Michigan Heat-Related Illnesses

Syndromic Surveillance Summary: July 2, 2018

Executive Summary

There were a total of 262 hospital emergency department (ED) visits in Michigan categorized in the heat syndrome (see description of the data below) during the week of June 24 to June 30, 2018. This represents an 8.7% increase from the previous week (Figures 1 and 4, Table 1) and an average of 37.4 ED visits per day. The Michigan Syndromic Surveillance System generated 1 statewide Heat syndrome alert and 9 county-level Heat syndrome alerts this week (Figure 2). Temperatures were higher on average compared to the previous week as much of the state was under an excessive heat warning or excessive heat watch at the end of the week. (Figure 4, Table 1). The total number of heat-related ED visits to date in 2018 is greater to date when compared to 2017 (Figure 3). Numbers of ED complaints specifically associated with heat and sun can be seen in Figures 6, 7 and 9. Heat-related ED visits during the week ending June 30 increased for the age groups less than 2 years, 18-49 years, and 65 years and older and decreased for those 2 to 4 years, 5 to 17 years, and 50 to 64 years (Figure 5). Compared to previous weekly averages, the male to female ratio of those presenting with heat-related illness during the week ending June 30 was slightly higher overall, and by age group the male to female ratio was elevated for the age groups between 18 years and 64 years (Table 2). The proportion of heat-related ED visits increased for regions 1, 2S, 2N, 6 and 7, and decreased for the other regions compared to the previous week (Figure 8, Table 3). Among those heat-related ED visits, the proportion of sun-associated and heat-associated visits increased for regions 6 and 7 and decreased for the other regions. (Figure 9, Table 4).

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 and categorizes visits into one of ten syndromes based on text in the chief complaint.

Visits assigned to the Heat syndrome including chief complaints with terms such as “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.

A weighting system is used to accurately categorize chief complaints into the correct syndrome when keywords for more than one syndrome are detected in chief complaint text. For example, a chief complaint of “fever and dehydration” would be categorized in the Constitutional syndrome, not the Heat syndrome, because the complaint of fever is of higher significance and therefore given more weight than that of dehydration.

Heat-related illness complaints identified by the heat syndrome were divided into one of three categories 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, e.g. 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 – June 30, 2018)

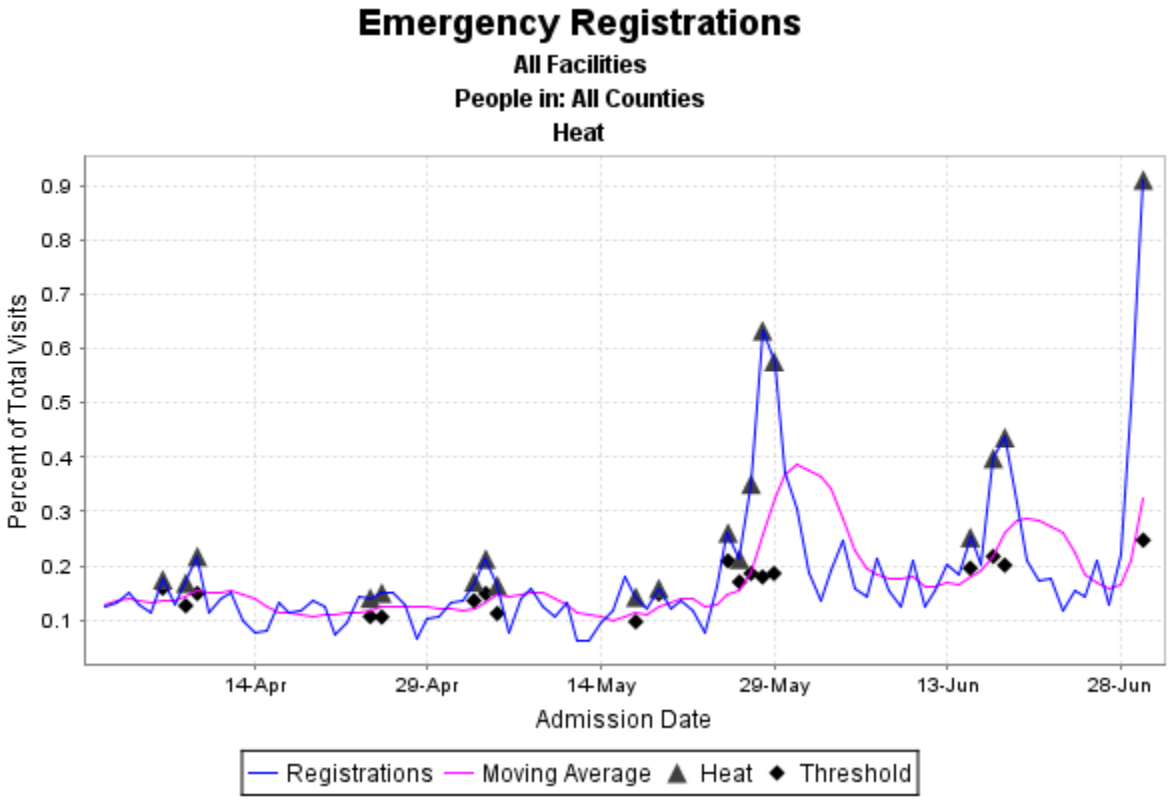


Figure 2: Daily Counts of Statewide and County-Level Heat Alerts (April 1 – June 30, 2018)

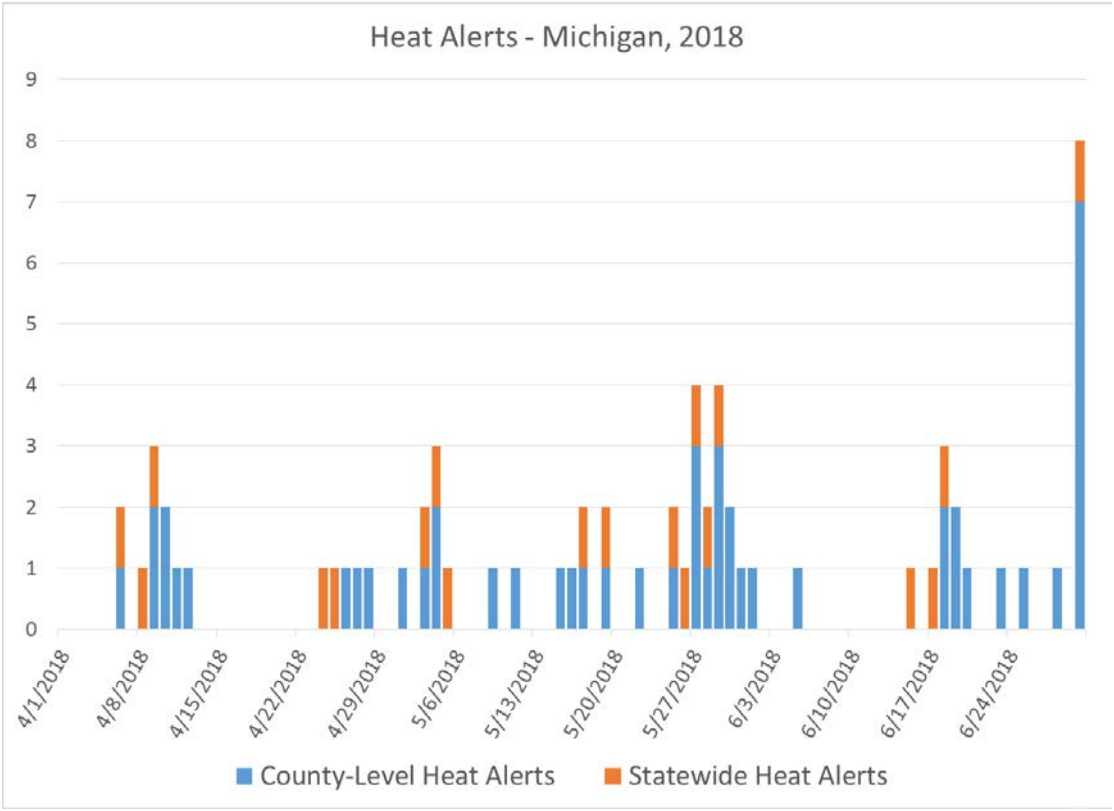


Figure 3: Seasonal (May 15 – Sept 15) Daily Heat-Related ED Visits, 2014 – 2018 (to date)

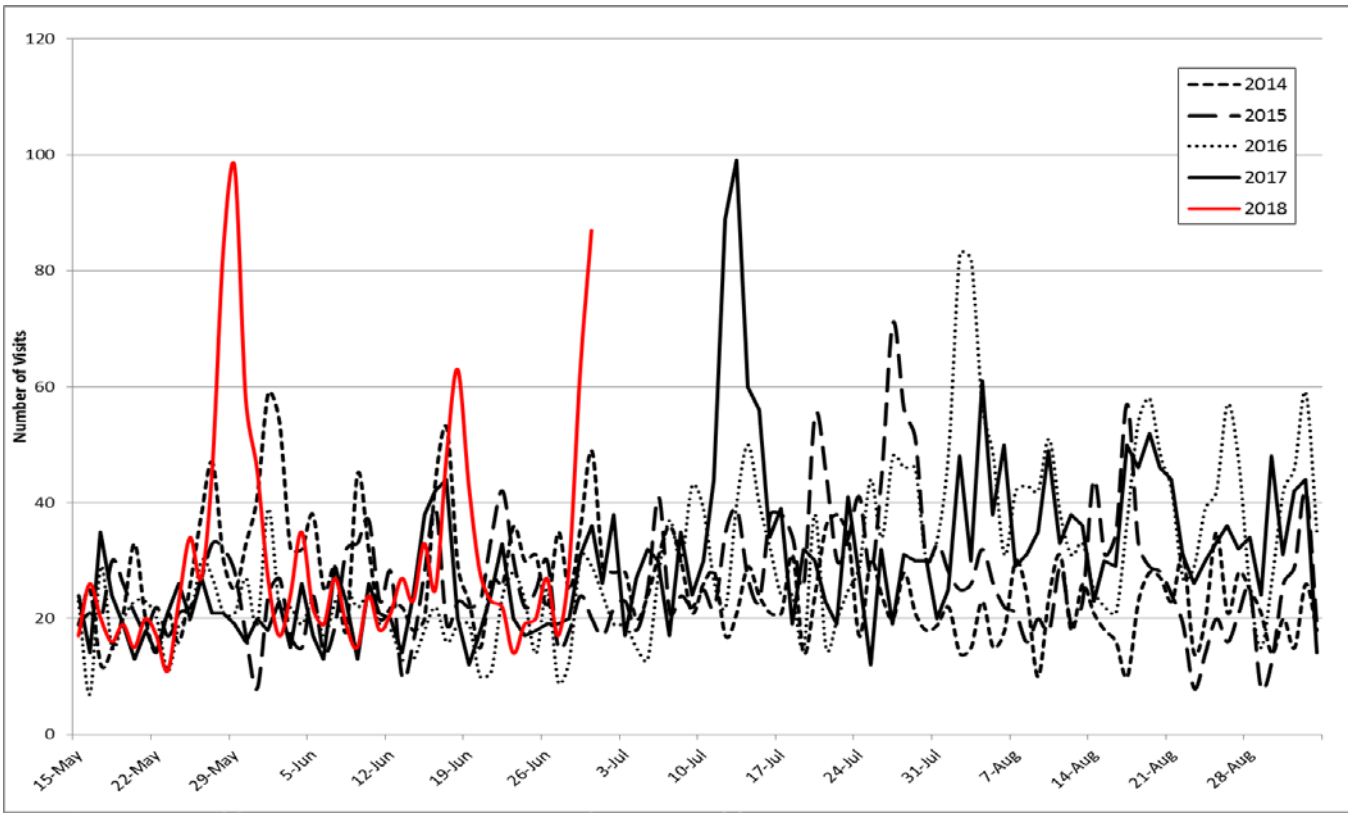


Figure 4: Statewide Heat-Related ED Visits and National Oceanic and Atmospheric Administration (NOAA) Maximum Daily Temperature Averages for 6 Select Cities (April 1 – June 30)

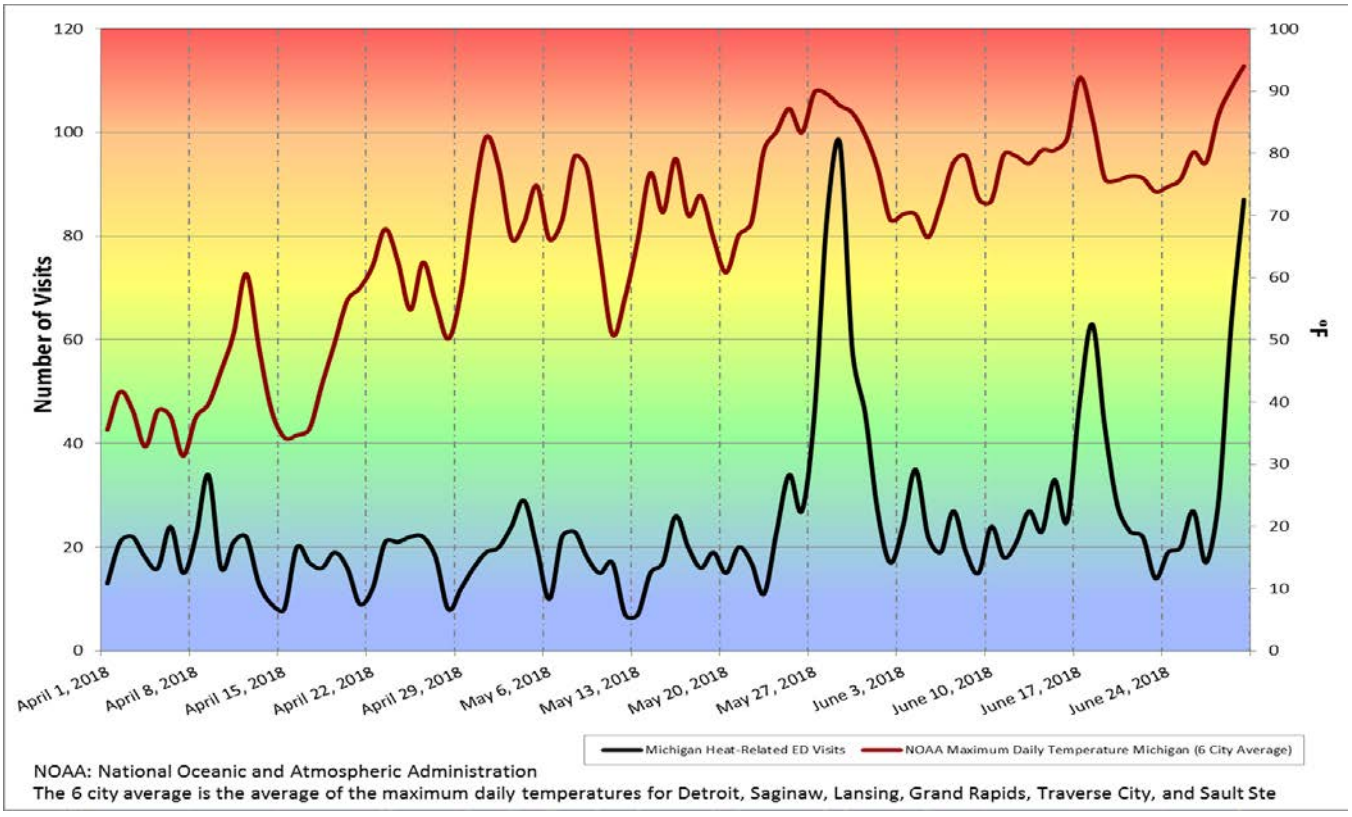


Figure 5: Age Distribution of Heat-Related ED Visits by Week (May 6 – June 30, 2018)

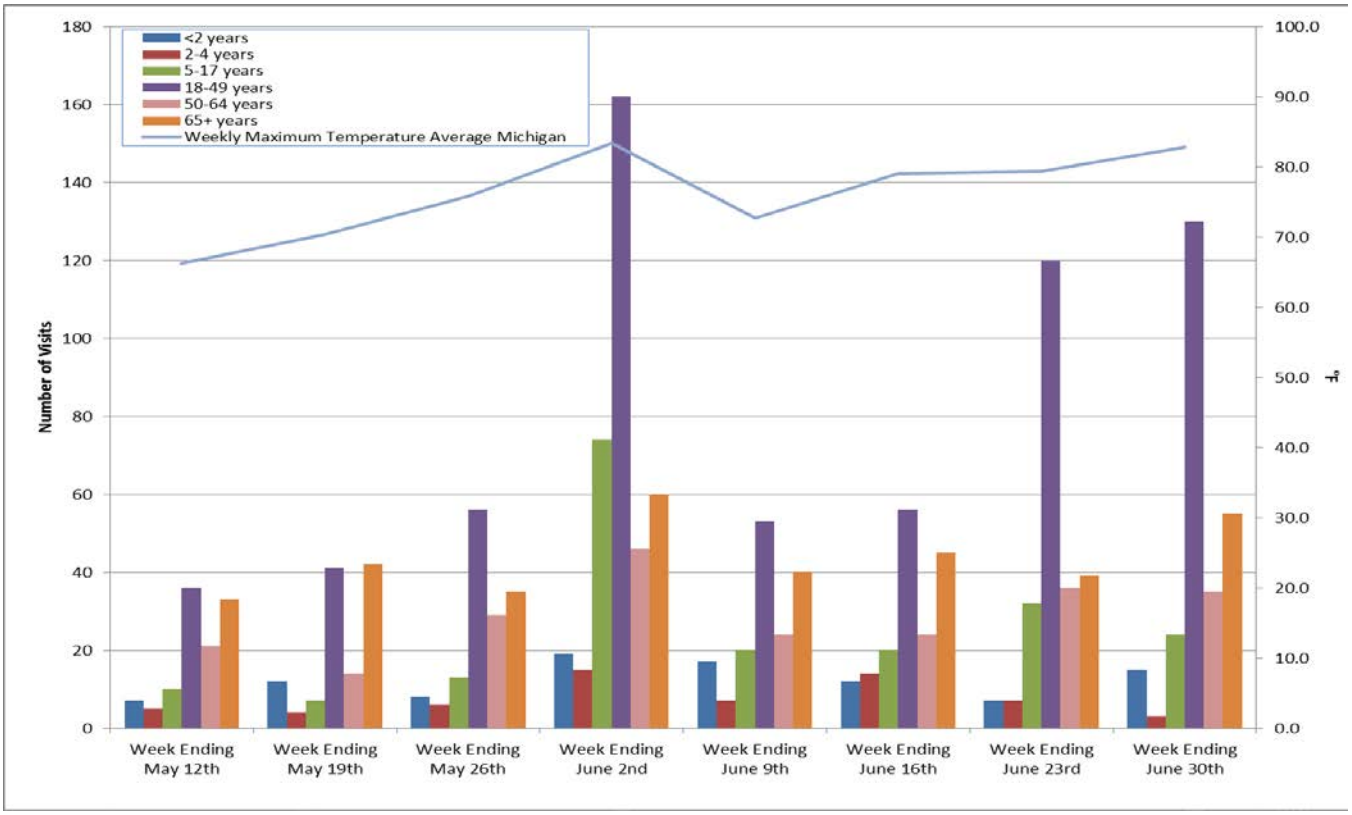


Table 1: Weekly Heat-Related ED Visits and Average Weekly Maximum Temperatures (Past 4 Weeks)

Week	Total Heat-Related ED visits	Average Weekly Max. Temps (°F)
June 3 – June 9	161	74.1
June 10 – June 16	171	79.9
June 17 – June 23	241	79.4
June 24 – June 30	262	82.8

Table 2: Heat-Related ED Visits by Age and Gender, Current Week Compared to the Weekly Average

	Weekly Average (April 1 – June 23)			Current Week (Week Ending June 30)		
	Gender		Male to Female Ratio	Gender		Male to Female Ratio
Age Group	Male	Female		Male	Female	
<18 years	23	18	1.22	21	21	1.00
18-34 years	16	21	0.78	43	43	**1.00**
35-49 years	9	12	0.77	26	16	**1.63**
50-64 years	12	12	1.00	21	14	**1.50**
65+ years	20	20	1.03	20	34	0.59
Total	80	83	0.97	131	128	**1.02**

Bold indicates a Male to Female Ratio that is higher when compared to the average. Our data from previous years suggests than an increase in males presenting to EDs with heat-related illnesses may be characteristic of a heat event.

Figure 6: Statewide Heat-Related ED Visits by Syndrome (April 1 – June 30, 2018)

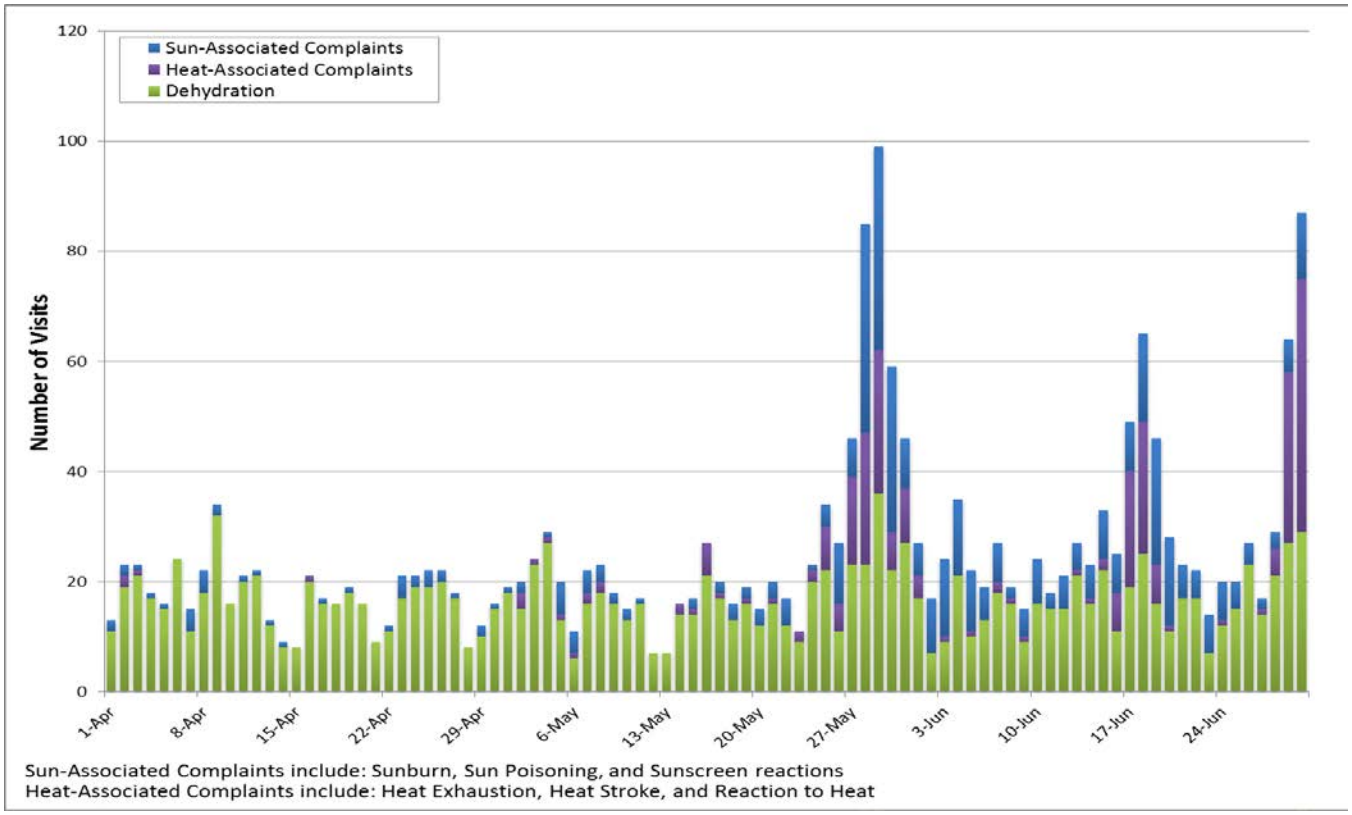


Figure 7: Statewide Heat-Related ED Visits by Syndrome Excluding Dehydration (April 1 – June 30, 2018)

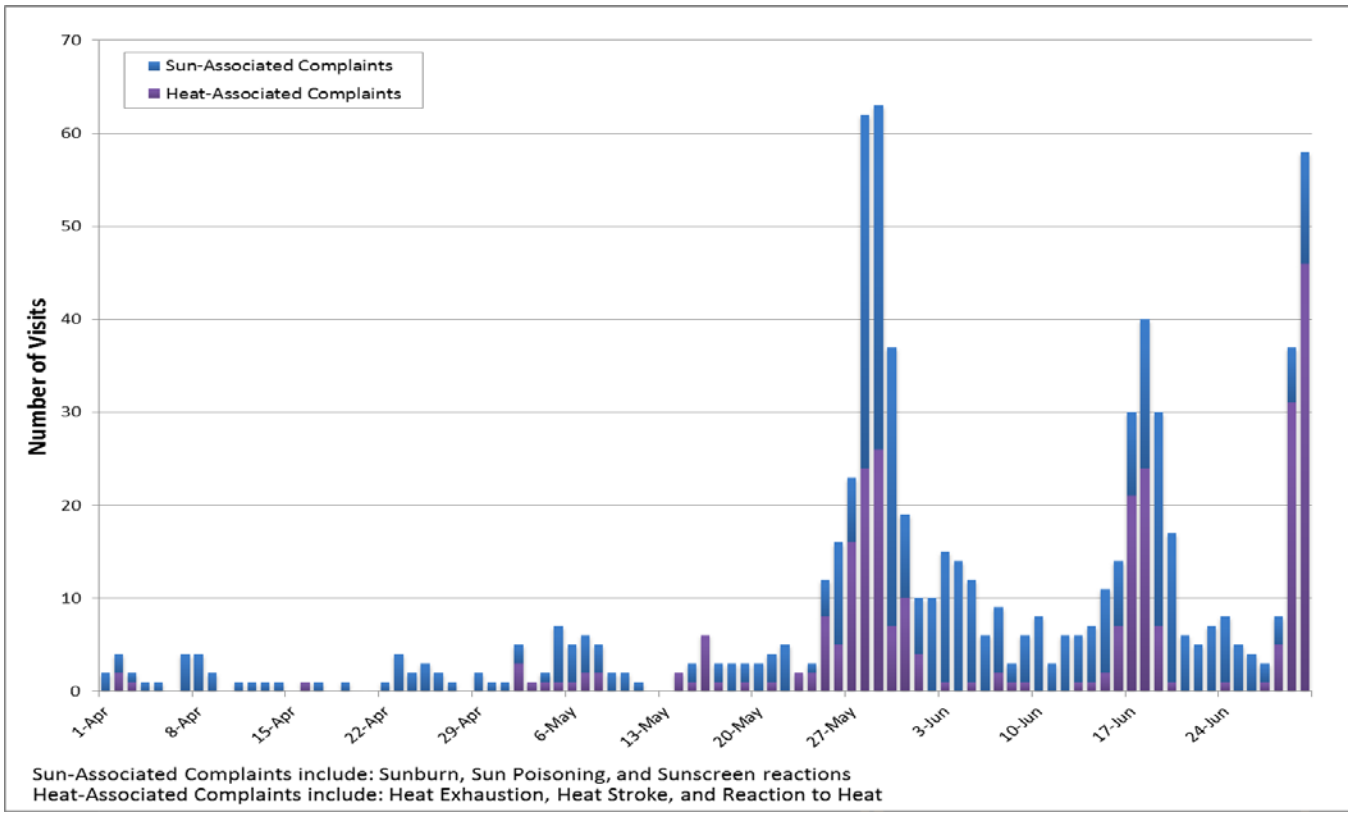
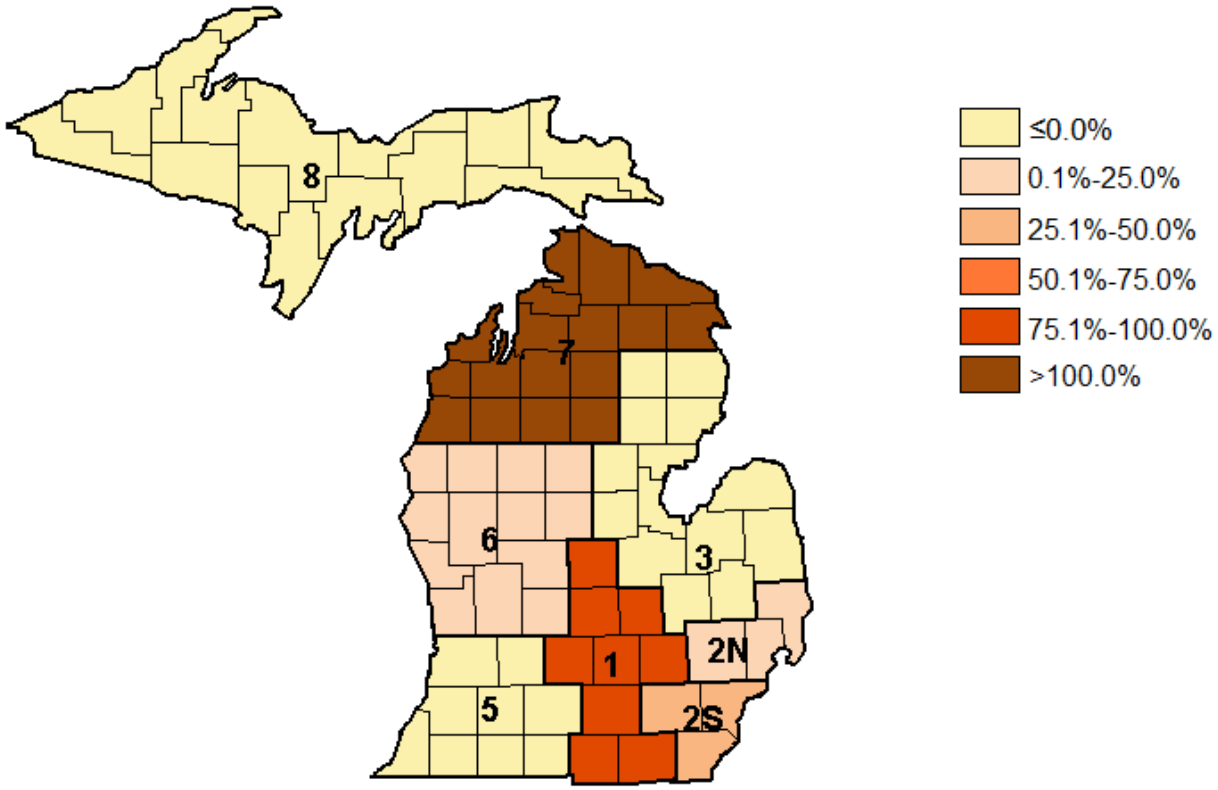


Figure 8: Percent Change of Heat-Related Emergency Department Visits by Region: Current week compared to the previous week



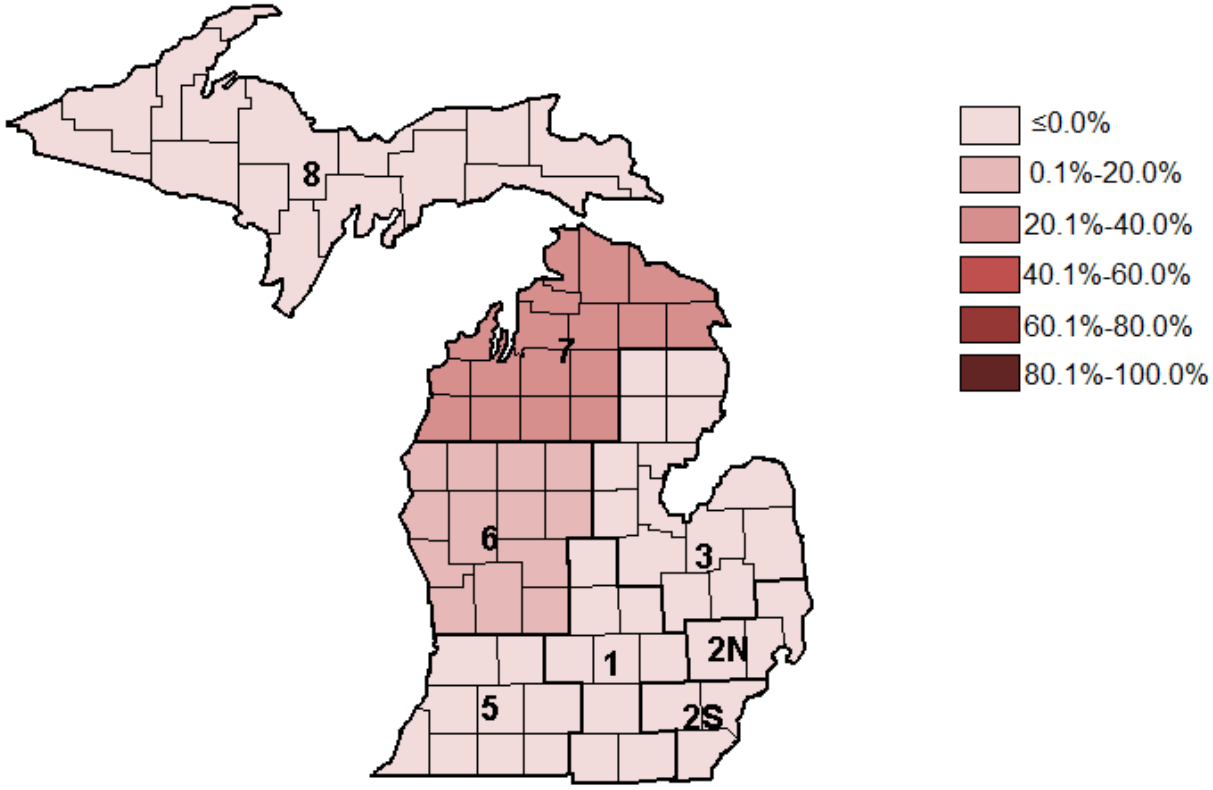
This regional map indicates the percent change in the normalized values of heat-related emergency department complaints from the previous week ending June 23, 2018, to the current week ending June 30, 2018.

Table 3: Number and percent of heat-related visits by region

Region	Week Ending June 23		Week Ending June 30		% Change
	# of Visits	% of All ED Visit	# of Visits	% of All ED Visit	
1	21	0.271%	40	0.516%	90.53%
2N	37	0.238%	42	0.283%	18.96%
2S	58	0.227%	69	0.290%	27.52%
3	29	0.206%	20	0.149%	-27.47%
5	40	0.428%	19	0.211%	-50.76%
6	42	0.294%	43	0.309%	5.11%
7	9	0.245%	25	0.654%	167.02%
8	5	0.267%	4	0.218%	-18.21%

Note: Very low rates are sensitive to small changes in the numerator (heat-related illness visits) and dramatic rate movements should be expected. Fluctuations in the total number of ED visits (denominator) unrelated to heat illnesses can also strongly impact rate comparisons and introduce bias.

Figure 9: Risk Difference of Heat-Related Emergency Department Visits Due to Heat-Associated and Sun-Associated complaints by Region: Current week compared to the previous week



The regional map indicates the weekly difference in the proportion of sun/heat-associated ED visits out of all heat-related visits (sun/heat-associated and dehydration) from the previous week ending June 23, 2018, to the current week ending June 30, 2018.

Table 4: Number and percent of heat-associated and sun-associated visits by region

Region	Week Ending June 23		Week Ending June 30		Risk Difference
	# of Heat-Associated and Sun-Associated Visits	Proportion of All Heat-Related Visits	# of Heat-Associated and Sun-Associated Visits	Proportion of All Heat-Related Visits	
1	14	66.7%	20	50.0%	-16.7%
2N	16	43.2%	15	35.7%	-7.5%
2S	23	39.7%	26	37.7%	-2.0%
3	14	48.3%	9	45.0%	-3.3%
5	33	82.5%	13	68.4%	-14.1%
6	22	52.4%	24	55.8%	3.4%
7	2	22.2%	11	44.0%	21.8%
8	5	100.0%	3	75.0%	-25.0%

Report prepared by:
Fatema Mamou, MPH – Region 6 Epidemiologist mamouf@michigan.gov
Tiffany Henderson, MPH – Manager, Regional Epidemiology Unit