THE INTERNATIONAL OUTLOOK: MIGRATION, AGEING, AND FERTILITY

Past, present and future of population ageing: a global perspective

Iñaki Permanyer



Three elderly men sit resting on benches in the Can Cuiàs neighborhood of Montcada i Reixac on January 14, 2013. Photography by Rober Astorgano

The gains in longevity registered worldwide over the last century are cause for celebration. Human populations have been able to sustain and extend the lives of most of their members to levels that would have been considered unattainable just a few decades ago. In turn, this unprecedented success in increasing survival has profoundly transformed the societies in which it has occurred, forcing us to address a number of unprecedented challenges. Firstly, population age structures have changed dramatically, with a considerable increase in the population above retirement age. This phenomenon is known as ageing and has major implications for the sustainability of the pension system and, more generally, the welfare state. Secondly, it is not entirely clear whether the increase in life expectancy has been accompanied by a delay in the age at which people's health begins to decline (i.e. the age of onset of morbidity). The relationship between mortality and morbidity can have enormous consequences for care and health systems, which need to ensure citizens' well-being. Finally, gains in health and longevity have not been shared equally across all sectors of societies, as they disproportionately benefit certain socioeconomic groups over others. In this article we will take a brief look at global trends in ageing levels over the past decades and present some of the main characteristics of a phenomenon that, while posing enormous challenges, also offers new opportunities for societies around the world.

What is population ageing? We often feel that this is one of the biggest problems facing contemporary societies around the world, but its extent, determinants and main characteristics are often unknown. Far from being treated as a problem, ageing should be seen as one of the greatest collective achievements of the human species – yet it is one that brings with it a number of challenges.

Changing age structures

Population pyramids are perhaps one of the most characteristic and well-known graphs used by demographers around the world. They show the number of people in a given population, separated by age and sex. Figure 1 shows the population pyramids for three very different countries (Spain, India and Mali) for the years 1970, 2020 and 2070 (the latter pyramid is a projection made by the United Nations Population Division). As can be seen, the graphs are very different, both between countries and over time.

In the case of Spain, we can see how the characteristic pyramid shape of 1970, with population numbers falling as age increases, had changed radically by 2020, and the pyramid of 2070 is also projected to be quite different from the previous two. The 2020 pyramid, and more so the 2070 pyramid, is characterised by a relatively thin base and a population size that varies greatly by age. The proportion of individuals over 65 years of age increases rapidly over time. The case of India shows a relatively similar pattern: it starts with the classic pyramid with a very wide base and ends with a relatively thinner base and a much higher proportion of people aged over 65. In the case of Mali, a country with limited economic resources, the age structure remains relatively stable over time and follows a pattern also observed in many African countries.

An unprecedented transformation

As the population pyramids in the graph above illustrate, the age structure of populations around the world has undergone a radical transformation, with a relative contraction at the base of the pyramid (where children and young people who will eventually form part of the labour force are located) and a very substantial increase in the proportion of the population surviving to older ages. This phenomenon is known as population ageing. The fact that people living in old age are more likely to suffer from diseases that potentially lead to physical and/or mental disability, together with the fact that they are no longer in the labour force (with a corresponding fall in income), means population ageing has major implications for the sustainability of health and pension systems.

The remarkable transformations in the age structure shown in Figure 1 are due to the combined effects of the three fundamental demographic forces: fertility, mortality and migration. While the effect of migration on population age structure can vary enormously over time and space, depending on the size of the migrant population and the corresponding ages of arrival, declining fertility has contributed to thinning the base of the pyramid and lower mortality has contributed to an increasing number of people living to ages that would have been completely unimaginable a few decades ago. [1] [2]

Records in longevity

On 19 August 2024, Maria Branyas died at the age of 117, having become the longest living person in the world up to then. Despite her exceptional longevity, history records up to seven people who lived even longer: Jeanne Calment is the absolute record holder at 122 years and 164 days. While these are still exceptional cases, the number of centenarians and supercentenarians (i.e. people living to over 110 years) has increased dramatically in recent decades. On 1 January 2024, there were 16,902 centenarians in Spain, a 50% increase just from 2019.

Increasing longevity has not only benefited older people, but also whole populations worldwide. A review of figures for life expectancy at birth (an indicator that measures the number of years a newborn infant is expected to live under the age-specific mortality conditions observed in a given year) shows that there has been a general increase over recent decades for both women and men (see the top panels in Figure 2). Despite sporadic shocks in this indicator (notably, the genocide in Rwanda in 1994, the great famine in China around 1960 and, more recently, the impact of COVID-19 in 2020 and 2021), we may say that, globally, the direction of this indicator is extremely encouraging and reflects the human species' huge success in preserving and extending the lives of fellow human beings in all latitudes and longitudes of the planet.

When we look at survival beyond the age of 65, the age that has often been used to determine the start of retirement, we see that the patterns around the world have also been quite positive for both women and men (see bottom panels of Figure 2). Despite turbulence in certain countries or in certain years, trends have generally been upward, especially for women. These results show how survival has improved at both younger and older ages, increasing the average age of the populations concerned.

Finally, an important feature of the panels in Figure 2 is the international convergence in life expectancy levels at birth, accompanied simultaneously by a divergence in life expectancy at age 65. In other words, there has been an international decline in inequality in basic survival (due to a general decline in child mortality), accompanied by an increase in international inequality in longevity at older ages (due, among other things, to differences in the standards of living around the world). [3] Consequently, while the country of a baby's birth is becoming less and less important in determining the number of years they may live, the country in which people reach retirement age is becoming increasingly relevant in determining the years they have left to live.

Add years to life or life to years?

As longevity continues to increase worldwide, there are growing concerns about how healthily the “extra” years of life will be lived. Already by the late 1970s and early 1980s, competing hypotheses on the direction of future developments had begun to emerge. On the one hand, the compression of morbidity hypothesis, put forward by James Fries, [4] suggests that, as mortality declines, the onset of disease and disability is delayed and concentrated at ages close to death. This optimistic hypothesis suggests that the forces delaying death are the same as those that delay the ages at which people’s health begins to deteriorate. On the other hand, the expansion of morbidity hypothesis, put forward by Gruenberg [5] suggests that reducing mortality will simply lead to an increase in the number of years people will live in poor health. Clearly, the implications of these assumptions for the sustainability of health and care systems are far-reaching.

For many years, lack of comparable data made it difficult to verify the validity of these hypotheses. With the passage of time and the emergence of appropriate data and methods, the empirical evidence has not proved definitive either way. However, recent studies based on the diagnosis of chronic diseases indicate that recent increases in life expectancy have been accompanied by a parallel increase in the prevalence of (multi)morbidity at all ages. [6] [7] All this suggests the need to earmark ever greater resources to reducing morbidity, either through preventive campaigns that delay the ages of disease onset and/or disability (e.g. by promoting healthy lifestyles and the creation of inclusive, respectful and sustainable socioeconomic environments) or through investment in treatments or technological innovations that reduce the burden associated with morbidity.

Efficiency versus (in)equality

As argued above, human societies have become increasingly efficient at sustaining and extending people’s lives. However, it does not necessarily follow that this increase in longevity has been equally distributed among the different sectors of societies. Indeed, in the few countries where reasonably long data series are available, there has emerged since the beginning of the Industrial Revolution a clear socioeconomic gradient in health that favours groups with greater access to resources and power. [8] More contemporary studies confirm the existence of a gradient that has not only been robustly and systematically documented around the world, but one which very often tends to become more pronounced over time

Figure 3 shows the levels of life expectancy at the age of 30 with good and poor health by level of formal education, among women and men in contemporary Spain. The first graph measures health in terms of the limitations people say they experience in carrying out their daily activities, while the second uses so-called self-perceived health, which asks respondents to describe their health as “very good”, “good”, “average”, “bad” or “very bad”. As can be seen, people with a higher level of education not only have a longer life

expectancy than people with lower levels of education, but also live longer in good health, in both absolute and relative terms.

Conclusions

The empirical evidence generated over the years suggests that population ageing is a multidimensional and complex phenomenon that, as we have just seen, can affect various population groups very differently. The pool of people above a certain age (be it 65, 70 or a similar age) is not only growing in absolute and relative terms, but is also becoming increasingly diverse. Advances in medicine and improvements in living conditions have greatly reduced premature mortality, resulting in people who years ago would have died at relatively young ages now surviving to older ages, but often with significant sequelae that greatly diminish their health status. As a result, these populations are made up of an increasingly heterogeneous mix of healthy and robust individuals, others suffering from many chronic diseases and/or disabilities, and many others in between.

As mentioned above, the deterioration of individuals' health is not completely random, but follows often well-defined patterns, almost always to the benefit of those with greater economic, social and/or educational resources. The existence of these gradients demonstrates that neither morbidity nor mortality is an inevitable consequence of age and that there is therefore the potential to influence and modify these processes to benefit all sectors of society. This is undoubtedly one of the major challenges facing health and care systems over the coming decades – challenges that, if they are to be met, will require firm, coordinated action across many government sectors beyond those strictly related to health and care.

Although population ageing has often been labelled problematic – sometimes dramatically associated with the arrival of the so-called demographic winter – it must be remembered that it is a phenomenon that reflects not only the capacity to lengthen our lives, but also the capacity to voluntarily reduce fertility without endangering our survival. This has led to revolutionary changes in people's lives and has largely freed women from the reproductive tasks to which they were subjected to ensure the survival of the species. The profound transformation brought about by this unprecedented demographic change also offers new opportunities and forces us to conceive new ways of organising many areas of life, from sharing work and leisure to the care of children and the elderly, in contemporary and future societies.

REFERENCES

1 — Riley, J. C. (2005). "Estimates of Regional and Global Life Expectancy, 1800–2001". *Population and Development Review*, no. 31 (3), pp. 537-543.

2 — Oeppen, J.; Vaupel, J. W. (2002). "Broken Limits to Life Expectancy". *Science*, no. 296, pp. 1029-1031.

3 — Permanyer, I.; Scholl, N. (2019). “Global Trends in Lifespan Inequality: 1950-2015”. *PLoS ONE*, no. 14 (5), pp. 1-19. Available online.
4 — Fries, J. F. (1980). “Aging, Natural Death, and the Compression of Morbidity”. *New England Journal of Medicine*, no. 303, pp. 130-135.
5 — Gruenberg, E. M. (1977). “The Failures of Success”. *Milbank Memorial Fund Quarterly*, no. 55, pp. 3-24.
6 — Head, A.; Fleming, K.; Kypridemos, C.; Schofield, P.; Pearson-Stuttard, J.; O’Flaherty, M. (2021). “Inequalities in Incident and Prevalent Multimorbidity in England, 2004-19: A Population-Based, Descriptive Study”. *Lancet Healthy Longevity*, no. 2 (8), e489-497.
7 — Ribe, E.; Cezard, G. I.; Marshall, A.; Keenan, K. (2024). “Younger But Sicker? Cohort Trends in Disease Accumulation Among Middle-aged and Older Adults in Scotland Using Health-linked Data from the Scottish Longitudinal Study”. *European Journal of Public Health*, no. 34 (4), pp. 696-703. DOI: 10.1093/eurpub/ckae062.
8 — Bengtsson, T.; Dribe, M.; Helgertz, J. (2020). “When Did the Health Gradient Emerge? Social Class and Adult Mortality in Southern Sweden, 1813-2015”. *Demography*, no. 57, pp. 953-977. Available online.

Iñaki Permanyer

Iñaki Permanyer is an ICREA Research Professor at the Centre for Demographic Studies (CED), where he has worked since 2010. He holds a degree in Mathematics and a PhD in Demography from the Autonomous University of Barcelona (UAB). Prior to joining the CED, he conducted research at the Department of Economics at the UAB and at the Department of City and Regional Planning at Cornell University. He has been awarded several fellowships and grants, including the Fulbright, Juan de la Cierva, Ramón y Cajal, and a European Research Council Starting Grant (2015–2020). He currently leads the *Health and Ageing* unit at the CED and is principal investigator of the European project *HEALIN (Healthy Lifespan Inequality)*. His work has been recognized with awards such as the European Demographer Award (2020) and the James W. Vaupel Trailblazer Award (2024). He has authored more than fifty publications in leading international journals in the fields of demography, economics, and epidemiology.