JUL 2022 Num. 028

Increased Longevity in Europe: Adding Years to Life or Life to Years?

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In 1950, life expectancy at birth in Spain was 64.2 years for women and 59.3 years for men. Thereafter and to the present day, this life expectancy has risen practically uninterruptedly to reach, in 2020, 85.1 and 79.6 years, respectively. The case of Spain is not the only one, since the inhabitants of most countries in the world are living to ages that seemed unattainable only a few decades ago, and this represents a historic landmark for humanity (Vaupel et al., 2021). While it is true that the generalised postponement of mortality is an unprecedented collective success, it must be asked whether we are equally successful in our efforts to delay the onset of disease and disability (or, in other words, morbidity). If decreasing mortality rates are not matched by an equivalent decline in morbidity rates, people in these societies tend to live for more years but in a worse state of health (Gruenberg, 1977). This is a phenomenon with enormous consequences for the sustainability of health and pensions systems, as we know them. In this issue of *Perspectives Demogràfiques* we explore the extent to which the increases in longevity recorded in Spain over the last 30 years have happened with gains in years in good health (which is to say, "adding life to years") or in bad health ("adding years to life"). Focusing not only on quantity but also on the quality of the years gained, we aim to shed new light on a pressing issue of today which should be taken into account in the designing of a wide range of public policies that must, as a matter of necessity, go beyond the confines of what is strictly understood as the domain of health.

Many theories and not much data (until very recently)

While longevity has been increasing without apparent limits, a growing number of doubts have been raised about the state of health people will enjoy in these extra years of life. Around 1980, conflicting hypotheses were already speculating about the future course of events. At one extreme, Fries' "morbidity compression" hypothesis (1980) suggests that as mortality declines, the onset of disease and disability is delayed and becomes concentrated in the years closer to death. At the opposite extreme, the "morbidity expansion hypothesis" presented by Gruenberg (1977) suggests that reduced mortality simply entails a greater number of years in which people will live in poor health. For a long time, the scarcity of comparable data has made it difficult to verify the validity of these hypotheses at the international level.

At present, the international Global Burden of Disease project (*Institute for Health Metrics and Evaluation, 2019*) provides indicators that are comparable in space (204 countries and territories around the world) and time (from 1990 until the present). These data allow estimates to be made not only of life expectancy (LE) but also of healthy life expectancy (HALE, which is also known as "health-adjusted life expectancy") and unhealthy life expectancy (UHLE, which is also known as "life expectancy in poor health"). The first measures the years a newborn would live on average under present mortality conditions, while the second and third measure the average number of years this newborn would live in good health and poor health under the present mortality and morbidity conditions, respectively. Owing to the way they have been defined, the sum of the latter two indicators coincides with the first one or, in other words, LE = HALE + UHLE. It should be emphasised that, while the first component (HALE) is normatively desirable, the normative character of the second one (UHLE) is somewhat ambiguous since it is not evident that people want to live more years in poor health.

Regional patterns: widespread increases, persistent gaps

In Figure 1 we show the evolution between 1990 and 2019 of LE, HLE, and ULE for four large European regions (Central and Eastern Europe, Northern Europe, Southern Europe, and Western Europe, in accordance with the classification of EuroVoc, the thesaurus of European Union publications), and for women and men separately.

At an overall level, there has been a widespread increase in the three indicators (LE, HALE, and UHLE) for all four regions. Nevertheless, a certain disparity appears in the evolution of HALE in the various regions of Europe. That of Central and Eastern Europe presents the lowest results, with persistently lower HALE values. Southern and Western Europe, however, show very similar results, which are higher than those for the other regions. Northern Europe is in between but gradually approaching the levels of the Southern and Western Regions. It should be noted that these results could be explained by the presence of the three Baltic states (Estonia, Lithuania, and Latvia), which showed health patterns that were closer to those of their Eastern European peers. The poor performance of Central and Eastern Europe, and Northern Europe between 1990 and 1995 is largely attributable to the collapse of the Soviet Union after the fall of the Berlin Wall in 1989. At the other end of the scale, as we approach 2020, we find a slowing in the rate of HALE growth in the leading regions, which does not seem to be the case with UHLE, which continues to rise at a steady pace.

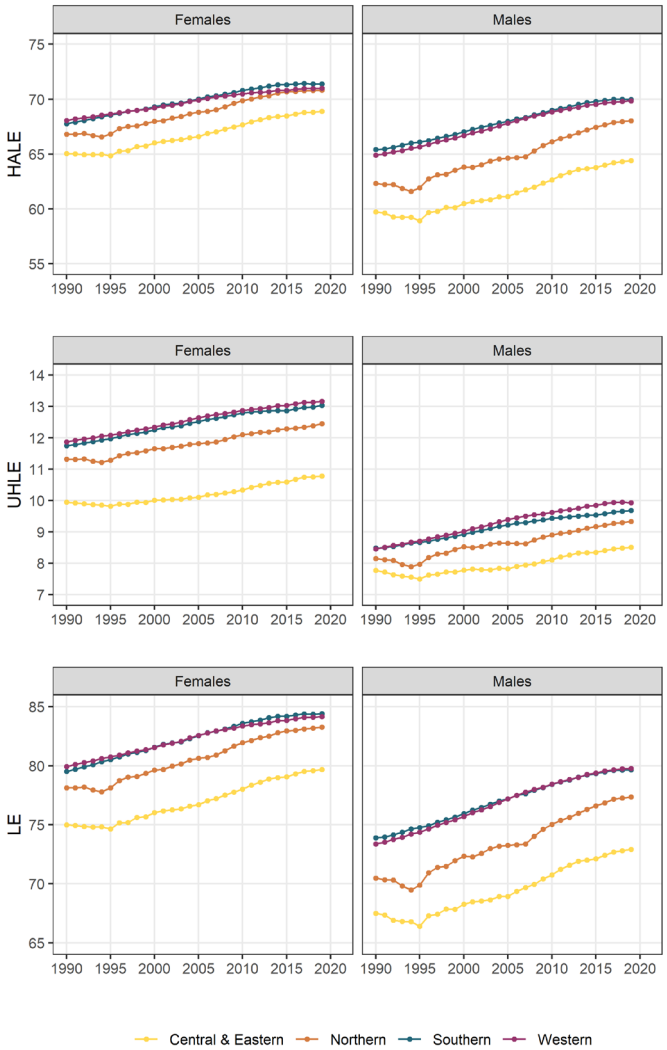

Figure 1. Evolution of HALE, UHLE, and LE for women and men (left and right panels respectively) in four European regions between 1990 and 2019.

Source: Authors' own elaboration using data from the "Global Burden of Disease" project.

As for differences by sex, we find that the three indicators show higher values for women. For HALE, there is a smaller gradient among women than among men although, in the case of UHLE, men show a smaller dispersion. In other words, the men of Central and Eastern Europe lag much further behind in terms of HALE than their counterparts elsewhere in Europe, while the women in this region show the lowest UHLE values. Given the ambiguous nature of this variable, it is not clear whether this fact of being left behind is necessarily negative.

Longer, healthier lives?

What can we say about the joint evolution of HALE and UHLE in each country separately? In Figure 2, we use arrows to show the simultaneous gains in HALE and UHLE in 43 European countries between 1990 and 2019, with results for women and men on the left and right respectively. The start of the arrow indicates the value of these indicators for 1990 and its tip shows their value for 2019. The arrows that slope less steeply represent situations in which the growth of HALE is much greater than that in UHLE, and vice versa. The diagonal dashed lines serve as a reference to show the LE value corresponding to the sum of HALE and UHLE.

For women, we observe two distinct clusters, that consisting of the countries of Central and Eastern Europe (plus the Baltic countries of Northern Europe) and another of the countries of the rest of Europe. In general, the arrows of the first group start with smaller values (in both HALE and UHLE, which are lower in these countries) and their slope is less, suggesting that increases in longevity in the countries of this group are characterised by a larger preponderance of the good health component of LE. By contrast, in the rest of the European countries, the poor health component of LE (UHLE) has a much more conspicuous presence in the total increases in longevity. In the case of men, we observe similar patterns, although the regional differences are not so pronounced. Spain stands out for two reasons. First, it is one of the countries showing the highest levels of longevity in 2019 (with a LE of 80 years). Second, the proportion of years lived in good health (HALE) is particularly high by comparison with countries showing a similar longevity.

Comparing the results between women and men, we can ascertain that, for a given level of LE (for example, 70, 75, or 80 years), the proportion of years lived in good health is higher among men. Moreover, the arrows showing the joint paths of HALE and UHLE tend to start and end at higher values, and to slope more steeply in the case of women.

In sum, the results shown in Figure 2 would seem to suggest that (i) the higher the LE in 1990, the more likelihood that subsequent increases in longevity will occur at the cost of adding to the number of years lived in poor health, and (ii) although women tend to live more years than men, the increases in their longevity tend to be more and more attributable to increases in UHLE (once again at the cost of living more years in poor health). These issues are explored further in Figure 3 where we compare LE levels for 1990 (shown on the horizontal axis) with the percentage of LE increase between 1990 and 2019 that is the result of increased HALE (vertical axis). In order to explain this last variable, we take the case of Spain as an example (highlighted in bold in Figure 3). In the case of Spanish women, the HALE and UHLE values for 1990 were 68.8 and 11.7 years respectively while, in 2019, they rose to 72.3 and 13.4. This means that LE for Spanish women increased by 5.2 years between 1990 and 2019, and that HALE and UHLE increased by 3.5 and 1.7 years respectively. Hence, in this case, the 100 * 3.5/5.2=67.3% of the LE increase can be attributed to HALE. As for Spanish men, 83% of the LE increase can be attributed to increased HALE.

As Figure 3 shows, in the vast majority of cases, HALE is the component that can be seen as most responsible for the changes in longevity between 1990 and 2019, for both women and men. With the exception of one country (Monaco) this contribution is always above 60% of the total. However, the relationship between both variables is clearly negative in both sexes. This quantitatively confirms the idea set out above: the higher the initial LE (in 1990), the more the likelihood that subsequent increases in longevity will occur at the cost of adding to the number of years lived in poor health. At one end of the scale, in the countries with lowest longevity figures in 1990, like Russia and Latvia (with 64 and 64.6 years of LE for men), more than 90% of the subsequent increases in LE between 1990 and 2019 were attributable to HALE. At the other end, in the countries with the highest longevity figures in 1990, like Switzerland and France (with 81.3 years of LE for women), only 60% of the subsequent increases in LE over the next thirty years were attributable to HALE.

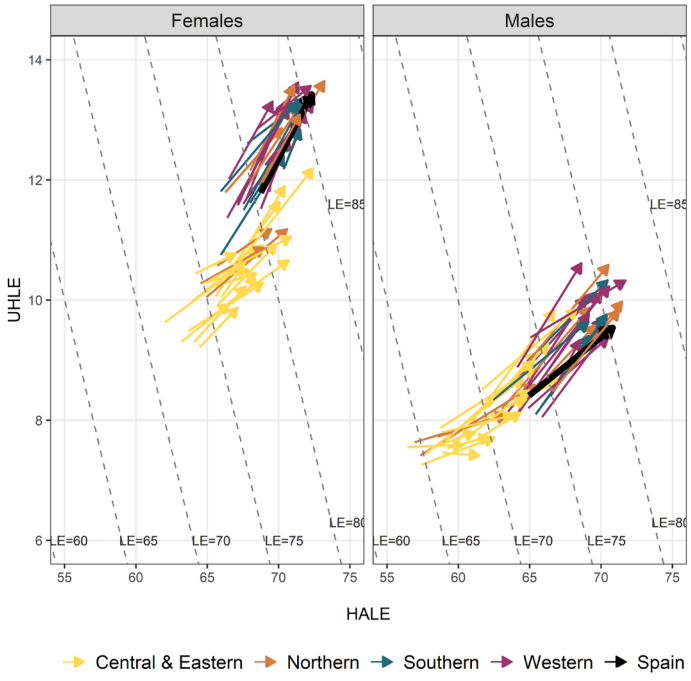

Figure 2. HALE (horizontal axis) and UHLE values (vertical axis) for 43 European countries in 1990 and 2019 for women (left panel) and men (right panel).

Source: Authors' own elaboration using data from the "Global Burden of Disease" project.

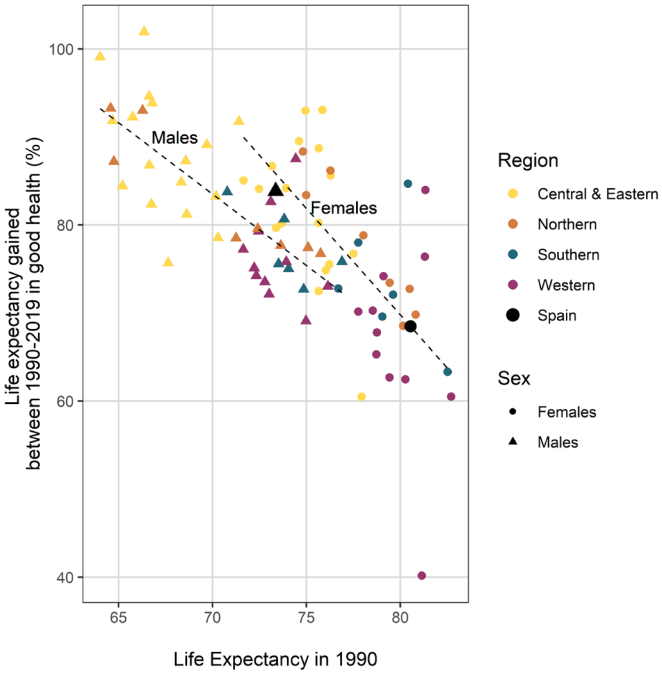

Figure 3. Relationship between life expectancy at birth in 1990 with the portion of the change in life expectancy between 1990 and 2019 represented by changes in HALE. Separate results for men and women.

Source: Authors' own elaboration using data from the "Global Burden of Disease" project.

The inverse relationship between these variables is more accentuated among women than men. This means that the greater a country's longevity in 1990, the more the subsequent increases in longevity have occurred at the cost of living more years in poor health, with more pronounced effects among women than among men.

The greater the longevity, the greater the resistance to progress

The results shown are consistent with the idea that, in the countries with lower figures for longevity, it is more likely that subsequent increases in longevity will occur "in good health". This is due to the fact that, in these countries, lower mortality rates tend to be more beneficial for relatively young individuals, whose survival entails, above all, an increase in the number of years lived in good health. At the other end of the scale, increased longevity in societies with higher LE levels can only be achieved by even further reducing mortality at advanced ages since levels of mortality at younger ages are extremely low and there is little room for improvement. In this regard, since people tend to suffer from illness and/or disability at older ages, the subsequent increases in LE are likely to be more attributable to increases in UHLE.

The empirical evidence presented here suggests that the proportion of LE lived in poor health tends to be higher among women and to increase over time. As happens with other recent studies (Permanyer et al 2021), these results seem to support the expansion of morbidity theory formulated by Gruenberg (1977), although such interpretations should be taken with extreme caution. First, the measurement of what "good" or "poor" health constitutes is still somewhat arbitrary, and the quality of data sources varies among countries, which means that there is a considerable degree of uncertainty in some estimates of HALE and UHLE. Second, what might nowadays be considered a severely limiting disease or disability might be treated very effectively in the near future due to the discovery of new drugs or treatments. Continual advances in technology and medicine can significantly improve the quality of life of people living in situations of morbidity (for example, when suffering from chronic diseases).

Future increases in LE, so that it could eventually exceed a hundred years (Vaupel et al 2021), could pose a major social challenge if, as this study suggests, they are accompanied not only by increased morbidity but also of co-morbidity. All this suggests the need to devote more and more resources to reducing morbidity, either by means of preventive campaigns to delay the ages of onset of disease and disability (for example, by promoting healthy lifestyles and inclusive, sustainable socioeconomic environments) or with investment in treatments and technological innovations that would reduce the burden associated with individuals living in situations of morbidity.

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Cita

Permanyer, I.; Bramajo, O. (2022) "Increased Longevity in Europe: Adding Years to Life or Life to Years?", *Perspectives Demogràfiques*, 28: 1-4 (ISSN: 2696-4228). DOI: 10.46710/ced.pd.eng.28

ISSN

ISSN 2696-4228

DOI

https://doi.org/10.46710/ced.pd.eng.28

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Credits

Graphics: Anna Turu

Layout

Xavier Ruiz and Eva Albors

Acknowledgements

This work has been funded by the project ERC-CoG-864616 "Healthy lifespan inequality: Measurement, trends and determinants" from the European Research Council.
Grants for the recruitment of new research staff FI (AGAUR)

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