Debate

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Research versus Rhetoric

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Mortality · Life expectancy · Forecasting

Abstract
Limited to 1,000 words, we address some serious technical mistakes and factual errors, as well as the misleading quotations in the section of Olshansky's and Carnes' article that attacks some of our joint research.

Olshansky and Carnes [1] claim that we assert that 'radical life extension is already available'. They back this deceitful misrepresentation by partially citing a sentence from one article: '…in countries with high life expectancies most children born since the year 2000 will celebrate their 100th birthday…' [2, p. 536]. They omit the key clause that makes this sentence conditional: 'If progress in reducing mortality continues at the same pace as it has over the past two centuries, which is a matter of debate, then' [2, p. 536]. The article for which we made the forecasts clearly states: 'if the present yearly growth in life expectancy continues through the 21st century' [3, p. 1196].

Lifespans have radically increased from historical levels. For instance, Swedish female life expectancy was around 40–45 years in the early decades of the 19th century. At that time it was an exceptionally long life expectancy [4, 5]. Reaching 83.71 years in 2010, life expectancy approximately doubled since the early 1800s [5]. Remaining life expectancy at age 65 for Swedish females in 1840 was 10.62 years. In 2010 it was 21.15 years.

Our forecast was that if progress continues at its past pace, then 'in countries with high life expectancies most children born since the year 2000 will celebrate their 100th birthday'. Olshansky and Carnes claim that this implies a prediction of 'life expectancies greater than 100'. This is not true. Life expectancy is generally less than the median lifespan and several years less in countries with high life expectancies [5].

Our forecast was based on the simplification that no further progress would be made in reducing death rates before age 50. We made this simplification because further improvements in mortality at younger ages will have little impact on the chance of surviving to 100. To avoid unnecessary controversy about the pace of progress before age 50, it is reasonable to conservatively assume that there would be no progress. Olshansky and Carnes misrepresent this assumption, which results in median lifespans that are lower than they would be if we forecast mortality reductions before age 50. Olshansky and Carnes claim that under the scenario we assumed, '50–75% (or more) of the babies born in 2000 and beyond will live to 100'. We did not consider years past 2007 and all of our forecasts imply that far fewer than 75% of babies would live to 100.

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They claim that we assume that the future repeats the past and that this is not true because, e.g., chronic disease is now more important than infectious disease as a cause of death. We do not assume that the future will repeat the past: we recognize that the ways death rates will be reduced in the future will be different from the past and we document the changing age pattern of mortality improvements in the past [3, and table 2 therein]. In the middle of the 19th century, increases in life expectancy were almost entirely due to reductions in death rates below age 50; in recent years, the increases have been largely due to reductions after age 65 [3].

Their assertion that 'actuarial aging… has little or nothing to do with biological aging' is backed by self-citations. It is not clear what, if anything, this assertion means. Biological aging is often measured, in studies of humans and various other species, by the rate of increase in death rates with age. Mortality is only one aspect of health, and so such statistics do not capture the full complexity of aging, but they are useful indicators.

Olshansky and Carnes calculate the difference between period life expectancy in the USA in 1900 and the corresponding cohort life expectancy achieved by people born in 1900. They dismiss our forecast by noting that this difference is considerably smaller than the difference between period life expectancy in 2000 and our cohort forecast. The difference between period and cohort life expectancy, however, increases as life expectancy increases. It is remarkable how much faster improvements in cohort life expectancy have been compared with improvements in period life expectancy [6, 7].

Olshansky and Carnes assert that our forecasts 'violate the consistent signature (age pattern of death) observed in human populations'. This is incorrect. We assume that the underlying pattern will remain the same but with deaths being postponed to higher ages. This is what has occurred in the past [2, 8].

Olshansky and Carnes conclude their critique of our forecasts with a metaphor about a runner accelerating 'at an increasing faster pace while running uphill on an increasing slope against a headwind of increasing resistance'. This style of argument, using florid rhetoric instead of scientific fact, characterizes much of their article. Life expectancy trends vary over time and from country to country [9, 10]. But in the countries with the longest life expectancies, the pace of life expectancy increase is not systematically getting slower and slower. In particular, for Japanese women, the population that currently enjoys the longest life expectancy, mortality, even at advanced ages, is continuing to decline [11–13]. We have shown with publicly available data for Japanese women during the first few years of the new millennium that 'the median value of improvements (in survival at single ages) was never lower than 3.3% annually' [13, p. 759] between ages 80 and 100 – an age range which was virtually irrelevant for the increase in life expectancy until the middle of the 20th century [3].

Life expectancy for women in Japan is now 86.42 years and for both sexes combined 83.31 [5]. The modal age at death in Japan in 2009 – the most recent year available in the Human Mortality Database – is 93 years for women, 85 years for men and 89 years for both sexes combined.

So, Olshansky's and Carnes' essay is not only factually inaccurate, it is deliberately misleading. We are astonished it passed scientific and editorial review.

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