

Does human life span really have a limit?

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The limits of human existence might not be as limited as we have long thought.

A person's risk of death slows and even plateaus above age 105, a new study reports, challenging previous research saying there's a cutoff point past which the human [life span](#) cannot extend.

Longevity pioneers lucky enough to make it past the perilous 70s, 80s and 90s could potentially live well into their 110s, if fortune remains on their side, said senior author Kenneth Wachter, a professor of demography and statistics at the University of California, Berkeley.

"Our data tell us that there is no fixed limit to the human life span yet in sight," Wachter said. "Very few of us are going to reach those kinds of ages, but the fact that mortality rates are not getting worse forever and ever tells us there may well be more progress to be made improving survival past the ages of 80 to 90. This is a valuable, encouraging discovery."

Specifically, the study showed that people at age 110 had the same continued chances of survival as those between the ages of 105 and 109—a 50/50 chance of dying within the year and an expected further life span of 1.5 years.

This plateau runs counter to the way death risk relentlessly rises as we age from age 40 onward, Wachter said.

"If mortality rates kept rising at the rates they rise from age 40 to age 90, then there would be a strong barrier to progress at extreme ages—great diminishing returns to behavioral change or to new medical advances," Wachter said. "The fact these rates ultimately level out gives hope there's more leeway for those advances."

The oldest known human on record is Jeanne Calment of France, who died in 1997 at age 122.

Different findings

There's been ongoing debate about whether there's a maximum human life span.

Last year, researchers at McGill University in Montreal issued a report challenging earlier assertions that human life span peaks at about 115 years.

"The statistics aren't good enough to be able to say you can't live much longer than that, based on the data we have," said report author Siegfried Hekimi, chairman of developmental biology at McGill. "It's simply not good enough to make that claim."

To investigate this further, Wachter and his colleagues tracked the death trajectories of nearly 4,000 residents of Italy who reached age 105 between 2009 and 2015.

The investigators found that the odds of survival inexorably decline as a person enters middle and old age.

For example, Italian women who reached age 90 had a 15 percent of chance of dying within the year and an expected further life span of six years on average, results showed.

But if they made it to 95, their odds of dying within a year increased to 24 percent and their life expectancy dropped to 3.7 years.

One might think these odds would continue to increase indefinitely, as people age toward an undefined vanishing point.

That's not what happened, though. The chances of survival instead plateaued once people made it past 105.

"The risk of death is very high at 105 years, but next year it's not higher," Hekimi said of the new study. "Every year you have the same chance of dying, and every year you can be the one who wins the coin toss."

This plateau likely occurs due to evolutionary selection and the influence of good genes and healthy life choices, Wachter said.

"When you look at a group of older people who are all the same age, some are already quite frail and some are robust. There's a big difference in the level of frailty," Wachter said.

"People who go to college 50th reunions, you just look around you and some people are climbing mountains while some people are walking with canes. Now go 15 to 20 years later, the people who were already frail are the ones who are likely to have died," he said.

Not enough study participants

So far, looking at the genetics of long-lived people has provided maddeningly few clues for extending overall human life span, Hekimi said.

There are just too few people who make it to these extreme old ages, and the genes that seem to be working in their favor vary from place to place, Hekimi said. For example, genes that seem to be supporting extended life span on Okinawa are not the same ones found in England.

But this study shows there's a good chance of extending the survival plateau earlier into the average human life span, making it increasingly likely that more people will survive into their 100s, Wachter said.

"It gives us a good piece of hope, because there is now lots of

opportunity to look at these bad variants as they are in populations today and to try to understand the interaction of those genetic variants with potential medicines and different health challenges," Wachter said.

"This basic theory could help us inform medical progress and public health progress 10 to 15 years from now as genetic research continues," he said.

Hekimi agreed.

"Given that our [life](#) span keeps increasing, maybe the plateauing is going to start earlier and earlier," he said.

The new study is published in the June 29 issue of the journal *Science*.

More information: "The plateau of human mortality: Demography of longevity pioneers," *Science* (2018). [science.sciencemag.org/cgi/doi ... 1126/science.aat3119](https://science.sciencemag.org/cgi/doi/10.1126/science.aat3119)

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