

HEAT- RELATED ILLNESS IN LOUISIANA'S REGION 7:

Review of Emergency Department
Data from 2010–2020

MAY 2024



AUTHORS:

This report was prepared by the Louisiana Department of Health (LDH) Office of Public Health's (OPH) Occupational Heat-Related Illness Prevention Program and Tulane University School of Public Health/Disaster Management Program.

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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 residents and visitors to Louisiana Department of Health (LDH) Office of Public Health (OPH) Region 7 (Northwest Louisiana) from 2010 to 2020 who were treated in the emergency department (ED) with a diagnosis indicating heat exposure. The LDH OPH Region 7 encompasses nine parishes in the Northwest section of the state: Bienville, Bossier, Caddo, Claiborne, DeSoto, Natchitoches, Red River, Sabine, and Webster.

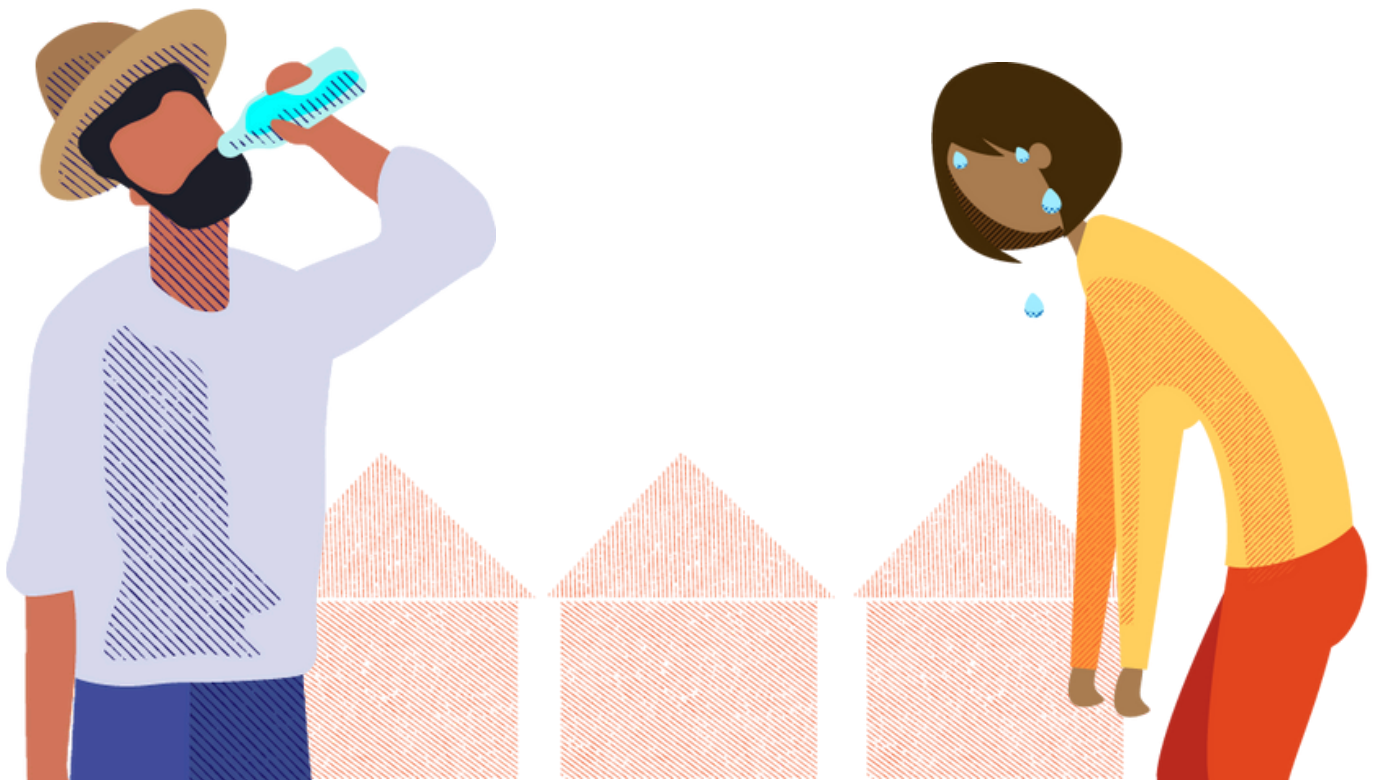
Heat exposure is intensifying as the frequency, severity, and duration of extreme heat events increases due to climate change. These changes are of concern for Region 7 because the area experiences some of the highest average summer temperatures in the nation. Region 7's hot summers are compounded by 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 7 Residents:** This refers to patients who lived in Region 7 based on the address listed on their medical record and were treated in any ED in Louisiana. (Refer to Appendix A: Summary Table: Region 7 Resident Heat-Related Illness Data, 2010-2020).
 - **Non-Region 7 Residents:** This refers to people who did not live in Region 7 based on the address listed on their medical record but were treated in an ED located in Region 7. These people are included because heat-health safety plans need to consider individuals visiting and working in Region 7. (Refer to Appendix A: Summary Table: Region 7 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 7 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 7 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 7 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 7 residents.

Cases who were working when they developed heat-related illness were flagged. Cases were considered work-related if workers' compensation paid the medical bill or the medical record contained a work-related diagnostic code (Refer to [External Causes of Morbidity: Work-relatedness](#)).

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 7 residents who developed heat-related illness when they were visiting or working in Region 7, but received treatment in an ED not located in Region 7.

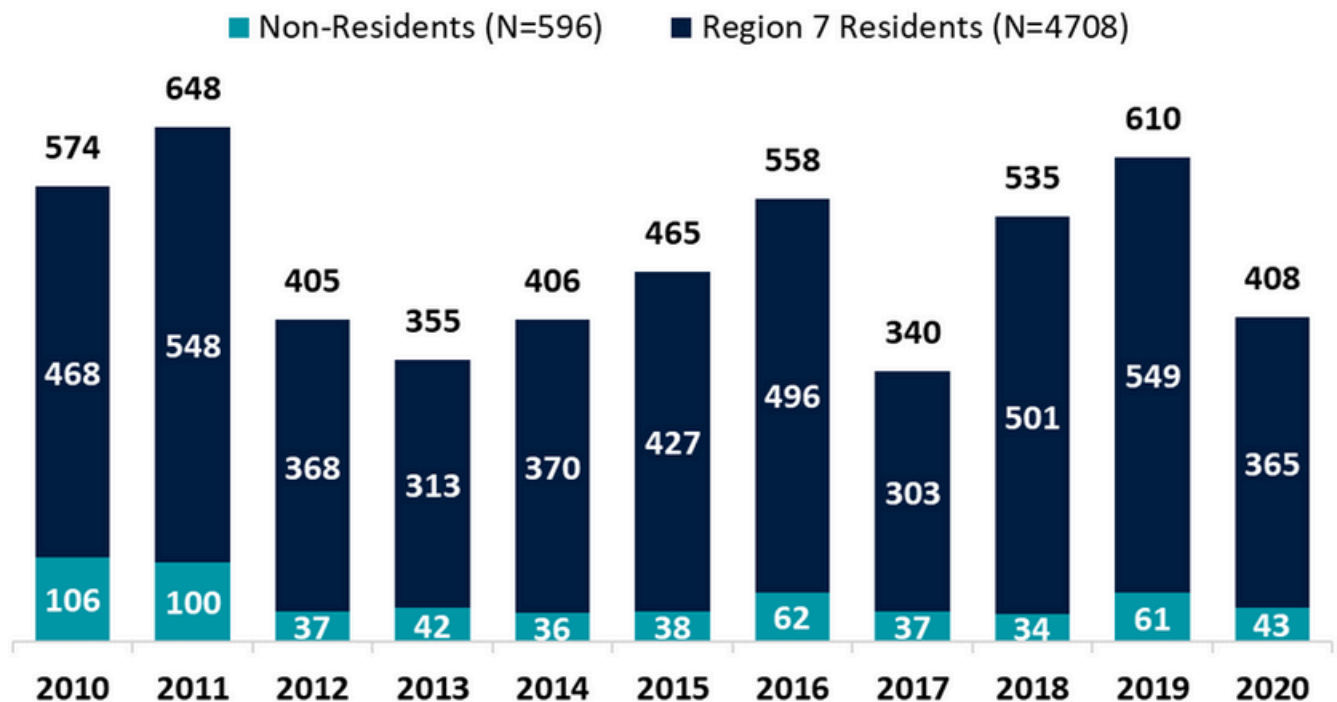
RESULTS

ANNUAL COUNTS & RATES: ALL CASES

From 2010 to 2020, there were 5,304 ED visits for heat-related illness in Region 7. 4,708 Region 7 residents who were treated in any ED, and 596 non-Region 7 residents who were treated in a Region 7 hospital.

On average, there were 482 ED visits for heat-related illness every year. Most of these ED visits were for Region 7 residents (89%). There were approximately 54 ED visits every year for non-Region 7 residents.

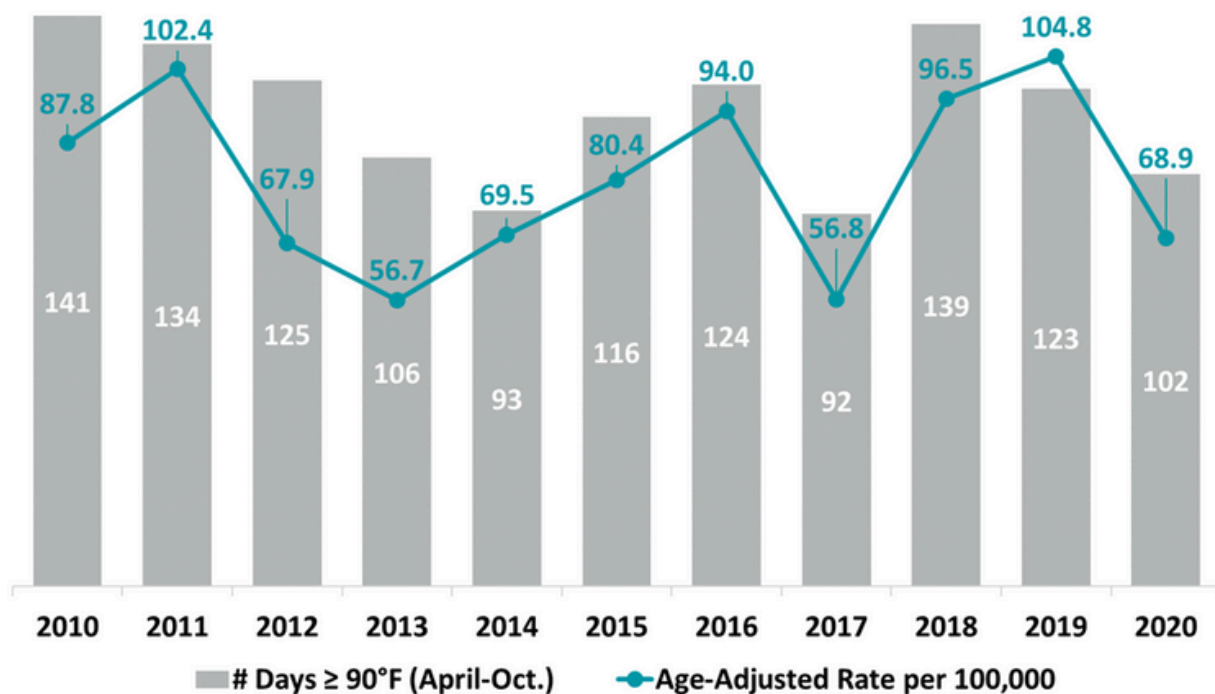
Heat-Related ED Visits by Year, 2010-2020



TEMPERATURE

Annual fluctuations in heat-related ED visits generally corresponded to variations in the numbers 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 7 residents. Temperature data are from the National Weather Service stations located in Shreveport and Natchitoches.

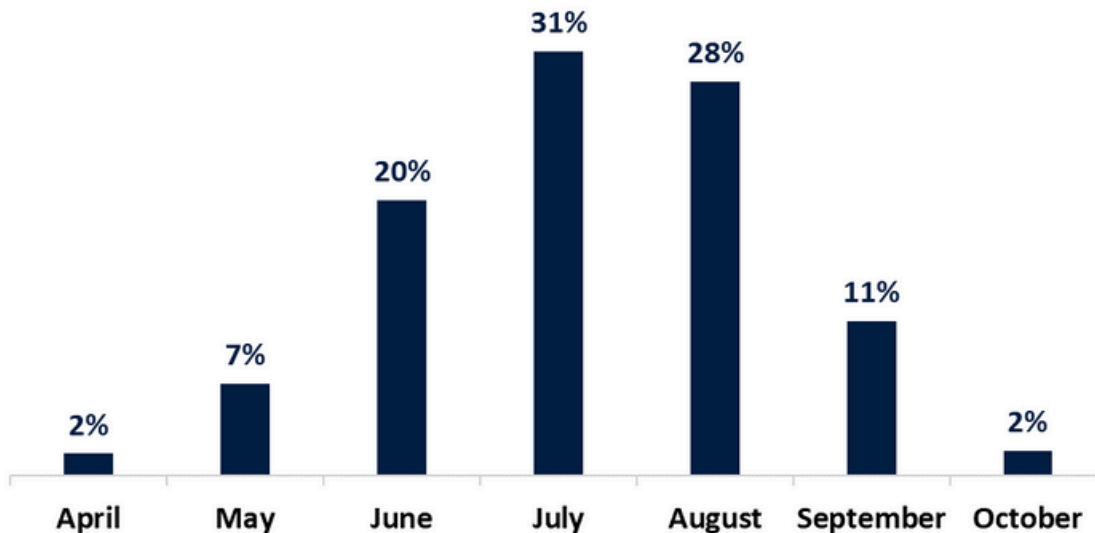
Region 7 Heat-Related ED Visits by Year and Days \geq 90°F, 2010-2020



MONTH

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

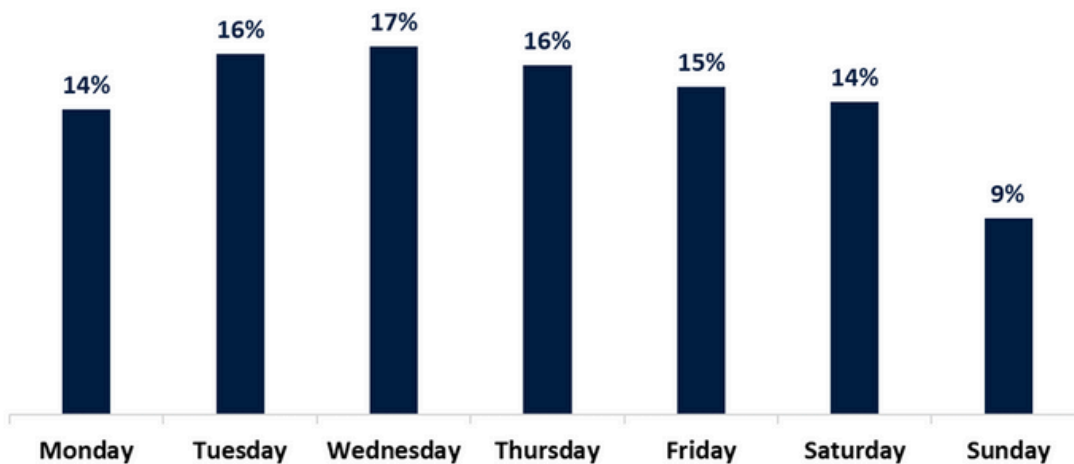
Region 7 Heat-Related ED Visits by Month, 2010-2020



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.**

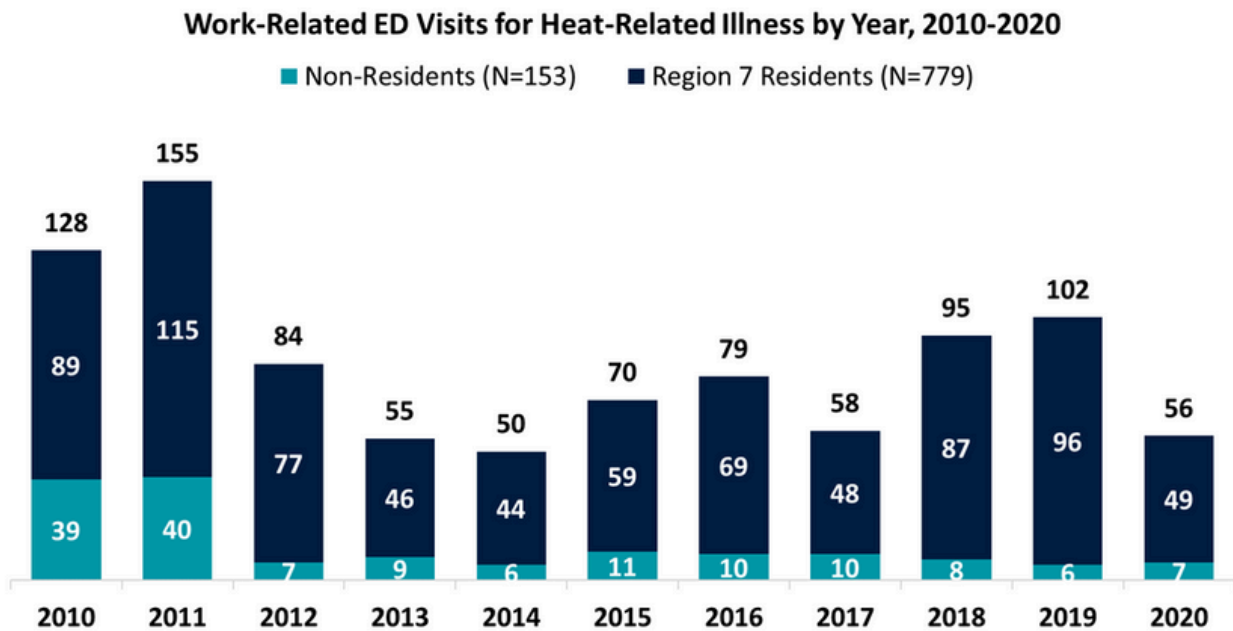
Region 7 Heat-Related ED Visits by Day, 2010-2020



ALL COUNTS AND RATES: WORKERS

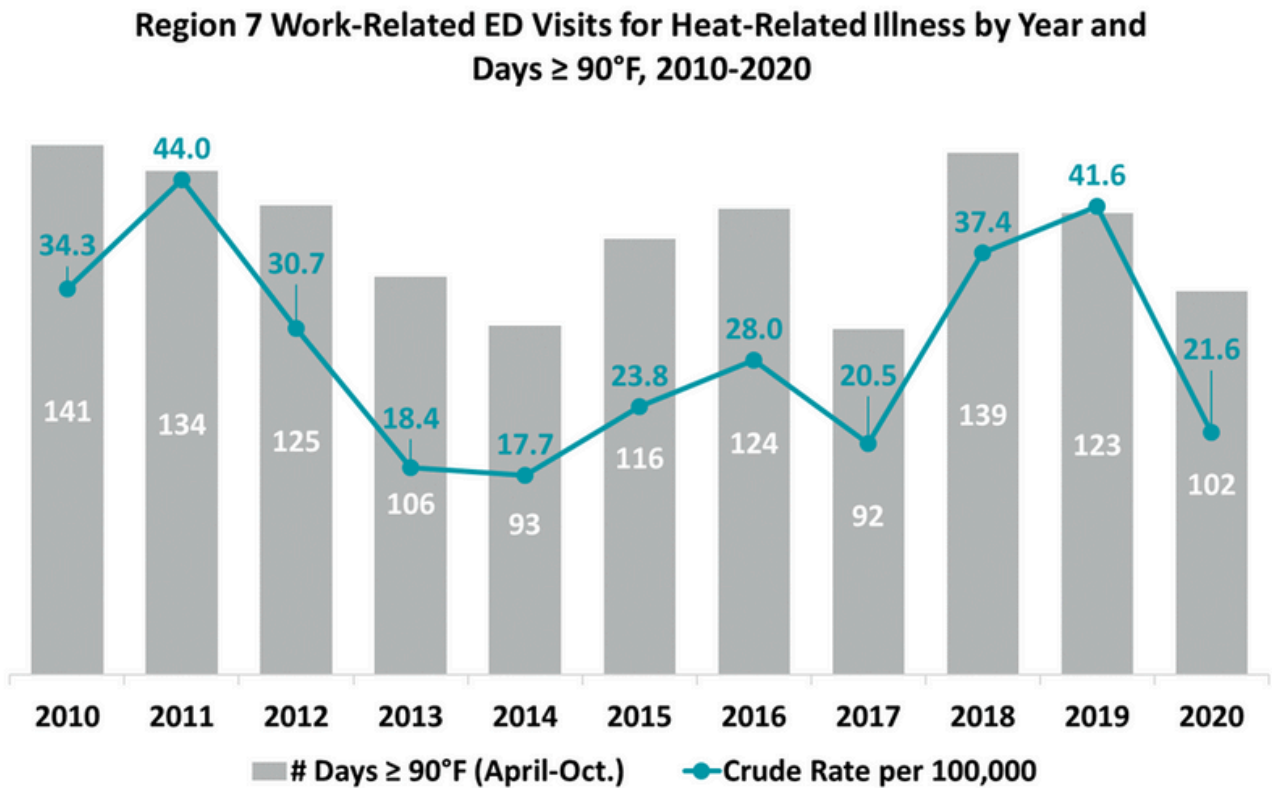
Heat is a well-recognized occupational hazard and workers are one of the most at risk populations because their exposure and responses are largely controlled by their job requirements and employer. About one-quarter of Louisiana's workforce is at risk of heat exposure due to outdoor and physically demanding 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 85 work-related ED visits for heat-related illness. Approximately 16% of these visits were for workers who were not Region 7 residents.



TEMPERATURE

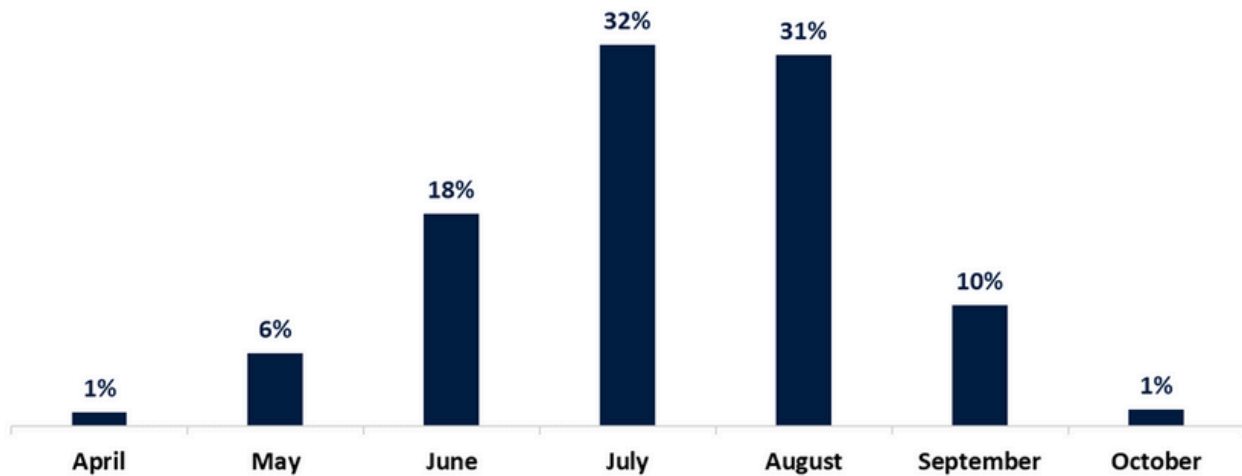
Annual fluctuations in work-related ED visits for heat-related illness generally corresponded to variations in the numbers of hot days.



MONTH

Most work-related ED visits for heat-related illness occurred during the summer months with a peak in July at 32%. Spring and fall accounted for 18% of ED visits.

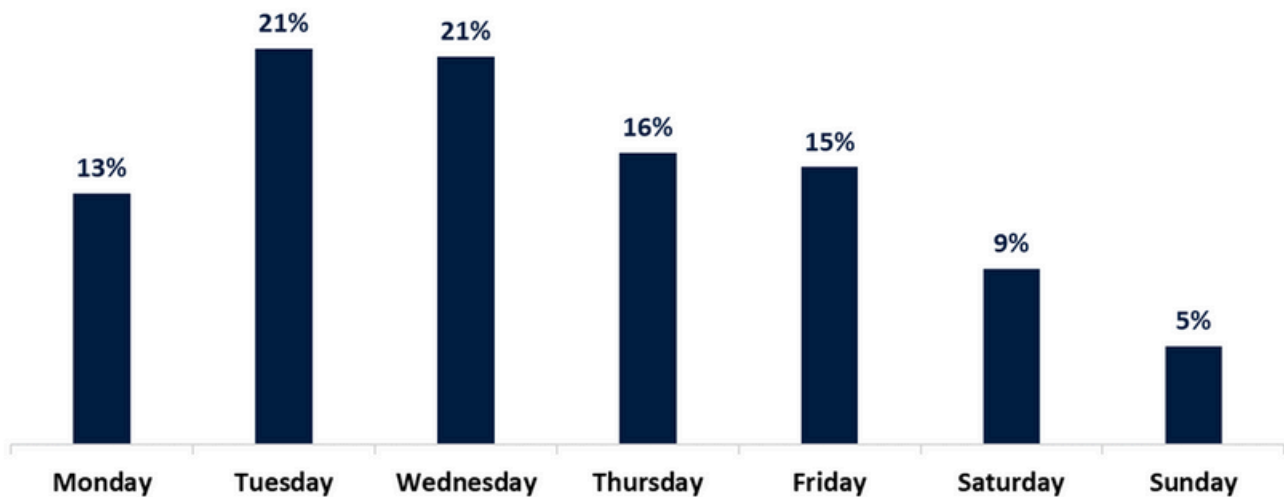
Region 7 Work-Related ED Visits for Heat-Related Illness by Month, 2010-2020



DAY

Tuesday and Wednesday had the highest percentages of work-related ED visits for heat-related illness. Sunday had the fewest cases accounting for 5%.

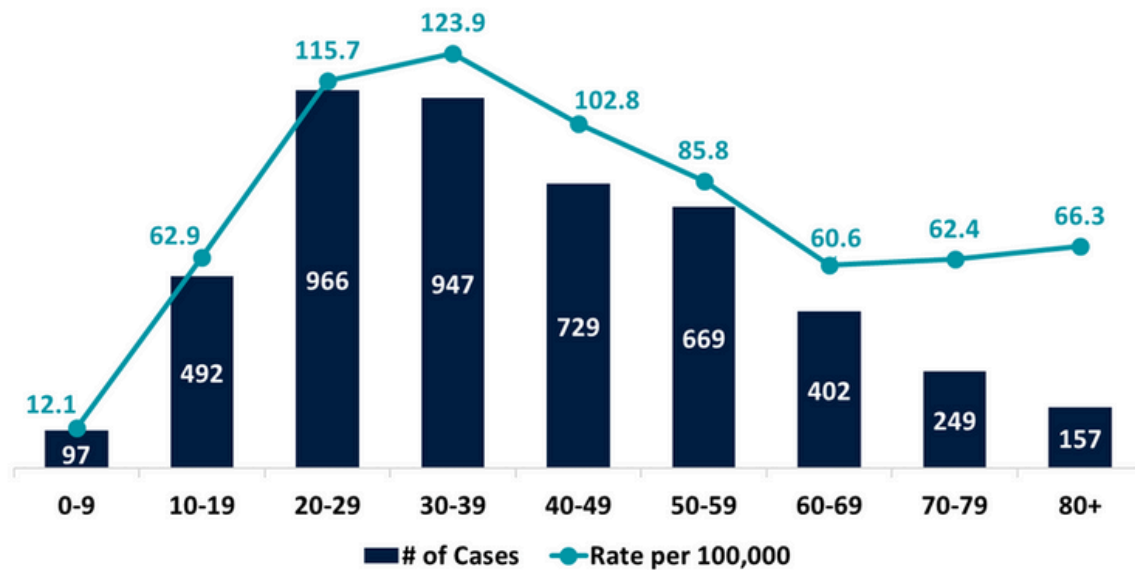
Region 7 Work-Related ED Visits for Heat-Related Illness by Day, 2010-2020



AGE: ALL CASES

Individuals 30 to 39 years old had the highest age-adjusted rate, followed by the 20 to 29 age group. The smallest number and rate were for children under 10 years of age.

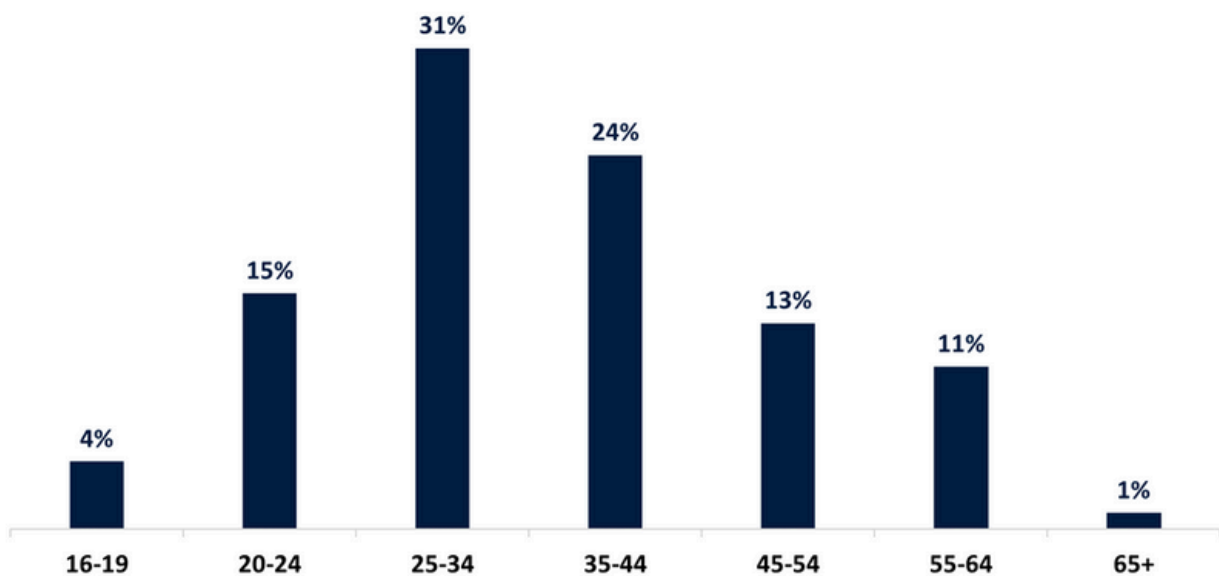
Region 7 Heat-Related ED Visits by Age, 2010-2020



AGE: WORKERS

Workers ages 25 to 34 had the most ED visits at 31% followed by ages 35 to 44 at 24%.

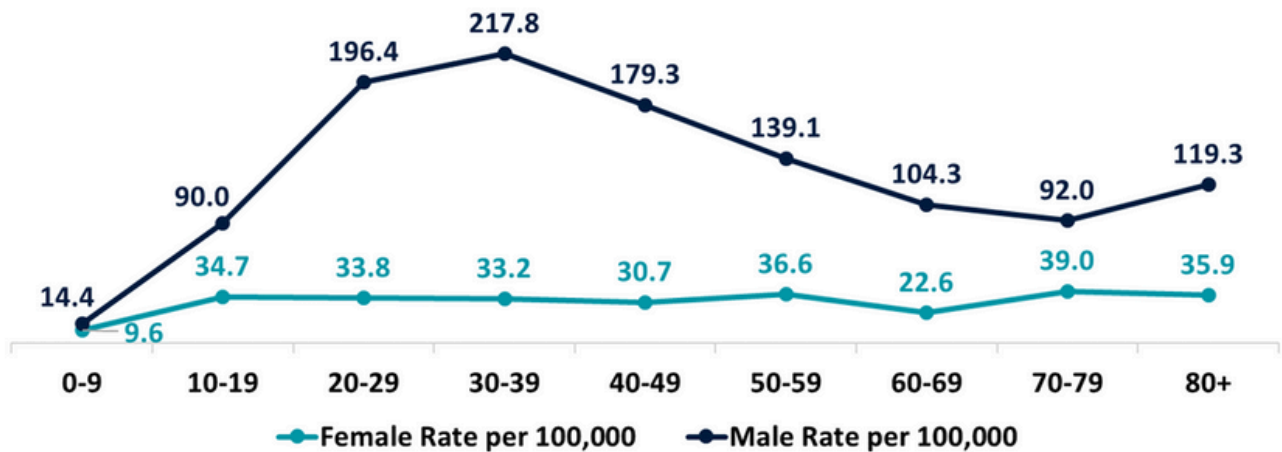
Region 7 Work-Related ED Visits for Heat-Related Illness by Age, 2010-2020



SEX: ALL CASES

Males made up 80% 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 4.5 times the female rate: 134.0 cases per 100,000 vs 29.8 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 sports such as football and golf. The difference in rates is less acute for the youngest age group.

Region 7 Heat-Related ED Visits by Sex and Age, 2010-2020

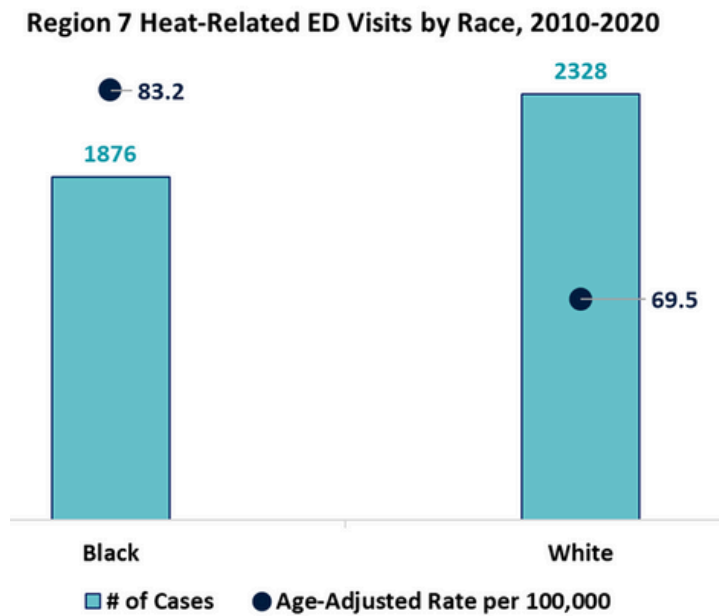


RACE: ALL CASES

Black residents had higher rates of ED visits for heat-related illness than white residents (83.2 vs 69.5). Other races are not shown due to low numbers.

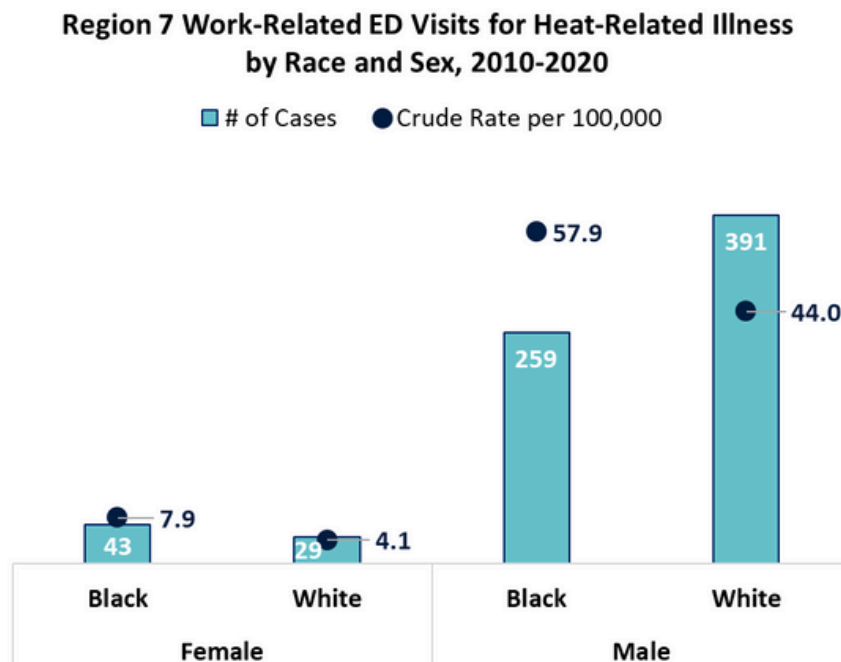
Racial inequities in heat illness, and other health outcomes, are influenced by structural determinants of health including income and housing.

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.



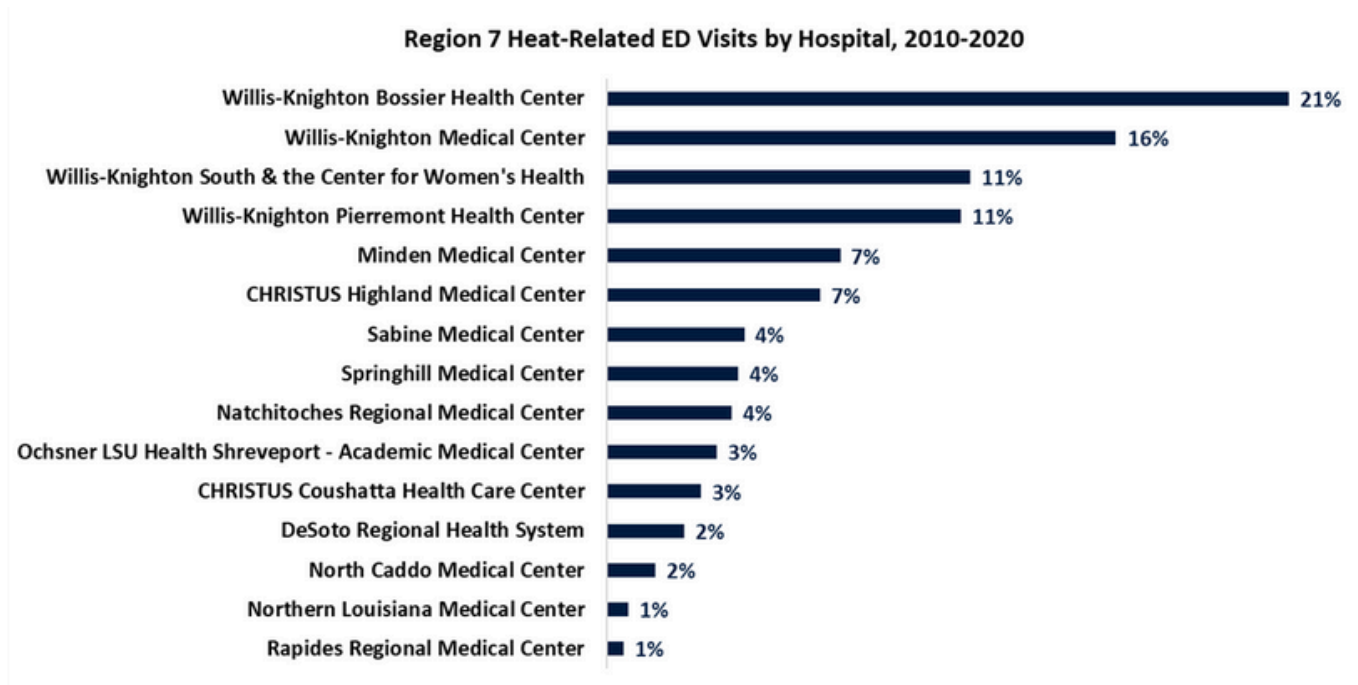
RACE BY SEX: WORKERS

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.**



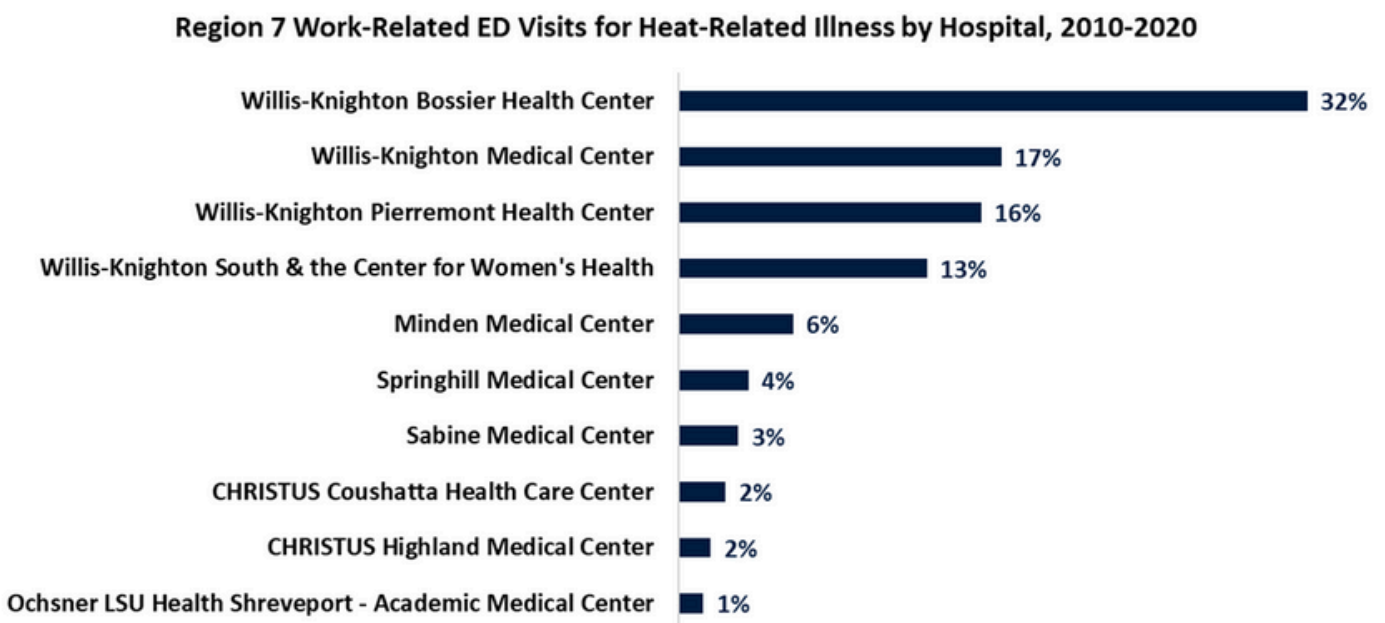
HOSPITAL: ALL CASES

The figure shows hospitals that had 10 or more ED visits for heat-related illness. **Willis-Knighton Bossier Health Center** had the greatest percent of ED visits at **21%** followed by **Willis-Knighton Medical Center** at **16%**.



HOSPITAL: WORKERS

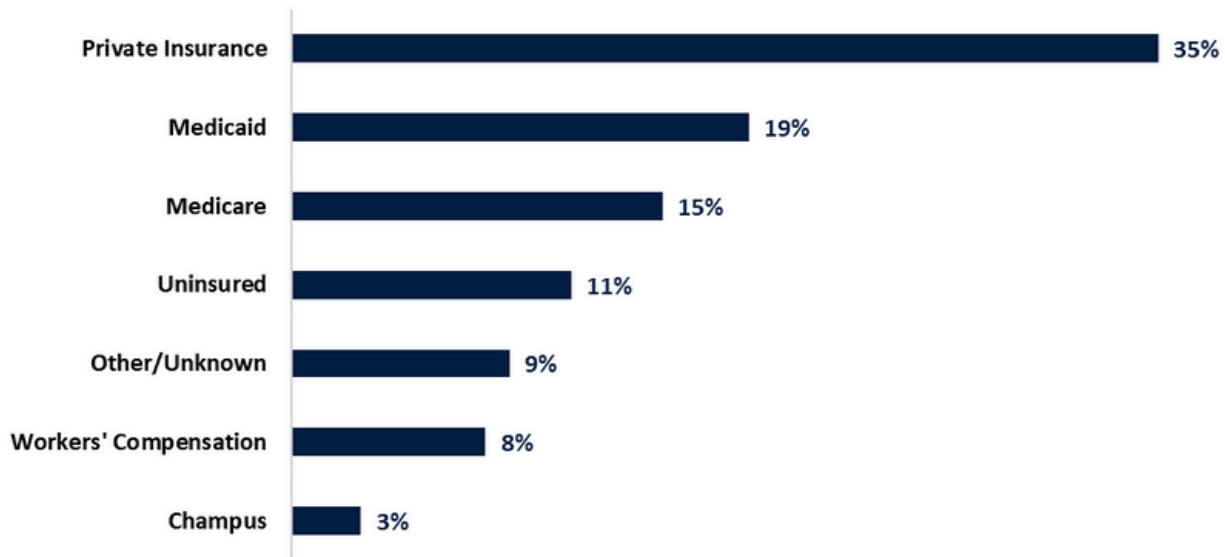
The figure shows hospitals that had 10 or more work-related HRI ED visits. **Willis-Knighton Bossier Health Center** had the most visits at **32%**.



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.**

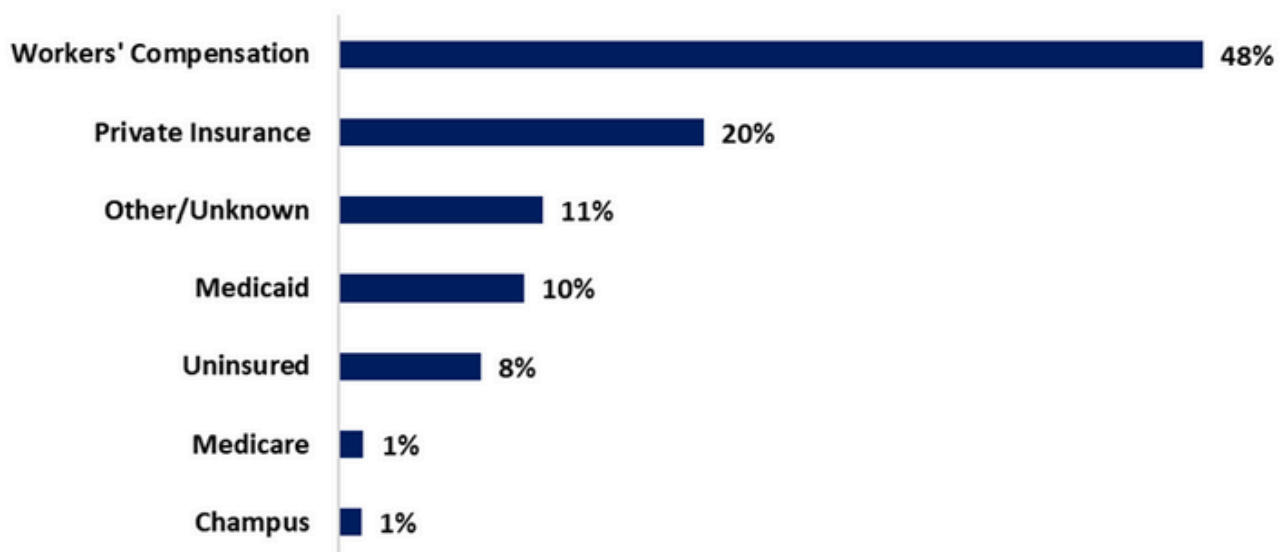
Region 7 Heat-Related ED Visits by Payer, 2010-2020



PAYER: WORKERS

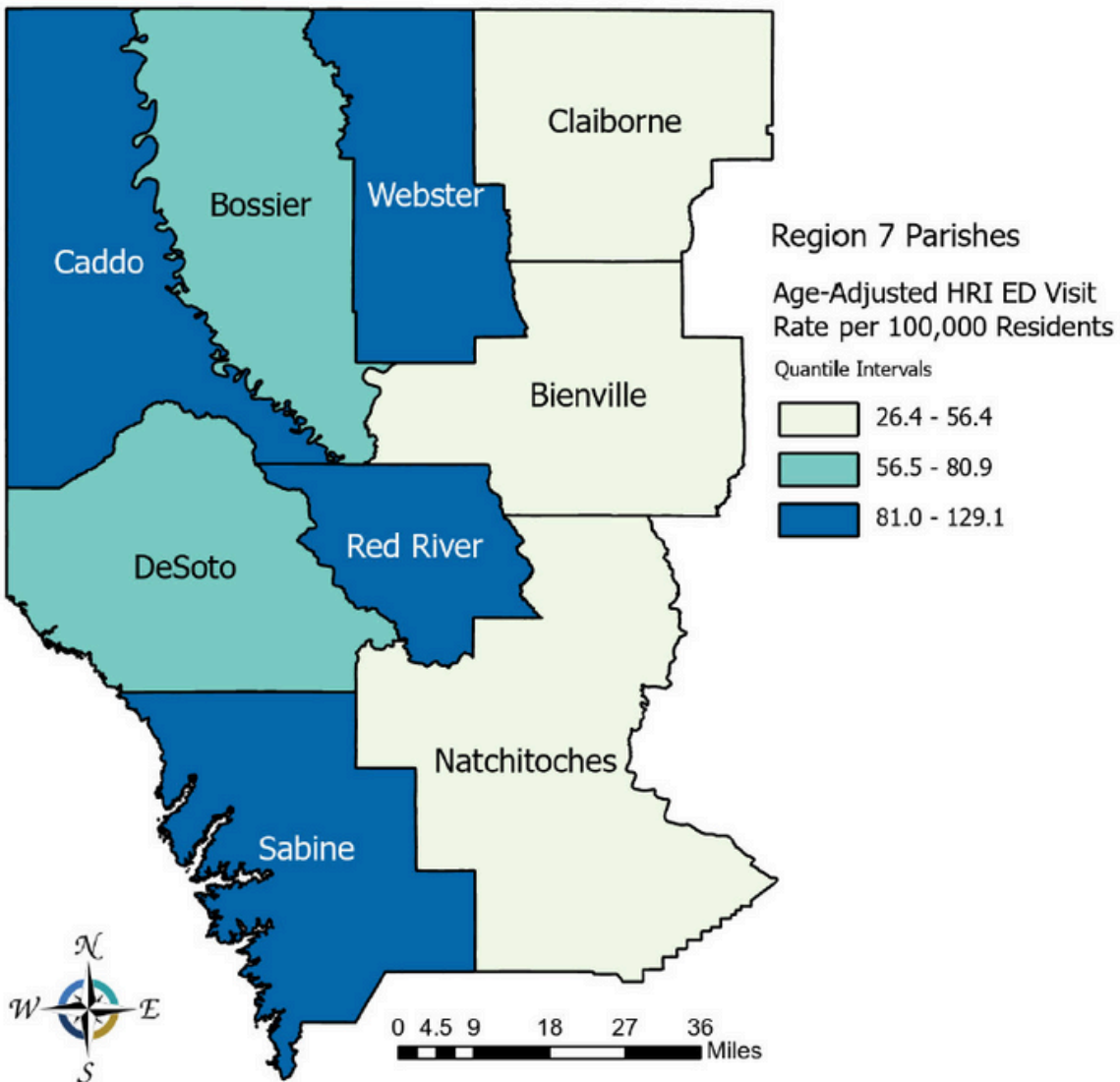
Among workers, workers' compensation was the most common payment source accounting for 48%. Private insurance was the second most common at 20%.

Region 7 Work-Related HRI ED Visits by Payer, 2010-2020



LOCATION: ALL CASES

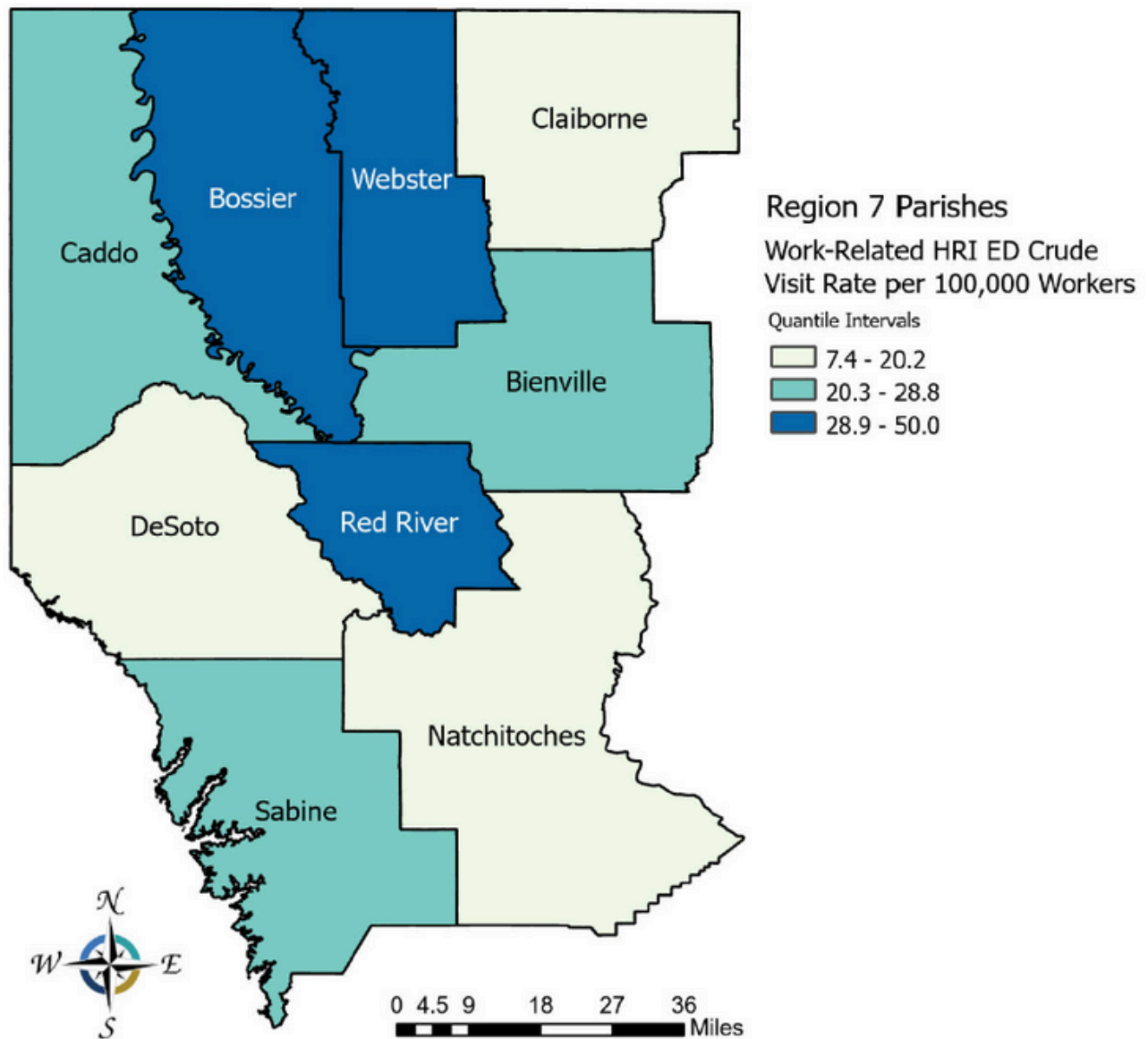
Age-adjusted heat-related illness ED visit rates were mapped based on the patient's parish of residence. **Caddo, Webster, Red River and Sabine parishes had the highest rates.**



LOCATION: WORKERS

Worker rates were calculated based on where the worker lived. Bossier, Red River and Webster Parishes had the highest crude rates for heat-related illness.

Workers from Claiborne, DeSoto and Natchitoches had the lowest crude rates.



APPENDICES

APPENDIX A: SUMMARY TABLE: REGION 7 RESIDENT HEAT-RELATED ILLNESS DATA, 2010-2020

Characteristic	Number	Percent
Overall	4,708	100.0%
Age		
0-9	97	2.1%
10-19	492	10.5%
20-29	966	20.5%
30-39	947	20.1%
40-49	729	15.5%
50-59	669	14.2%
60-69	402	8.5%
70-79	249	5.3%
80+	157	3.3%
Sex		
Female	921	19.6%
Male	3,787	80.4%
Race		
Black	1,876	39.8%
White	2,328	49.4%
Other	100	2.1%
Unknown	404	8.6%

Month		
April	75	1.6%
May	312	6.6%
June	936	19.9%
July	1,440	30.6%
August	1,337	28.4%
September	524	11.1%
October	84	1.8%
Day		
Monday	647	13.7%
Tuesday	765	16.2%
Wednesday	780	16.6%
Thursday	741	15.7%
Friday	695	14.8%
Saturday	663	14.1%
Sunday	417	8.9%
Payer		
Champus	134	2.9%
Medicaid	876	18.6%
Medicare	712	15.1%
Other/Unknown	418	8.9%
Private	1,659	35.2%
Uninsured	537	11.4%
Workers' Compensation	372	7.9%

Parish		
Bienville	79	1.7%
Bossier	1,071	22.7%
Caddo	2,170	46.1%
Claiborne	47	1.0%
DeSoto	234	5.0%
Natchitoches	228	4.8%
Red River	104	2.2%
Sabine	234	5.0%
Webster	541	11.5%

APPENDIX B: SUMMARY TABLE: NON-REGION 7 RESIDENT HEAT-RELATED ILLNESS DATA, 2010-2020

Characteristic	Number	Percent
Overall	596	100.0%
Age		
0-19	59	9.9%
20-29	156	26.2%
30-39	130	21.8%
40-49	94	15.8%
50-59	78	13.1%
60-69	43	7.2%
70-79	25	4.2%
80+	11	1.8%
Sex		
Female	80	13.4%
Male	516	86.6%
Race		
Black	102	17.1%
White	396	66.4%
Other	38	6.4%
Unknown	60	10.1%

Month		
April	13	2.2%
May	51	8.6%
June	117	19.6%
July	171	28.7%
August	173	29.0%
September	58	9.7%
October	13	2.2%
Day		
Monday	87	14.6%
Tuesday	96	16.1%
Wednesday	90	15.1%
Thursday	97	16.3%
Friday	70	11.7%
Saturday	91	15.3%
Sunday	65	10.9%
Payer		
Champus	8	1.3%
Medicaid	48	8.1%
Medicare	57	9.6%
Other/Unknown	50	8.4%
Private	240	40.3%
Uninsured	80	13.4%
Workers' Compensation	113	19.0%

State of Residence		
Alabama	6	1.0%
Arkansas	63	10.6%
Florida	8	1.3%
Louisiana (excluding Region 7)	182	30.5%
Missouri	5	0.8%
Mississippi	19	3.2%
Oklahoma	11	1.8%
Tennessee	5	0.8%
Texas	249	41.8%
Other States	33	5.5%
Missing	15	2.5%

APPENDIX C: SUMMARY TABLE: WORKERS REGION 7 RESIDENT HEAT-RELATED ILLNESS DATA, 2010-2020

Characteristic	Number	Percent
Overall	779	100.0%
Age		
16-19	34	4.4%
20-24	119	15.3%
25-34	243	31.2%
35-44	189	24.3%
45-54	104	13.4%
55-64	82	10.5%
65+	8	1.0%
Sex		
Female	81	10.4%
Male	698	89.6%
Race		
Black	302	38.8%
White	420	53.9%
Other	14	1.8%
Unknown	43	5.5%

Month		
April	9	1.2%
May	48	6.2%
June	139	17.8%
July	250	32.1%
August	243	31.2%
September	79	10.1%
October	11	1.4%
Day		
Monday	104	13.4%
Tuesday	164	21.1%
Wednesday	161	20.7%
Thursday	121	15.5%
Friday	115	14.8%
Saturday	73	9.4%
Sunday	41	5.3%
Payer		
Champus	10	1.3%
Medicaid	80	10.3%
Medicare	11	1.4%
Other/Unknown	88	11.3%
Private	157	20.2%
Uninsured	61	7.8%
Workers' Compensation	372	47.8%

Parish of Residence		
Bienville	13	1.7%
Bossier	226	29.0%
Caddo	363	46.6%
Claiborne	13	1.7%
DeSoto	26	3.3%
Natchitoches	13	1.7%
Red River	14	1.8%
Sabine	23	3.0%
Webster	88	11.3%