

Maximum human lifespan has already been reached, researchers conclude

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A study published online today in *Nature* by Albert Einstein College of Medicine scientists suggests that it may not be possible to extend the human life span beyond the ages already attained by the oldest people on record.

Since the [19th century](#), average life expectancy has risen almost continuously thanks to improvements in [public health](#), diet, the environment and other areas. On average, for example, U.S. babies born today can expect to live nearly until age 79 compared with an average life expectancy of only 47 for Americans born in 1900. Since the 1970s, the maximum duration of life—the age to which the oldest people live—has also risen. But according to the Einstein researchers, this upward arc for maximal lifespan has a ceiling—and we've already touched it.

"Demographers as well as biologists have contended there is no reason to think that the ongoing increase in maximum lifespan will end soon," said senior author Jan Vijg, Ph.D., professor and chair of genetics, the Lola and Saul Kramer

Chair in Molecular Genetics, and professor of ophthalmology & visual sciences at Einstein. "But our data strongly suggest that it has already been attained and that this happened in the 1990s."

Dr. Vijg and his colleagues analyzed data from the Human Mortality Database, which compiles mortality and population data from more than 40 countries. Since 1900, those countries generally show a decline in late-life mortality: The fraction of each birth cohort (i.e., people born in a particular year) who survive to old age (defined as 70 and up) increased with their calendar year of birth, pointing toward a continuing increase in average life expectancy.

But when the researchers looked at survival improvements since 1900 for people aged 100 and above, they found that gains in survival peaked at around 100 and then declined rapidly, regardless of the year people were born. "This finding indicates diminishing gains in reducing late-life mortality and a possible limit to human lifespan," said Dr. Vijg.

He and his colleagues then looked at "maximum reported age at death" data from the International Database on Longevity. They focused on people verified as living to age 110 or older between 1968 and 2006 in the four countries (the U.S., France, Japan and the U.K.) with the largest number of long-lived individuals. Age at death for these supercentenarians increased rapidly between the 1970s and early 1990s but reached a plateau around 1995—further evidence for a lifespan limit. This plateau, the researchers note, occurred close to 1997—the year of death of 122-year-old French woman Jeanne Calment, who achieved the maximum documented lifespan of any person in history.

Using maximum-reported-age-at-death data, the Einstein researchers put the average maximum human life span at 115 years—a calculation allowing for record-oldest individuals occasionally living

longer or shorter than 115 years. (Jeanne Calment, they concluded, was a statistical outlier.) Finally, the researchers calculated 125 years as the absolute limit of human lifespan. Expressed another way, this means that the probability in a given year of seeing one person live to 125 anywhere in the world is less than 1 in 10,000.

"Further progress against infectious and chronic diseases may continue boosting [average life expectancy](#), but not maximum lifespan," said Dr. Vijg. "While it's conceivable that therapeutic breakthroughs might extend human longevity beyond the limits we've calculated, such advances would need to overwhelm the many genetic variants that appear to collectively determine the human lifespan. Perhaps resources now being spent to increase lifespan should instead go to lengthening healthspan—the duration of old age spent in good health."

More information: *Nature*,
[nature.com/articles/doi:10.1038/nature19793](https://www.nature.com/articles/doi:10.1038/nature19793)

Provided by Albert Einstein College of Medicine

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