



## England & Wales mortality monitor - July 2019

### Summary

Mortality in the second quarter of 2019 was relatively light compared to the 2009-2018 average, continuing the period of relatively light mortality observed in the first quarter of 2019 and the second half of 2018.

### Background

This is the fourth in a series of quarterly updates monitoring mortality in England & Wales. It is based on provisional weekly deaths data to 28 June 2019 (i.e. week 26 of 2019), published by the Office for National Statistics (ONS) on 9 July 2019. We intend to publish the next update, for data to the end of week 39 of 2019, in October 2019.

All updates are publicly available from the CMI pages of the Institute and Faculty of Actuaries website:  
<https://www.actuaries.org.uk/learn-and-develop/continuous-mortality-investigation/other-cmi-outputs/mortality-monitor>.

### Notes

All of our analysis is based on Standardised Mortality Rates (SMRs). These adjust the provisional weekly deaths data published by the Office for National Statistics (ONS) to allow for changes in the population over time.

As noted in [Working Paper 111](#), we make our population estimates of at the start of the year, and these are not revised during the year to reflect emerging deaths data. We do not think that the impact on the results would justify the additional complexity of doing so.

Charts A, B and C show centred averages of weekly SMRs. The annual averages smooth out seasonal variations. The quarterly averages smooth short-term variations but still show seasonal patterns, allowing the identification of, for example, winters with particularly heavy or light mortality.

Chart D shows cumulative standardised mortality (cSMR) for each year, relative to the average for 2009-2018, and Chart E shows cumulative standardised mortality improvements (cSMRI) for each year (i.e. the progression of annual mortality improvements over the course of each year). Charts D2 and E2 show the same information as charts D and E respectively in a different format and may be easier to interpret for those with colour vision deficiency.

Charts A to E show results for males and females combined, for ages 20-100. Charts F and G show variations in the cSMR and cSMRI by gender and age band.

The numerical results underlying the charts are provided in an accompanying spreadsheet, together with further results, including SMRs by gender and age band.

Full details of the methods used are included in [Working Paper 111](#).

### Use of this document

Please note that:

- The CMI disclaims any liability from use of or reliance on these calculations, including in relation to financial transactions such as longevity swaps; and
- The CMI does not guarantee that it will continue to publish quarterly updates.

Please also see the reliances and limitations, disclaimer, and copyright notice on the final page of this document.

### TAS compliance

This paper is intended to analyse recent mortality in England & Wales. It complies with the principles in the Financial Reporting Council's Technical Actuarial Standard "TAS 100: Principles for Technical Actuarial Work". Any person using this paper should exercise judgement over its suitability and relevance for their purpose.

## Smoothed mortality at a point in time

Chart A shows quarterly (13-week) and annual (53-week) centred averages of SMR, since weekly deaths data became available. Note that although we have used data from 31 July 1999 to 28 June 2019, the quarterly and annual averages start 6 and 26 weeks later and stop 6 and 26 weeks earlier.

The annual average SMR shows a fairly steady fall from 1.75% in early 2000 to 1.30% by mid-2011. From mid-2011 to mid-2018, the annual average SMR was fairly flat, remaining within the range from 1.24% to 1.34%, but it reached a new low of 1.21% at the end of the second quarter of 2019, breaking the previous low of 1.22% reached at the end of the first quarter of 2019.

The quarterly average shows that mortality peaks each winter. Winter mortality in 2018/19 was relatively light, particularly compared to 2017/18, and continued the trend of relatively light mortality that was seen in the second half of 2018.

**Chart A: Quarterly and annual centred average SMRs - whole period**

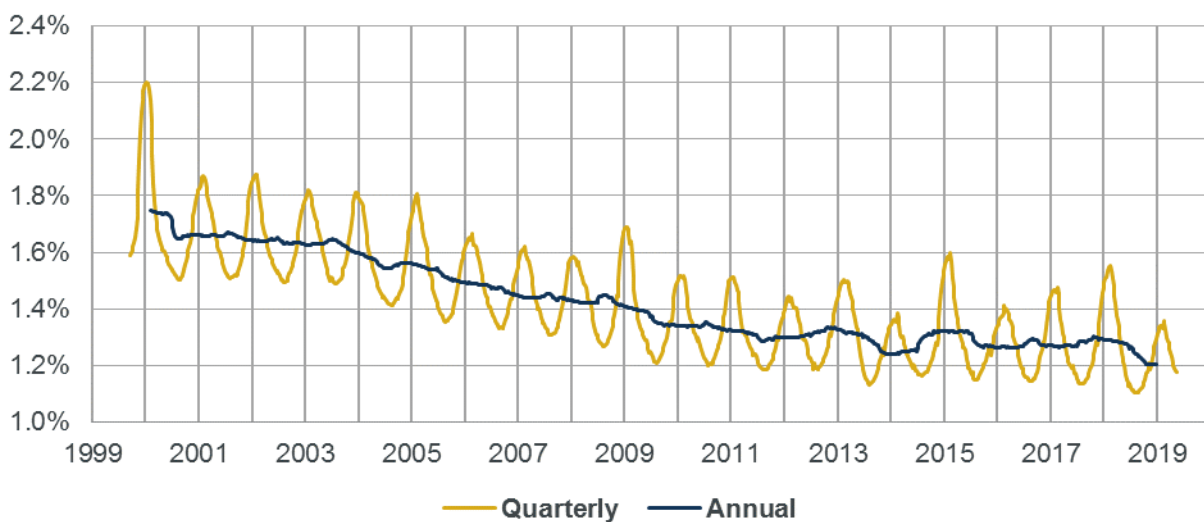


Chart B shows the same information as Chart A, magnified to show the current year and the previous five years more clearly.

**Chart B: Quarterly and annual centred average SMRs - current and previous five years**

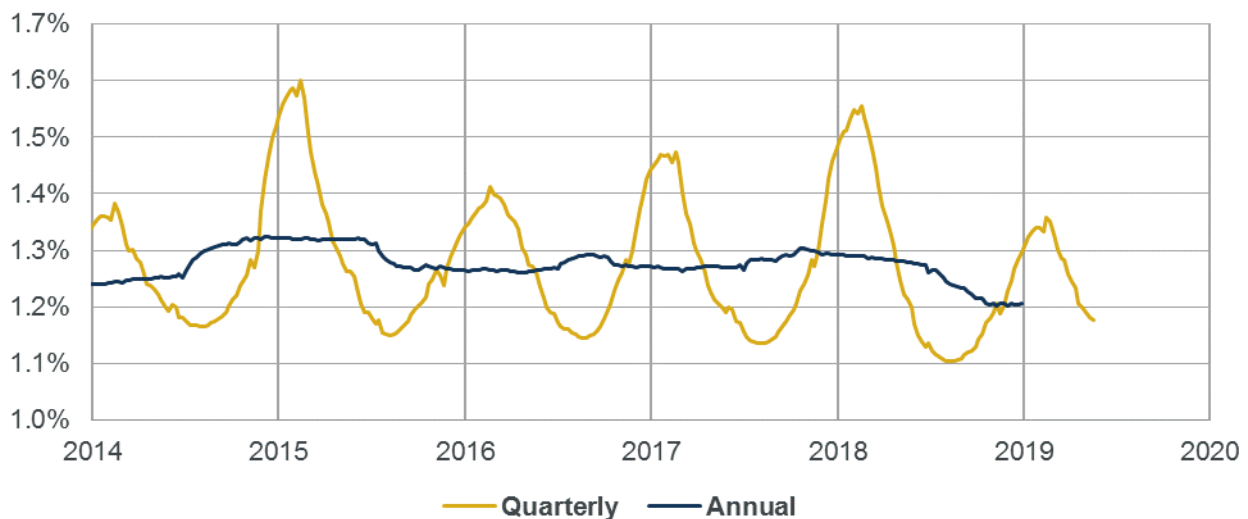
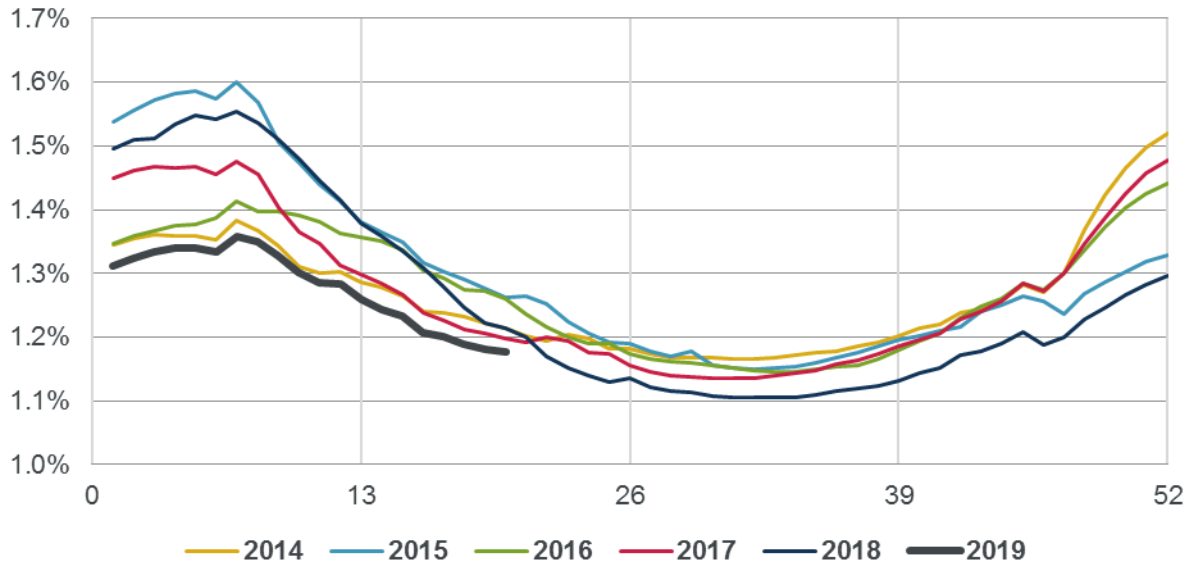


Chart C shows the quarterly average SMRs from Chart B for each year, with values plotted by week number to aid comparison. We note that although lines are labelled by calendar year, the quarterly averages for weeks towards the start and end of each year will be affected by mortality in earlier and later years respectively. The chart again illustrates the relatively low level of mortality in the first half of 2019.

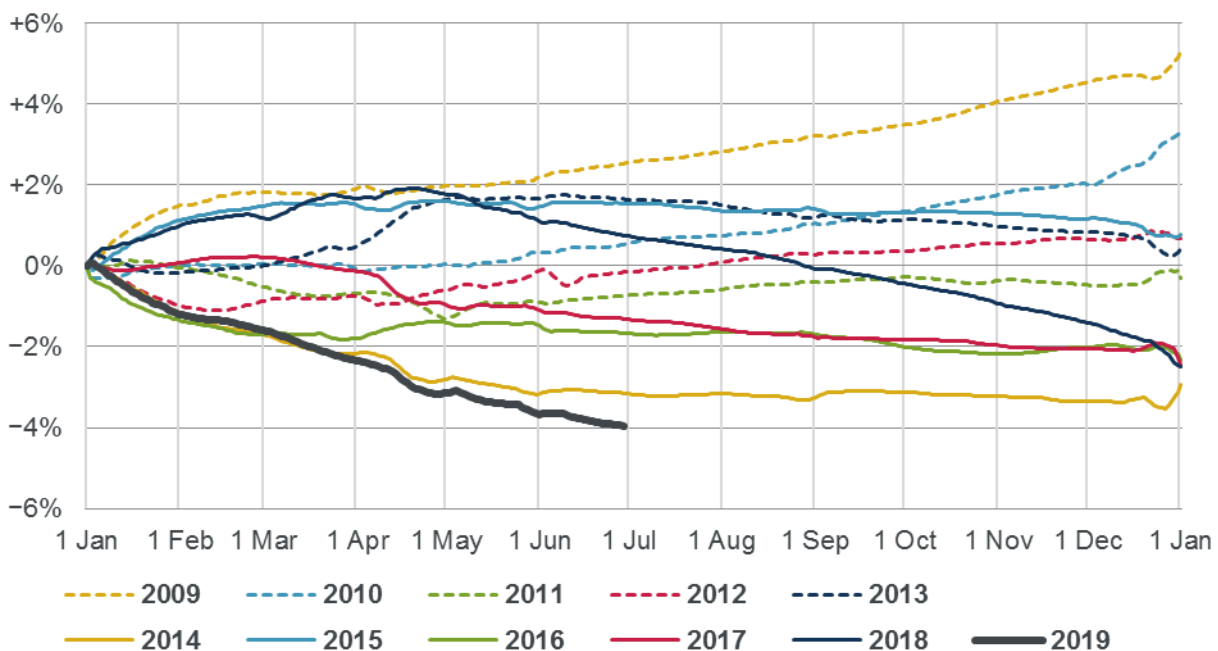
**Chart C: Quarterly centred average SMRs, by week number**



## Cumulative mortality

Chart D shows cumulative standardised mortality rates for the first half of 2019 and for the previous ten years compared to the 2009-2018 average. (The calculation method is described in Section 4.2 of Working Paper 111.) Chart D2 shows the same information in a different format and may be easier for those with colour vision deficiency.

**Chart D: Cumulative standardised mortality rate (cSMR) compared to the 2009-2018 average**



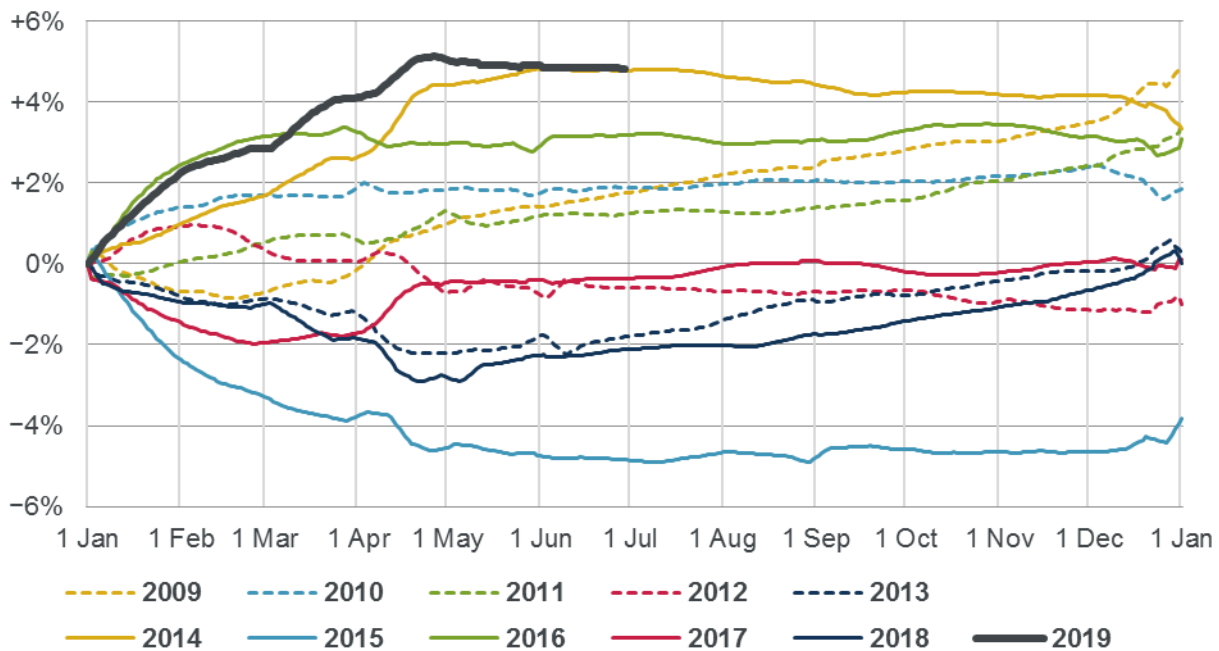
All years have a value of 0% at the start of the year, by definition, as there has been no mortality at that point of the year. If mortality improvements had been constant throughout the period considered then the lines for each year would form a “fan”, with the end-year values decreasing steadily from year to year. While we see a decrease of this sort from 2009 to 2011, there is no clear pattern to the end-year values for later years, as mortality has been volatile with low annual improvements. Mortality for complete calendar years was lowest in 2014.

Chart D shows that cumulative standardised mortality in 2019 continues to be well below the ten-year average. Mortality in 2019 up to May was similar to mortality in over the same period in 2014 but since May cumulative standardised mortality in 2014 and 2019 has diverged.

Chart E shows the cumulative annual standardised mortality improvement (also described in Section 4.2 of Working Paper 111) for 2019 and for the previous ten years. Chart E2 shows the same information in a different format and may be easier for those with colour vision deficiency.

Note that Chart E shows cumulative improvements, so a higher value represents a higher improvement and lower mortality; whereas in Chart D a higher value represents higher mortality.

**Chart E: Cumulative annual standardised mortality improvement (cSMRI)**



Mortality in the first half of 2019 has been substantially lower than in the corresponding period in 2018. The cumulative mortality improvement reached a peak of 5.1% p.a. towards the end of April, before falling slightly to 4.8% p.a. at the end of June; i.e. if mortality in the remainder of 2019 is the same as in the corresponding part of 2018, then the annual improvement for 2019 will be +4.8% p.a. The cumulative improvement for the first half of 2019 is higher than in any of the previous ten years.

Note that:

- The cumulative values at the end of the year in Charts D and E may not necessarily agree precisely with the corresponding values based on annual data. This is because some weeks span two years, requiring us to estimate in which year those deaths were registered.
- Mortality improvements vary by age (as shown later in this report) and the mortality improvements shown in Chart E are sensitive to the age distribution of the chosen standard population.



Chart D2: Cumulative standardised mortality rate (cSMR) compared to the 2009-2018 average, showing 2009-2019 and highlighting individual years

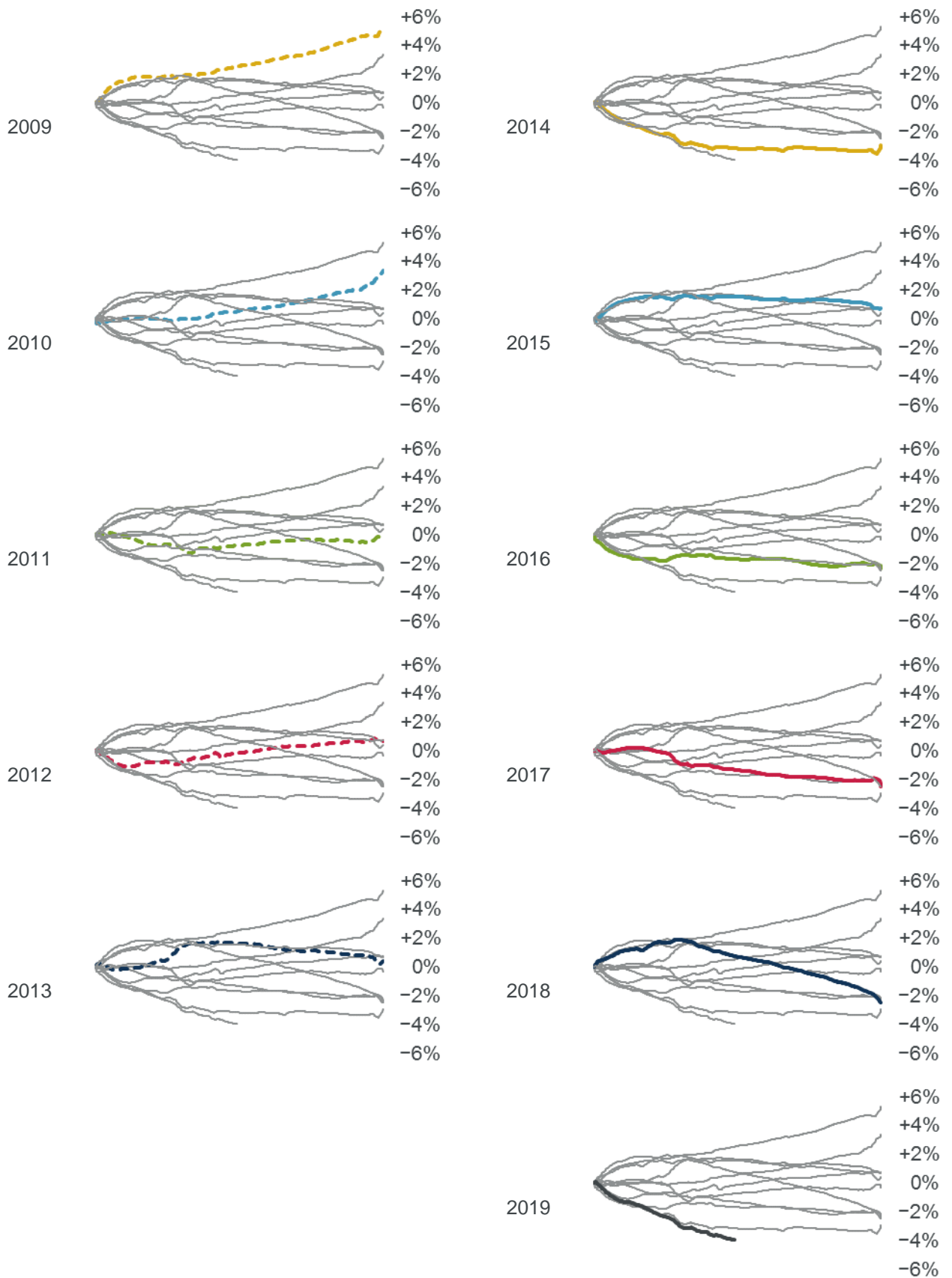
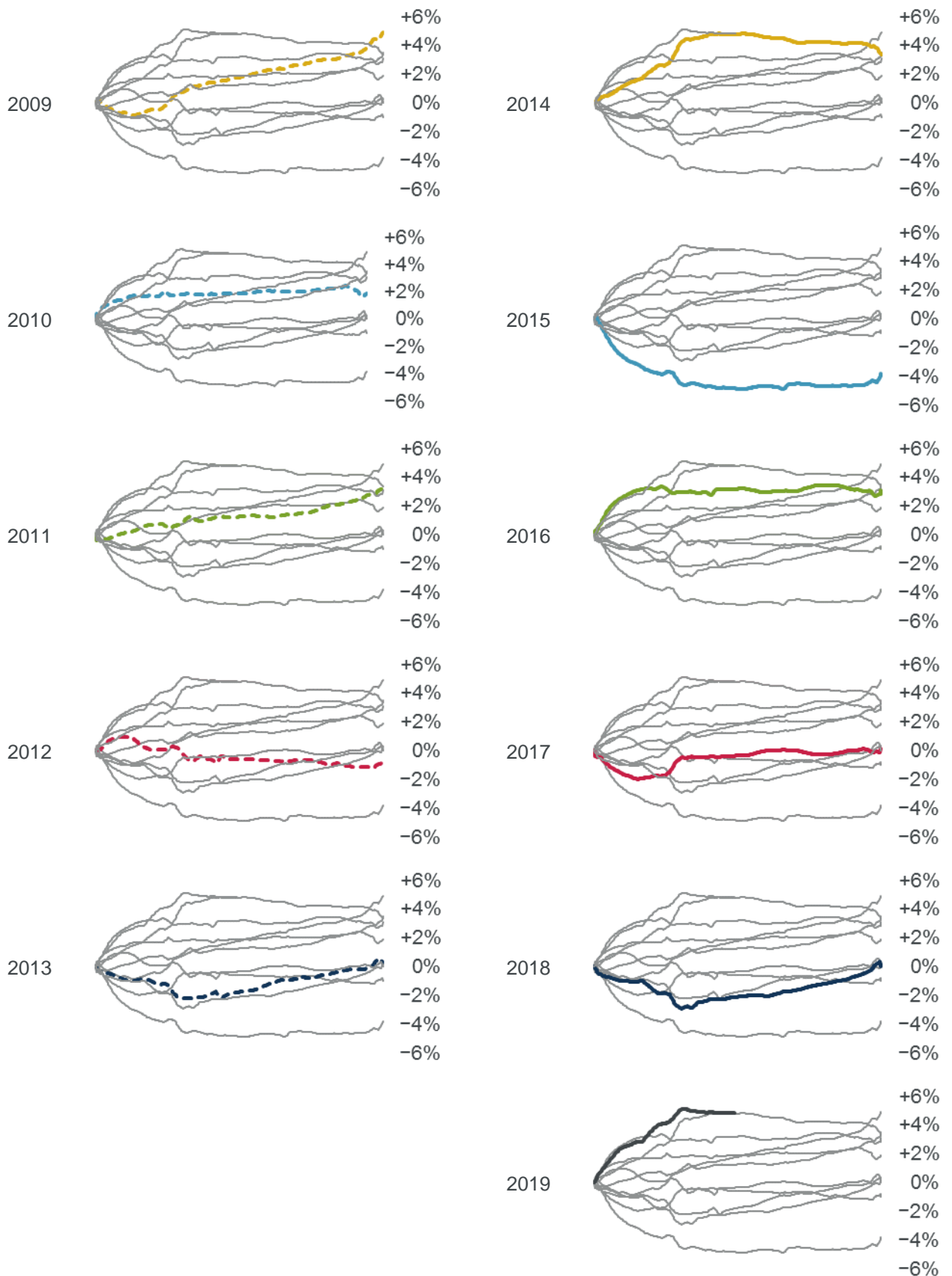




Chart E2: Cumulative annual standardised mortality improvement (cSMRI) for 2009-2019, highlighting individual years



## Implication for CMI\_2019

Table 1 is based on Section 7 of Working Paper 119 and shows how life expectancy might change between CMI\_2018 and hypothetical versions of CMI\_2019, based on a range of possible mortality improvements and assuming no change in method.

In the scenario that the cumulative annual standardised mortality improvement remains at the current level of +4.8% p.a. over the remainder of 2019, we might expect a rise in life expectancy somewhere between the “+3% improvement” and “+6% improvement” rows (in the absence of any change in method). However, as illustrated in Chart E, users should be mindful that the cumulative annual standardised mortality improvement can vary significantly, with monitoring reports carried out earlier in the year showing higher levels of variability compared to the final year end improvement. Users should also note that there can be significant variations in improvements between the age bands.

**Table 1: Percentage difference in life expectancy between CMI\_2018 Core and CMI\_2019 Core for different levels of mortality improvement in 2019, assuming no change in method**

Gender and age	Male 45	Female 45	Male 65	Female 65	Male 85	Female 85
+6% improvement	+0.9%	+0.8%	+1.3%	+1.1%	+1.6%	+1.5%
+3% improvement	+0.1%	+0.1%	+0.2%	+0.1%	+0.1%	+0.2%
Nil improvement	-0.7%	-0.5%	-1.0%	-0.9%	-1.3%	-1.2%
-3% improvement	-1.6%	-1.2%	-2.3%	-1.9%	-2.7%	-2.5%

## Variation by gender and age

Charts F and G shows how cSMR and cSMRI have varied by gender and age band.

Chart F shows considerable variation by age band:

- The spread of mortality rates over the period is widest for ages 65-84 and narrowest for ages 85+, for both genders.
- Mortality for ages 65-84 and 85+ in 2019 has so far been well below the 2009-2018 average. For males and females aged 65-84, for males aged 85+ and for females aged 0-64, mortality in 2019 is so far lower than in any other year shown.

Chart G shows that:

- Mortality improvements in the 2009-2018 period have been most volatile for the 85+ age band, particularly for females.
- Mortality improvements to date in 2019 for ages 65-84 and 85+ are similar to 2014 and higher than any other year shown. Improvements for ages 0-64 are lower, but positive, and for females are higher than in any other year shown except for 2017.



Chart F: Cumulative standardised mortality rate (cSMR) compared to the 2009-2018 average, by gender and age-band

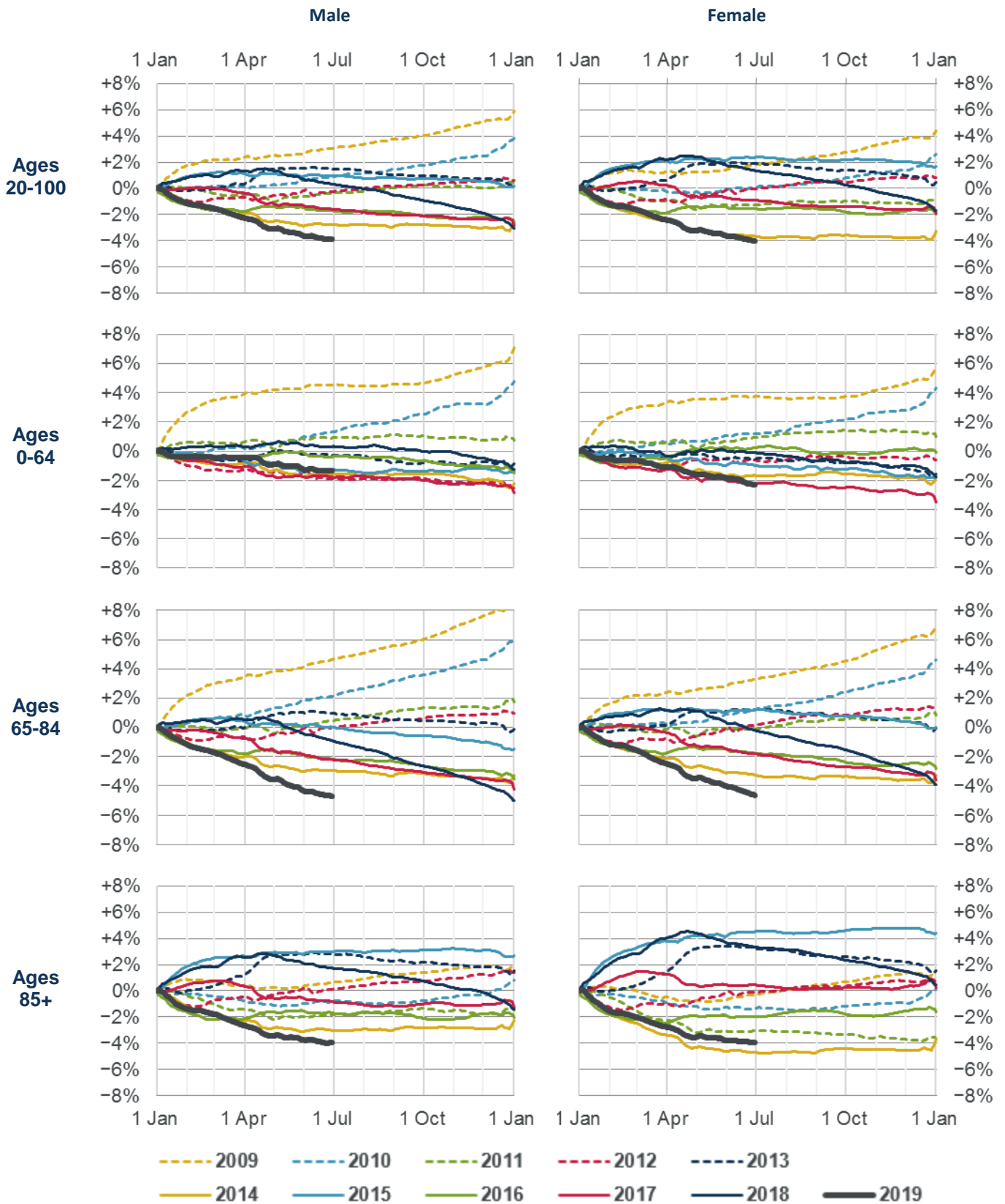
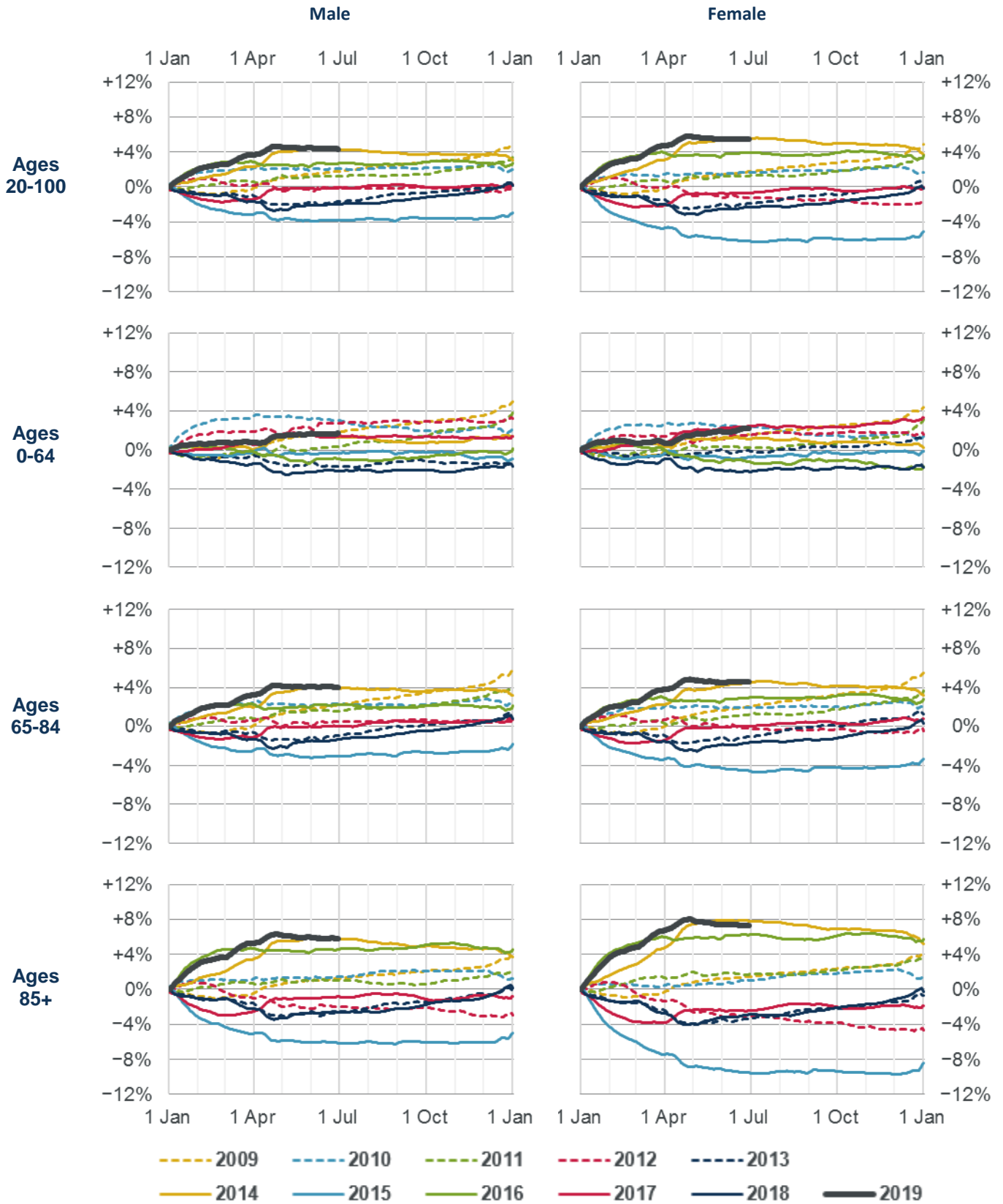




Chart G: Cumulative annual standardised mortality improvement (cSMRI), by gender and age band





## Reliances and limitations

The purpose of the mortality monitor is to provide regular updates on standardised mortality in England & Wales, adjusting ONS data to allowing for changes in the size and age of the population. This can be used to inform a view on the outcome of the next version of the CMI Model.

The CMI aims to produce high-quality outputs and takes considerable care to ensure that the mortality monitor and the accompanying spreadsheet of results are accurate. However:

- We cannot guarantee their accuracy (see the Disclaimer).
- There is a reliance on the underlying data, published by the ONS and described as provisional.
- We have also applied judgement and assumptions in deciding on the calculation methods and the presentation of results.
- Anyone using the results of the mortality monitor should ensure that it is appropriate for their particular use, and note that care is needed when estimating full year experience from partial year experience, particularly over short periods.

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