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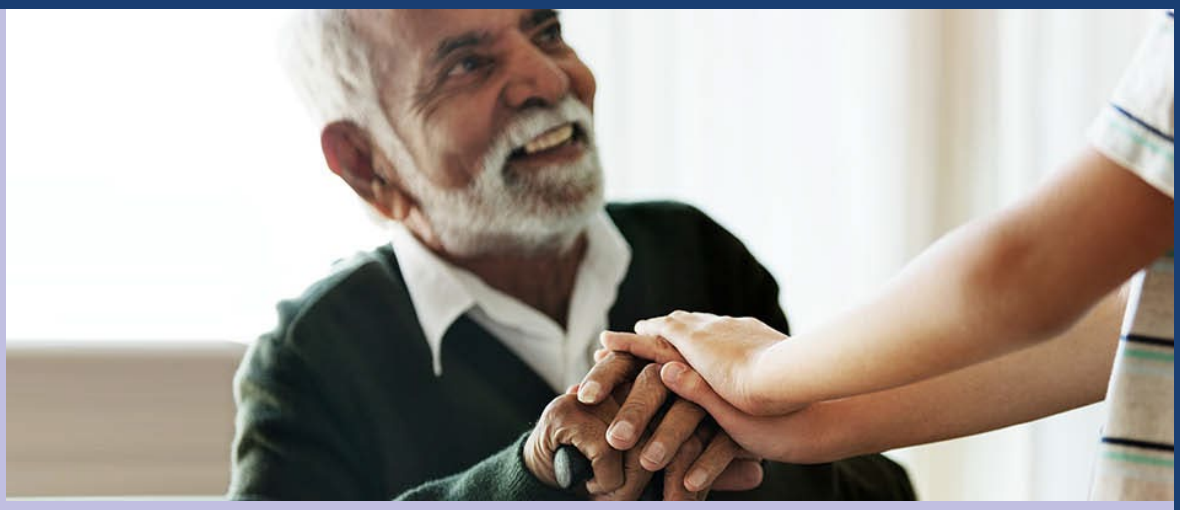

Comparison of trends in life expectancy and disability-free life expectancy between the UK and the remaining countries of the EU28

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Briefing Report

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Background

Life expectancy has been increasing in recent decades, leading to a growth in the size of the older population in many developed nations. Older people are more likely to live with multiple long-term conditions (multimorbidity),[1] which means that extended life expectancy is increasing pressures on health and social care.

Longer life expectancy is of limited value, if the extra years of life gained are spent in ill health and dependence. Many countries have been directing efforts to maximise the health of the extra life years gained, and compress the disabled phase into the smallest possible time before death. In recent years, the UK and the US have seen a reduction in the speed of increase in life expectancy (LE). [2,3] This is important because it may uncover areas for improvement or lead to better understanding of inequalities in health and longevity.[1] Existing evidence has shown that women have longer lives, but compared to men, they spend a higher proportion of them with disability.[4] Both of these concepts - the extension of healthy life years and reductions in health inequalities - are central to the UK government's Ageing Society Grand Challenge.[5]

Comparison of trends in life and health expectancy between developed countries can be limited by the use of different definitions of health. Within Europe a measure of disability-free life expectancy (DFLE) (the Healthy Life Years (HLY) indicator), has been harmonised across the European Union (EU).[6] In this report we determine how trends and sex differences in UK LE and DFLE compare to the other countries of the EU28. We analyse data between 2008 and 2016, therefore prior to the COVID-19 pandemic.

Methods

Data

Calculation of DFLE requires life tables and the age and sex specific prevalence of disability. Data were retrieved from the EuroHex website (www.eurohex.eu):

a) full life tables for each of the EU28 countries from 2008 to 2016 (data from before 2010 were not available for Croatia), and for males and females separately, based on the EuroStat method;

b) two of the health questions (for Healthy Life Years and for Healthy Life Expectancy) from the European Union-Statistics of Income and Living Conditions (EU-SILC) survey of people of 16 years and older living in private households.

Healthy Life Years (HLY) is based upon question PH030 from the EU-SILC survey.

> **Question PH030** 'For at least the last 6 months have you been limited in activities people usually do, because of a health problem?'
> **Possible responses**: 1) yes, strongly limited, 2) yes, limited or 3) not limited.

Healthy life expectancy (HLE) is based upon question PH010 from the EU-SILC survey.

> **Question PH010** 'How is your health in general?'
> **Possible responses**: 1) very good, 2) good, 3) fair, 4) bad, or 5) very bad.

These responses were subsequently collapsed into three categories before release (good, fair or bad). As harmonisation of the EU-SILC survey was significantly improved in 2007-2008, data from before 2008 were excluded.

Statistical analyses

The Sullivan method[7] was used to estimate DFLE ('Not limited' versus any level of activity limitation) and the proportion of remaining life expectancy (LE) expected to be spent disability-free (DFLE%). Disabled life expectancy (DLE) was calculated as LE minus DFLE, and further subdivided into mild DLE (PH030 'limited but not strongly') and severe DLE ('strongly limited'). Healthy-life expectancy (HLE) was estimated using the same method, where those responding 'good' were compared to all other respondents. Confidence intervals were calculated for all estimates of DFLE, DFLE%, HLE, DLE, mild DLE and severe DLE for participants of 16 years and older.[8]

Linearity of trends was assessed visually, and where deviation from clear linear associations was suspected, the basic linear model was compared to a change-point linear model (single knot placement auto-assigned by software) using adjusted R^2 values.[9]

We assessed sex differences in estimates by first calculating the difference in annual values between males and females, and then plotting and analysing the series using simple linear models.

Whether time spent in poor self-perceived health or with disability was expanding or contracting over the timespan for each country was determined by comparing the gradients of LE and DFLE from the simple linear models.

- Absolute expansion of disability was defined as LE increasing significantly faster than DFLE.
- Absolute compression of disability was defined as DFLE increasing significantly faster than LE.
- Relative compression of disability was determined when DFLE% was increasing, and LE and DFLE gradients were not significantly different from each other.
- Relative expansion of disability was defined when DFLE% was reducing, and LE and DFLE gradients were not significantly different from each other.
- Dynamic equilibrium was defined when total DFLE had been significantly increasing but severe DFLE had not.[10]

All analyses were conducted in R version 6.3.2 (R Core Team, Vienna, Austria) including the change- point linear model with package 'segmented.'[11]

Results

The main findings are:

Life expectancy

- The rate of increase in LE at birth for UK males and females between 2008 and 2016 slowed around 2011, taking the UK from being a country with one of the highest rates, to one of the lowest. Germany (males only) and France showed a similar trend with a shallower gradient in later years. In all other EU countries including those with higher LE than the UK, LE at birth underwent a linear increase throughout the period 2008-2016, suggesting the UK findings were not a result of nearing any natural limit to LE.

- Similar patterns were evident for UK LE at age 65. Other countries with a slowing down were Germany and Portugal. In all other EU countries LE at 65 underwent a linear increase.

Disability-free life expectancy

- DFLE at birth for females in the UK reduced rapidly throughout the period 2008-2016. DFLE at birth for males was initially stable; then from 2011 it reduced at a similar speed to DFLE for females. Austria, Greece and Luxembourg also had a reduction in DFLE and a change of trajectory, but Greece had a disproportionate increase in severe DLE rather than mild DLE, similar to the UK.
- Regardless of the intervening trend, most countries saw an overall increase in DFLE over the period, with similar trends in males and females within each country (Figure 1).
- The UK was one of a minority of countries to have seen a reduction in DFLE at age 65 from 2008 to 2016 (Figure 1). (DFLE for males fell in nine countries; DFLE for females fell in eleven countries).
- The reduction in DFLE at birth and age 65 and the greater increase in severe than mild DLE in the UK has implications for demand on health and care services, and for attaining the Ageing Society Grand Challenge target of increasing health, independent years by five by 2035.

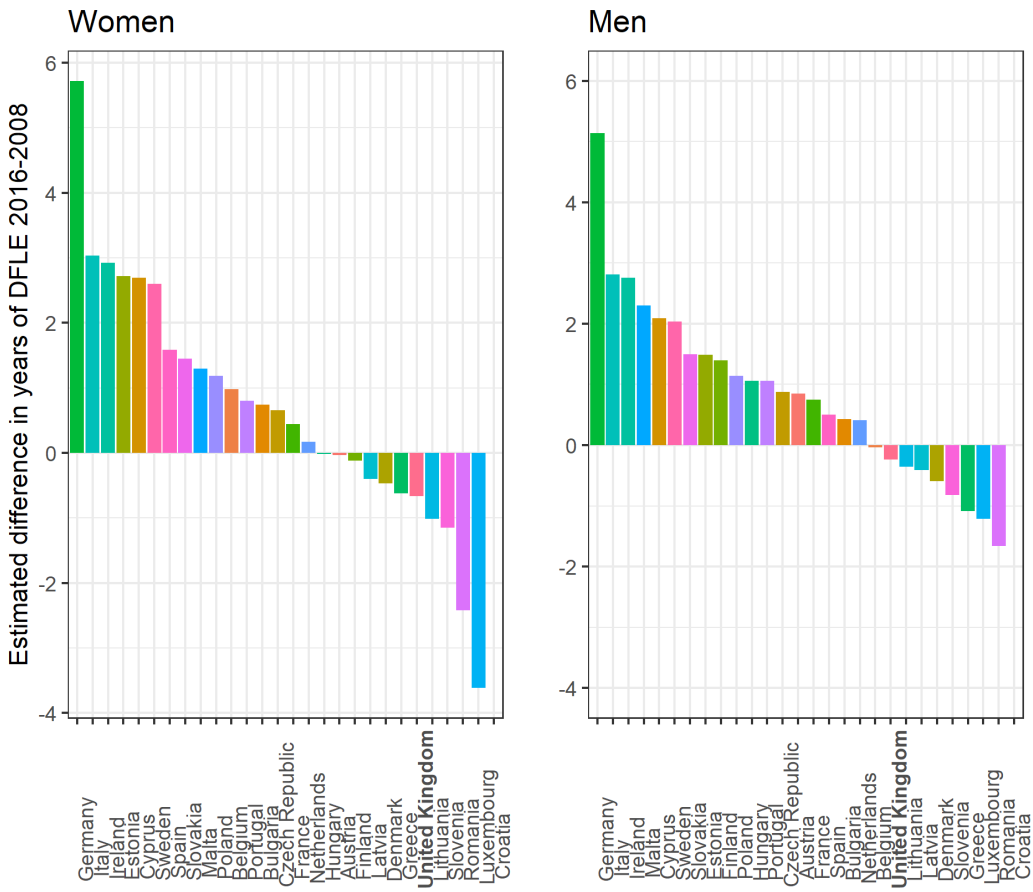

Figure 1. Difference in years of disability-free life expectancy at age 65 between 2008 and 2016 in the EU28.

Differences between males and females at birth and age 65

- Sex differences in UK LE at birth and age 65 reduced significantly between 2008 and 2016, albeit more slowly than most other countries. The UK was one of 9-11 countries to experience a significant reduction in sex differences in DFLE at birth, though no significant change was evident at age 65, nor in the proportion of life spent disability-free at birth or age 65. Four countries saw increases in sex differences in DFLE (Bulgaria, Spain, Cyprus and Sweden).

Overall performance

- Between 2008 and 2016, men and women in the UK experienced a period of absolute expansion of disability (LE increasing significantly faster than DFLE), as did a minority of other countries (Luxembourg, Greece, Estonia, Denmark and Austria) (Figure 1). Ireland and Slovakia experienced absolute compression of disability (DFLE increasing significantly faster than LE) but only in females. Although there was some evidence of narrowing of sex differences in UK LE and DFLE at birth, the speed of reduction of these differences was slow.

Further details of results in tabular and graphical form are provided in the full report.

Conclusions

In 2008, LE in the UK was amongst the highest of the EU28 countries. Around 2011, there was a significant slowing of the increase in LE, a dramatic reduction in DFLE and an increase in severely disabled-life expectancy (for females). Since 2012, LE and DFLE in the UK has been low compared to most of the EU28. Some improvements, albeit slow, have occurred in the gaps in LE and DFLE between males and females. Our findings suggest that the Ageing Society Grand Challenge target of increasing healthy, independent years by 5 years by 2035 is unlikely to be met,[5] and there may be increased demand on health and care. Although the period covered by our analysis does not include the recent COVID-19 pandemic, the excess deaths in the UK, and the reported long-term effects of COVID-19 on health, both directly and indirectly through reduced physical activity, may well increase the prevalence of activity limitation, which will lead to further reductions in DFLE.

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