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Clarifying Misunderstanding of Life Expectancy and COVID-19

Life expectancy is a complex concept that is often subject to misinterpretation. Actuaries—due to their rigorous training and statistical acumen—are well positioned to help bring clarity to this challenging subject.

Life expectancy, generally, is a measure of the expected future lifetime of an individual person. There are various measures of life expectancy used in different contexts, which can lead to confusion when decreases attributed to certain events—e.g., the COVID-19—pandemic, are reported. One might conclude that reports showing expected life span is a prediction of the exact number of years they can expect to live.

An example of a report subject to such misinterpretation is the Centers for Disease Control and Prevention (CDC) National Center for Health Statistics data brief, which shows that estimates of the average life expectancy of Americans decreasing by 1.8 years during 2020, primarily due to COVID-19.

Life Expectancy Measures

Basically, there are two life expectancy measures—**period life expectancy** and **cohort life expectancy**. Period life expectancy generally is based on the assumption that current rates of death continue indefinitely. Cohort life expectancy is more heavily influenced by long-term expectations. Period life expectancies can vary dramatically from one year to the next when there is a short-term increase in mortality. The CDC data brief uses the period life expectancy

measure. More detailed considerations of the two measures are broken down into their essential elements below.

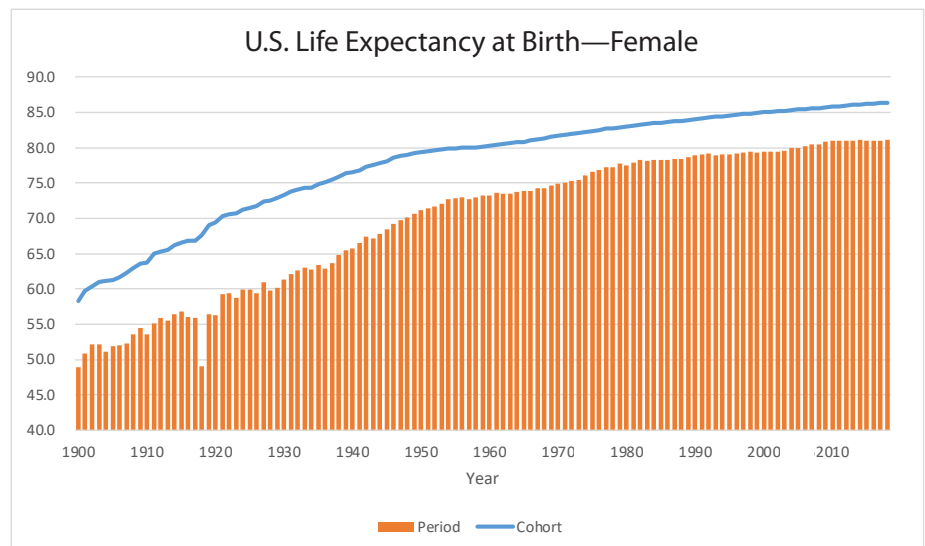
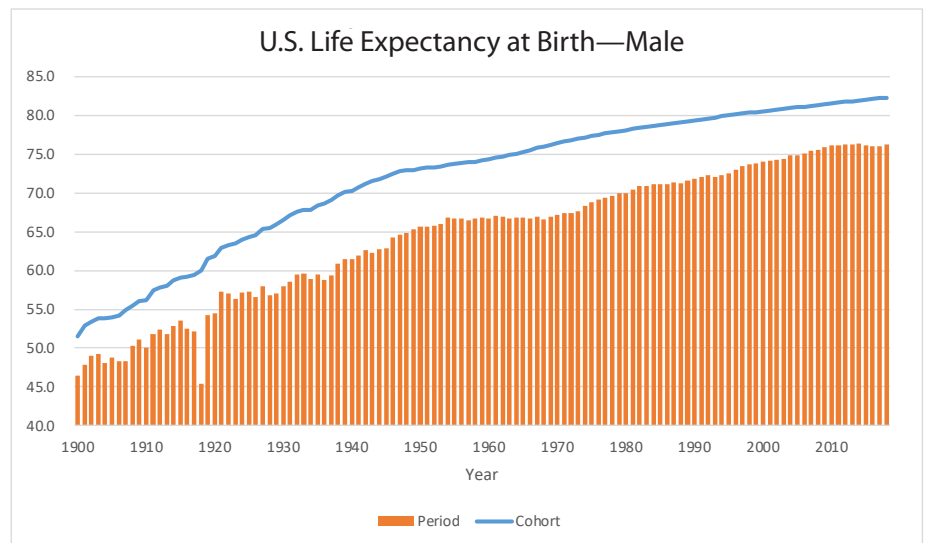
Period life expectancy, measured as of a given age, is the remaining number of years that a hypothetical individual can expect to live (on average) if rates of death prevailing during a given period continue indefinitely. When mortality rates increase significantly during a given year—as has been the case during the COVID-19 pandemic—period life expectancy will decline noticeably because it is calculated as if these higher rates of mortality will continue in all future years. This often-cited measure of life expectancy can vary dramatically from one year to the next. The CDC report highlights period life expectancy at birth as well as at age 65—the number of years that a newborn or a 65-year-old would be expected to live if the current pandemic conditions persist indefinitely.

Cohort life expectancy (also known as “generation” life expectancy) takes into consideration changes in rates of mortality that are expected to occur in the future. A pandemic or other significant event that has a substantial effect on short-term population mortality but is expected to subside will have a much smaller effect on cohort life expectancy than it does on period life expectancy measurement.

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To the right is an illustration¹ showing how both period and cohort life expectancy have changed over a 115-year timespan including the Spanish flu pandemic of 1918. The significant dip in period life expectancy during 1918 and subsequent recovery during 1919 can be seen in these graphs, while the annual changes in cohort life expectancy are less volatile. Due to historical and expected future improvements in mortality rates, cohort life expectancy is consistently higher than period life expectancy.

Period life expectancy can be a useful metric for year-over-year comparisons in normal times but tends to exaggerate the effect of nonrecurring events. Cohort life expectancy is likely what most people envision when thinking about the concept of life expectancy because cohort life expectancy is an estimate of the actual number of years that a typical individual might be expected to live based on reasonable expectations for future conditions. For this reason, cohort life expectancy is the measure used by the [Actuaries Longevity Illustrator](#) that can help individuals estimate how long they might live.



¹ For these numbers, [historical U.S. population mortality rates](#) published by the Social Security Administration in conjunction with the publication of the 2020 Trustees Report were used.

Additional Resources from the American Academy of Actuaries

- Issue brief—[Interpreting Pandemic-Related Decreases in Life Expectancy](#) (December 2021)
- [Actuaries Longevity Illustrator](#)