

# When is someone old?

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Populations around the world are living longer lives than was the norm just a few decades ago, presenting governments with significant challenges in terms of caring for their growing elderly populations. According to a new study published in *PLOS ONE*, understanding how to assess who is elderly is a crucial first step for our understanding of population aging.

The UN's Profiles of Ageing 2019 provides people who study [population](#) aging with a choice of perspectives, namely a conventional potential support ratio (PSR) and a prospective potential support ratio (PPSR).

The difference between the two is based on different threshold ages at which people are first seen as "old." In the PSR the threshold age is 65 years and is fixed independently of time or place, while in the PPSR, the threshold age is the age where remaining life expectancy is 15 years. The first is commonly known as the conventional old age threshold and the second as the prospective old age threshold.

The conventional old age threshold is the most commonly used, but it has the disadvantage that it does not change over time and is the same for all countries regardless of their trajectories of aging. This is of course not the case, as today's 65 year-olds are very different from their counterparts half a century ago, and are also likely to be very different from what they will be like half a century in the future. People also age differently depending on where they live and across population subgroups.

In their study, the authors propose that the old age threshold should be determined using an equivalency criterion—in other words, people at the old age threshold should be roughly similar to one another in terms of relevant characteristics regardless of when and where they lived. Using [historical data](#) on five-year death rates (the proportion of people dying between ages  $x$  and  $x+5$ ) at the old age threshold as an indicator of one aspect of health, the researchers assessed the extent to which the two approaches used by the UN are consistent with the equivalency criterion.

The results indicate that the old age threshold based on a fixed remaining life expectancy is consistent with the equivalency criterion, while the old age threshold based on a fixed chronological age is not. Specifically, five-year death rates at the old age threshold based on a fixed chronological age strongly decline over time, while the one based on a fixed remaining life expectancy is almost constant.

This implies that if the equivalency criterion were not at least

approximately adhered to, people with a particular five-year death rate in one country would be categorized as old, while people in another country with the same five-year death rate would not be. The study is based on previous research by the authors in which they developed measures of population aging adjusted for changes in remaining life expectancy—a so-called dynamic old age threshold—and provides additional arguments around why it would be beneficial to use such measures of aging. They highlight that when this dynamic old age threshold is used to study people in many countries over long periods of time, at that threshold, people have roughly the same health.

"We wanted to provide researchers with a solid argument around why measures of aging based on a fixed remaining [life expectancy](#) should be used and how similar groups of older people should be defined. We want people to understand that the use of an old age threshold based on a fixed chronological age does not produce groups of adults whose relevant characteristics are comparable across time and space. The equivalency criterion is effective in making that decision because it defines who is elderly in a consistent way based on characteristics relevant to the study of population aging," explains IIASA researcher and study author Warren Sanderson.

"The picture of population aging that emerges when measures consistent with the equivalency criterion are used are markedly different from those that result when the equivalency criterion is not adhered to. We recommend that measures of aging that do not adhere to the equivalency criterion should only be used in special circumstances where it is inconsequential," concludes study author Sergei Scherbov, a researcher in the IIASA World Population Program.

**More information:** Sanderson W & Scherbov S (2020). Choosing between the UN's alternative views of population aging. *PLOS ONE* [DOI: 10.1371/journal.pone.0233602](https://doi.org/10.1371/journal.pone.0233602)

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