

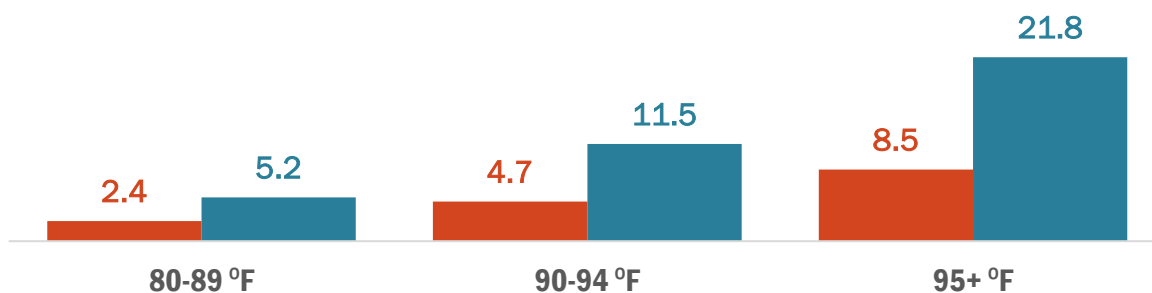
As the climate continues to change, people who live in Vermont will experience more days with hot temperatures. Everyone who lives in Vermont is at risk for heat-related illness, but the risks are greatest for older adults and young children, people experiencing chronic health conditions or disabilities, people who are unhoused, work, or recreate outside, people who do not have access to air conditioning, and people who are socially isolated. Improving our understanding of how heat impacts health in Vermont can help us to prepare for hot weather and keep people safe.

People who live in Vermont are more sensitive to heat.

Since Vermont is still a generally cool place, people living here tend to be less resilient to the effects of heat than people who live in places with more frequent high temperatures. The data analysis summarized below shows how the health of people who live in Vermont is affected by the heat index – the “what it feels like” temperature. The heat index takes both the air temperature and relative humidity into account. This is important because when relative humidity increases, it makes it harder for sweat to evaporate, which makes it harder for people to cool off.

As the data below show, heat starts to impact health in Vermont at heat index values in the 80s. There are more emergency department visits for heat-related illnesses when people have not had a chance to acclimate, or adjust, to hot temperatures. For example, rates of heat-related emergency department visits are about twice as high in the blue bars below (when the week before has been cool) compared to the orange bars below (when the week before has been warm).

The risk of heat impacting health increases as the heat index increases. The risk is greater when it has been relatively cool the week before a hot day compared to when it has been relatively warm the week before a hot day.



Rates of heat-related emergency department visits when the heat index is above 80 °F compared to the rate when it is less than 80 °F. A cool week is one in which the weekly average high temperature is less than 80 °F. A warm week is one in which the weekly average high temperature is 80 °F or hotter.

KEY POINTS

- Heat impacts health in Vermont even at relatively low heat index values.
- There are more emergency department visits when the weather has been relatively cool and then it suddenly gets hot.
- Heat-related illnesses may reach extreme levels when multiple risk factors occur at the same time.

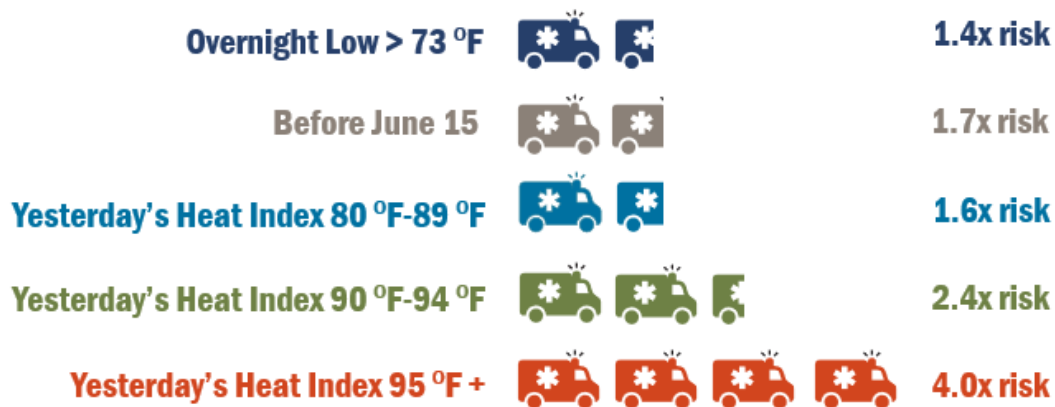
Heat and Health

There was a 3 to 5% increase in risk for all-cause emergency department visits on days when the heat index was above 80°F. This is because – in addition to causing heat exhaustion or heatstroke – exposure to heat can make symptoms of chronic conditions, like asthma or heart disease, worse.

The relationship between heat index and increased risk for emergency department visits varies across the state, depending on what the “normal” hot conditions are for a given area. People’s bodies, buildings and behaviors adapt to normal conditions. When heat index values exceed normal hot conditions for an area, health risks increase substantially. Excessive heat is often defined locally as heat index values that exceed 95% of the hottest days over the past 30 years, so [excessive heat thresholds in Vermont](#) vary widely by county. As a result, heat index values above 85°F may cause similar health impacts for people living in Washington County as would heat index values above 91°F for people living in Chittenden County.

More than one hot day in a row, warm overnight temperatures, and other factors can increase risk in addition to the current day’s heat index.

When we think about the overall risk of heat-related illness, we need to consider more than just the heat index today. For example, how warm was it yesterday? Did it cool off overnight? You can see below how certain risk factors increase the risk of Vermonters going to the emergency department.



Comparison groups: overnight low greater than 73 °F compared to less than 73 °F; before June 15 compared to after June 15; all prior day heat index categories compared to heat index less than 80 °F.

What does this mean?

The examples below provide estimates of expected health impacts related to potential hot weather scenarios. Note that when more than one risk factor occurs at the same time, their interaction has a more dangerous multiplicative effect on the risk of heat-related illness, rather than just an additive effect.

Normal Summer Day

It is mid-August, and the last week has been relatively cool. The heat index was 78 °F yesterday. It was 65 °F overnight. The heat index will be 79 °F today.



Expected Number of Heat-Related Emergency Department Visits: 0.2

Typical Summer Heat Wave

It is July and the last week has been relatively warm. The heat index was 95 °F yesterday. The overnight low temperature was 74 °F and the heat index today will be 96 °F.



Expected Number of Heat-Related Emergency Department Visits: 5

A Single Hot Day in May

It is May and the last week has been cool. The heat index was 80 °F yesterday. The overnight low temperature was 68 °F and the heat index today will be 95 °F.



Expected Number of Heat-Related Emergency Department Visits: 8

A Major Early Heatwave

It is May and the last week has been cool. The heat index was 95 °F yesterday. The overnight low temperature was 74 °F and the heat index today will be 96 °F.



Expected Number of Heat-Related Emergency Department Visits: 42

How did we do this?

We analyzed data from the Vermont Hospital Discharge Dataset and National Weather Service temperature stations. We included heat-related illnesses that occurred during the warm season (defined as May through September) from 2009 to 2019. We used regression models to explore how factors like same-day heat index category, overnight low temperature, and time in the warm season impacted the number of heat-related and all-cause emergency department visits.

Key Takeaways

This analysis allowed us to learn more about factors that contribute to the magnitude of heat impacts on health in Vermont. These findings will allow us to better coordinate with partners like the National Weather Service, Regional Planning Commissions, and Vermont Emergency Management to identify action thresholds for emergency response activities. In addition, we are better able to provide specific and actionable public outreach during hot weather events.

There are many factors that influence risk of heat-related illness in Vermont.

Data Sources: Vermont Uniform Hospital Discharge Data Set (VUHDDS), 2009-2019. VUHDDS is stewarded by the Green Mountain Care Board. National Weather Service Temperature Stations, 2009-2019.

All findings above were statistically significant (using a p-value cut off of 0.05).

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