



New thinking about health expectancy: introduction to the special section

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Introduction: health expectancy

Populations are ageing more than ever before. Both the larger number of older people and their longer life expectancy raise concerns about society's ability to finance health and long-term care provision (Christensen et al 2009). Whether further increases in life expectancy pose a threat to the sustainability of the health systems as we know them, largely depends on whether these extra years of life are lived free of disease, disability or physical and mental impairment (Murray et al 2015; Rechel et al 2013; Salomon et al 2012). The average life expectancy at birth reported in the current life tables peak at 81.9 years for men in Switzerland and 87.3 years for women in Japan; while South Africa reported the lowest estimate of life expectancy at birth of 63.9 years (OECD 2020). Therefore, it should be noted that life expectancies worldwide are very heterogeneous. Regardless of the lengths of lives, a crucial question is how healthy life years will be when LE keeps increasing. In an ideal scenario, poor health would be compressed towards the end of life, as claimed by the 'compression of morbidity' hypothesis (Fries 1980). A pessimistic scenario would be one where people live longer but the expected years of life gained are spent predominantly in poor health (termed 'expansion of morbidity') (Manton 1982).

When monitoring levels and trends of population health across countries, life expectancy—an indicator that measures the average time a population is expected to live under prevailing mortality conditions—has become the most well-known and widely used indicator. It is a measure that enables comparisons across populations and time periods. Thus, increases in life expectancy have long been considered the most powerful evidence of improvements in health. Despite its popularity, life expectancy has the important shortcoming that it is only a measure of mortality (ignoring the health status of those who remain alive) and it cannot provide insights into whether the rate of decreasing mortality is equally matched by the rate of improving health. Furthermore, it is often used as a population average that does not show how length of life is distributed across the members of a given population.

In order to understand the health of ageing populations and its consequences, and especially the health-mortality interaction, during the last decades health expectancy indicators were developed. Health expectancies summarize a population's expected years of life lived in a state of "good health" under prevailing mortality and morbidity conditions (Robine 2011). These measures combine not only the quantity but also the quality (in terms of health) of the years of life a population is expected to live. Since health expectancies can be based on various concepts of health, it is possible to estimate several health expectancy indicators (Robine et al. 2003). Previous studies showed that different definitions of health expectancy may show different trends, which helps to understand underlying mechanisms and to specify directions for intervention (Parker and Thorslund 2007). To illustrate, if life expectancy free from diseases declines while life expectancy free from disability increases, this contrast suggests an increased need for prevention of diseases over and above medical care and rehabilitation.

Measuring and monitoring health expectancies are thus not only instrumental in understanding population health, but are also necessary to forecast economic development and

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to provide timely scenarios for evidence-informed policy interventions. For these reasons, health expectancies are now actively used by multiple international organizations when planning policy responses to population ageing (Eurostat, 2020). This includes public health policy makers' domains such as social security, employment, retirement, pensions, health promotion, and social and health care, for all of which knowledge is needed on how long populations will live and how long this will be in a healthy and unhealthy state.

Expanding definitions of health expectancy

The selection of the four articles published in this issue is based on papers presented at the 2019 Réseau Espérance de Vie en Santé (REVES) Meeting in Barcelona. REVES is a worldwide network that promotes the use of health expectancy as a population health indicator and stimulates research on the measurement and underlying mechanisms of population health, amongst others through organizing annual meetings. The four articles describe new uses of health expectancy indicators. This is reflected in this special section's title: 'New thinking about health expectancy'. Whereas so far, health expectancy indicators combined mortality rates with prevalences of health, the 'new thinking' moves beyond health into the realm of social and health care. To understand population ageing, it is important to study not only how many years populations live in good and poor health, but also how social and health care services influence health and how they are used by the population. Plus, there is no one-on-one relation between health and utilization of social and health care. Therefore, it is suggested that "health care free life expectancy" might be a useful complementary indicator.

The four articles address the link between health and care in various ways. The first, making use of the U.S. Health and Retirement Study over the period 2000–2014, specifies health expectancy as life expected in three degrees of frailty (Zimmer et al. 2021). The concept of frailty is commonly defined as a state of diminished strength, endurance, and physiologic function that increases an individual's vulnerability for developing increased dependency and/or death (Morley et al. 2013). Research using frailty as a health indicator in the definition of health expectancy is scarce (Herr et al. 2018). Yet, severe frailty has been shown to be directly associated with health care costs (e.g., Hajek et al. 2018). What the current article by Zimmer and colleagues adds, is evidence on the stark inequality in frailty-free life expectancy between socio-economic groups, with older people with high wealth living 4 more frailty-free years from age 70 than older people with low wealth. Also, recovery from severe frailty is more likely for older people with high versus low wealth—suggesting that the wealthier have better access to resources to address their health condition.

In the second article, conventional health expectancy defined as disability-free life expectancy is estimated for 100 French geographic regions (*départements*), based on the survey *Vie Quotidienne et Santé* in 2014, and linked to socio-economic characteristics and the presence of social and health care services in these *départements* (Laborde et al. 2021). Disability-free life expectancy varied across *départements* by as much as 5.4 years for men and 6.7 years for women from age 60. Differences could be attributed to social factors, such as unemployment rate, as well as to the supply of social and health care services, such as the availability of in-home nursing services. The evidence on such differences demonstrates the importance of monitoring health expectancy and its link with the supply of social and health care services at the local level in order to evaluate the extent to which the health needs of the local population are matched by the local care supply.

The third article uses Danish register data on hospital admission from the years 1995 to 2014 to examine gender differences in health expectancy, defined as time to first hospital admission (Höhn et al. this issue). During the full study period, men had a 0.8 years shorter time to first hospital admission than women. This difference was partly attributed to gender differences in causes of admission and partly to faster disease progression in men than in women. As shorter time to first hospital admission could indicate poorer health for men, this result contrasts with the common finding that women are in poorer health than men (Oksuzyan et al. 2010). However, the explanation of the findings by a faster disease progression implies that men are more likely to delay to seek medical advice, causing diseases to progress more rapidly up to the point where treatment in hospital is necessary (Höhn et al. 2020).

The fourth article goes farthest in expanding the concept of health expectancy by calculating the number of years lived in different living arrangements, including living alone and living with children, based on the Panel on Health and Ageing of Singaporean Elderly over the period 2009 to 2015 (Chan et al. this issue). Results show that at older ages, women spend more years without a partner and that when living alone, they are more likely to move in with their children. Earlier evidence shows that living alone is associated with adverse outcomes such as unplanned hospital admission and, particularly in women, greater functional dependence (Pimouguet et al. 2016; Gubhaju et al. 2017). In a context such as Singapore, where the proportion of older adults living alone is increasing, these findings demonstrate the need for careful planning of social and health care services and taking lifelong gender differences into account.

Conclusion

In conclusion, the four studies presented in the current special section highlight four specific issues: (1) the inequality in duration of a healthy life is socially patterned; (2) the

context of each region and its healthcare supplies matter; (3) there are gender differences in the timing of use of health care; and (4) there are gender differences in life years spent in specific living arrangements. The four studies go beyond the description of health expectancy at the national level and assess the importance of individual characteristics such as wealth and gender, and contextual factors such as social and health care services, for older persons and for policies to address population ageing. However, there is still work to be done to identify and quantify mechanisms underlying these new findings. Future studies may be informed by these findings. First, socio-economic and gender-related inequalities in health and use of social and health care services need to be monitored over time, because they may narrow or widen as societies and their institutions change (Mackenbach et al. 2016; Oksuzyan et al. 2010). Second, discrepancies between population health, living arrangements, and the supply of social and health care services need to be investigated in more detail, accounting for differences between socio-economic groups and genders. Third, at the infra-national level, more specific attention to the local context will provide insights to better adapt social and health care systems to the challenges of population ageing. Overall, studies on population health, and particularly in understanding the dynamics (social, contextual, gender and care) in healthy life expectancy, are needed to continue to understand the state of health of our populations and to further suggest which type of public health policies and to which groups should be implemented.

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