



# Emerging Findings: frailty and mortality during austerity

Alan Marshall, Chima Eke, Bruce Guthrie, Carys Pugh, Sohan Seth



## ACRC briefing paper 2

This briefing paper presents emerging findings from the Advanced Care Research Centre (ACRC) Data Driven Insight and Prediction work package that examines changes in frailty following the financial crisis.

### What is the problem?

The 2010s have been marked by shocks, including the financial crisis and associated austerity policies, Brexit and the COVID-19 pandemic, that have sharply affected experiences in later life. It is not yet clear what the implications of these events are for trajectories in frailty, wellbeing and social participation in later life. We also don't know how these trajectories may interrelate in new ways to determine risks of suffering adverse events in later life. In this briefing paper we focus on the financial crisis and subsequent austerity policies examining how these may have affected mortality, frailty and their interrelationship.



### What do we know about it?

In 2008/9, a financial crisis unfolded in the US that quickly spread across the world, forcing Governments in many countries to borrow significant sums of money. Subsequently, policies of austerity sought to reduce Government budget deficits through either increased taxes and/or reduced public spending, with the UK Government focussing particularly on the latter. Such policies of austerity that involved sizeable cuts in public spending are thought to have had a significant impact on the health and wellbeing of the older population, connected to reduced funding for social care and income support in later life<sup>1,2</sup>. Perhaps the starker illustration of the impact of austerity is that the UK, and a number of other countries, experienced a levelling off, or even a decline, in the improvement in life expectancy after the financial crisis, following 200 years of steady improvement in life expectancy (see figure 1a and 1b).

The levelling off in mortality cannot be accounted for by influenza, harsh winters or by any limit to human longevity<sup>3</sup>. Analysis suggests that in the UK, the stall in life expectancy improvement was concentrated in the poorest areas and among women with spending cuts, particularly around social care and income support in later life considered likely drivers.<sup>3,4</sup>

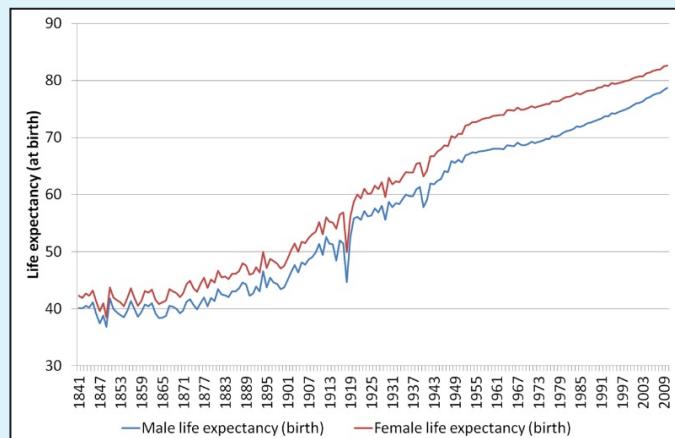
The levelling off in life expectancy did not occur equally in different national contexts since, as illustrated by figure 2, some

### Key points

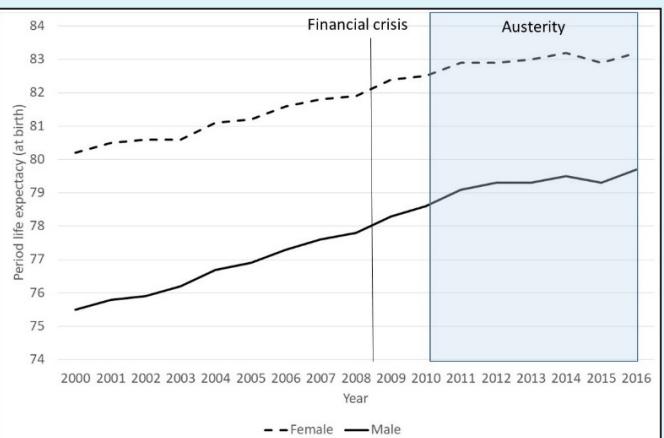
- A key aim of the ACRC is to model trajectories in frailty, wellbeing and social participation to better predict adverse outcomes such as mortality, hospitalisation or moves to care homes.
- This paper presents initial findings on frailty and mortality and their interrelationship following the financial crisis and the associated period of austerity in the UK.
- There is strong evidence to suggest that cuts to spending on social care and income support in later life played a significant part in driving the levelling off in mortality improvement. The timing and its increased impact on the poorest places and people suggest this to be a plausible reason.
- However, some countries that enacted strong public spending cuts in response to the financial crisis, such as Portugal, did not experience a levelling off in mortality improvements and so other factors are likely also involved.
- Frailty has emerged as a key concept in research on population ageing and geriatric practice. In the period 2002 to 2010, analysis of data from the English Longitudinal Study of Ageing (ELSA) suggests that there were increases in frailty in later born cohorts compared to earlier born cohorts.
- Our analysis suggests that this process continued between 2010 and 2019, but that the increasing levels of frailty across cohorts among the poorest in the early phases of later life (age 60-70) approached a 'ceiling' of frailty.
- Risk of mortality is particularly high as frailty approaches a score of 0.3 on the frailty index. A further driver of the levelling off in mortality improvement observed from 2010 is that poorer people approached this 'ceiling' of frailty in earlier phases of later life (ages 60-70) that spilt over into raised mortality from 2010 in a way not observed for previous cohorts where frailty levels were lower.

**Figure 1: Life expectancy in the UK since 1841**

## 1a. Life expectancy (1841 to 2009)



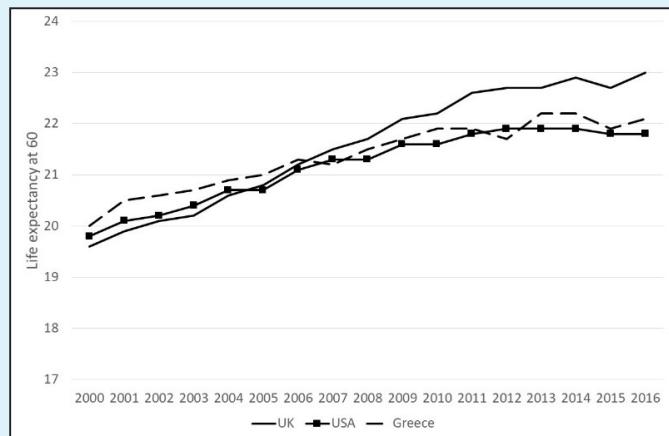
## 1b. Life expectancy (2000 to 2016)



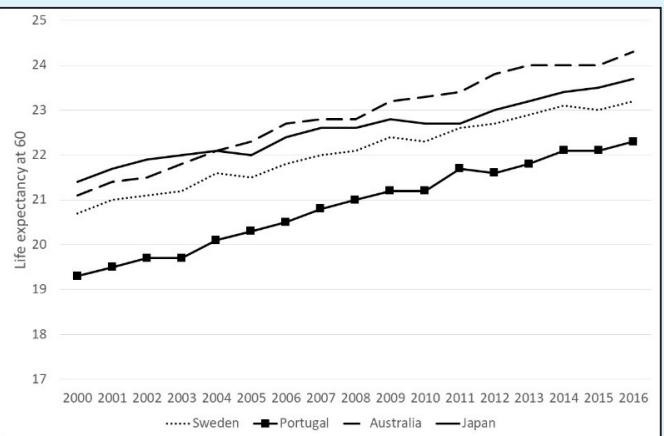
Source: Office for National Statistics (ONS)

**Figure 2: Life expectancy at age 60 (2000-2016) in a selection of countries**

Selected countries with a levelling off in the improvement in life expectancy from 2010



Selected countries with no levelling off in the improvement in life expectancy from 2010

Source: [Human Mortality Database](#)

countries experienced a levelling off in life expectancy improvement whilst others did not. The extent of the stall in life expectancy across nations is unrelated to wealth of countries using indicators such as national Gross Domestic Product per capita, but there does seem to be an association with the extent of inequality within countries with the most unequal countries observing the sharpest levelling off in mortality improvement after 2010 compared to before (see figure 3). While austerity cuts to public spending provide a strong and plausible driver of the levelling off in mortality improvement, it seems likely that other factors are involved since some countries (e.g. Portugal – figure 2 or Italy – not shown here) did not experience any clear stall in life expectancy improvement but also implemented strong cuts in public spending.<sup>1</sup>

*Trajectories in frailty before and after the financial crisis*

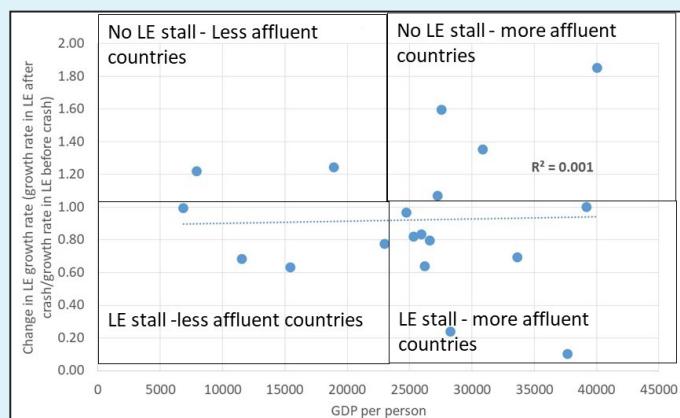
Analysis of life expectancy trends provides valuable descriptive results on potential impacts of austerity on those in later life, but mortality is just one indicator of population health. We might also consider other indicators of health as well as wellbeing. A key question that we are interested in is how trajectories or change in frailty, wellbeing and social participation interrelate and are predictive of adverse outcomes such as mortality before and during austerity.

In this briefing note we focus on frailty, a key concept in research on population ageing and geriatric practice. There are a number of different measures and conceptualisations of frailty but there is general agreement that frailty is a non-specific state reflecting age-related declines in multiple systems that are predictive of a range of adverse outcomes such as falls, fractures, hospitalisation, institutionalisation, and mortality. In the ELSA, the frailty index calculates the

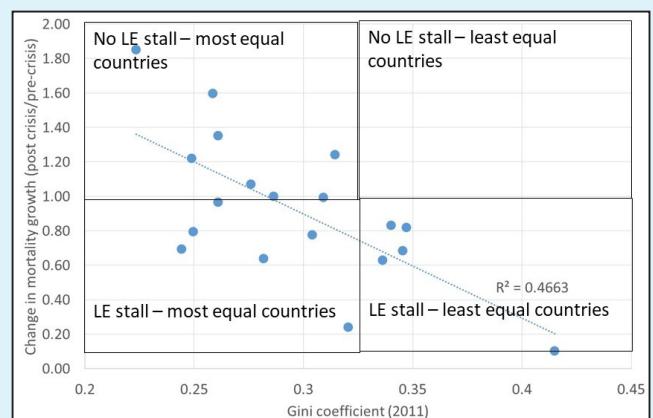
<sup>1</sup>For detailed cross-national analysis from the Office for National Statistics see [Changing trends in mortality: an international comparison - Office for National Statistics \(ons.gov.uk\)](#)

**Figure 3:** Extent of stall in life expectancy improvement versus a. national GDP per capita and b. national inequality (Gini coefficient)

a. Extent of stall in life expectancy improvement versus GDP per person



b. Extent of stall in life expectancy improvement versus inequality (Gini coefficient)



Source: Office for National Statistics (ONS) and The Equality Trust

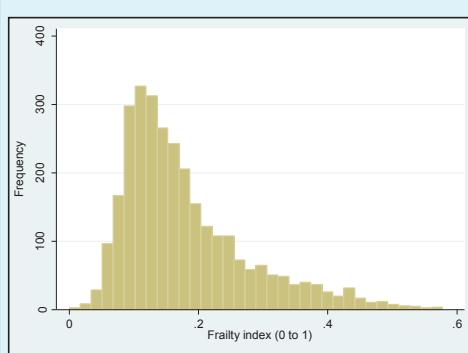
proportion of age-related deficits that a person experiences. Levels of frailty can vary between 0 and 1 but, in practice, few experience levels of frailty above 0.3-0.4 since mortality risk is very high at these levels.

We are building on a body of work that has developed and explored a frailty index defined as the proportion of 60 ‘deficits’ that are held by an individual<sup>5,6,7</sup>. These deficits cover a wide range of age-related issues from activities of daily living to cognitive ability to tests of grip strength and walking speed. We extend earlier analysis that has considered frailty prior to 2010 and the austerity period and we will extend this to include the latest wave of data in 2019.

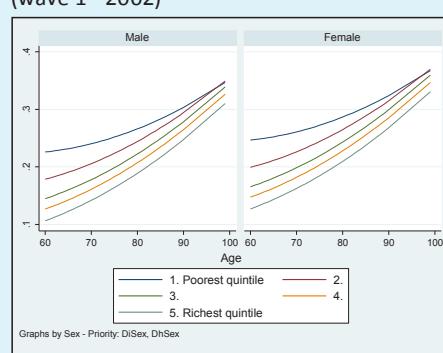
The distribution of the ELSA frailty index is shown in figure 4 along with its cross-sectional age pattern in wave 1 (2002) stratified by wealth. Frailty levels above 0.3, and certainly 0.4, are relatively rare since risk of mortality, as well as moves to care homes, are high for such individuals (figure 4a). Frailty increases with age and there are stark inequalities across the wealth distribution that narrow at the oldest ages with selective mortality concentrated among the poorest, one driver for this narrowing<sup>8</sup> (figure 4b).

**Figure 4:** Analysis of frailty (cross-sectional and longitudinal) between 2002 and 2010

4a. ELSA Frailty distribution (wave 1 - 2002)



4b. ELSA frailty age pattern by wealth (wave 1 - 2002)



4c. ELSA Frailty trajectories by age cohort and wealth (2002-2010)

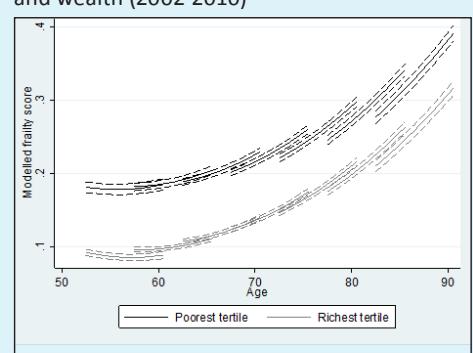
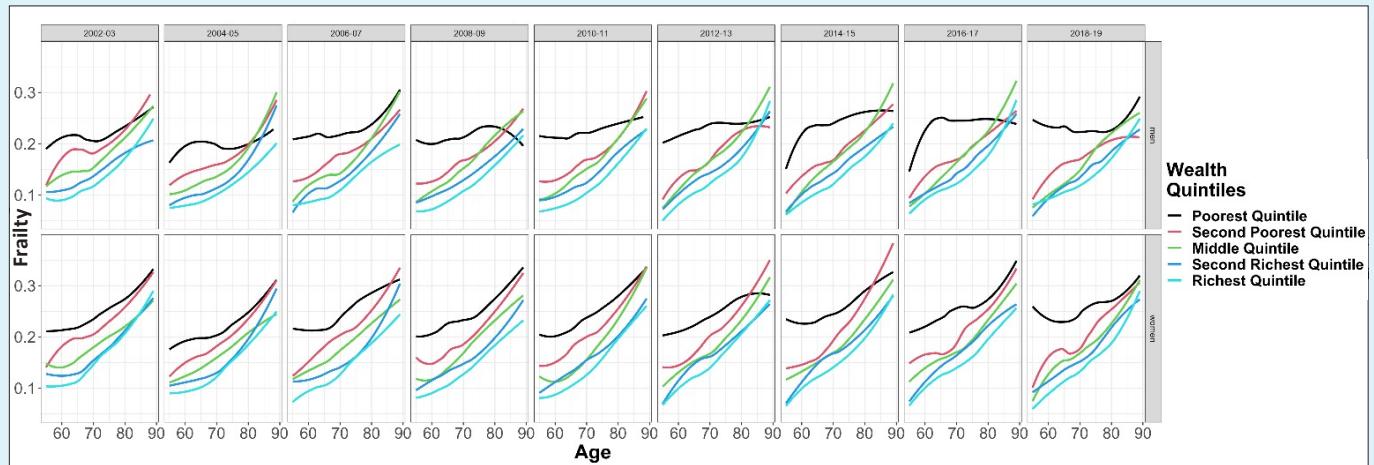


Figure 4c shows that the trajectory of frailty for an individual in the richest tertile (third) at age 80+ is comparable to that for a person aged 70-74 in the poorest tertile. A further concerning result (in figure 4c) is that between 2002 and 2010 these inequalities in frailty appear to have widened. For the poorest, at particular overlapping ages, more recent cohorts appear to have higher levels of frailty compared to earlier cohorts. For example, a comparison of the levels of frailty between the ages of 75 and 80, for the two cohorts that cross this age range, reveals that for the wealthiest there is little difference in frailty across cohorts. However the same cannot be said for the poorest members of the cohort. A key driver of this wealth-specific change in frailty across cohorts is the slower estimated growth rate of frailty for those in the richest tertile compared to the poorest tertile, a finding that is statistically significant.<sup>4</sup>

Figure 5 shows the mean frailty varying with age for each wave of ELSA from 2002/3 to 2018/19. It shows a trend towards widening inequalities in frailty among men and women at age 60 with steady increases in frailty for those in the poorest 20% and some evidence of declines in frailty amongst the most affluent at age 60 over the period. But, in this full analysis of all ELSA data between 2002 and 2019, there is also a strong suggestion that the increases in frailty across cohorts in the poorest quintile is approaching a ‘ceiling’. By 2019, there is a flatter frailty age pattern for the poorest quintile, particularly for males, that is not observed in more affluent groups. Few respondents in ELSA have frailty scores above 0.3 with very low proportions exceeding 0.4 (see figure 4a). At such levels of frailty, mortality, as well as moves to care homes and non-response, prevent further increases in frailty among the sample who remain in the survey data. This effect brings additional context for the levelling off in mortality observed from 2010 and the national variations in this result. It is plausible that the trends towards increasing levels of frailty across cohorts reached such a level that a spill over into raised mortality particularly among the poorest occurred from 2010 onwards. Thus, one avenue of research to extend this analysis would be to connect the longitudinal analysis of frailty by wealth and cohort in different national contexts to the degree of the levelling off in mortality improvements observed from 2010.

**Figure 5: Frailty age pattern (2002-2019)**



## Conclusion

The UK and a number of other countries experienced a levelling off in mortality improvement, from 2010 and following the financial crisis. This levelling off has been convincingly connected to austerity policies and reductions in public spending that have affected the poorest in particular. Yet some countries that implemented public spending cuts did not experience any levelling off in mortality so other factors are likely involved. Over the period 2002 to 2019, frailty levels for those aged 60-70 have increased for the poorest in England to approach a ‘ceiling’ of frailty at which risk of mortality are particularly high. Thus, an additional driver of the levelling off in mortality is likely attributable to the rising frailty among the poorest in the early phases of later life that is now sufficiently high to spill over into raised mortality.

## What will the ACRC do about it?

One strand of the interdisciplinary research programme of the ACRC is concerned with developing and disseminating data-driven prediction tools for adverse events in later life including falls, hospitalisation, increased care needs and mortality. Rich survey data such as the ELSA provide insights around how trajectories (or change) in frailty, wellbeing and social participation interrelate and are predictive of adverse outcomes in later life. We will transfer these insights from social surveys to routine health data within the [SAIL databank](#) and [Dataloch](#) to develop a suite of risk prediction tools for a range of audiences to make better informed interventions improving the quality and duration of later life.

Part of our initial phase of work analyses data from the ELSA to consider how inequalities in frailty, wellbeing and social participation are changing between 2002 and 2019 and to determine the implications for inequalities in adverse outcomes such as mortality. Our expectation is that our prediction models will need to be dynamic and updated over time to most accurately predict risks of adverse events as prevailing social, political and economic circumstances change.

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