



England & Wales mortality monitor – January 2020

Summary

Despite heavier mortality in the final quarter of 2019 than in the same period in 2018, mortality for 2019 as a whole has been lower than in any previous year considered. The annual mortality improvement for 2019 is estimated to be 3.6% p.a.

Background

This is the latest in a series of quarterly updates monitoring mortality in England & Wales. It is based on provisional weekly deaths data to 3 January 2020 (i.e. week 1 of 2020), published by the Office for National Statistics (ONS) on 14 January 2020. We intend to publish the next update, for data to the end of week 13 of 2020, in April 2020.

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 ONS to allow for changes in the population over time.

As noted in [Working Paper 111](#), we make our population estimates 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 3 January 2020, the quarterly and annual averages start 6 and 26 weeks later and stop 6 and 26 weeks earlier.

The annual average SMRs 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 fell to a new low of 1.20% in 2019. It has since risen, and the latest value is 1.22%.

The quarterly average SMR shows that mortality peaks each winter. Winter mortality in 2018/19 was relatively light, with the lowest peak quarterly average mortality of any year shown, 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

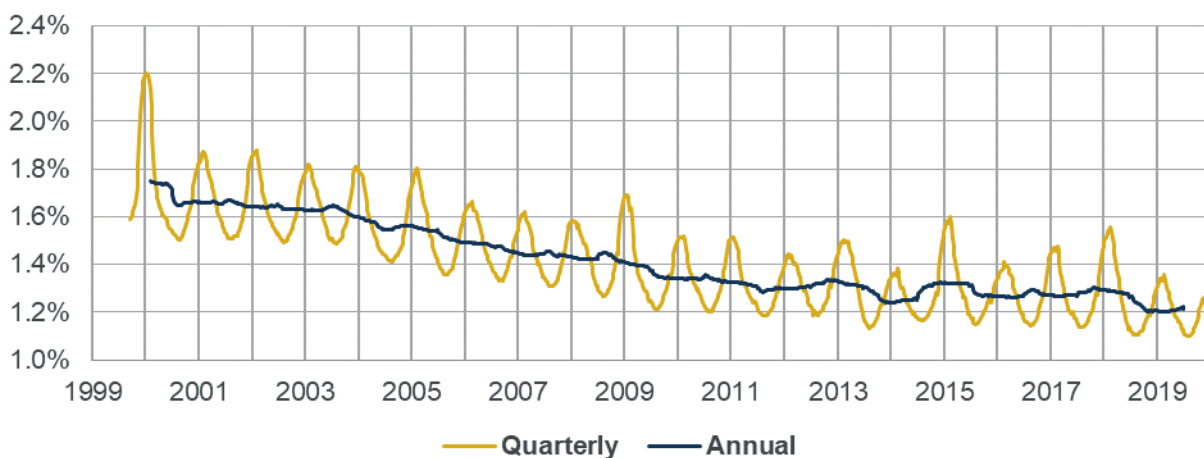


Chart B shows the same information as Chart A, magnified to show the current year and the previous five years more clearly.

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

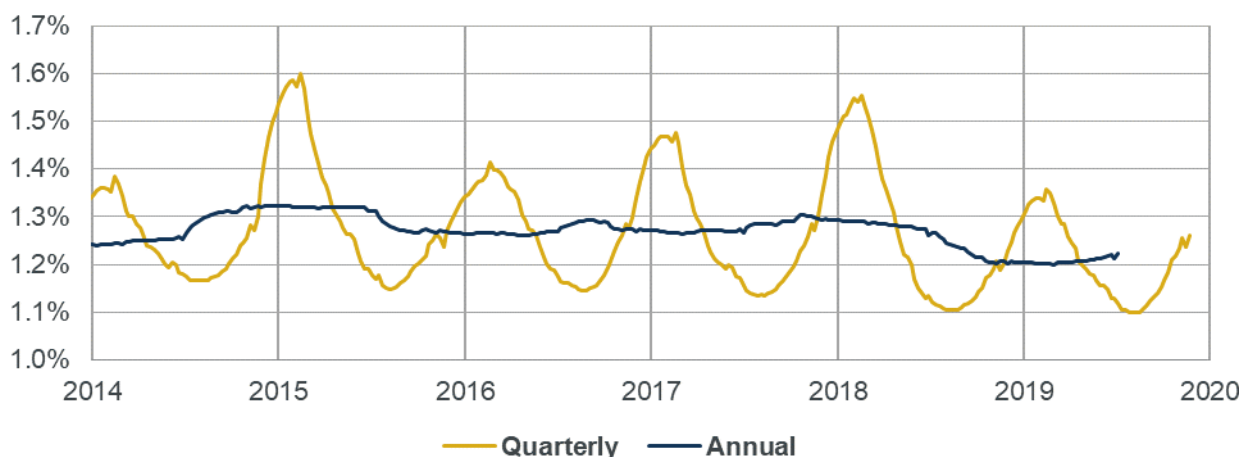
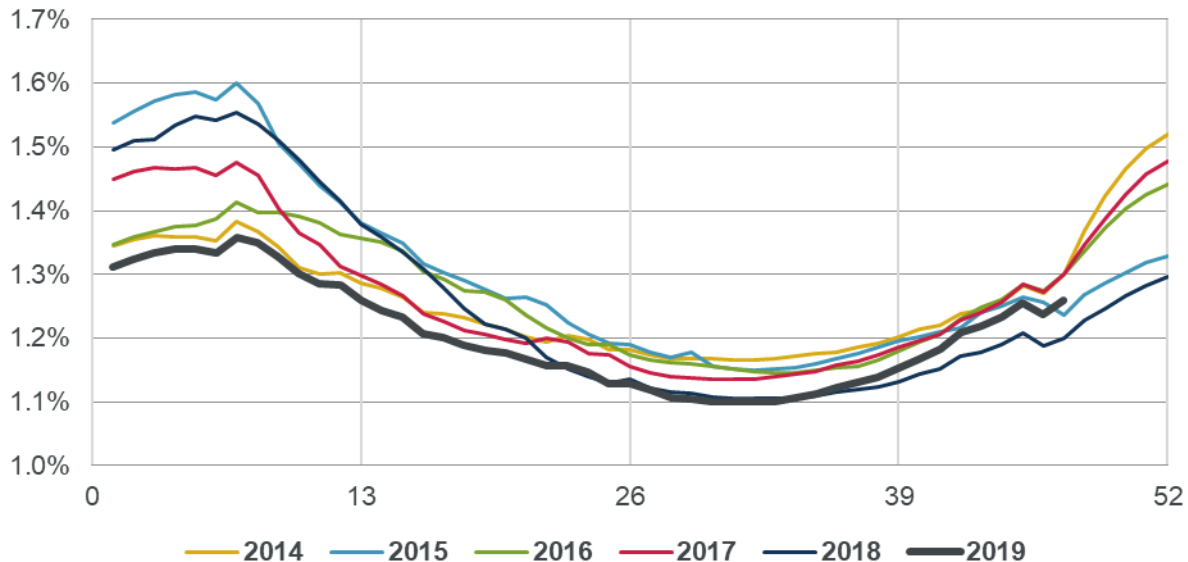


Chart C shows the quarterly average SMRs from Chart B for each year, with values plotted by week number to aid comparison. We note that although lines are labelled by calendar year, the quarterly averages for weeks towards the start and end of each year will be affected by mortality in earlier and later years respectively. The chart shows that mortality in the first part of 2019 was low compared to previous years. However, the latest quarterly average SMR is higher than for the corresponding point in 2018.

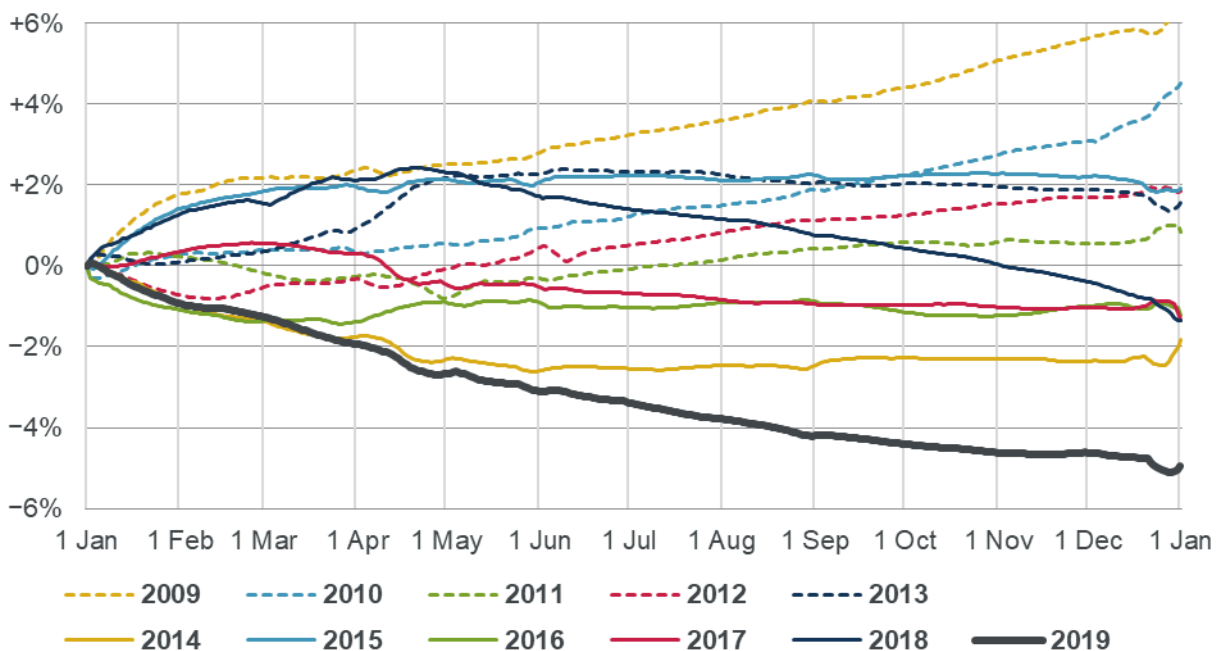
Chart C: Quarterly centred average SMRs, by week number



Cumulative mortality

Chart D shows cumulative standardised mortality rates for 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





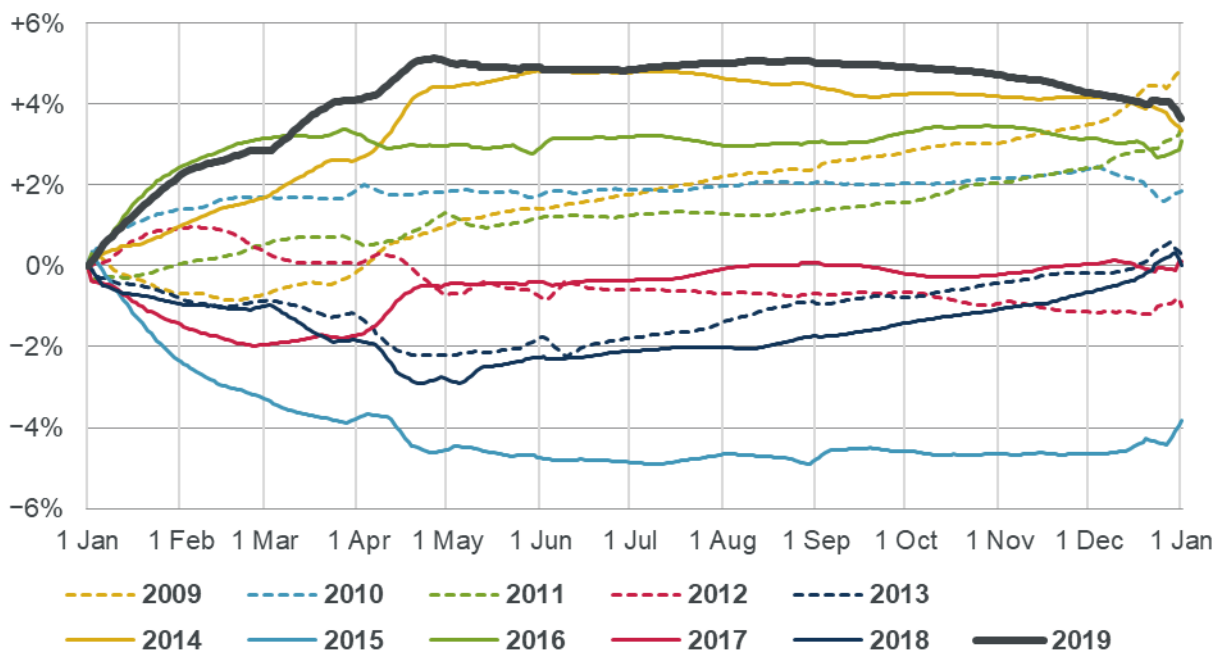
All years have a value of 0% at the start of the year, by definition, as there has been no mortality at that point of the year. If mortality improvements had been constant throughout the period considered then the lines for each year would form a “fan”, with the end-year values decreasing steadily from 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.

Chart D shows that cumulative standardised mortality in 2019 was lower than in any of the previous ten years.

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 2019 has been substantially lower than in 2018. The cumulative mortality improvement reached a peak of 5.1% p.a. towards the end of April, before falling to 3.6% p.a. at the end of the year. Of the previous ten years shown, only 2009 had a higher cumulative mortality improvement

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

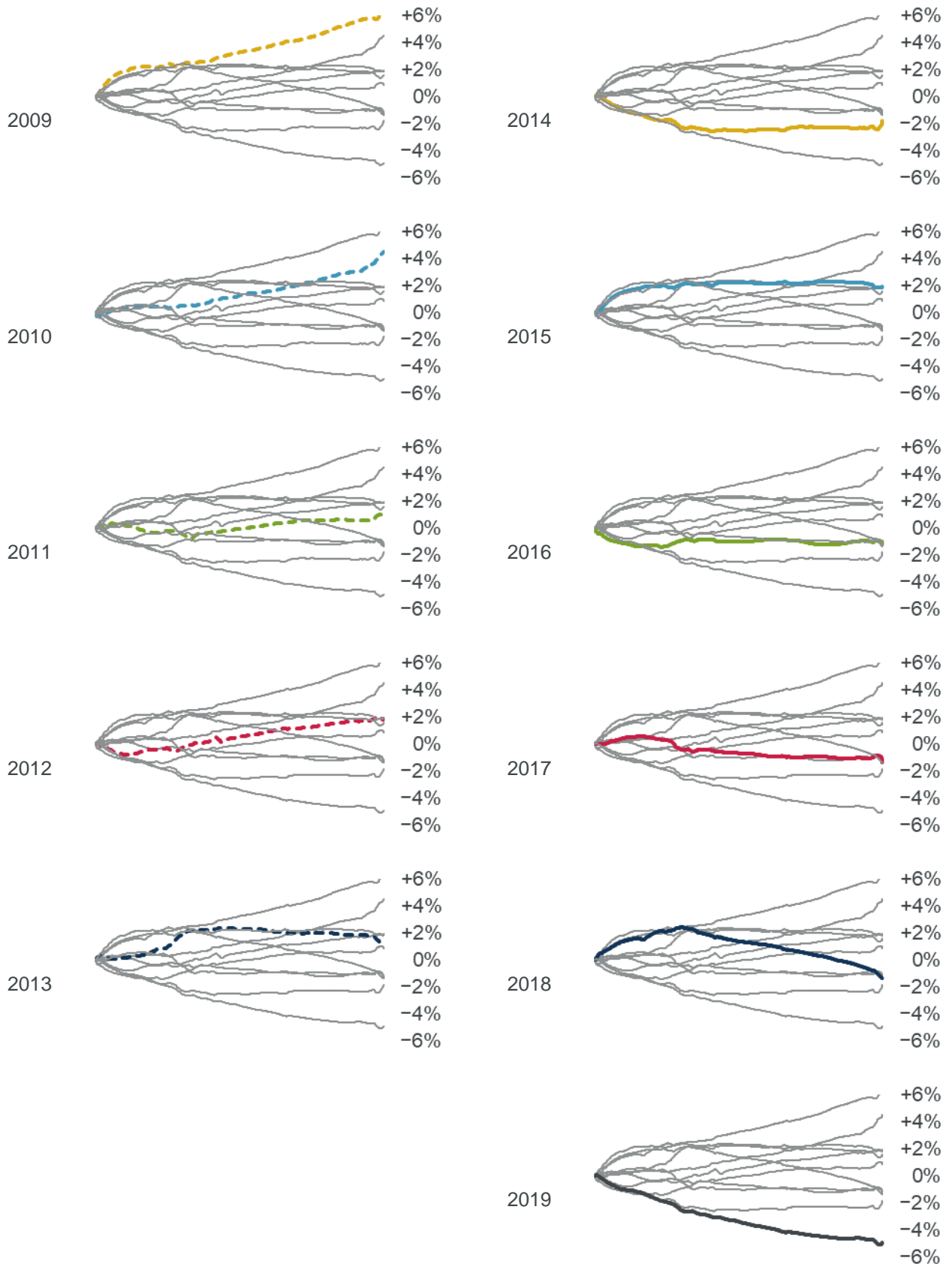
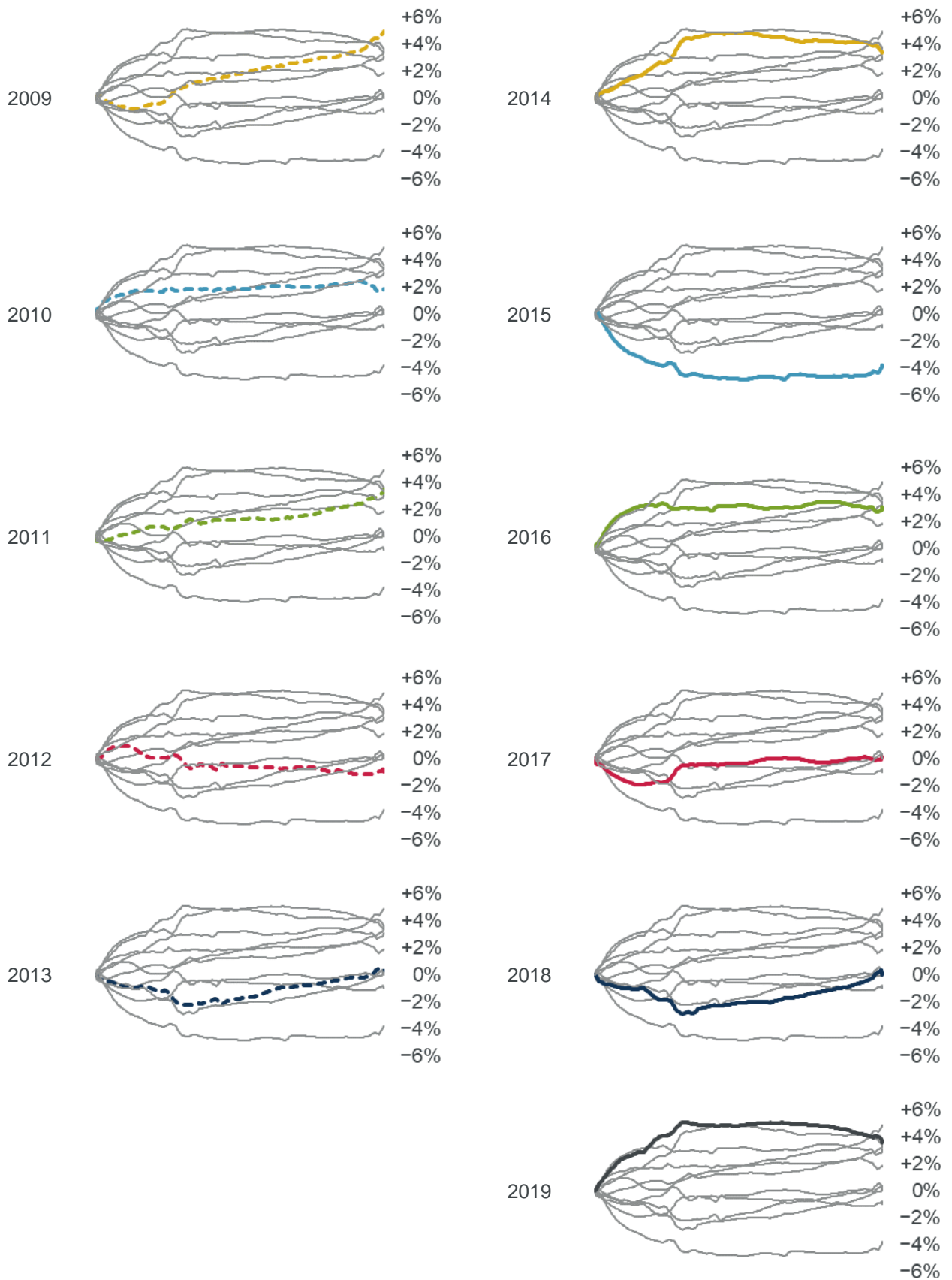




Chart E2: Cumulative annual standardised mortality improvement (cSMRI) for 2009-2019, highlighting individual years



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.

Based on the table, and a cumulative annual standardised mortality improvement of +3.6% in 2019, we might expect a modest rise in life expectancy slightly above that in the “+3% improvement” row (in the absence of any change in method). However, actual results from CMI_2019 might differ due to variations in improvements between the age bands, and revisions made by the ONS to population estimates during the year.

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.
- For both genders and all age bands, mortality in 2019 has been lower than in any other year shown. Mortality has been particularly low compared to the 2009-2018 average for ages 65-84.

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 in 2019 have been positive for both genders and all age bands shown. The older age bands have experienced higher improvements.



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

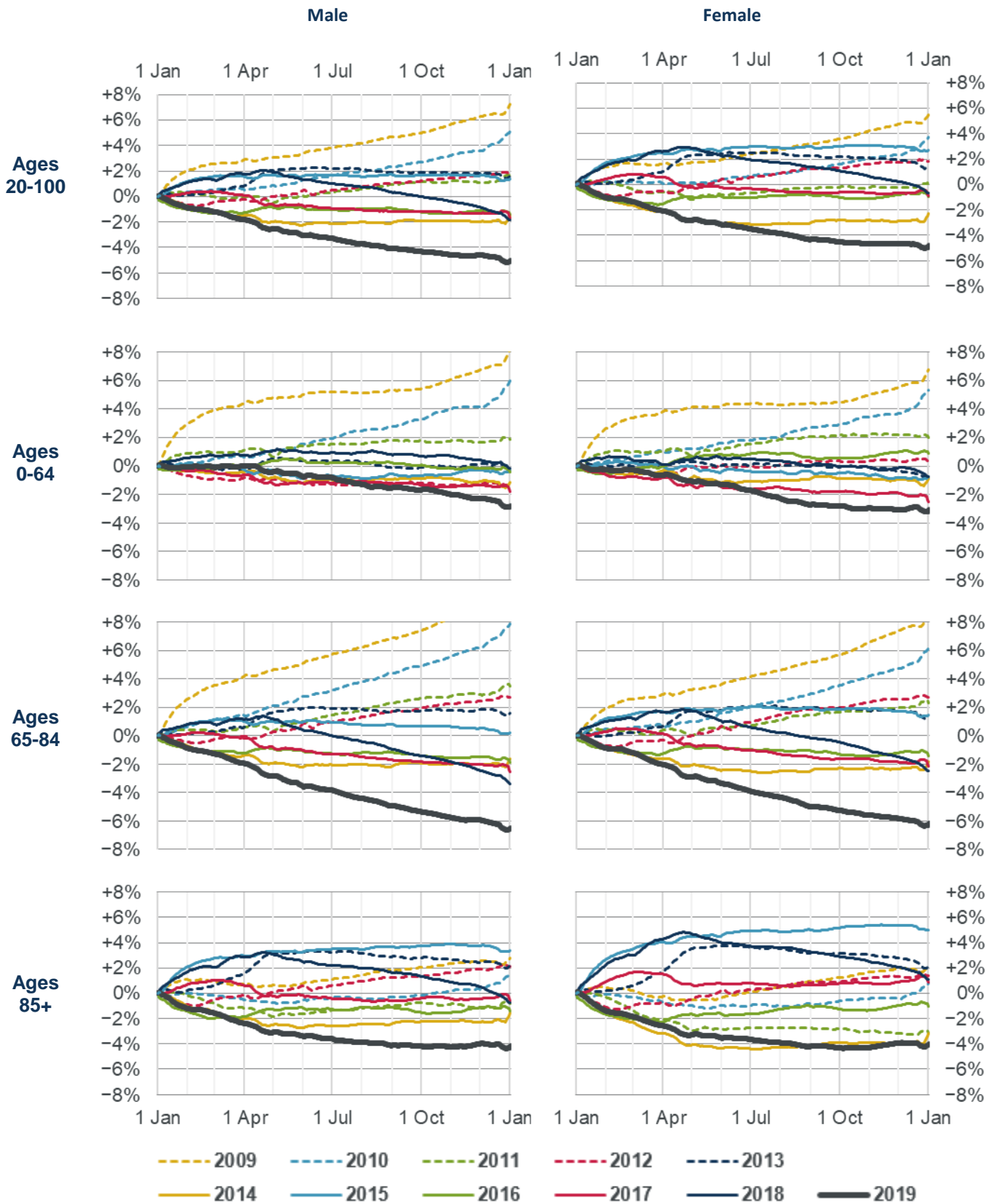
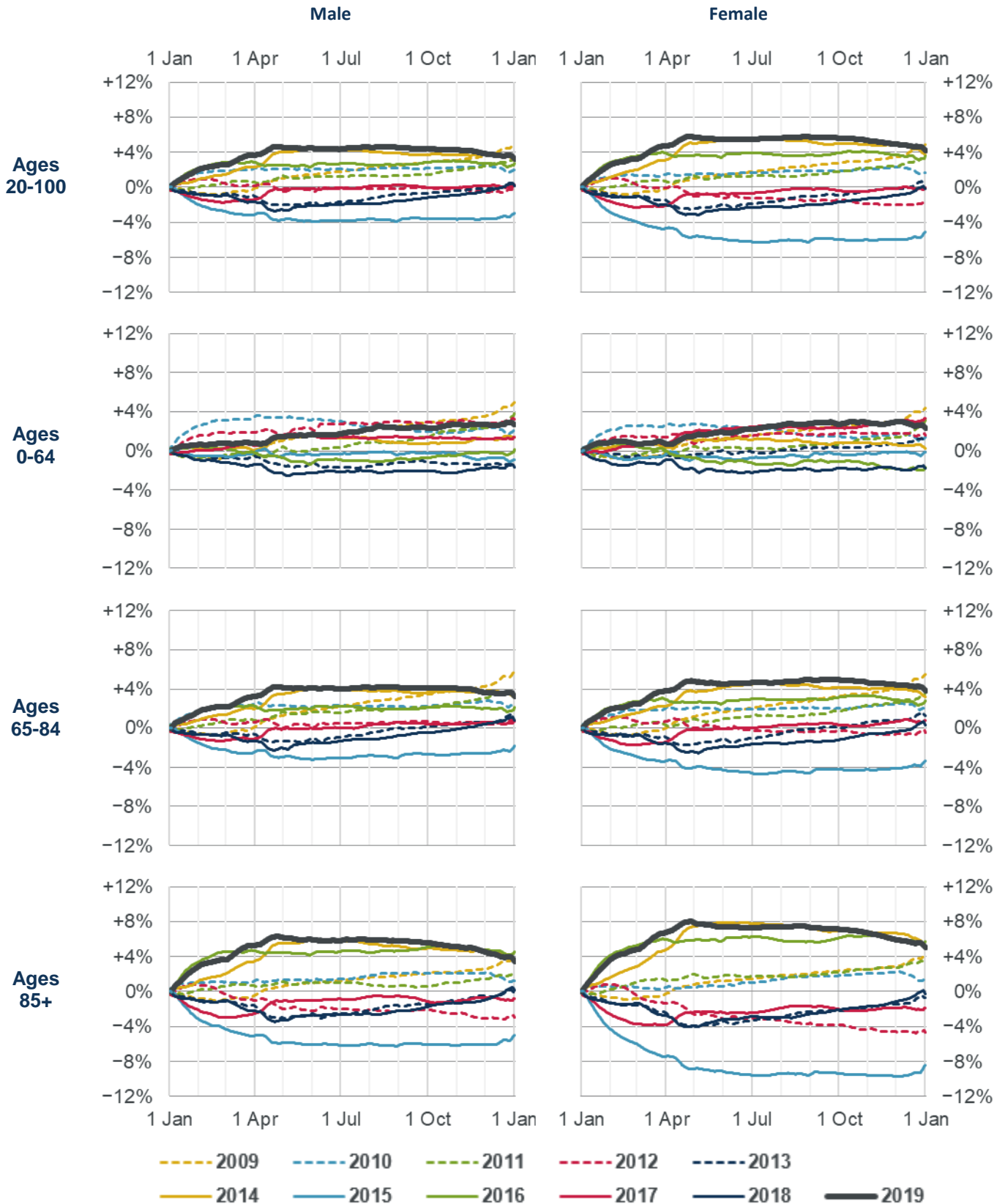




Chart G: Cumulative annual standardised mortality improvement (cSMRI), by gender and age band





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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Company number: 8373631
Registered Office: 7th floor, Holborn Gate, 326-330 High Holborn, London, WC1V 7PP

Correspondence address: Two London Wall Place, 123 London Wall, London, EC2Y 5AU
Email: info@cmilimited.co.uk
Tel: 020 7776 3820

Website: www.cmilimited.co.uk (redirects to www.actuaries.org.uk)

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