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An Age-Old Debate

My [print column](#) examines a new study of how mortality rates rise as people age. This [study](#) suggests that a previously detected slowdown in mortality growth after age 88 didn't exist among Americans born between 1875 and 1895. This finding — by [Leonid Gavrilov and Natalia Gavrilova](#), a husband-and-wife team at the Center on Aging, part of the NORC research center at the University of Chicago — coupled with a lower-than-expected count of U.S. centenarians in the 2010 census, has some demographers re-examining their beliefs about how well people who survive to old ages stave off death.

"I believe we will see a number of different explanations for the lower-than-expected number of centenarians," said Peter Martin, a gerontology researcher at Iowa State University. "The contributions made by [Gavrilov and Gavrilova] are a first important start of this discussion."

However, other researchers question the study. Underlying the controversy is that many other studies have documented a plateau in death rates that is absent in the new study. "I have fitted models to the mortality data for at least 40 different pension schemes and insurance portfolios, covering both the U.K. and the U.S.A.," said Stephen Richards, managing director of Longevitas, a mortality consulting company. "In every case but one there was the slowing increase in mortality with age" that wasn't detected by the new study.

One possibility is that the finding applies to the data set examined, but not to all people at all times. Furthermore, the people they studied lived through different epochs, and different threats of death as they aged. Theoretical models of mortality growth could be confounded by real-world complexity. "Despite how meticulous [Gavrilov and Gavrilova] were in their data gathering, sorting and censoring, their mortality trajectory at older ages is still subject to the theoretical and real problems of ever-changing mortality conditions as a cohort ages," said James R. Carey, professor in the department of entomology at the University of California, Davis.

Gavrilov and Gavrilova responded — in a statement that, like much of their writing, was written jointly — that their findings likely are universal. "There is no reason to believe that the U.S. is populated by fundamentally different human beings than other countries," they wrote. "However, to have a definitive answer to this question we need to do a similar data analysis for other countries as well."

Gavrilov and Gavrilova used a data set of deaths from the U.S. Social Security Administration that allowed them to track all Americans born between 1875 and 1895 who died before 2011 — presumably, all of them.

"The advantage is that both numerator and denominators come from the same source," said P.J. Eric Stallard, a demographer and actuary at Duke University. "There is the potential for mismatches on age — the Census has one age, and whoever reports on the death certificate gets another age."

“The analysis looks fairly solid,” Stallard added. “If I were reviewing the paper, I would recommend it be published.”

Another advantage of the Social Security data is that they include not just the age in years at death, but also months. This makes little difference at young ages. But at older ages, it turns out that monthly death rates provide a clearer, and different, picture than annual mortality rates. The chance of dying becomes great enough that annual rates present too rosy a picture: More people die in the first month after their, say, 102nd birthday than in the 12th month, simply because deaths early in the 103rd year diminish the pool of survivors to the point that there aren't as many left to die late in the 103rd year of life. (The math gets morbid.) Monthly rates, then, show higher mortality growth, consistent with a consistent increase in mortality rates.

“Standard methodology assumptions don't hold at the older ages,” said Michael Sherris, professor of actuarial studies at the Australian School of Business in Sydney, in summarizing the paper. Among these assumptions: That deaths will be spread out evenly at time measurements such as a year. “All our analysis that makes these assumptions, which I do all the time, will be biased if this is the case.”

Even skeptics of the findings say they could find a receptive audience among some actuaries. “Pension-plan actuaries have a tendency to jump at research that suggests higher mortality rates in the future as this means lower reserves now,” said Andrew Cairns, professor of financial mathematics at Heriot-Watt University in Edinburgh.

As for the Social Security Administration, a spokesman said, “Social Security has confidence in the mortality rate estimates used for the annual Trustees Report.”

Gavrilov and Gavrilova have to sort out how their report squares with their belief that humanity can greatly expand its lifespan. “Our findings indicate that we do not have much time just to sit and wait for ‘longevity revolution’ to occur without our active support and participation,” they wrote. “We have to do something, if we wish to survive to that time.”

Further reading: I wrote previously about [centenarians](#), and about counting [the very oldest humans](#).

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