

# Forehead thermometers may miss fevers in black patients

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Thermometers that read body temperature via the forehead have become

a common sight throughout the pandemic, but whether they always spot a fever may depend on the color of someone's skin.

In a new study, researchers found that, similar to problems seen with [pulse oximeters](#), temporal thermometers are less accurate at detecting fevers in Black people.

"The finding of racial bias in one category of devices could have been an anomaly. The finding of bias in thermometers as well leads to the important question of what other medical devices or diagnostics could be failing our patients," study author Dr. Sivasubramaniam Bhavani told *CNN*. He is an assistant professor in the division of pulmonology, allergy, critical care and [sleep medicine](#) at the Emory University School of Medicine in Atlanta.

Up to 23% of fevers in Black people may go undetected, Bhavani said.

The study, which also included researchers from the University of Hawaii's John A. Burns School of Medicine in Honolulu, used data from 2,031 Black patients and 2,344 white patients at four Emory hospitals between 2014 and 2021.

While [fever](#) was detected in just over 10% of Black patients when using a [temporal thermometer](#), that was lower than the 13.2% detected using an oral thermometer. By comparison, temporal thermometers detected fever in 10.8% of white patients, while oral thermometers found fever in 10.2% of white patients.

The concern is that not detecting fever in people who may have one could lead to poor medical care.

"If fevers are going undetected, then notifications are being missed, and these missed notification pathways could lead to delays in [antibiotics](#) and

could lead to worse outcomes for Black patients," Bhavani said.

"In the outpatient and community setting, missed fevers could lead to delayed diagnosis, which could be especially important during surges of the pandemic. If schools, churches and workplaces were using temporal thermometers to screen for fevers, this likely led to undetected fevers in a significant percentage of Black people," he added.

This could be an issue with any [medical equipment](#) that uses infrared sensing, *CNN* reported.

Devices such as temporal thermometers and pulse oximeters emit and capture light to make their measurements. Temporal thermometers measure heat energy, but skin pigmentation can affect how the light is absorbed if the equipment isn't calibrated for darker skin tones.

The new findings were published Sept. 6 in the *Journal of the American Medical Association*.

"As someone who has been involved in this work and has found something similar in a different diagnostic tool—[pulse oximetry](#)—unfortunately, I'm not surprised," said Dr. Tom Valley, an assistant professor in the University of Michigan's division of pulmonary and critical care. "We don't know whether these problems exist unless we look for them, and if we don't look for them, we're not going to identify these problems. If we don't identify these problems, we can't fix them, and so that's part of the issue. We don't know how far this goes. We don't know how deep this goes, this racism within health care."

The study did not analyze why [racial differences](#) exist in temporal thermometer accuracy, but it could suggest they weren't sufficiently tested in people with dark skin, *CNN* reported.

It may be that the thermometers "depend heavily" on the user taking the temperature correctly, Dr. Ashraf Fawzy, an assistant professor of medicine at Johns Hopkins Medicine in Baltimore, told *CNN*.

"It may be that users of the device are placing the [thermometer](#) in the wrong location more often on Black patients, leading to inaccurate readings," Fawzy said. "The findings are certainly surprising. Unlike pulse oximeters, it is generally well known that temporal [thermometers](#) are less accurate and reliable, however I personally never considered that this inaccuracy may be different between Black and white patients."

Dr. Leo Anthony Celi, clinical research director and principal research scientist at the MIT Laboratory for Computational Physiology in Cambridge, Mass., said the findings illustrate why it is important for research to be more inclusive.

"It's not as simple as it sounds, though. Historically, it is more difficult to recruit people of color or underrepresented individuals to [clinical trials](#) because of the problems that we have seen in the past where they were abused," Celi said.

But overall, "it really reflects the much bigger systemic problem that we have now in the way we design, we innovate, we develop health products—not just [medical devices](#), but also medications and interventions," he said. "We really need to step up in terms of making sure that the research we perform is [more inclusive](#) so that we avoid these unintended consequences of the technology that we develop."

**More information:** The U.S. National Library of Medicine has more on how [pulse oximeters](#) may have a higher error rate in Black patients.

Sivasubramaniam V. Bhavani et al, Racial Differences in Detection of Fever Using Temporal vs Oral Temperature Measurements in

Hospitalized Patients, *JAMA* (2022). [DOI: 10.1001/jama.2022.12290](https://doi.org/10.1001/jama.2022.12290)

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