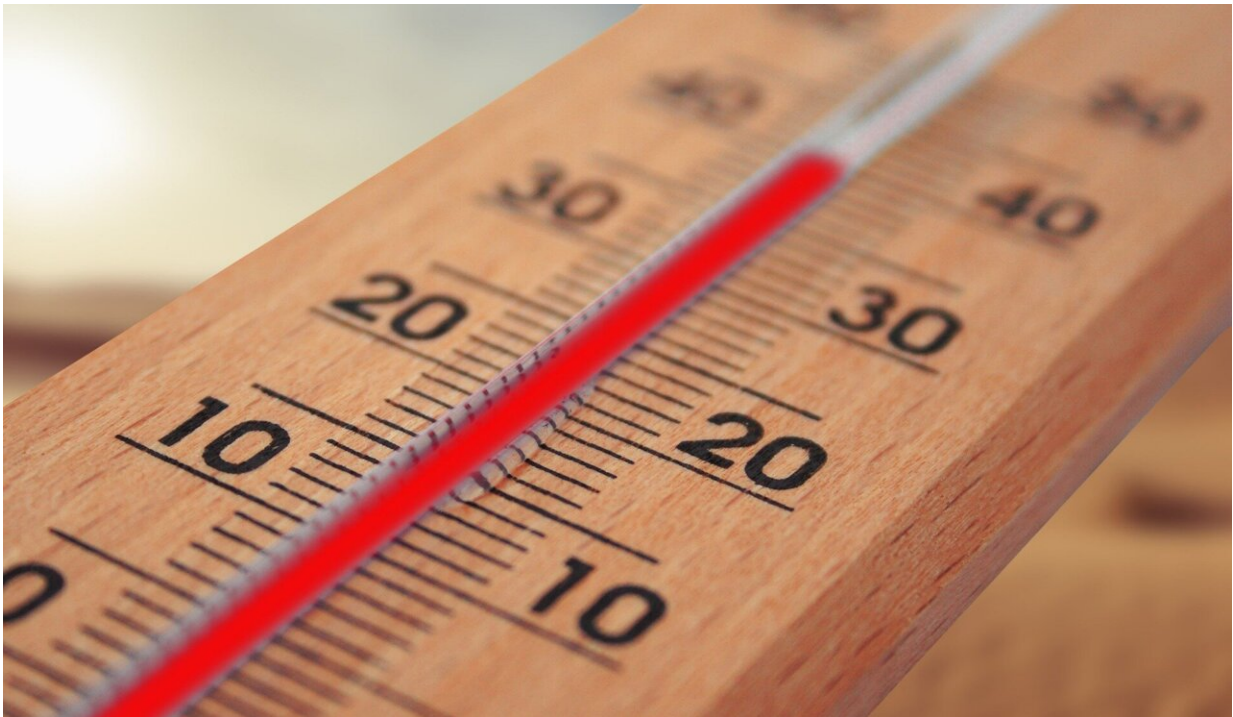


Climate change may be keeping patients from vital doctor appointments

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Temperature extremes, becoming increasingly frequent due to growing global climate change, are associated with higher rates of missed primary care appointments, according to a recently [published study](#) by Drexel University researchers in the *American Journal of Preventive Medicine*.

The researchers found that rates of missed appointments increased by 0.72% for every 1°F decrease in daily maximum temperatures below 39°F and increased by 0.64% for every 1°F increase above 89°F. Patients 65 and older and those with [chronic conditions](#) had stronger associations with an increased rate of missed appointments.

"These findings should be a clarion call for clinical teams, including their practice managers, to adapt to ensure care access for patients before the problem gets worse," said senior author Nathalie S. May, MD, a professor at Drexel University College of Medicine.

The team tallied 1,048,575 appointments from 91,580 [adult patients](#) at 13 university outpatient clinics in Philadelphia from Jan. 2009 through Dec. 2019 and linked those with daily maximum temperature and [precipitation data](#) from the National Oceanic and Atmospheric Administration. The group controlled for seasonal trends, sociodemographic attributes and chronic disease status.

"During the COVID pandemic, telemedicine became an integral part of health care delivery," said Drexel College of Medicine Clinical Associate Professor Janet H. Fitzpatrick, MD, one of the lead authors on the study. "With worsening climate change, this study supports advocating for permanent telemedicine coverage as an option to ensure patients can get the care they need."

Telemedicine has been linked with a [13% lower odds](#) of missed appointments in a study of patients at Federally Qualified Health Centers.

The Earth's temperature has increased 0.11 degrees Fahrenheit each decade, on average, since 1850, although the rate of warming has more than tripled in recent decades—0.36 degrees every 10 years since 1982. Some estimates suggest the global average temperature could increase by

as much as 9 degrees Fahrenheit [in the next 76 years](#).

"Extreme temperatures from climate change threaten the health and well-being of all patients with chronic health conditions," said May. "We must be especially vigilant for our most vulnerable patients who may not have the resources to combat extreme heat or extreme cold stretches. In studying the impact of climate change in primary care utilization, we hope to promote policies that support health and equity in light of the negative effects of climate change, especially in cities."

The researchers took the data a step further, looking at ZIP code data from the American Community Survey's social deprivation index (SDI)—a measure of disadvantage or social deprivation that factors in seven attributes like poverty rate, [education level](#), percent living in rented units and other factors—but found no statistically significant association between higher SDI and rates of missed appointments.

Although the lack of association with SDI was surprising to the authors, 87% of the study's patients had [private insurance](#), so the authors caution that this measure might not be an accurate way to assess an individual patient's SDI and how it affects their likelihood to miss medical appointments.

Numerous studies link climate change with many health problems, including [chronic kidney disease](#), asthma, heart disease, violent crime, worsening mental health, and other conditions.

The current study is among very limited data available that suggests extreme weather can impact primary care visit attendance. The data in this paper contrasts with a 2014 paper in the journal *Decision Support Systems* that found [no significant link](#) between weather and missed primary care appointments.

Additional studies into the causes of no-show appointments suggest that factors such as previous no-shows, day of the week, use of automated reminders, and average temperature can play a role in attendance.

The authors say future studies would benefit from evaluating how transportation access influences missed appointment rates.

"When patients don't show up at appointments, they damage their own health, and also cause downstream consequences for others," said Fitzpatrick. "No-shows waste valuable appointment slots that could be used for others anxiously awaiting appointments and can lead to decreased patient satisfaction due to longer wait times. It also makes our nation's health care system more expensive, due to increased use of urgent care and emergency room visits, and poorer management of chronic illness, leading to more medical care needed in the future."

In addition to May and Fitzpatrick, Adrienne Willard, Janelle R. Edwards, Meera N. Harhay, Leah H. Schinasi and Janet Matthews contributed to this research.

More information: Janet H. Fitzpatrick et al, Time Series Analysis: Associations Between Temperature and Primary Care Utilization in Philadelphia, Pennsylvania, *American Journal of Preventive Medicine* (2024). [DOI: 10.1016/j.amepre.2024.06.014](https://doi.org/10.1016/j.amepre.2024.06.014)

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