Michigan Heat-Related Illness, Emergency Department Visits: 2013 Summary

Highlights

- There were a total of 4,541 hospital emergency department (ED) visits in Michigan with self-reported dehydration (3,553, 78.2%), sun-associated complaints (599, 13.2%), and/or heat-associated complaints (389, 8.6%) between April 1, 2013 and August 31, 2013. (Figures 1 & 4)
- During the summer of 2013, Michigan experienced one heat wave from Monday, July 15 through Friday, July 19. For the majority of the state, maximum temperatures were at or above 90 degrees each day during that period. (Figure 2)
- There were less ED visits for heat-related illnesses in 2013 than the previous two summers when several spikes in heat-related illnesses were observed. (Figure 3)
- Heat-related illnesses during the week of the heat wave increased 162% compared to the previous week. (Table 1)
- During the week of the heat wave, dehydration complaints increased 79.6%, sun-associated complaints increased 126.7%, and heat-associated complaints increased 900.0%. (Figure 4)
- During periods of hot weather, increases in heat-related ED visits were seen among age groups 5 years and older but most significantly among those age groups between 18 years and 64 years as seen in the month of July. (Figure 4)
- The highest male to female ratios are observed during periods of hot weather as seen in the month of July. (Figure 5)
- Although increases in dehydration were seen during periods of extreme heat, on average, dehydration complaints did not vary greatly by month while sun-associated complaints gradually increased each month as summer temperatures climbed. The majority of heat-associated complaints were observed during periods of extreme heat. (Figures 4 and 7)
- The greatest number of heat-related visits between April 1, 2013 and August 31, 2013 occurred in regions 2N, 2S, and 6, likely due to the higher population centers in those regions compared to the other regions. (Table 2)
- Regions 7 and 8 experienced the highest proportion of heat-related ED visits compared to all ED visits within those regions. (Figure 8 and Table 2)

Description of the Data

Heat-related emergency department (ED) visits were identified using the Michigan Syndromic Surveillance System which gathers data from participating hospital emergency departments across the state. “Heat-related illness” complaints are defined as daily ED visits with the primary complaints of: “hyperthermia”, “heat”, “sun”, “prostration”, or “dehydration” (including word derivatives and misspellings). Terms that have been identified in the search, but do not indicate heat-related illness, such as “wheat”, are excluded.

Heat-related illness complaints were categorized into one of three syndromes based on the chief complaint.

- Sun-associated: sunburn, sun poisoning, sunscreen reactions
- Heat-associated: heat exhaustion, heat stroke, heat reaction
- Dehydration

Note: Due to the nature of categorizing ED complaint data, these visits do not represent all potential cases of heat-related illness. These data may also represent non-heat-related illnesses, i.e. dehydration due to other causes. However, the data can be used to describe trends in illness presentations over time.

Figure 1: Daily Counts of Statewide Heat-Related ED Visits (April 1 – August 31, 2013)

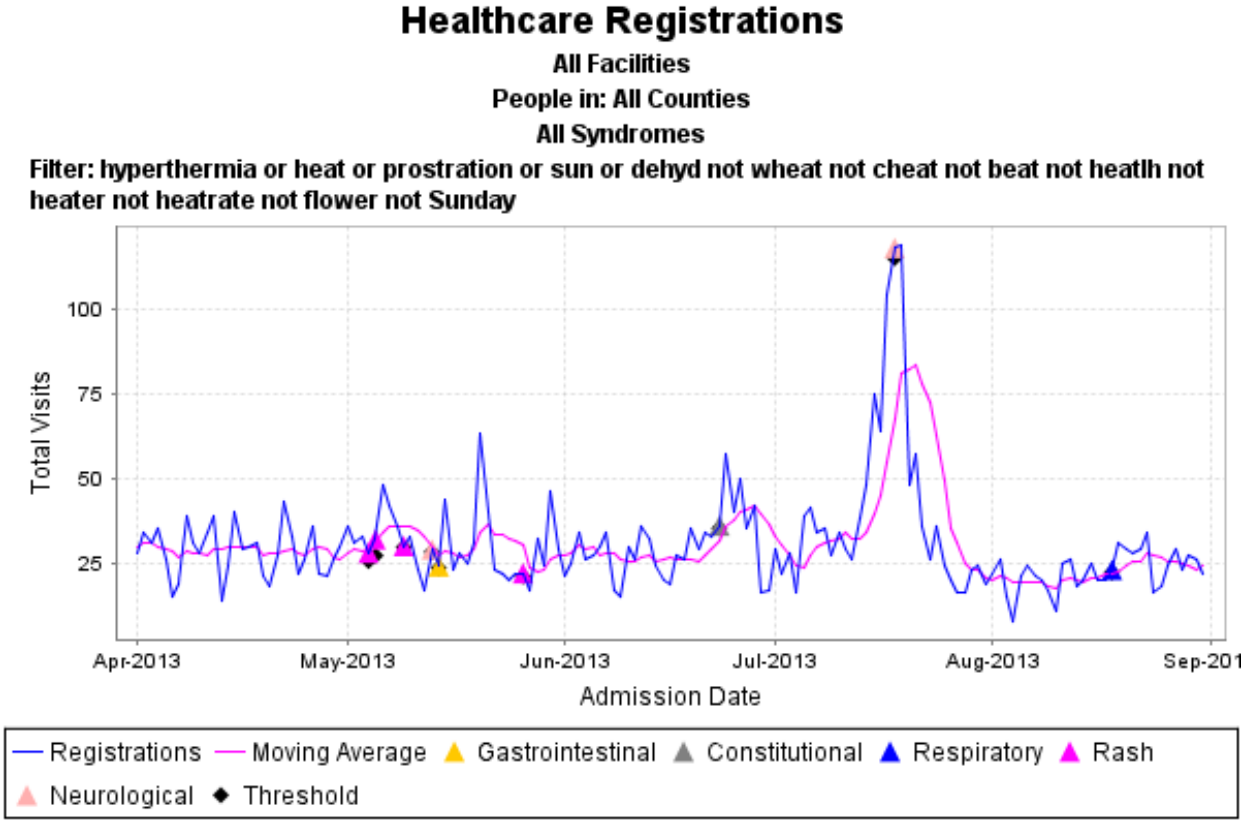

Figure 2: Statewide Heat-Related ED Visits and National Oceanic and Atmospheric Administration (NOAA) Maximum Daily Temperature Averages for 6 Select Cities (April 1 – August 31, 2013)

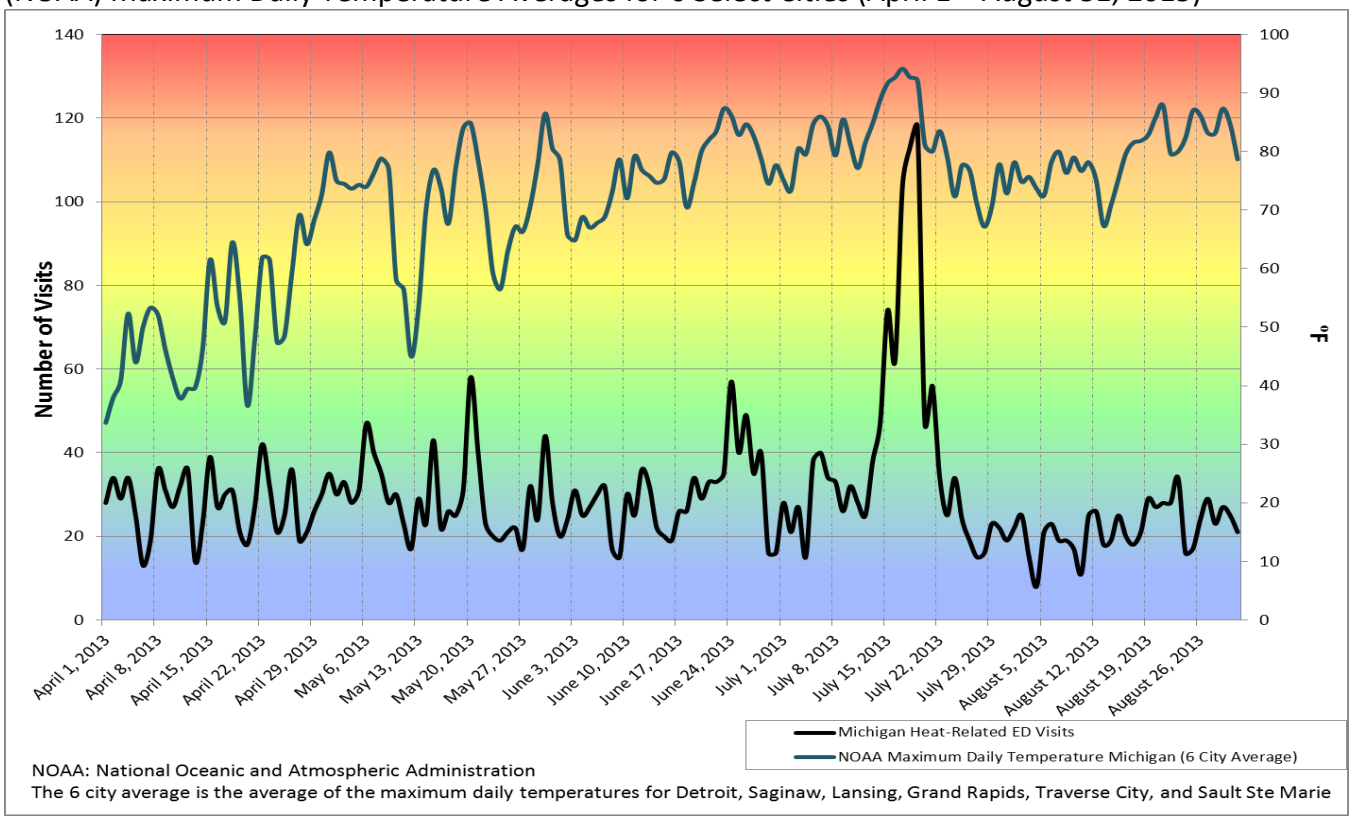

Figure 3: Seasonal (May 15 - August 31) Daily Heat-Related ED Visits, 2010 – 2013

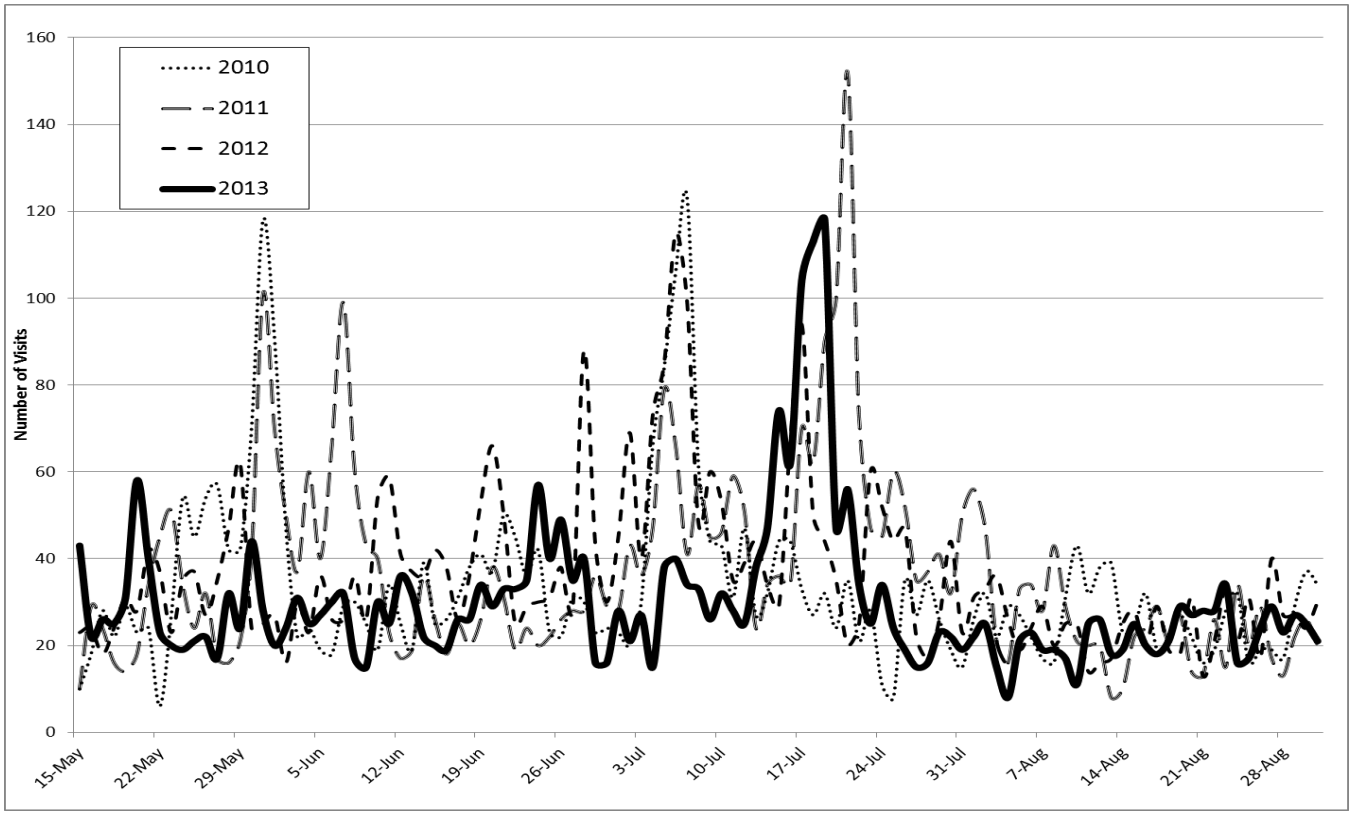

Table 1: Weekly Heat-Related ED Visits and Average Weekly Maximum Temperatures

Week	Total Heat-Related ED visits	Average Visits Per Day	Comparison From Prior Week	Average Weekly Max. Temps (°F)
March 31 – April 6	193	27.6	--	43.1
April 7 – April 13	195	27.9	1.0%	44.3
April 14 – April 20	189	27.0	-3.1%	52.6
April 21 – April 27	202	28.9	6.9%	56.5
April 28 – May 4	203	29.0	0.5%	72.6
May 5 – May 11	234	33.4	15.3%	70.7
May 12 – May 18	185	26.4	-20.9%	66.3
May 19 – May 25	212	30.3	14.6%	70.9
May 26 – June 1	187	26.7	-11.8%	75.4
June 2 – June 8	186	26.6	-0.5%	68.0
June 9 – June 15	180	25.7	-3.2%	76.1
June 16 – June 22	200	28.6	11.1%	78.4
June 23 – June 29	272	38.9	36.0%	82.4
June 30 – July 6	185	26.4	-32.0%	79.5
July 7 – July 13	216	30.9	16.8%	82.0
July 14 – July 20	565	80.7	161.6%	90.5
July 21 – July 27	207	29.6	-63.4%	77.2
July 28 – August 3	142	20.3	-31.4%	73.9
Aug 4 – Aug 10	118	16.9	-16.9%	76.6
Aug 11 – Aug 17	151	21.6	28.0%	75.4
Aug 18 – Aug 24	183	26.1	21.2%	82.9
Aug 25 – Aug 31	166	23.7	-9.3%	84.3

Figure 4: Statewide Heat-Related ED Visits by Syndrome (April 1 – August 31, 2013)

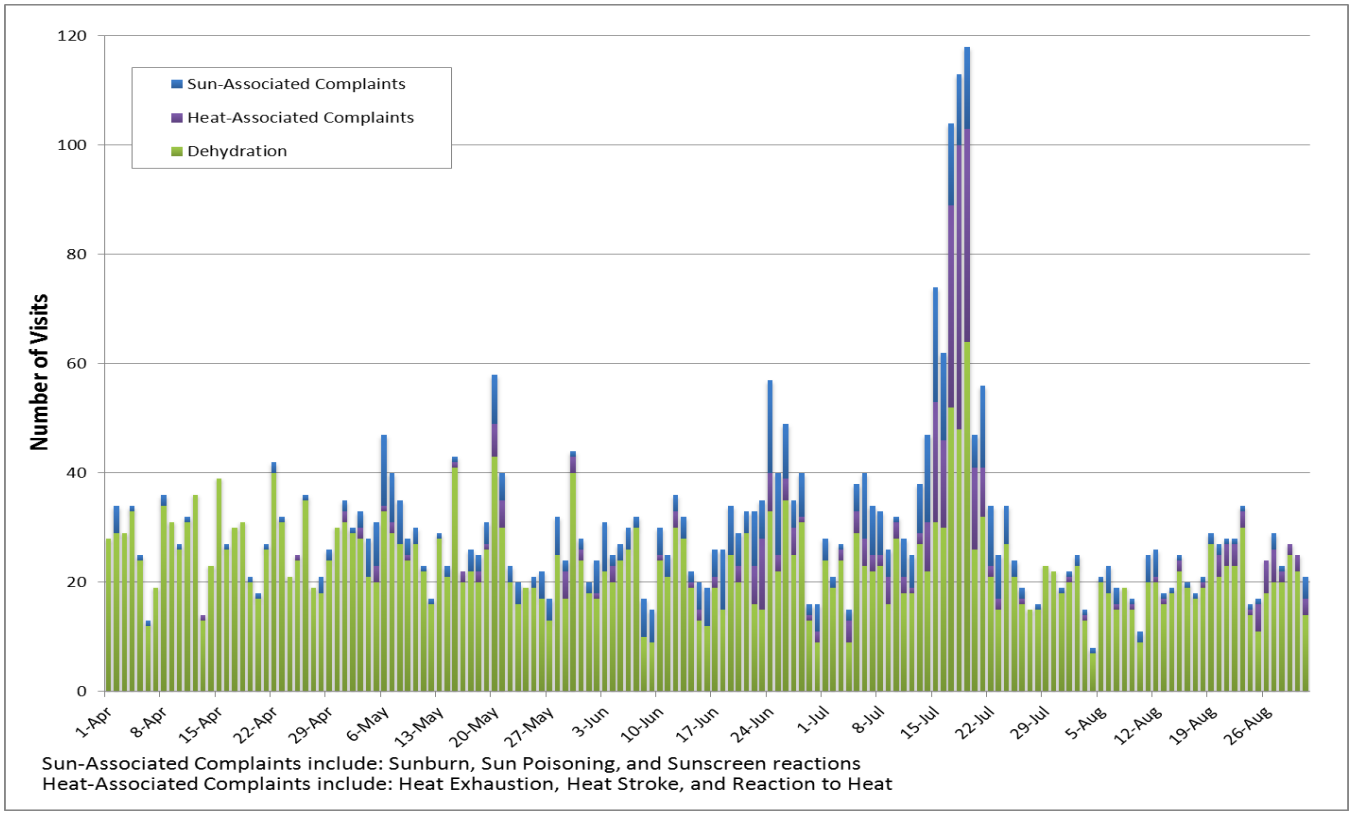

Figure 5: Age Distribution of Heat-Related ED Visits by Month (April 1 – August 31, 2013)

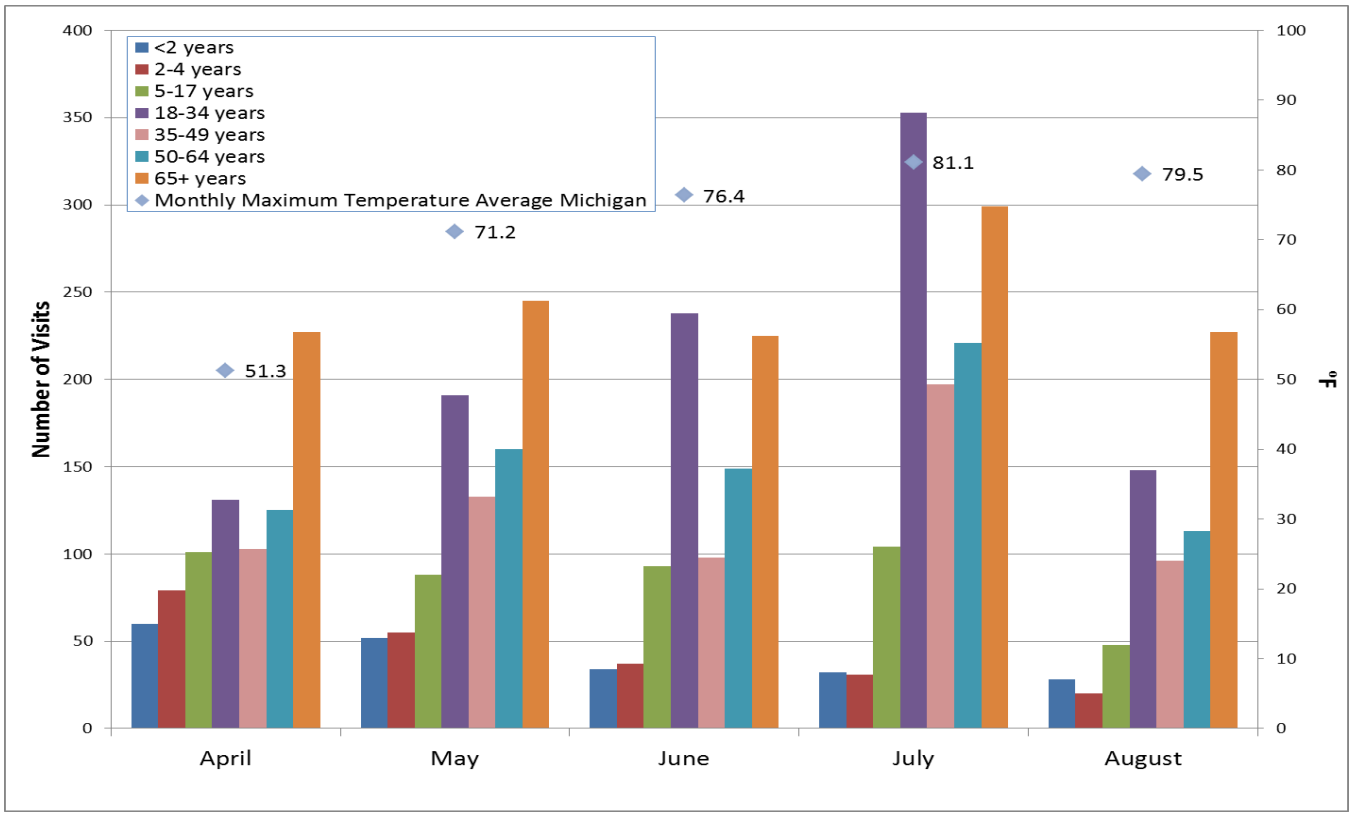

Figure 6: Male to Female Ratio of Heat-Related ED Visits by Month (April 1 – August 31, 2013)

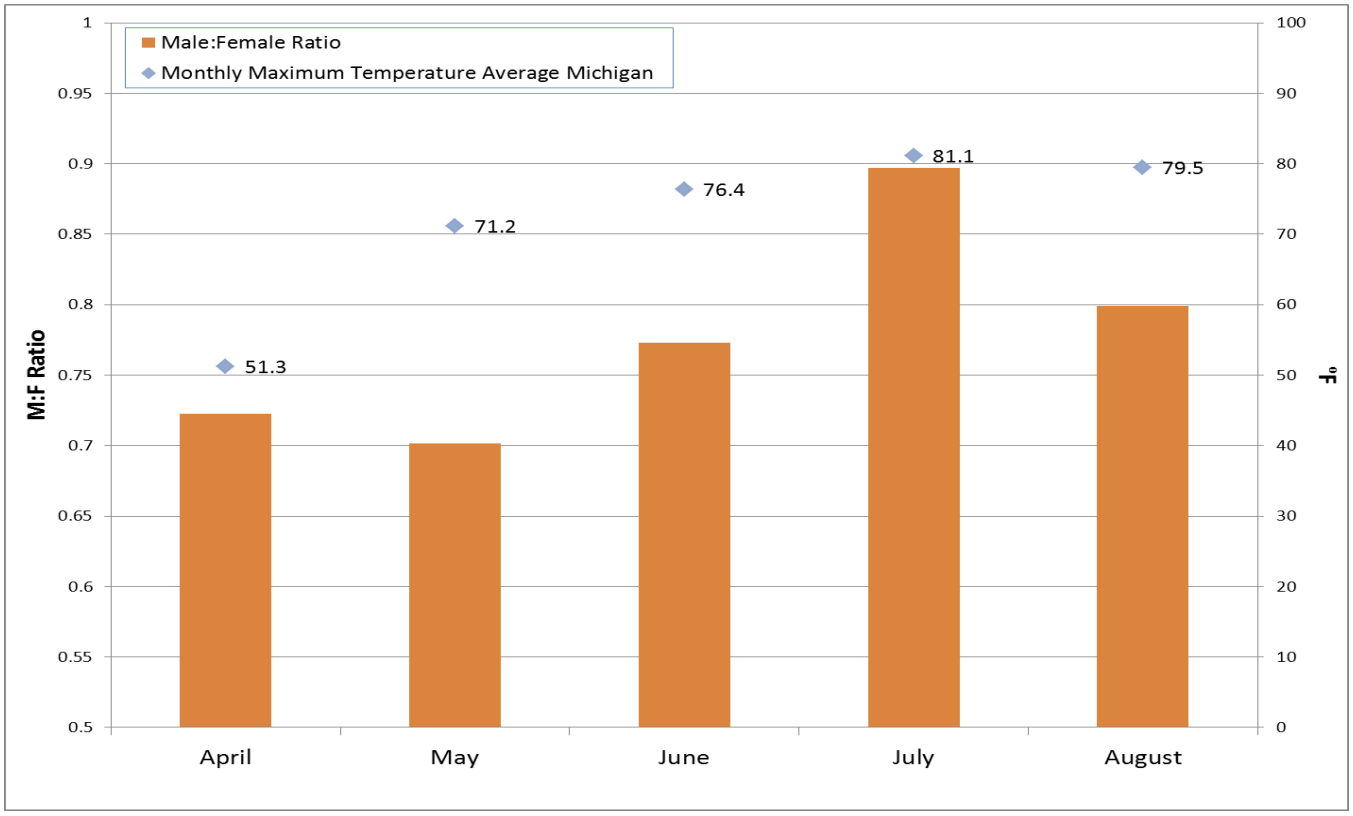

Figure 7: Statewide Heat-Related ED Visits by Syndrome (April 1 – August 31, 2013)

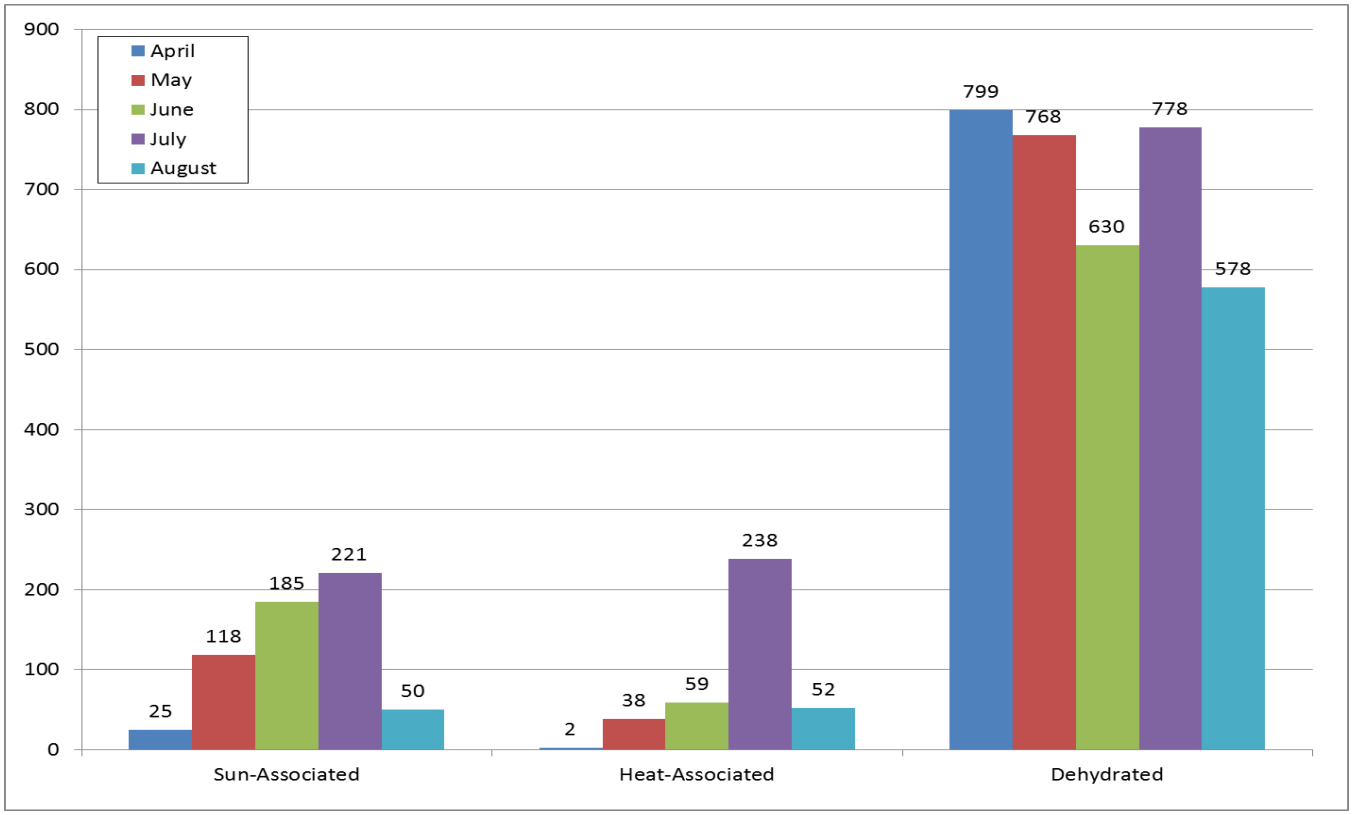

Figure 8: Proportion of Heat-Related ED Visits of all ED Visits
(April 1 – August 31, 2013)

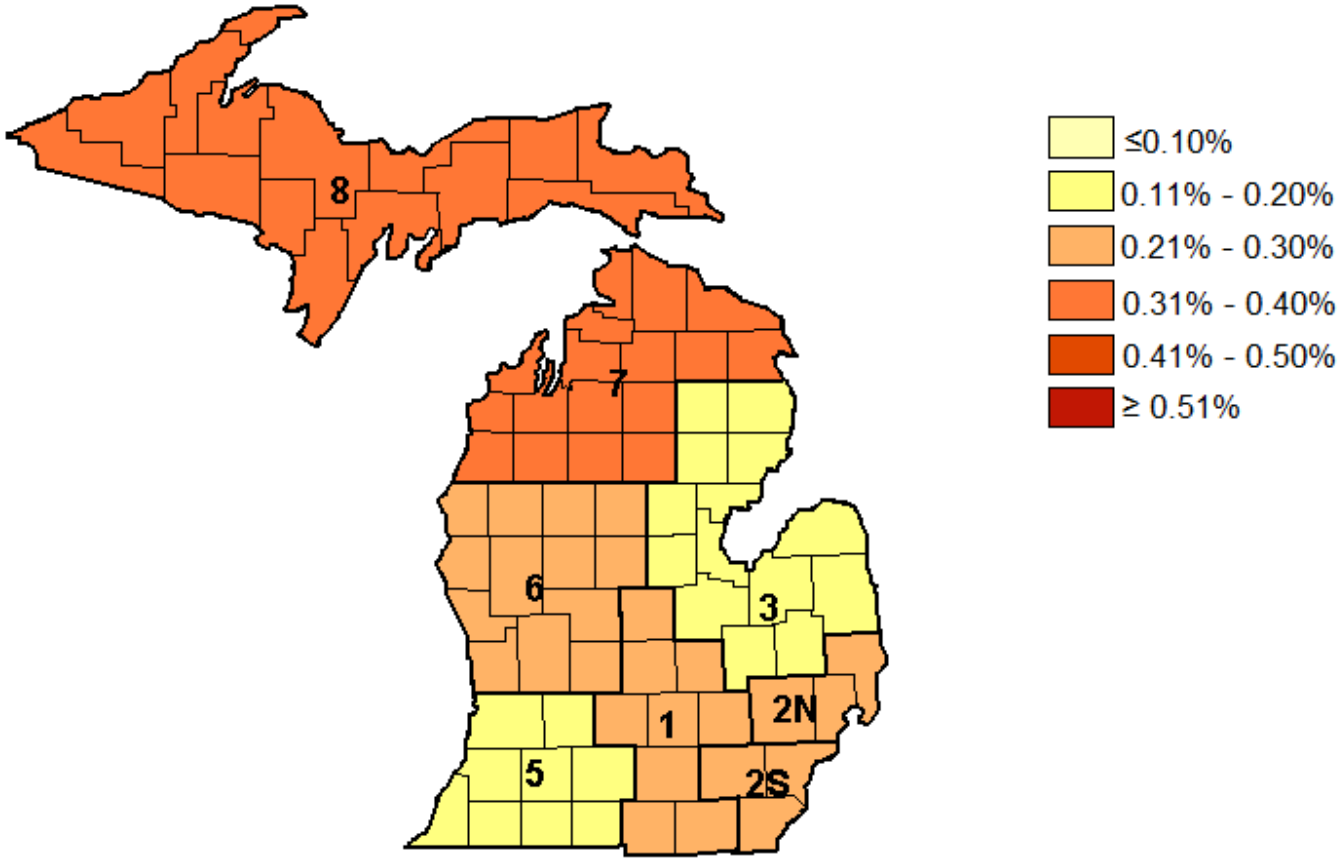

Table 2: Summary of Heat-Related ED Visits by Region **(**April 1 – August 31, 2013)

Region	Heat-Related ED Visits	All ED Visit	Proportion of Heat-Related ED Visits	Distribution of Heat-Related ED Visits Across Regions
1	524	248,482	0.211%	11.54%
2N	832	319,918	0.260%	18.32%
2S	1124	503,790	0.047%	24.75%
3	438	221,386	0.198%	9.65%
5	384	205,490	0.187%	8.46%
6	847	299,551	0.283%	18.65%
7	271	84,011	0.323%	5.97%
8	121	39,798	0.304%	2.66%
Michigan Total	4541	1,922,426	0.236%	100.0%

For past weekly reports on heat-related illnesses in Michigan and for more information on public health and climate change in Michigan, visit MDCH's *Preparing for the Public Health Impacts of Climate Change* website at http://www.michigan.gov/mdch/0,1607,7-132-54783_54784_55975---,00.html

Tips to Avoid Heat Illness:

- Use air conditioning or spend time in air-conditioned locations, when possible. Public authorities may set up cooling centers in your area to provide air-conditioned locations. Call 211 or check with local authorities for more information, including city and county websites.
- Take a cool bath, shower, or swim.
- Minimize direct exposure to the sun.
- Limit time outdoors as much as possible, but take frequent breaks if you must be outside.
- Stay hydrated - drink water or nonalcoholic fluids; try to avoid fluids with caffeine, because they can dehydrate you.
- Wear loose fitting, light-colored clothes.
- Check on your neighbors, friends and family members, especially those who are older, those with very young children, or those who have health problems.
- Never leave children, the elderly, or pets unattended in a vehicle. Even with the windows rolled down, or just for a few minutes, it is never OK to leave anyone in a vehicle in extreme heat.
- Use a fan when the windows are open or the air conditioner is on when the weather begins to heat up. Once the temperature reaches the high 90s, fans will not prevent heat illness.

Understanding Heat Illness:

1. Dehydration is the first stage of heat-related illness. Dehydration occurs when body fluids are lost, and not replaced, by sweating. Symptoms include dry mouth, thirst, headache, dizziness, cramps, excessive fatigue and irritability.

   If you are experiencing dehydration, move to a shaded or air-conditioned area, replace fluids by drinking water, and consult a physician if symptoms persist or if there is an existing condition that could be complicated by increased fluid intake.

2. The next, more serious stage of heat-related illness is heat exhaustion. Heat exhaustion occurs when people exercise heavily or work in a warm, humid place where body fluid loss occurs greatly from sweating. This fluid loss can cause reduced blood flow to vital organs, which results in shock.

   Signs of heat exhaustion include headache, moist and pale skin, nausea, dizziness, weakness and exhaustion. To treat exhaustion, seek shade or a cool place. Drink a half glass of cool water every 15 minutes, remove or loosen any tight clothing, and apply a cool, wet towel or compress. Heat exhaustion can develop into heat stroke, so if symptoms persist or worsen, seek emergency medical treatment.

3. Heat stroke is the most severe stage of heat-related illness. A heat stroke, also called sunstroke, can be deadly. Symptoms include vomiting, decreased alertness level or complete loss of consciousness, high body temperature (sometimes as high as 105 degrees) or red, hot, and dry skin with a rapid, weak pulse.

   Call 911 for immediate medical help and try to cool the person down. If possible, put them in a tub of cool water or shower them with a garden hose.

Source: Michigan Department of Community Health (2013), MDCH Advises Caution in Hot Weather: Simple steps can reduce threat of dangerous heat-related illnesses [Press Release]. Retrieved from http://michigan.gov/mdch/0,4612,7-132-8347-308332--,00.html

Report prepared by:
Fatema Mamou, MPH – Region 6 Epidemiologist mamouf@michigan.gov
Roger Racine, MS – Region 7 Epidemiologist raciner@michigan.gov
Tiffany Henderson, MPH – Manager, Regional Epidemiology Unit
Jay Fiedler, MS – Manager, Surveillance and Infectious Disease Epidemiology Section