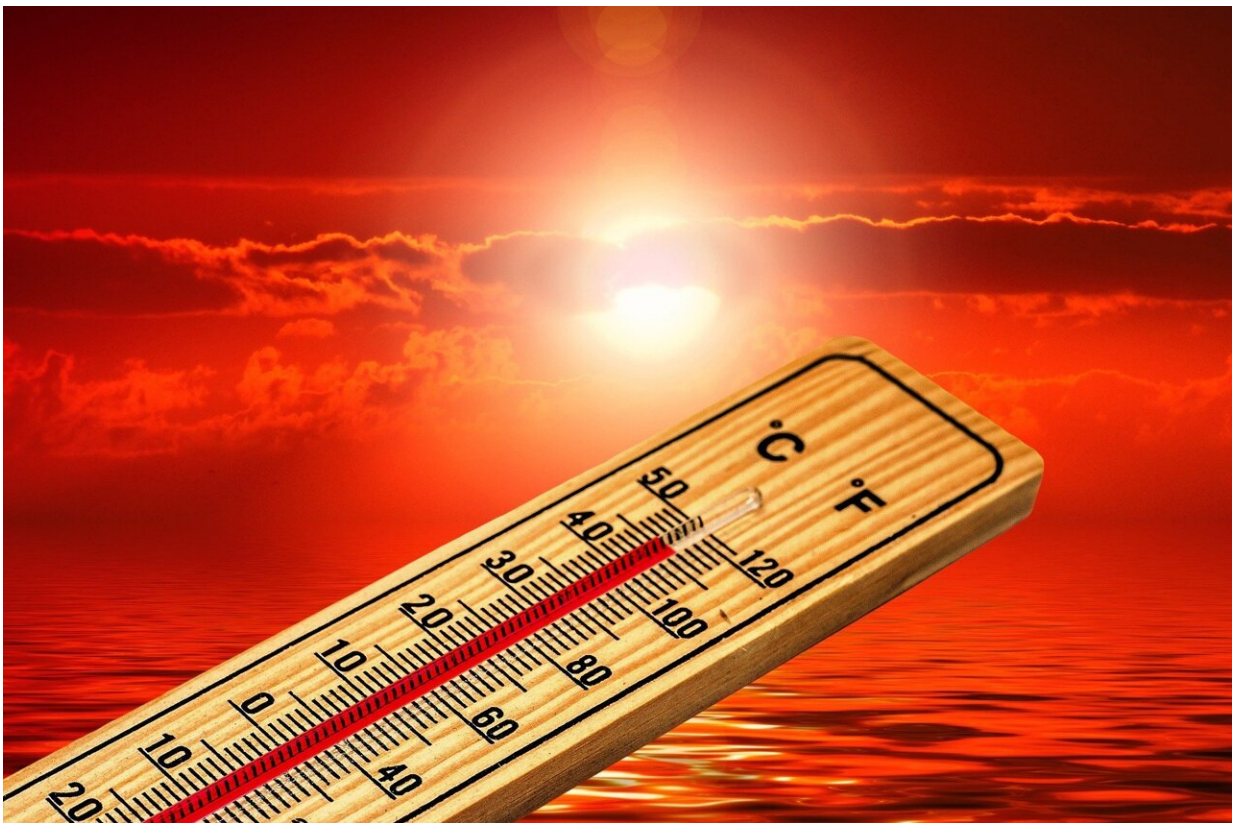


# Researcher examines extreme heat, multiple sclerosis link

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Public health scientist Naresh Kumar found that clinical visits by multiple sclerosis patients to Veterans Affairs medical centers increased during months associated with warmer weather and high humidity.

With sweltering temperatures still enveloping much of the nation, a University of Miami public health scientist has released the results of a new study that shows patients with multiple sclerosis (MS) may experience a worsening of their symptoms when exposed to extreme heat.

"We've known for quite some time that neurological symptoms of multiple sclerosis can be exacerbated as a result of exercise that increases [core body temperature](#) and metabolism," said Naresh Kumar, a professor of environmental health at the Miller School of Medicine "But what we don't have a lot of data on is the relationship between ambient meteorological conditions and symptoms of the disease," he said.

Multiple sclerosis is a progressive neurological disease in which the body's own immune system eats away at the protective covering of nerves. The disease affects the brain and spinal cord, and symptoms can include weakness, tingling, numbness, and blurred vision.

In his recent study, "Heat Exposure and Multiple Sclerosis—A Regional and Temporal Analysis," Kumar and colleagues found that between January 2010 and December 2013, the number of clinical visits by multiple sclerosis patients to the nation's Veterans Affairs medical centers increased substantially during months associated with [warmer weather](#), soaring humidity rates, and huge temperature swings, with visit rates varying across different regions of the country.

For example, the highest frequency of MS clinic visits occurred in March (an 8.9 percent increase), followed by August (8.8 percent). Winter months, on the other hand, saw relatively low rates of MS clinic visits, with December (7.7 percent) recording the lowest.

Across geographic regions, the Pacific Northwest saw the highest MS clinic visit rate (67.6 per 10,000 patient visits), followed by the

Northeast (64 per 10,000) and the subtropical U.S. (46.8 per 10,000 patients). The lowest MS clinic visit rates, Kumar noted, were observed in the Lower Midwest (15.1 MS clinic visits per 10,000 patients), followed by the Upper Midwest (24.6 per 10,000).

Temperature variability, or the rate at which temperature changes day to day or month to month within a single year, most likely had an effect on increased rates of clinical MS visits, Kumar said. "For example, we observed a significant change in temperature in the month of March, a transition month between a long winter and spring season, which corresponded with the highest frequency of MS clinic visits," he explained.

"Miami is subtropical, so we are used to the [high humidity](#) and high temperatures," Kumar continued. "In other areas of the country that undergo massive swings in temperatures in a short time, some patients might not be used to it. In our analyses, temperature variation was the strongest predictor of visit risk among all variables, both at the national and regional level."

For the study, Kumar and his colleagues relied on Veterans Affairs medical data, reviewing the clinical visits of a total of 27,290 patients with multiple sclerosis, many of whom had multiple doctor appointments at VA health care facilities during the study period. Most of the subjects were white, non-Hispanic males (75.2 percent), followed by Black males (18.3 percent).

Kumar and his group also used meteorological data from the National Climatic Data Center for the period 2009 to 2014.

Published in the *International Journal of Environmental Research and Public Health*, Kumar's findings could guide region-specific strategies to manage multiple sclerosis and its associated comorbidities, such as

providing heat advisories and critical information on sudden changes in local weather to MS patients and health care providers.

"Managing individuals with chronic diseases requires a multimodal approach. In addition to medical therapy, it is important to understand how environmental conditions impact specific diseases so that individuals may make appropriate lifestyle modifications," said Anat Galor, a professor of ophthalmology at Bascom Palmer Eye Institute of the UHealth–University of Miami Health System, who is co-author of the study. "In this paper, we demonstrate that change in temperature, measured as standard deviation of temperature, correlated with multiple sclerosis hospital visit risk."

Galor, who is one of the lead investigators on an upcoming study that examines the relationship between temperature variation and allergic conjunctivitis, said patients with MS should consider regulating their indoor temperature and avoiding exposure to unstable outdoor weather conditions when possible.

Kumar stressed that his study focused on the clinical visits of a specific group of patients—veterans—and that further investigation into the link between weather-related heat and worsening symptoms of multiple sclerosis and other diseases should be pursued. "With global warming leading to more intense [heat](#) waves, the need for more research in this area becomes even more paramount," he said.

**More information:** Gill Chacko et al, Heat Exposure and Multiple Sclerosis—A Regional and Temporal Analysis, *International Journal of Environmental Research and Public Health* (2021). [DOI: 10.3390/ijerph18115962](https://doi.org/10.3390/ijerph18115962)

Provided by University of Miami

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