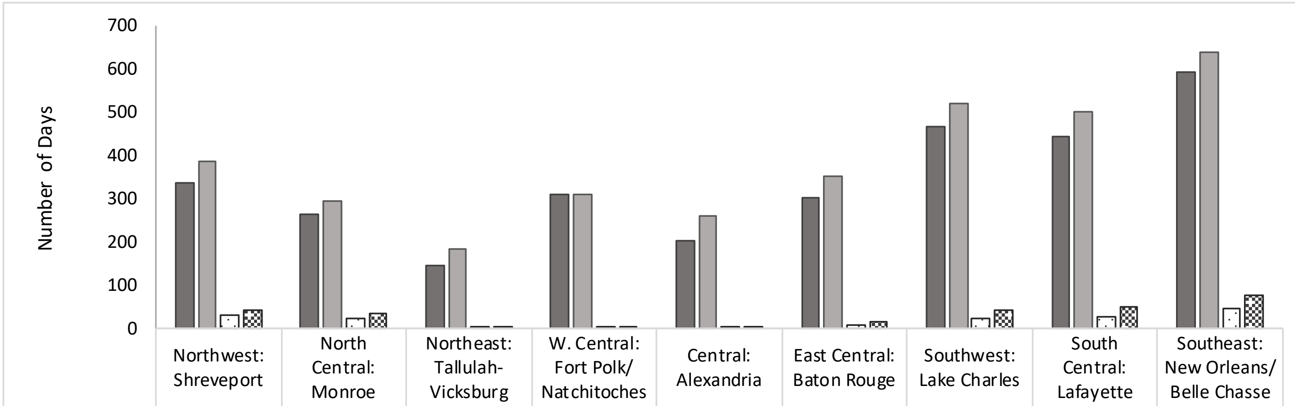
(Distribution of Extreme Heat Days ... continued from page 4)

Figure 4. Number of Days Daily Minimum Temperature (Tmin) and Heat Index (HImin) Exceeded Threshold by Location, 2010-2016



	Northwest: Shreveport	North Central: Monroe	Northeast: Tallulah-Vicksburg	W. Central: Fort Polk/ Natchitoches	Central: Alexandria	East Central: Baton Rouge	Southwest: Lake Charles	South Central: Lafayette	Southeast: New Orleans/ Belle Chasse
Tmin ≥ 75	337	264	148	312	203	305	468	444	593
HImin ≥ 75	389	296	187	312	263	352	522	501	640
Tmin ≥ 80	34	24	4	6	1	11	25	30	47
HImin ≥ 80	45	37	5	6	5	18	44	51	79

days where the T_{max} ≥ 95°F or 100°F than the more southern parts of the state.

Humidity, which is a main determinant of heat index, is a measure of the amount of water vapor in the air. Humidity plays an important role in sweating, the body's primary cooling mechanism. When humidity is high, heat exchange efficiency is impaired which reduces the rate of moisture evaporation from the surface of the skin. As anyone living in south Louisiana knows, when humidity is high, sweat does not evaporate very quickly and you feel hotter than the actual temperature. While prolonged or intense exposure to hot temperatures are obvious risk factors for heat-stress illness, anything that interferes with the body's ability to cool itself, including high humidity, increases the risk for heat-stress illness. While certain areas of the state tend to experience higher actual temperatures and other areas experience higher humidity, the risk of heat-stress illness is high for all of Louisiana.

Occupational Heat-Stress Illness Emergency Department Visits and Hospitalizations in Louisiana and its Climate Divisions, 2010-2016

Anna Reilly, Ph.D., M.P.H.

Working in a hot environment, whether indoors or outdoors, can be dangerous. Core body temperature must be maintained within a very narrow range (97.7-99.5°F). A 2°F increase in body temperature can affect mental functioning; a 5°F increase can result in serious injury or death. Exposure to extreme heat can interfere with sweating, the body's primary cooling mechanism, putting workers at risk of heat-stress illness (HSI). Milder forms of HSI include heat rash, heat cramps and heat exhaustion, which often lead to worker irritability, low morale, absenteeism and shortcuts in procedures. The most serious form of HSI, heat stroke, is a medical emergency that can be fatal. HSI may be an underlying cause of other types of injuries such as heart attacks, falls and equipment accidents. Accidents leading to injuries can occur due to sweaty palms and fogged-up safety glasses; burns can occur from accidental contact with hot surfaces or steam.

Occupations considered high-risk for HSI include firefighters, bakery and kitchen workers, laundry workers, landscapers, agricultural workers, construction workers, oil and gas workers, electrical utility (especially boiler room) workers, mail and package deliverers, and factory workers. These workers are exposed to occupational risk factors for HSI such as heavy physical activity (produces metabolic heat from physical exertion of energy), having to wear personal protective equipment (PPE; may interfere with the body's ability to sweat effectively), and/or hot environmental conditions (e.g., high temperature, humidity, radiant heat sources, and/or limited air movement). Additional personal factors that can increase the risk for HSI include obesity, advanced age (≥ 65 years), poor cardiovascular fitness, underlying health problems, existing burns (may damage or destroy sweat glands), use of certain medications, pregnancy, previous HSI, and lack of acclimatization (heat tolerance).

Thousands of workers in Louisiana are at risk of HSI. Many industries and occupations are vulnerable to HSI, but the industries most affected by HSI due to outdoor heat are construction,

(Occupational Heat-Stress Illness ... continued from page 5)

agriculture, and oil and gas well operations. About 13.2% of Louisiana's workforce is employed in the construction, agriculture or mining (includes oil and gas) industries. Summers in Louisiana get hot and, especially in south Louisiana, humid. The daily maximum heat index (HI_{max}) reached 95°F or higher in all climate divisions for 58-73% of summer days (May-Sep), and reached 100°F or higher for 35-56% of summer days from 2010-2016. Since 2010, the Occupational Health Program has been collecting HSI emergency department (ED) visit data as one of a suite of occupational health indicators submitted to the National Institute for Occupational Safety and Health (NIOSH) every year. This analysis characterizes occupational HSI ED visits and inpatient hospitalizations in Louisiana by age group, sex and comorbidity for 2010-2016. Occupational HSI ED visit rates by climate division are also examined, and the relationship between the number of monthly occupational ED visits and average monthly maximum summer temperatures as well as temperature thresholds of 95°F and 100°F from 2010-2016 is examined.

Methods

State ED records and Louisiana Hospital Inpatient Discharge Database (LaHIDD) records were used to select occupational HSI ED visits and inpatient hospitalizations, respectively, for Louisiana residents admitted from May 1, 2010 – Sep 30, 2016. An HSI case was a record with a primary or secondary diagnosis International Classification of Diseases, 9th/10th Revision, Clinical Modification (ICD-9-CM/ICD-10-CM) code for 'Effects of heat and light'(ICD-9-CM: 992.0 - 992.9; ICD-10-CM: T67.0XXA-T67.9XXA) or an ICD-9-CM/ICD-10-CM external cause of injury code for excessive heat (ICD-9-CM: E900.0, E900.1, E900.9; ICD-10-CM: W92.XXXA, X30.XXXA). Work-relatedness was determined by the presence of workers' compensation as the primary payer or the presence of a work-related external cause of injury ICD code (ICD-9-CM: E000.0, E000.1, E800-E807[.0], E830-E838[.2,.6], E840-E845[.2,.8], E846, E849.1, E849.2, E849.3; ICD-10-CM: Y99.0, Y99.1, Y92.61-Y92.69, Y92.71-Y92.79, Z04.2, Z57.6, Z57.8) for patients at least 16 years of age. ICD-9-CM codes were used for 2010-2015 Q3 data; ICD-10-CM codes for 2015 Q4-2016 data. Cases were flagged for the presence of the following comorbid conditions (as a primary or secondary diagnosis): cardiovascular disease (ICD-9-CM 390-398, 404-429, 440-448, 402), cerebrovascular disease (ICD-9-CM 430.0-438.9), respiratory disease (ICD-9-CM 460.0-519.9), renal disease (ICD-9-CM 580.0-589.9), diabetes (ICD-9-CM 250.0-250.9), and injury (ICD-9-CM 800.0-904.9, 910.0-959.9). ICD-10-CM code equivalents for the ICD-9-CM codes of these comorbid conditions were looked up using a crosswalk table provided by the Louisiana Department of Health's (LDH's) Bureau of Health Informatics.

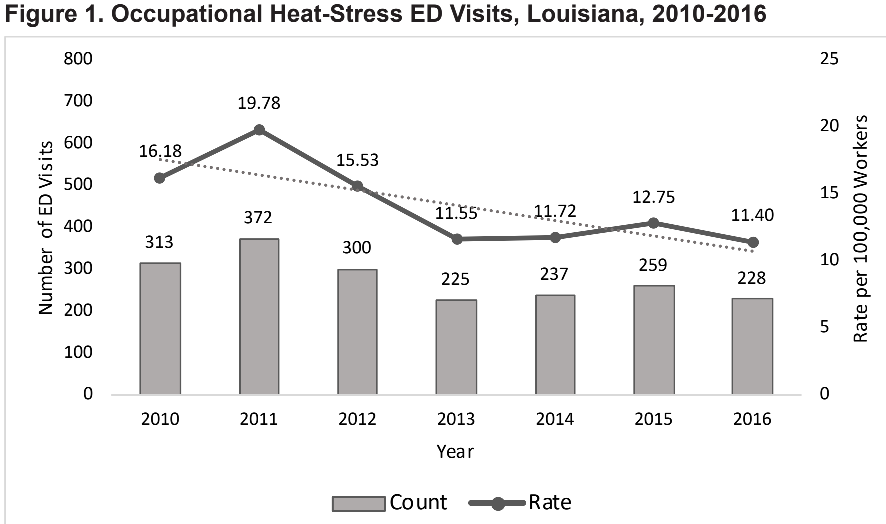
Occupational HSI ED visits and hospitalizations were stratified by year, age group, sex, comorbidity and climate division (based on parish of residence). Prevalence was calculated as the percent of total occupational HSI ED visits or hospitalizations for age group, sex and comorbidity. Comorbidity prevalence among age groups was also calculated. Annual rates per 100,000 workers were calculated for occupational HSI ED visits and hospitalizations, and where appropriate the Mann-Kendall test for trend was done for rates over time. Seven-year average annual rates per 100,000 workers were calculated for occupational HSI ED visits and hospitalizations by age group and climate division. Spearman rank correlation was used to examine the relationship between the monthly number of occupational HSI ED visits, the monthly average maximum temperature (T_{max}), the monthly average HI_{max}, the number of days per month T_{max} and $HI_{max} \geq 95$°F, and the number of days T_{max} and $HI_{max} \geq 100$°F for each year from 2010-2016. Statistical significance was set as $p < 0.05$.

For rate calculation, Louisiana's employed population stratified by age was obtained using NIOSH's Work-related Injury Statistics and Resource Data System's Employed Labor Force application, which utilizes data from the Bureau of Labor Statistics' (BLS) Current Population Survey. The employed population of each parish was obtained from the Local Area Unemployment Statistics, a federal-state cooperative program for which the BLS prepares monthly estimates of total employment and unemployment. Data was aggregated to obtain the employed population of each climate division. All analyses were performed using SAS EG version 7.1 and maps were created using ESRI ArcGIS version 10.6.1.

Results and Discussion

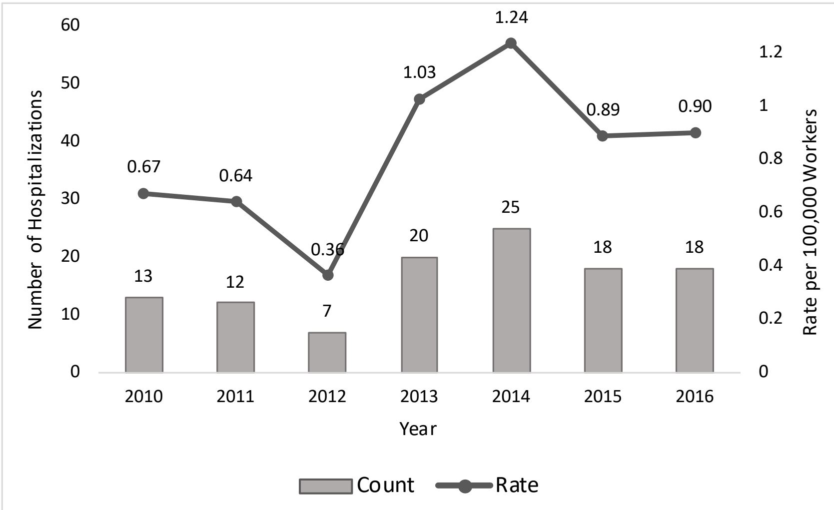
From 2010-2016, the number of occupational HSI ED visits ranged from 225-372 per year, and there was a non-significant downward trend (Kendall's $\tau = -0.6$, p=0.05) in the occupational HSI ED visit rate during this time (Figure 1). The highest rate,

Figure 1. Occupational Heat-Stress ED Visits, Louisiana, 2010-2016



(Occupational Heat-Stress Illness ... continued from page 6)

Figure 2. Occupational Heat-Stress Hospitalizations, Louisiana, 2010-2016



19.78 per 100,000 workers, occurred in 2011; the lowest rate, 11.40, occurred in 2016. The number of occupational HSI hospitalizations ranged from 7-25 per year, and rates ranged from 0.36-1.24 per 100,000 workers (Figure 2). Hospitalizations did not follow a monotonic pattern; therefore, the Mann-Kendall test was not performed. The highest rate occurred in 2014, and the lowest rate occurred in 2012.

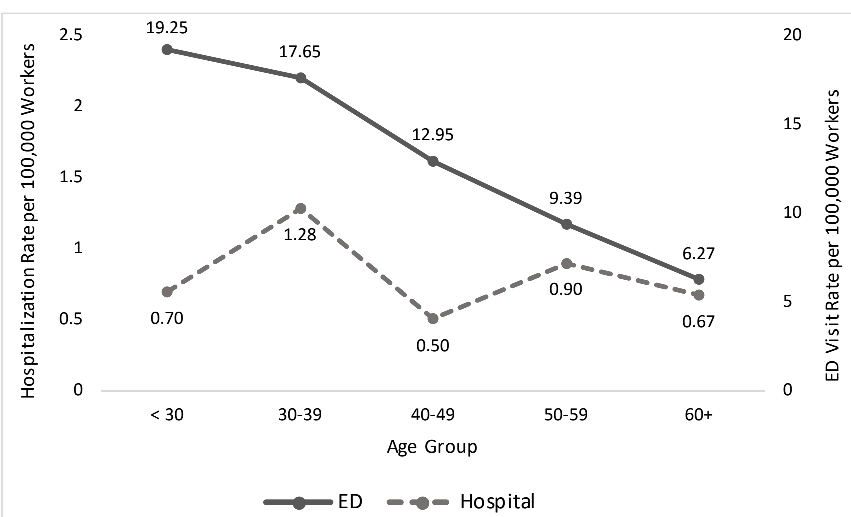
Table 1 displays the number and percentage of occupational HSI ED visits and hospitalizations in the state from 2010-2016. There were 1,934 occupational HSI ED visits and 113 occupational HSI hospitalizations, with average annual rates of 13.99 per 100,000 workers and 0.82 per 100,000 workers, respectively. Nearly all occupational HSI ED visits were male and about a third were under 30 years of age. Similar to occupational HSI ED visits, almost all HSI hospitalizations patients were male. About a third of the patients were between the ages of 30-39 years. The ED visit rate for occupational HSI was highest in the youngest age group (< 30 years) and linearly decreased with age; however, occupational HSI hospitalization rates by age group did not follow a linear pattern (Figure 3). The highest rates were for those aged

Table 1. Number and Percentage of Occupational Heat-Stress Illness ED Visits and Hospitalizations, Louisiana, 2010-2016

	ED		LAHIDD	
	No.	**%***	**No.**	**%***
Total Count	**1,934**	---	**113**	---
Age Group (years)				
< 30	662	34.2	24	21.2
30-39	522	27.0	38	33.6
40-49	386	20.0	15	13.3
50-59	271	14.0	26	23.0
60+	93	4.8	10	8.8
Sex^				
Male	1,768	91.4	108	95.6
Female	164	8.5	4	3.5
Comorbidity				
Cardiovascular	84	4.3	17	15.0
Cerebrovascular	2	0.1	1	0.9
Diabetes	82	4.2	9	8.0
Renal	250	12.9	60	53.1
Respiratory	62	3.2	10	8.8
Injury	42	2.2	2	1.8
None	1,476	76.3	35	31.0

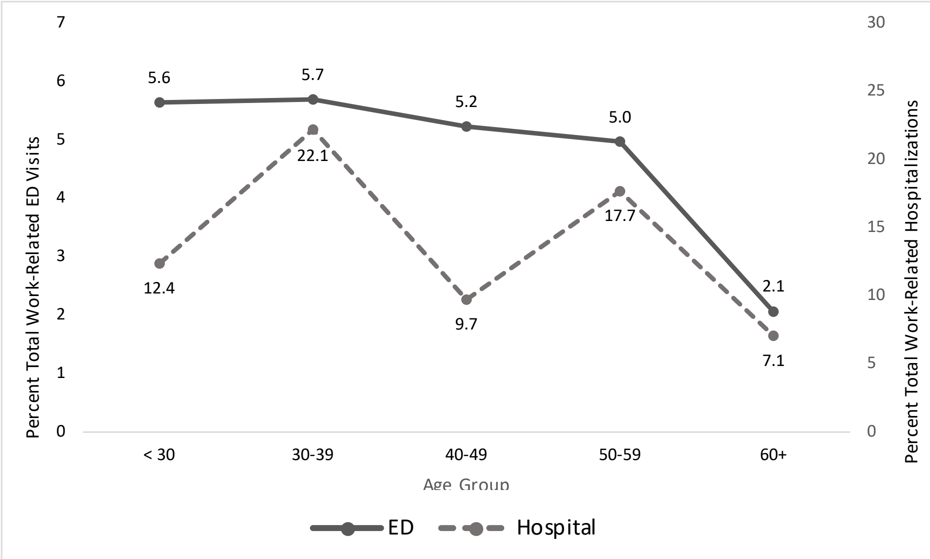
Percentages may not add up to 100 due to rounding and because patients may have had more than one comorbidity . ^Does not include cases where sex (n=2 ED; n=1 LAHIDD) was unknown.

Figure 3. Occupational Heat-Stress ED Visit and Hospitalization Rates by Age Group, Louisiana, 2010-2016



(Occupational Heat-Stress Illness ... continued from page 7)

Figure 4. Comorbidity Prevalence* among Occupational Heat-Stress ED Visits and Hospitalizations by Age Group, Louisiana, 2010-2016

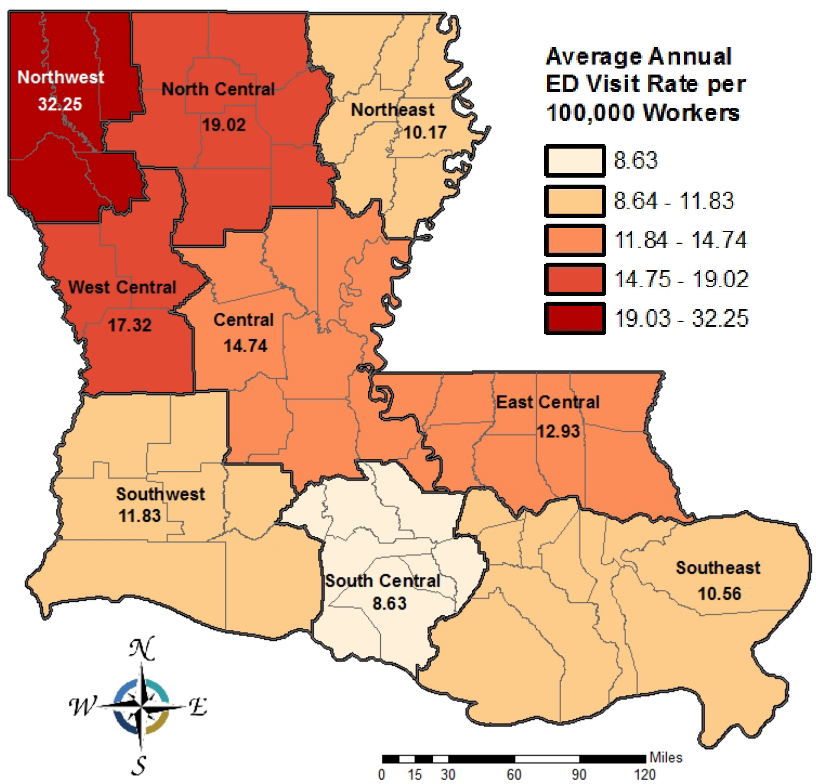


30-39 years followed by those aged 50-59 years. Occupational HSI hospitalization rates for the other age groups were similar.

Most occupational HSI ED visits did not have a comorbid condition (Table 1). Of those with a comorbidity, renal disease was the most common, followed by cardiovascular disease and diabetes. Patients younger than 60 years old accounted for the majority of comorbidities found in this population (Figure 4). Patients aged 60+ years had 2.3-2.7 times fewer comorbidities than younger patients. Comorbidities among occupational HSI hospitalizations were more common than they were among occupational HSI ED visits (Table 1). More than half of the hospitalization cases had renal disease. Cardiovascular disease was also the second most common comorbid condition listed, and diabetes and respiratory disease were nearly tied as the third most common comorbidities. The age groups with the highest occupational HSI hospitalization rates, 30-39 year-olds and 50-59 year-olds, also had the highest percentages of comorbidities (Figure 3). Similar to ED occupational HSI data, the oldest age group had the lowest percentage of comorbidities; the majority of comorbidities found among occupational HSI hospitalizations were distributed among those younger than 60 years of age.

Occupational HSI ED visit rates for 2010-2016 were the highest for the Northwest climate division, which was 1.7 times the rate for the North Central climate division (the next highest rate; Figure 5). The farther north the climate division is, the higher the rate tended to be; with the exception of the Northeast

Figure 5. Occupational Heat-Stress ED Visit Rates by Climate Division, Louisiana, 2010-2016



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(Occupational Heat-Stress Illness ... continued from page 8)

climate division, which had the second lowest rate in the state. Occupational HSI hospitalization rates were highest in the North Central climate division (Figure 6). The rate in the Central climate division, which was the second highest in the state, was 1.6 times lower than the rate in the North Central climate division. Generally, the climate divisions that make up the southeastern part of the state had the lowest rates. Rates were not calculated for the Northeast and West Central climate divisions because case counts were less than five. It should also be noted that the rates for the Northwest and South Central climate divisions are unstable due to low case counts. Case counts less than 12 result in a relative standard error that is greater than or equal to 30%, which yields an unstable rate.

There was a statistically significant correlation between monthly occupational HSI ED visits and average monthly T_{max} (Table 2). The relationship, or correlation, between the two variables is denoted by Spearman's coefficient (r_s), which varies between -1 and +1. An r_s value of zero means there is no correlation; a value on 1 indicates perfect correlation. An r_s value between 0.7-0.9 is indicative of a strong correlation, 0.4-0.6 a moderate correlation, and 0.1-0.3 a weak correlation. [The closer to 1 the value of r_s is the stronger the correlation.] The sign of r_s indicates the direction of the correlation. The correlation was strong for all climate divisions except for the Northeast, West Central, and Southwest climate divisions, where it was moderate. The correlation between monthly occupational HSI ED visits and average monthly HI_{max} was also statistically significant; the strength of correlation was moderate for the Northeast, West Central, and South Central climate divisions and strong for all other climate divisions (Table 2). The correlation between the monthly number of occupational HSI ED visits and the number of days per month $T_{max} \geq 95°F$ was statistically significant for all climate divisions (Table 3). Correlation strength was strong for the Northwest, East Central, and Southeast climate divisions and moderate for the other climate divisions. The correlation between the monthly number of oc-

Figure 6. Occupational Heat-Stress Hospitalization Rates by Climate Divisions, Louisiana, 2010-2016

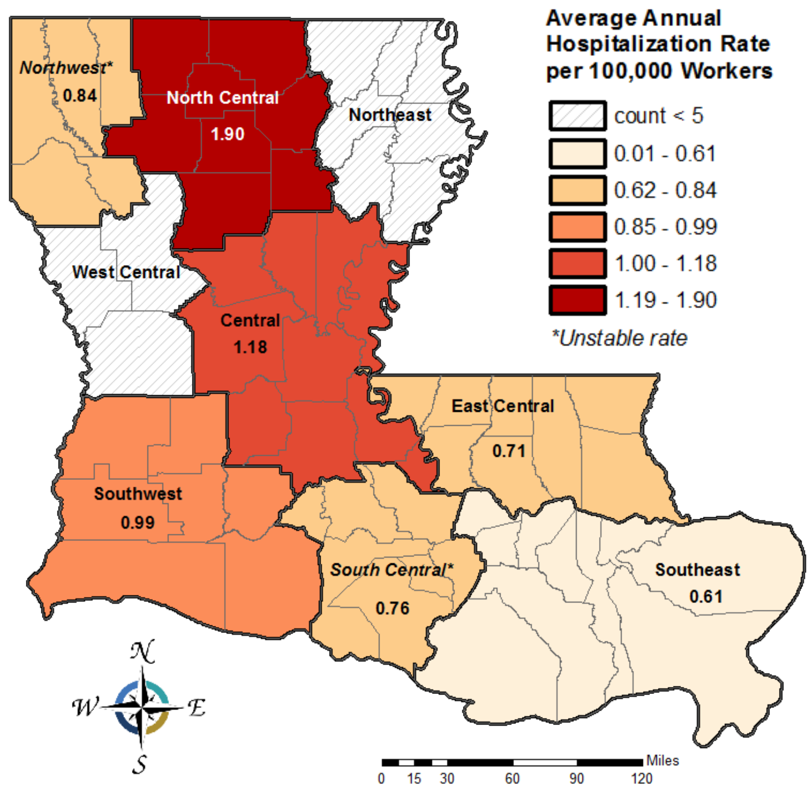

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Table 2. Correlation between Monthly Occupational Heat-Stress Illness ED Visits and Average Monthly T_{max} and HI_{max} by Climate Division, 2010-2016

Climate Division: Weather Station Location(s)	Spearman coefficient (r_s)*	
	T_{max}	HI_{max}
Northwest: Shreveport	0.8	0.9
North Central: Monroe	0.7	0.8
Northeast: Tallulah-Vicksburg	0.5	0.5
West Central: Fort Polk Army/ Natchitoches	0.5	0.6
Central: Alexandria	0.7	0.8
East Central: Baton Rouge	0.8	0.8
Southwest: Lake Charles	0.6	0.7
South Central: Lafayette	0.7	0.6
Southeast: New Orleans/ Belle Chasse	0.8	0.7

*$p < 0.05$

(Occupational Heat-Stress Illness ... continued from page 9)

cupational HSI ED visits and the number of days per month HI_{max} ≥ 95°F was also statistically significant for all climate divisions (Table 3). For most climate divisions, the correlation strength was strong. In the Northeast, West Central, and South Central climate divisions, it was moderate. Not all climate divisions had a statistically significant correlation between monthly occupational HSI ED visits and number of days per month T_{max} ≥ 100°F (Table 3). Among those that did, correlation strength was strong in the Northwest climate division; moderate in the North Central, West Central, Central, South Central, and Southeast climate divisions; and weak in the East Central climate division. Nearly all climate divisions had a strong statistically significant correlation between the number of occupational HSI ED visits and the number of days per month HI_{max} ≥ 100°F, except for the Northeast, West Central, and South central Climate divisions, which had a correlation of moderate strength (Table 3).

Table 3. Correlation between Occupational Heat-Stress Illness ED Visits and Days per Month T_{max} and HI_{max} Met/Exceeded Threshold by Climate Division, 2010-2016

Climate Division: Weather Station Location(s)	Spearman coefficient (r_s)*			
	Days T_{max} >= 95°F	Days HI_{max} >= 95°F	Days T_{max} >= 100°F	Days HI_{max} >= 100°F
Northwest: Shreveport	0.8	0.9	0.7	0.8
North Central: Monroe	0.6	0.7	0.5	0.8
Northeast: Tallulah-Vicksburg	0.4	0.6	**0.2**	0.5
West Central: Fort Polk Army/ Natchitoches	0.4	0.5	0.4	0.4
Central: Alexandria	0.6	0.8	0.5	0.8
East Central: Baton Rouge	0.7	0.8	0.3	0.8
Southwest: Lake Charles	0.4	0.7	**0.3**	0.7
South Central: Lafayette	0.6	0.6	0.4	0.6
Southeast: New Orleans/ Belle Chasse	0.8	0.7	0.4	0.8

**p < 0.05, unless bold*

Because only more severe cases of HSI require hospitalization, ED visit rates were predictably higher than hospitalization rates for occupational HSI. The occupational HSI ED visit rate peaked in 2011, which coincided with a particularly hot summer across the state. After 2011, the rate decreased and flattened. There was no corresponding increase in occupational HSI hospitalization rate in 2011; the rate has increased since then and may be starting to decrease. The prevalence of male occupational HSI over female occupational HSI for both ED visits and hospitalizations was expected because males tend to work outdoors more than females. Because advanced age is a risk factor for HSI, it is interesting to note that both occupational HSI ED visit and hospitalization rates were higher in younger age groups than older ones. Comorbidity may be a factor. While most ED cases did not have a comorbidity, another risk factor for HSI, those that did tended to be younger. Unsurprisingly, comorbidities were more prevalent among hospitalized cases, which represent more severe cases of HSI. We do not know what occupations these patients held or what risk factors they may have had other than the comorbid conditions in this analysis. Additional information on risk factors such as high-risk occupations or lack of acclimatization to heat could help provide explanation for the higher rates in younger age groups.

Occupational HSI ED visit rates were highest in the Northwest, North Central, and West Central climate divisions, areas that see some of the highest summer temperatures in the state; however, there was strong to moderate correlation between the number of monthly occupational ED HSI visits and several different temperature and heat index measures for nearly all climate divisions. For all climate divisions, as monthly T_{max} or HI_{max} increased, so did the monthly number of ED visits. Similarly, as the number of days per month the T_{max} or HI_{max} ≥ 95°F or 100°F increased, so did the monthly number of ED visits in all climate divisions (except for the Northeast and Southwest when T_{max} ≥ 100°F).

HSI is preventable. Understanding how to deal with heat stress can help to prevent or reduce accidents and is important to workers' health and well-being. Below are some ways to prevent heat-stress illness:

- Drink plenty of fluids. Drink often and before you are thirsty. Drink water every 15 minutes, at least one pint of water per hour.
- Employers should implement an acclimatization schedule if new employees are not used to working in the heat.
- Know signs/symptoms of heat illness; monitor yourself; use a buddy system.
- Block out direct sun and other heat sources.
- Avoid beverages containing caffeine or alcohol.
- Wear lightweight, light colored, loose-fitting clothing
- Take appropriate rest breaks to cool down

The Occupational Safety and Health Administration (OSHA)-NIOSH Heat Safety Tool (https://www.cdc.gov/niosh/topics/heatstress/heatapp.html) is a free app that is available for download through the Apple App Store or Google Play. The app features real-time heat index and hourly forecasts specific to your location, precautionary recommendations specific to heat-index associated risk levels, as well as signs, symptoms and first aid information for HSIs. The app is a great tool that workers and employers can use to help them remain safe while working outdoors.

As average temperatures across the United States increase, occupational HSI is becoming more common and gaining more attention, particularly because OSHA does not have a standard regarding heat. This summer 130 groups including several unions and public health specialists formally petitioned OSHA to start rulemaking to require employers to protect workers from heat. In July 2019, H.R. 3668 was introduced to the U.S. House of

(Occupational Heat-Stress Illness ... continued from page 10)

Representatives, directing OSHA to issue an occupational safety and health standard to protect workers from heat-related injuries and illnesses. Currently, OSHA can cite companies for heat stress violations under its General Duty Clause that requires employers to provide a place of employment that is "free from recognized hazards that are causing or likely to cause death or serious physical harm to employees." In the absence of an OSHA standard, NIOSH has developed criteria for an occupational heat exposure standard that specifically covers recommendations regarding engineering and administrative controls and PPE, which can be found here: https://www.cdc.gov/niosh/docs/2016-106/pdfs/2016-106.pdf?id=10.26616/NIOSHPUB2016106

Data Limitations

Because work-relatedness is not captured in ED or LaHIDD data, workers' compensation as the primary payer or the presence of a work-related e-code is used as a proxy. Many work-related injuries are never associated with a workers' compensation claim, and work-related e-code usage may not be consistent; therefore, this method is expected to undercount the actual number of occupational cases. The number of heat cases may also be undercounted. Heat is not always recognized as the cause of heat-induced injuries and can easily be misclassified because many heat-related symptoms overlap with other more common diagnoses. Practice pattern and payment mechanisms may affect diagnostic coding and decisions by health care providers to hospitalize patients. Veterans Affairs and institutionalized population records are not included in these data. Because we did not have information about where the patient worked, climate division was assigned based on parish of residence as a proxy. It is likely that misclassification bias occurred, as not everyone works in the parish in which they reside.

Heat-Stress Illness and Mortality in Louisiana

John Anderson, M.Sc.; Kate Friedman, M.N.S., Anna Reilly, Ph.D., M.P.H.; Arundhati Bakshi, Ph.D.

Abstract/Summary

Several programs within the Louisiana Department of Health (LDH), Section of Environmental Epidemiology & Toxicology (SEET) have been analyzing heat-stress illness. SEET's Occupational Health Program has reported on preliminary health effects of climate (2015) while tracking the effects of heat on Louisiana's workforce. The Environmental Health Tracking Program (LDH Tracking) has mainly considered the heat effects of climate as related to the surveillance of heat-stress illness. SEET has been a catalyst since 2015 for a series of outreach initiatives to improve public awareness, in an effort to keep everyone - from infants to older adults - safe from the effects of heat.

Working closely with the State Climatologist, the two SEET programs have collaborated on this article to describe the health effects of heat among Louisianans during 2010-2016. Most crucial from a public health messaging point of view, males aged 20-44 were found to be at the greatest risk of developing heat-stress illnesses, as determined by the higher frequency of this age group being treated in the Emergency Department (ED) or hospital setting for heat-stress during 2010-2016.

The major highlights of the article are summarized below:

1. Young people aged 20-44 years are most likely to require ED intervention for heat-stress illnesses.
2. Males aged 20-44 years and females aged 65+ years are most likely to require hospitalization.
3. People in the following climate divisions may be at a higher risk of experiencing heat stress illnesses that require medical intervention: Northwest, North Central, Central, and Southwest.
4. The highest rates of mortality due to heat-stress illness were observed in West Central and Southwest climate divisions, although the numbers are relatively small for the period analyzed (2010-2016) and are not likely a trend.
5. Based on a series of regression analyses, rates of ED visits, especially for males, were found to be moderately associated with daytime temperatures >= 95°F (~ 35°C) or a heat index >= 100°F (~ 38°C).

Introduction

As discussed in previous articles, extreme temperatures can overwhelm the body's ability to regulate its temperature. Prolonged exposure to very high temperatures can result in illnesses such as heat rash, heat cramps, heat exhaustion, heatstroke, and can eventually lead to death. Certain medical conditions such as diabetes, cardiovascular disease, respiratory disease, and cerebrovascular disease can be exacerbated by exposure to extreme heat.

Heat stress affects everyone differently. At particular risk are adults who are older, people working outside, athletes, homeless individuals, individuals with underlying chronic disease(s), pregnant women, children and individuals who are taking drugs that affect temperature regulation (e.g., beta-blockers, diuretics, and major tranquilizers). Healthy teens and middle-aged adults are at risk as well if they engage in vigorous physical activity (work or athletics) and do not take proper precautions to prevent heat-stress illness. Increased metabolism is one factor that places pregnant women at risk of being affected by heat illness before other individuals, potentially leading to premature labor or ad-

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LOUISIANA DEPARTMENT OF HEALTH

JOHN BEL EDWARDS
GOVERNOR

Environmental and Occupational Edition

REBEKAH E. GEE MD MPH
SECRETARY

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Distribution of Extreme Heat Days across Louisiana

Anna Reilly, Ph.D., M.P.H.; John Anderson, M.Sc.; Barry Keim, Ph.D.; Derek Thompson, M.S.

In August 2018, Louisiana summer weather made national news when Forbes published a blog post by climate scientist Brian Brettschneider titled "Who Has the Most Oppressive Weather?" The author determined that Louisiana "is the epicenter of summertime oppressive weather." This was based on the evaluation of temperature data from 380 weather stations across the country between noon and 6 p.m. from 1998-2017. Oppressiveness was defined as either a temperature or heat index ≥ 95°F or a dew point ≥ 75°F coupled with a wind speed ≤ 10 mph. Based on these parameters, Louisiana spent 40-70% of the summers from 1998-2017 between the hours of noon and 6 p.m. in oppressive heat. Conditions that promote oppressive summer heat are very light winds and a consistently high dew point in the Lower Mississippi River Valley. Even if the temperature does not reach 95°F, the heat index or dew point criteria are usually met.

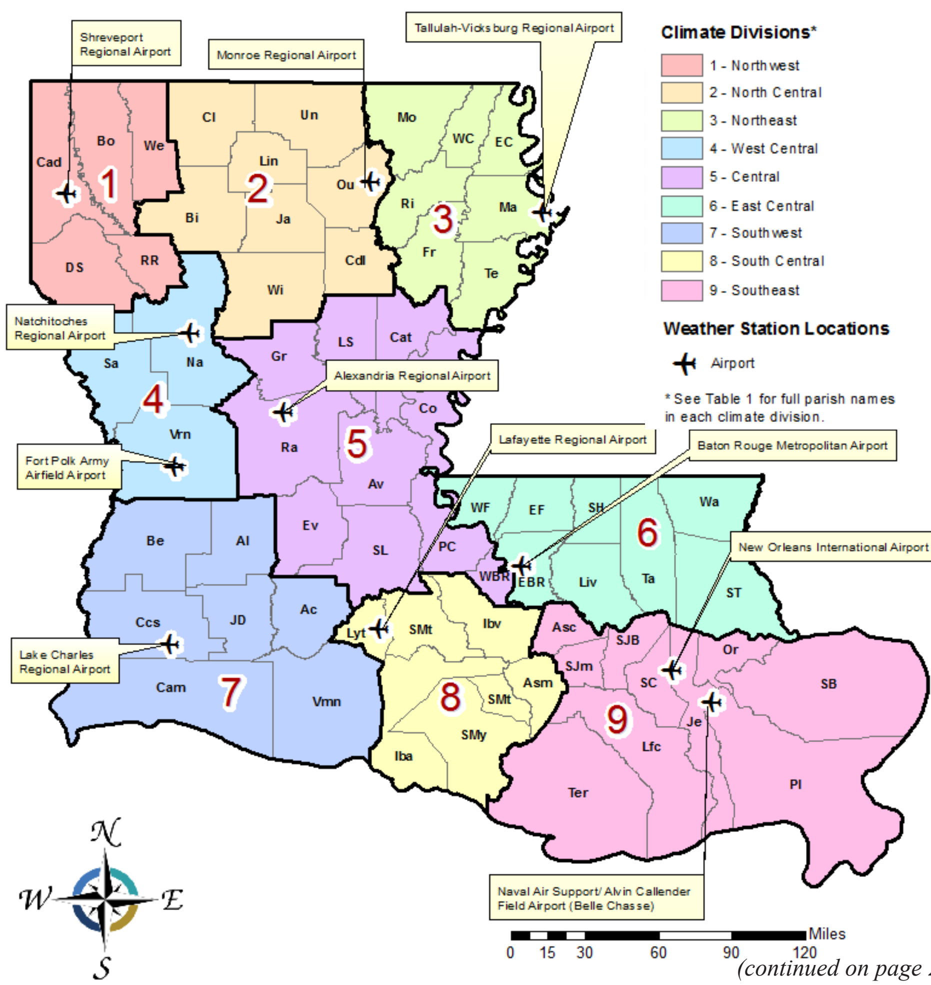
This issue of the Louisiana Morbidity Report discusses extreme heat and heat-stress illness (HSI). Two articles in this edition report on HSI for the state and by climate division from 2010-2016. One article examines HSI in the entire population while the other focuses on workers. Both articles examine the relationship between temperature and heat index and HSI emergency department visits. This article discusses extreme heat in Louisiana's climate divisions. Information is provided about temperature normals, actual temperature and heat index data for 2010-2016 as well as extreme temperature and heat index thresholds utilized in both of the above-mentioned studies.

Inside

Methods

Louisiana has nine climate divisions. The parishes within each climate division have nearly homogenous characteristics regarding temperature, precipitation and humidity. We chose one weather station in each climate division to represent the entire cli-

Figure 1. Louisiana Climate Divisions, Parishes, and Respresentative Weather Station Locations



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