Researchers examine the decline in average body temperature among healthy adults over the past two decades

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A Tsimane family in a traditional house with no walls. Credit: Michael Gurven

In the nearly two centuries since German physician Carl Wunderlich established 98.6°F (37 C) as the standard "normal" body temperature, it has been used by parents and doctors alike as the measure by which

fevers—and often the severity of illness—have been assessed.

Over time, however, and in more recent years, lower body temperatures have been widely reported in healthy adults. A 2017 study among 35,000 adults in the United Kingdom found average body temperature to be lower (97.9°F / 36.6 C), and a 2019 study showed that the normal body temperature in Americans (those in Palo Alto, California, anyway) is about 97.5°F (36.4 C).

A multinational team of physicians, anthropologists and local researchers led by Michael Gurven, UC Santa Barbara professor of anthropology and chair of the campus's Integrative Anthropological Sciences Unit, and Thomas Kraft, a postdoctoral researcher in the same department, have found a similar decrease among the Tsimane, an indigenous population of forager-horticulturists in the Bolivian Amazon. In the 16 years since Gurven, co-director of the Tsimane Health and Life History Project, and fellow researchers have been studying the population, they have observed a rapid decline in average body temperature—0.09°F per year, such that today Tsimane body temperatures are roughly 97.7°F (36.5 C).

"In less than two decades we're seeing about the same level of decline as that observed in the U.S. over approximately two centuries," said Gurven. Their analysis is based on a large sample of 18,000 observations of almost 5,500 adults, and adjust for multiple other factors that might affect body temperature, such as ambient temperature and body mass.

The anthropologists' research appears in the journal *Sciences Advances*.

"The provocative study showing declines in normal body temperature in the U.S. since the time of the Civil War was conducted in a single population and couldn't explain why the decline happened," said Gurven. "But it was clear that something about human physiology could have changed. One leading hypothesis is that we've experienced fewer

infections over time due to improved hygiene, clean water, vaccinations and medical treatment. In our study, we were able to test that idea directly. We have information on clinical diagnoses and biomarkers of infection and inflammation at the time each patient was seen.

While some infections were associated with higher body temperature, adjusting for these did not account for the steep decline in body temperature over time, Gurven noted. "And we used the same type of thermometer for most of the study, so it's not due to changes in instrumentation," he said.

Added Kraft, "No matter how we did the analysis, the decline was still there. Even when we restricted analysis to the