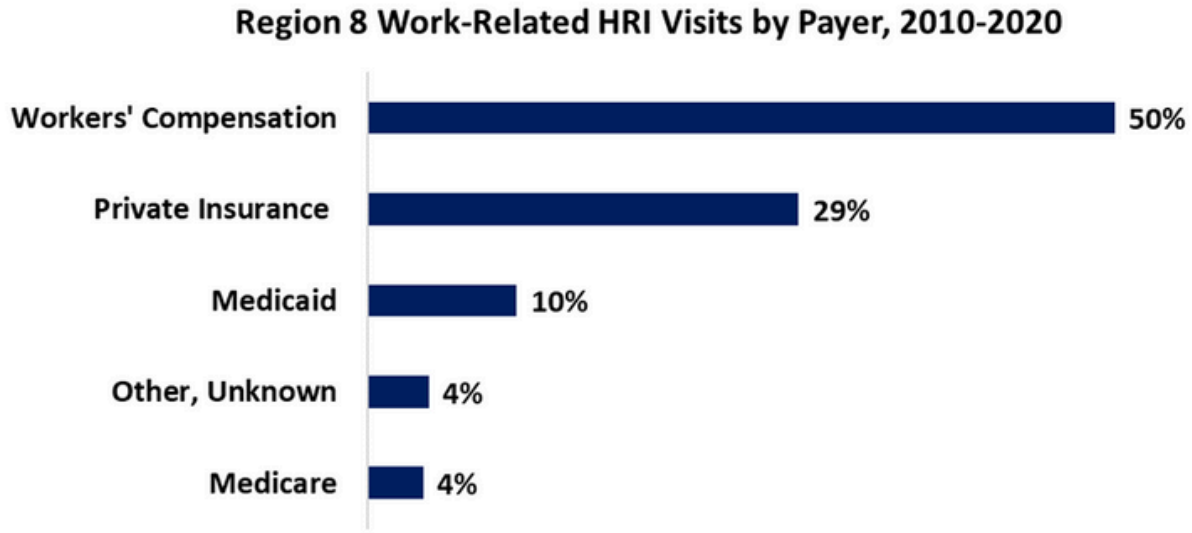
PAYER: ALL CASES

Payer reflects the source of payment for the ED visit. **Private insurance was the most common payment source, followed by Medicaid and Medicare.**



PAYER: WORKERS

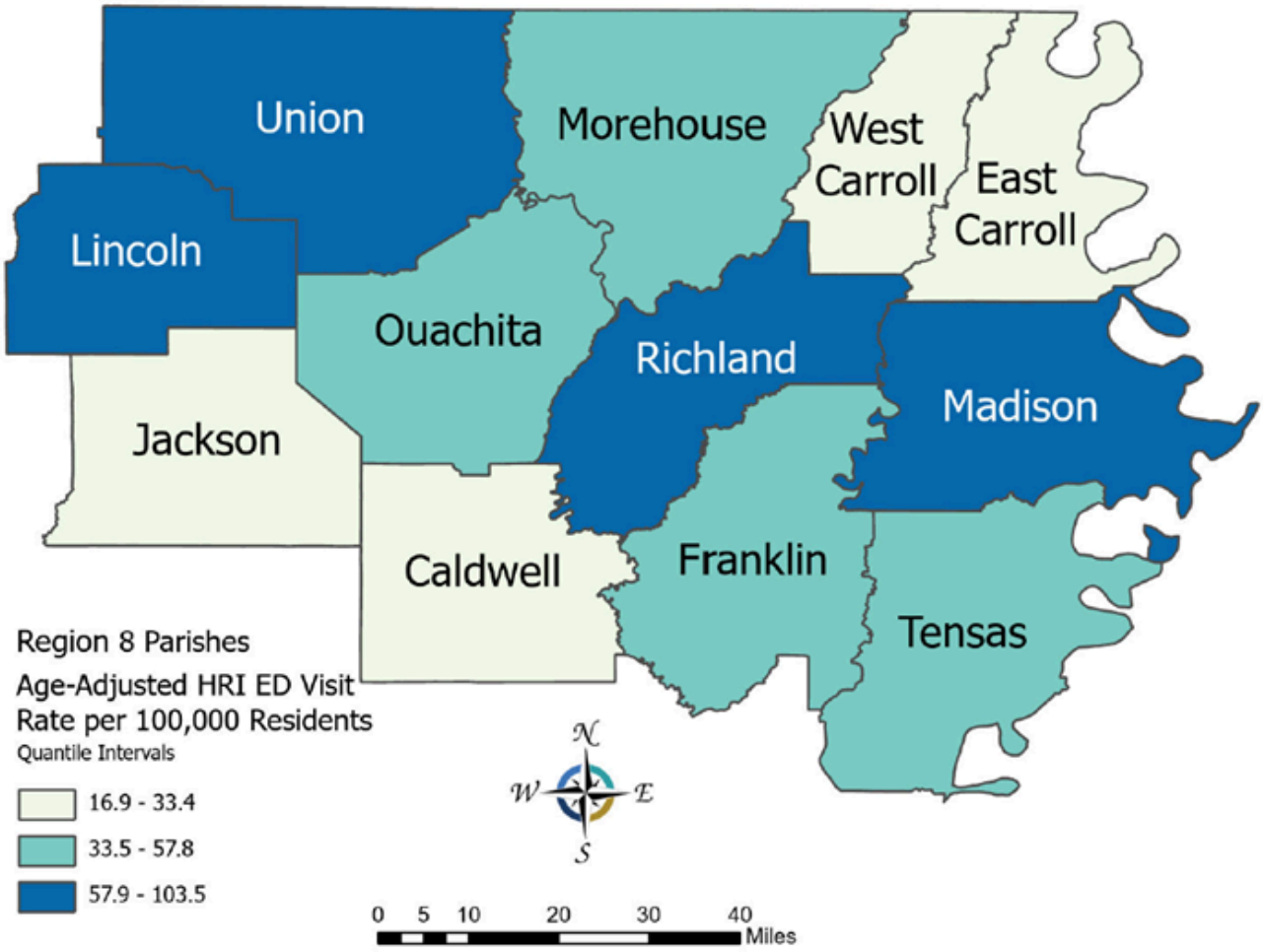
Among workers, workers' compensation was the most common payment source accounting for 50%. Private insurance was the second most common at 29%.



***The figure does not show all payment sources due to suppression.**

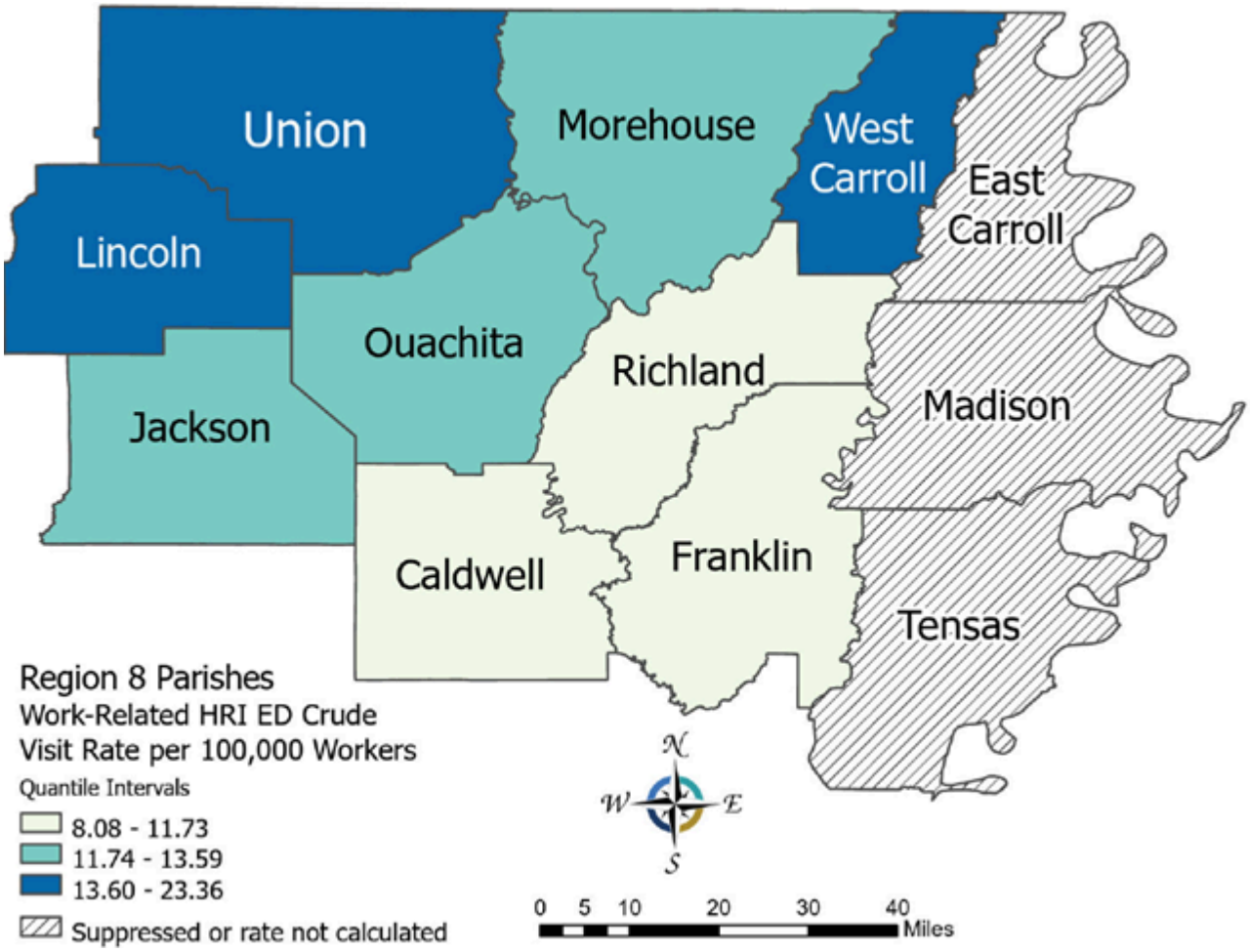
LOCATION: ALL CASES

Rates of ED visit for heat-related illness were mapped based on the patient's parish of residence. Rates are age-adjusted. **Union, Lincoln, Richland, and Madison parishes had the highest rates.**



LOCATION: WORKERS

Rates of work-related ED visits for heat-related illness were mapped based on the worker's parish of residence. **Lincoln, Union, and West Carroll had the highest crude rates for heat-related illness.**



APPENDICES

APPENDIX A: SUMMARY TABLE: REGION 8 RESIDENT HEAT-RELATED ILLNESS DATA, 2010-2020

Characteristic	Number	Percent
Overall	**2204**	**100.0%**
Age		
0-9	34	1.5%
10-19	297	13.5%
20-29	406	18.4%
30-39	423	19.2%
40-49	355	16.1%
50-59	325	14.7%
60-69	201	9.1%
70-79	112	5.1%
80+	51	2.3%
Sex		
Female	452	20.5%
Male	1752	79.5%
Race		
Black	880	39.9%
White	987	44.8%
Other	30	1.4%
Unknown	307	13.9%

Work Status		
Worker	239	10.8%
Non-Worker	1965	89.2%
Month		
April	31	1.4%
May	169	7.7%
June	472	21.4%
July	633	28.7%
August	589	26.7%
September	268	12.2%
October	42	1.9%
Day		
Monday	310	14.1%
Tuesday	347	15.7%
Wednesday	330	15.0%
Thursday	379	17.2%
Friday	323	14.7%
Saturday	316	14.3%
Sunday	199	9.0%

Region 8 Hospitals (N=2035)		
Franklin Medical Center	39	1.9%
Glenwood Regional Medical Center	201	9.9%
Jackson Parish Hospital	15	0.7%
Madison Parish Hospital	136	6.7%
Morehouse General Hospital	65	3.2%
Northern Louisiana Medical Center	424	20.8%
Oschner LSU Health Shreveport - Monroe Medical Center	173	8.5%
Richardson Medical Center	59	2.9%
Richland Parish Hospital	76	3.7%
St. Francis Medical Center	674	33.1%
Union General Hospital	173	8.5%

Payer		
Champus	80	3.6%
Medicaid	560	25.4%
Medicare	314	14.2%
Other/Unknown	43	2.0%
Private	1060	48.1%
Uninsured	27	1.2%
Worker's Compensation	120	5.4%
Parish		
Caldwell	35	1.6%
East Carroll	14	0.6%
Franklin	72	3.3%
Jackson	58	2.6%
Lincoln	399	18.8%
Madison	133	6.0%
Morehouse	125	5.7%
Ouachita	961	43.6%
Richland	139	6.3%
Tensas	16	0.7%
Union	229	10.4%
West Caroll	23	1.0%

APPENDIX B: SUMMARY TABLE: NON-REGION 8 RESIDENT HEAT-RELATED ILLNESS DATA, 2010-2020

Characteristic	Number	Percent
Overall	**217**	**100.0%**
Age		
0-19	42	19.4%
20-29	50	23.0%
30-39	44	20.3%
40-49	28	12.9%
50-59	29	13.4%
60-69	15	6.9%
70+	9	4.1%
Sex		
Female	45	20.7%
Male	172	79.3%
Race		
Black	61	28.1%
White	92	42.4%
Other	6	2.8%
Unknown	58	26.7%
Work Status		
Worker	30	13.8%
Non-Worker	187	86.2%

Month		
April	*	*
May	17	7.8%
June	41	18.9%
July	53	24.4%
August	59	27.2%
September	40	18.4%
October	*	*
Day		
Monday	27	12.4%
Tuesday	31	14.3%
Wednesday	30	13.8%
Thursday	30	13.8%
Friday	26	12.0%
Saturday	56	25.8%
Sunday	17	7.8%

Region 8 Hospitals		
Franklin Medical Center	6	2.8%
Glenwood Regional Medical Center	18	8.3%
Jackson Parish Hospital	*	*
Madison Parish Hospital	14	6.5%
Morehouse General Hospital	*	*
Northern Louisiana Medical Center	102	47.0%
Oschner LSU Health Shreveport - Monroe Medical Center	6	2.8%
Richardson Medical Center	*	*
Richland Parish Hospital	*	*
St. Francis Medical Center	45	20.7%
Union General Hospital	15	6.9%

Payer		
Champus	26	12.0%
Medicaid	33	15.2%
Medicare	18	8.3%
Other/Unknown	5	2.3%
Private	118	54.4%
Uninsured	0	0%
Workers' Compensation	17	7.8%
State of Residence		
Arkansas	16	7.4%
Florida	5	2.3%
Georgia	5	2.3%
Louisiana (excluding Region 8)	103	47.5%
Mississippi	21	9.7%
Oklahoma	5	2.3%
Tennessee	5	2.3%
Texas	31	14.3%
Other States/Missing	26	12.0%

APPENDIX C: SUMMARY TABLE: WORKERS REGION 8 RESIDENT HEAT-RELATED ILLNESS DATA, 2010-2020

Characteristic	Number	Percent
Overall	**239**	**100.0%**
Age		
16-19	8	3.3%
20-24	37	15.5%
25-34	68	28.5%
35-44	41	17.2%
45-54	50	20.9%
55-64	26	10.9%
65+	9	3.8%
Sex		
Female	24	10.0%
Male	215	90.0%
Race		
Black	86	36.0%
White	129	54.0%
Other/Unknown	24	10.0%

Month		
April & May	12	5.0%
June	52	21.8%
July	78	32.6%
August	60	25.1%
September	32	13.4%
October	5	2.1%
Day		
Monday	26	10.9%
Tuesday	45	18.8%
Wednesday	61	25.5%
Thursday	43	18.0%
Friday	33	13.8%
Saturday	21	8.8%
Sunday	10	4.2%

Region 8 Hospitals (N=206)		
Glenwood Regional Medical Center	20	9.7%
Madison Parish Hospital	*	*
Morehouse General Hospital	*	*
Northern Louisiana Medical Center	59	28.6%
Oschner LSU Health Shreveport - Monroe Medical Center	10	4.9%
Richland Parish Hospital	*	*
St. Francis Medical Center	91	44.2%
Union General Hospital	19	9.2%
Payer		
Champus	*	*
Medicaid	24	10.0%
Medicare	9	3.8%
Other/Unknown	10	4.2%
Private	70	29.3%
Uninsured	*	*
Workers Compensation	120	50.2%

***Counts less than 5 are suppressed to protect patient confidentiality.**