# England & Wales mortality monitor – Q2 2021

## Summary

Mortality was high, due to the coronavirus pandemic, during the first quarter of 2021, particularly in the first two months of the year. This followed high mortality in the final quarter of 2020. In contrast, mortality in the second quarter of 2021 has been lower than in previous years.

At the end of the second quarter of 2021, the cumulative standardised mortality rate for 2021 was 0.4% below the 2011-2020 average and 3.8% above 2019, the last full year before the pandemic.

The cumulative mortality improvement between 2020 and 2021 was +6.3% at the end of the second quarter, the highest value at the end of the second quarter for the period considered (since 2001).

## 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 2 July 2021 (i.e. week 26 of 2021), published by the Office for National Statistics (ONS) on 13 July 2021. We intend to publish the next quarterly update, for data to week 39 of 2021, in October 2021.

During the coronavirus pandemic, we are also publishing more regular shorter updates which focus on "excess mortality". Summary versions are published weekly, with a more detailed version every four or five weeks. The week 26 pandemic monitor update uses the same data as this quarterly monitor, and shows more detail of excess mortality during the past quarter.

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. The same page has "beta" mortality monitor software, which is available to Authorised Users. This enables users to produce their own ad hoc updates to the results of this report.

## Notes

We have used our standard approach in producing this report, basing it on data published by the Office for National Statistics. Our calculations rely on data for registered deaths, and we are conscious that during the coronavirus pandemic deaths may have been registered later than in previous years, due to restrictions on movement and increased pressure on the medical profession. Consequently, comparisons of mortality between 2020 and 2021 with earlier years may not be entirely on a like-for-like basis.

All of our analysis in this update is based on Standardised Mortality Rates (SMRs). These adjust the provisional weekly deaths data published by the Office for National Statistics to control for changes in the size and age and gender distribution of the population over time.

## Contents

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 2011-2020, 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.

Chart F shows the mortality improvement between 2019 and 2021, consistent with Section 7 of Working Paper 147, which indicates how mortality in 2021 may affect life expectancies produced by CMI_2021.

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

Full details of the methods used are included in Working Paper 111.

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

## 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.

This document is categorised as a "Research Report" as defined in the Terms and Conditions.

## 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 2 July 2021, 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 1.20% in early 2019. It rose rapidly because of the coronavirus pandemic, and the latest value is 1.29%.

The quarterly average SMR shows that mortality peaks each winter. Winter mortality in 2019/20 was lower than average, and broadly similar to 2018/19. The quarterly average SMR was extremely volatile in 2020: its peak of 1.76% in week 15 of 2020 is higher than any time since early 2005, and higher than the quarterly average SMR in week 15 in any other year shown; while the low of 1.06% in week 31 of 2020 is the lowest ever seen. In Q1 of 2021, the quarterly average SMR reached a peak of 1.73%, only slightly lower than the peak figure in 2020. The latest value is 1.09%.

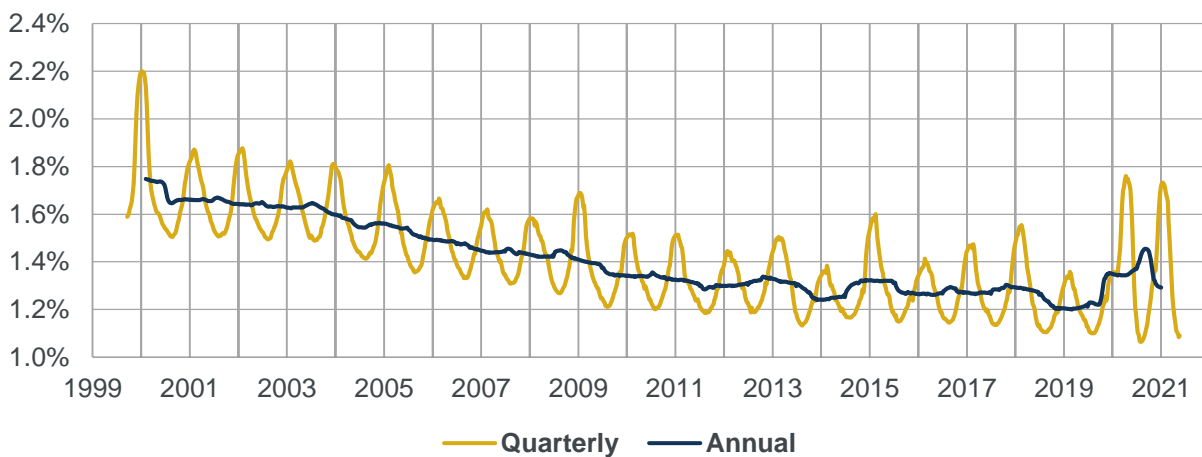**Chart A: Quarterly and annual centred average SMRs – whole period**



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

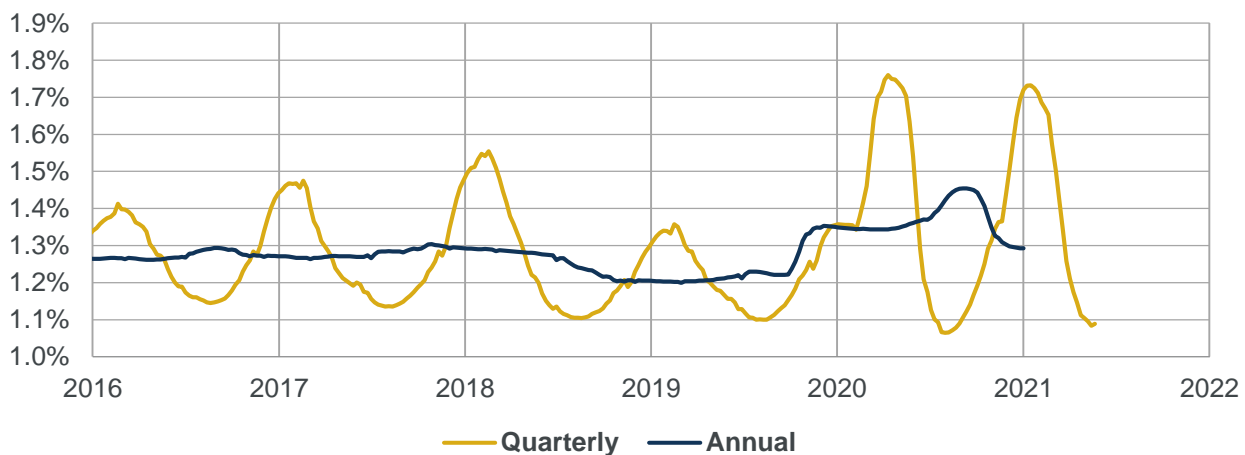**Chart B: Quarterly and annual centred average SMRs – current and previous five years**

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 exceptional nature of mortality during the pandemic, with highs in Q2 of 2020 and Q1 of 2021, and lows in Q3 of 2020 and Q2 of 2021.

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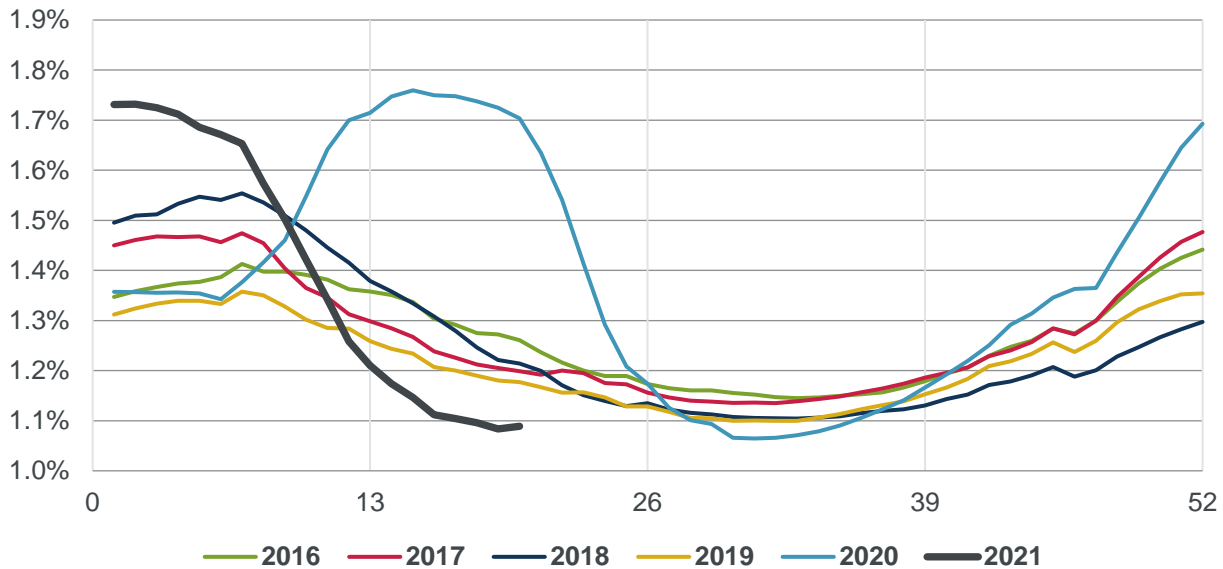


## Cumulative mortality

Chart D shows cumulative standardised mortality rates for the first quarter of 2021 and for the previous ten years compared to the 2011-2020 average. (The calculation method is described in Section 4.2 of Working Paper 111.) Chart D2 (in the appendix) 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 2011-2020 average**
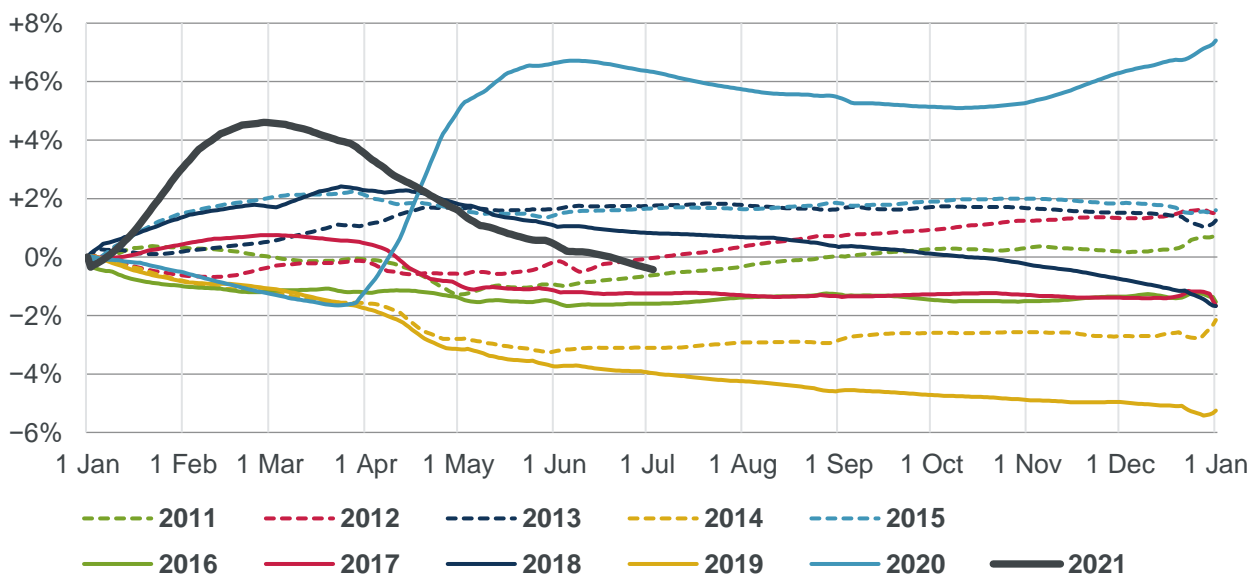
All years have a value of 0% at the start of the year, by definition, as there has been no mortality at that point of the year; the year-end values show how mortality for each year as a whole compares to the 2011-2020 average; and intermediate points show how mortality has developed during the year, relative to the average. 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 saw a decrease of this sort in the years up to 2011, there is no clear pattern to the end-year values for later years, as mortality has been volatile with low improvements. Mortality for complete calendar years was lowest in 2019 and highest in 2020.

Chart D shows that cumulative standardised mortality in the first quarter of 2021 was well above the ten-year average, continuing the exceptional mortality observed at the end of 2020. Cumulative standardised mortality reached a peak of 4.6% above the ten-year average, but has since fallen to 0.4% below the ten-year average. Cumulative standardised mortality to week 26 of 2021 is 3.8% above 2019.

Chart E shows the cumulative annual standardised mortality improvement (also described in Section 4.2 of Working Paper 111) for 2021 and for the previous ten years. Chart E2 (in the appendix) shows the same information in a different format and may be easier for those with colour vision deficiency.

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; the year-end values show how mortality for each year as a whole compares to the previous year; and intermediate points show how mortality improvements have developed during the year.

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)**
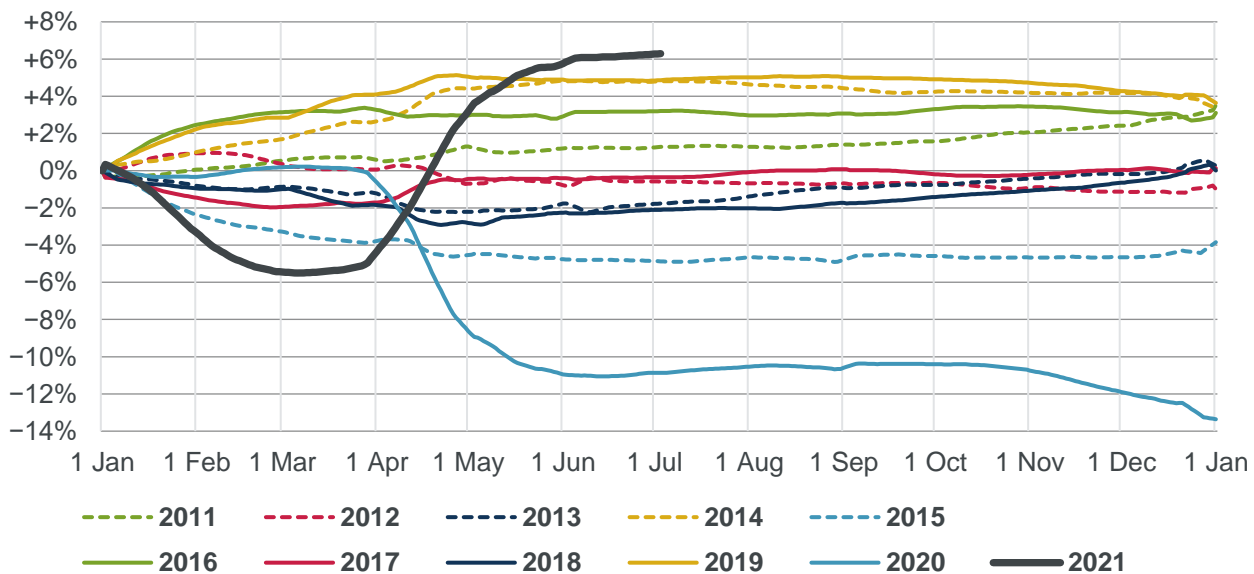


The cumulative mortality improvement for the first quarter of 2021 reached a low of −5.5%, but has since risen to +6.3% at the end of the quarter.

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 F shows the cumulative standardised mortality improvement between 2019 and 2021. The calculation in this chart is consistent with the method for 2021 used for Chart E, other than the starting mortality year being

2019 rather than 2020. By comparing to 2019, this chart avoids the uptick in mortality for 2020 seen in Chart E. It also informs the "Implication for CMI_2021" section below.

For the first two months of 2021, mortality improvements for 2021 compared to 2019 are very similar to the mortality improvements for 2021 shown in Chart E, due to the similarity of mortality at the start of 2019 and 2020. Charts E and F start to differ more materially for the latest weeks, and may deviate further in the coming months. The mortality improvement between 2019 and 2021 reached a low point of –6.0%, and has since risen to –3.7%.

**Chart F: Cumulative standardised mortality improvement between 2019 and 2021**
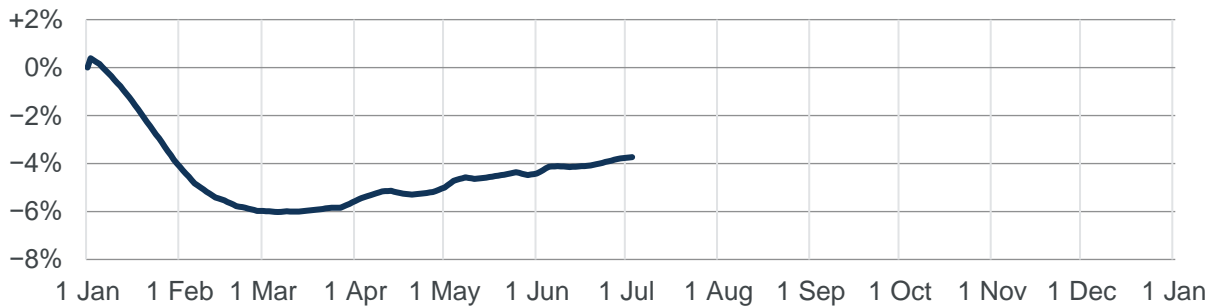


## Implication for CMI_2021

The analysis in this section shows possible outcomes from CMI_2021 for a range of mortality scenarios. We currently expect that CMI_2021 will use the same method as CMI_2020, with a suitable choice for the weight placed on data for 2021. However, it is possible that we may need to make further changes to the method so that CMI_2021 meets Subscribers' needs. We aim to confirm our initial views for CMI_2021 in the autumn of 2021.

Table 1 is based on Section 7 of Working Paper 147 (which includes further detail on the methods used) and shows how life expectancy might change between CMI_2020 and hypothetical versions of CMI_2021, based on a range of possible mortality improvements between 2019 and 2021 (consistent with Chart F above) and assuming no change in method. The first five rows show illustrative results for mortality improvements of +6%, +3%, 0%, –3% and –6% between 2019 and 2021, with an illustrative weight of 100% for 2021 data. The final row shows the potential impact of a weight of 0% for 2021 data. This would lead to a small fall in life expectancy between CMI_2020 Core and CMI_2021.

Based on the table, should the cumulative annual standardised mortality improvement remain at the current level of −3.7%, in the absence of any change in method and full weight is placed on data for 2021, we might expect a decrease in life expectancy between the –3% and –6% improvement rows. However, as illustrated in Chart E, users should be mindful that the cumulative annual standardised mortality improvement can vary significantly during the year. Given the abnormal experience in 2020 and at the start of 2021, much less emphasis can be placed on experience for the year to date than would usually be the case. A clearer indication of the impact on CMI_2021 will likely emerge later than would typically be the case.

**Table 1: Percentage difference in life expectancy between CMI_2020 Core and CMI_2021 for different levels of mortality improvement between 2019 and 2021, assuming no change in method**

| Gender and age | Male 45 | Female 45 | Male 65 | Female 65 | Male 85 | Female 85 |
|---|---|---|---|---|---|---|
| +6% improvement | +1.6% | +1.5% | +2.4% | +2.2% | +2.9% | +3.3% |
| +3% improvement | +0.6% | +0.7% | +0.9% | +1.1% | +1.1% | +1.6% |
| Nil improvement | −0.4% | −0.1% | −0.5% | −0.1% | −0.7% | 0.0% |
| −3% improvement | −1.4% | −0.9% | −2.0% | −1.4% | −2.5% | −1.8% |
| −6% improvement | −2.4% | −1.7% | −3.5% | −2.7% | −4.3% | −3.5% |
| 0% weight for 2021 | −0.3% | −0.2% | −0.3% | −0.3% | −0.4% | −0.3% |

## Variation by gender and age

Charts G and H shows how cSMR and cSMRI have varied by gender and age band. Tables 2 and 3 show the values at 2 April 2021.

**Table 2: Cumulative standardised mortality rate (cSMR) compared to the 2011-2020 average, by gender and age-band, at 2 July 2021**

| Gender | Ages 0-64 | Ages 65-84 | Ages 85+ | Ages 20-100 |
|---|---|---|---|---|
| Male | +6.3% | −0.5% | −2.0% | 0.0% |
| Female | +3.4% | −1.4% | −2.1% | −1.0% |
| Combined | +5.2% | −0.9% | −2.0% | −0.4% |

**Table 3: Cumulative annual standardised mortality improvement (cSMRI), by gender and age-band, at 2 July 2021**

| Gender | Ages 0-64 | Ages 65-84 | Ages 85+ | Ages 20-100 |
|---|---|---|---|---|
| Male | −1.2% | +6.1% | +9.4% | +6.3% |
| Female | +0.1% | +5.4% | +8.9% | +6.3% |
| Combined | −0.7% | +5.8% | +9.2% | +6.3% |

For the period from 2011 to 2020:

- The spread of mortality rates is widest for ages 65-84 and narrowest for ages 0-64, for both genders.
- Mortality improvements have been most volatile for the 85+ age band.

In the second quarter of 2021:

- Cumulative mortality rates for males and females ages 65-84 and 85+ reached a peak in the first quarter and have since fallen. For these age groups, the peak is lower than observed at the peak of the first wave of the pandemic in the second quarter of 2020.
- In contrast, cumulative mortality rates for males and females ages 0-64 have passed the peak of the first wave in 2020 and only in recent weeks have they stopped rising.
- Cumulative mortality improvements at the end of the quarter are similar for males and females ages 65-84 and 85+, and lower for males and females ages 0-64.

**Chart G: Cumulative standardised mortality rate (cSMR) compared to the 2011-2020 average, by gender and age-band**
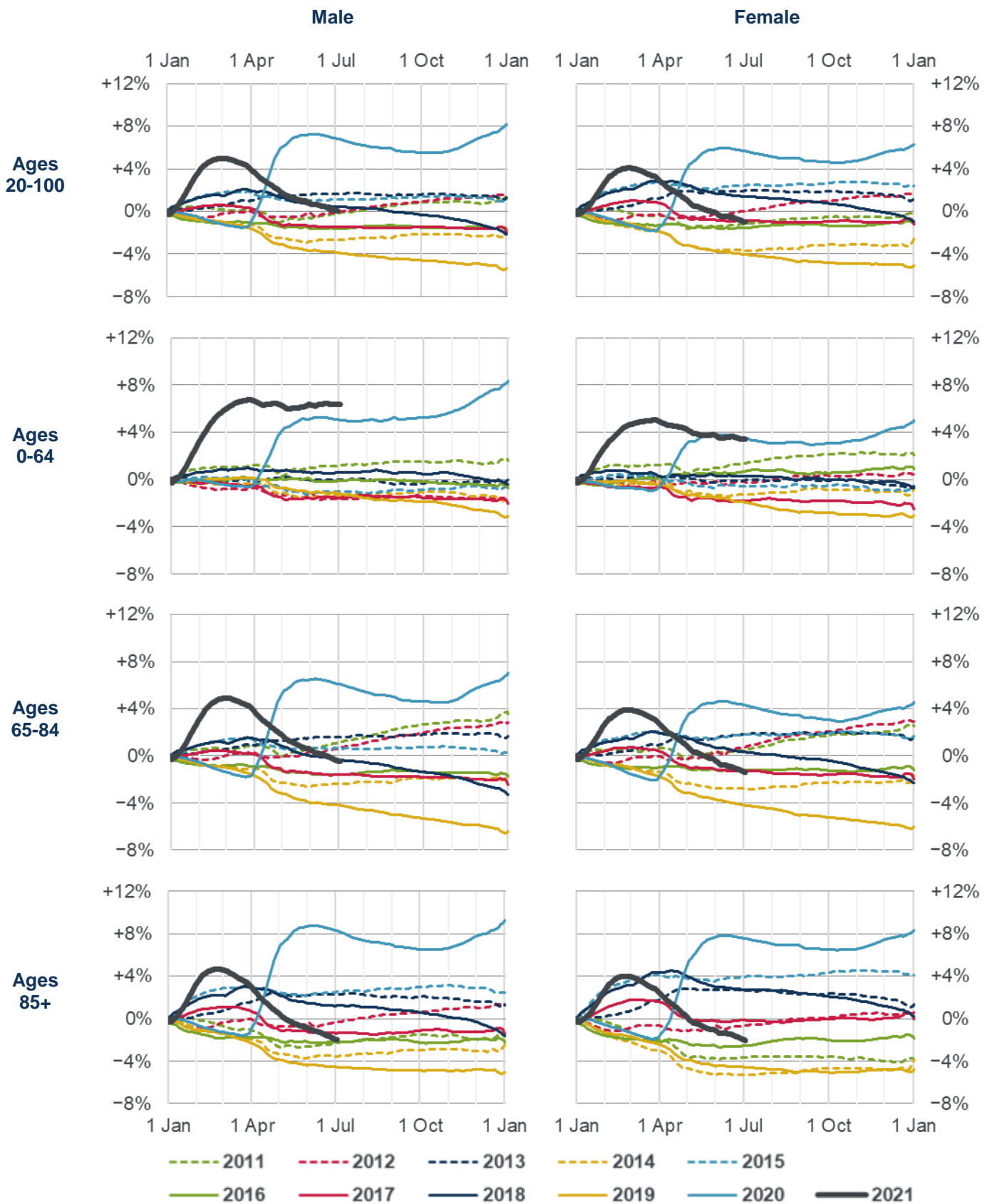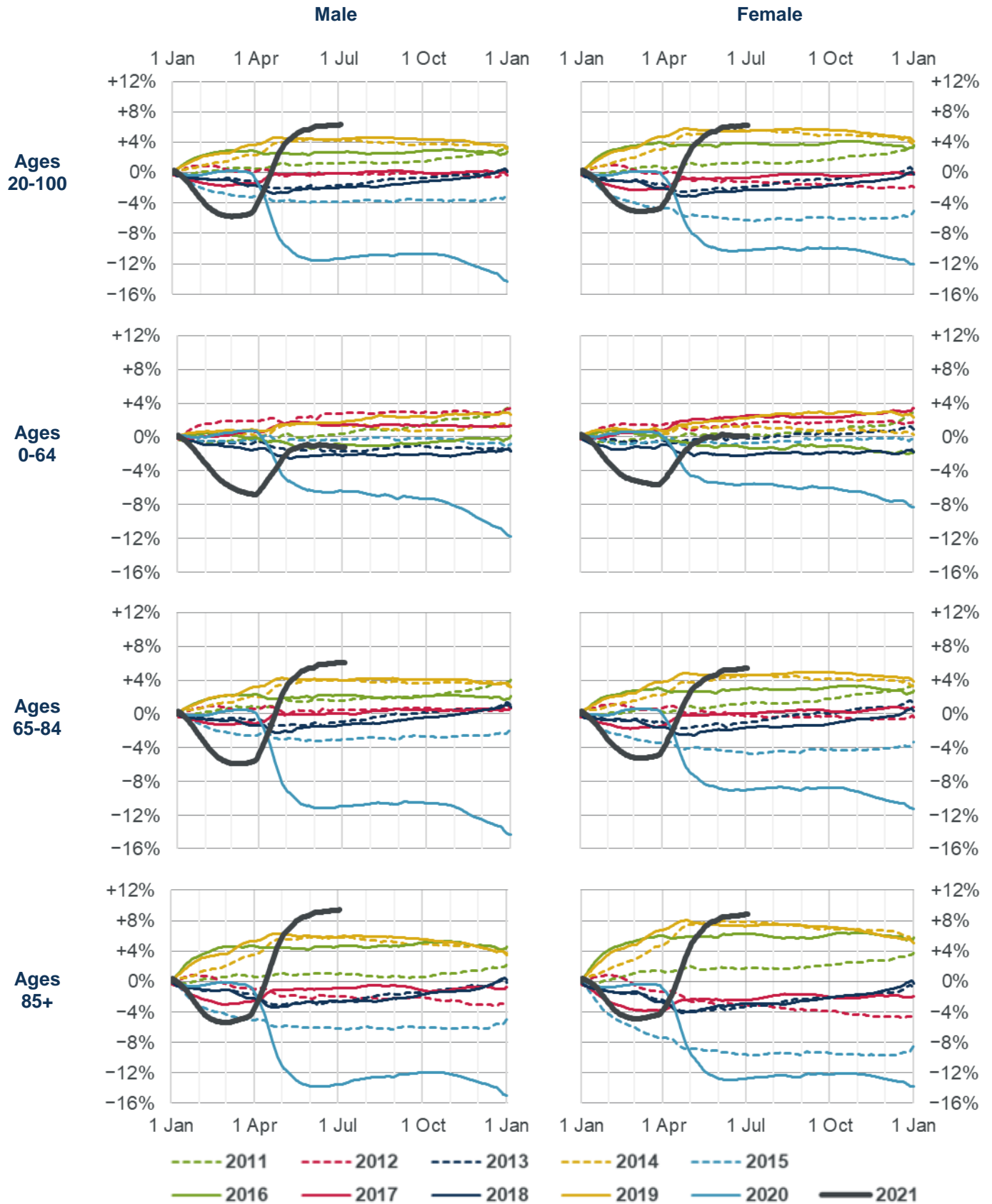
## Chart H: Cumulative annual standardised mortality improvement (cSMRI), by gender and age band

# Appendix – Accessible versions of charts D and E

**Chart D2: Cumulative standardised mortality rate (cSMR) compared to the 2010-2019 average, showing 2011-2021 and highlighting individual years**
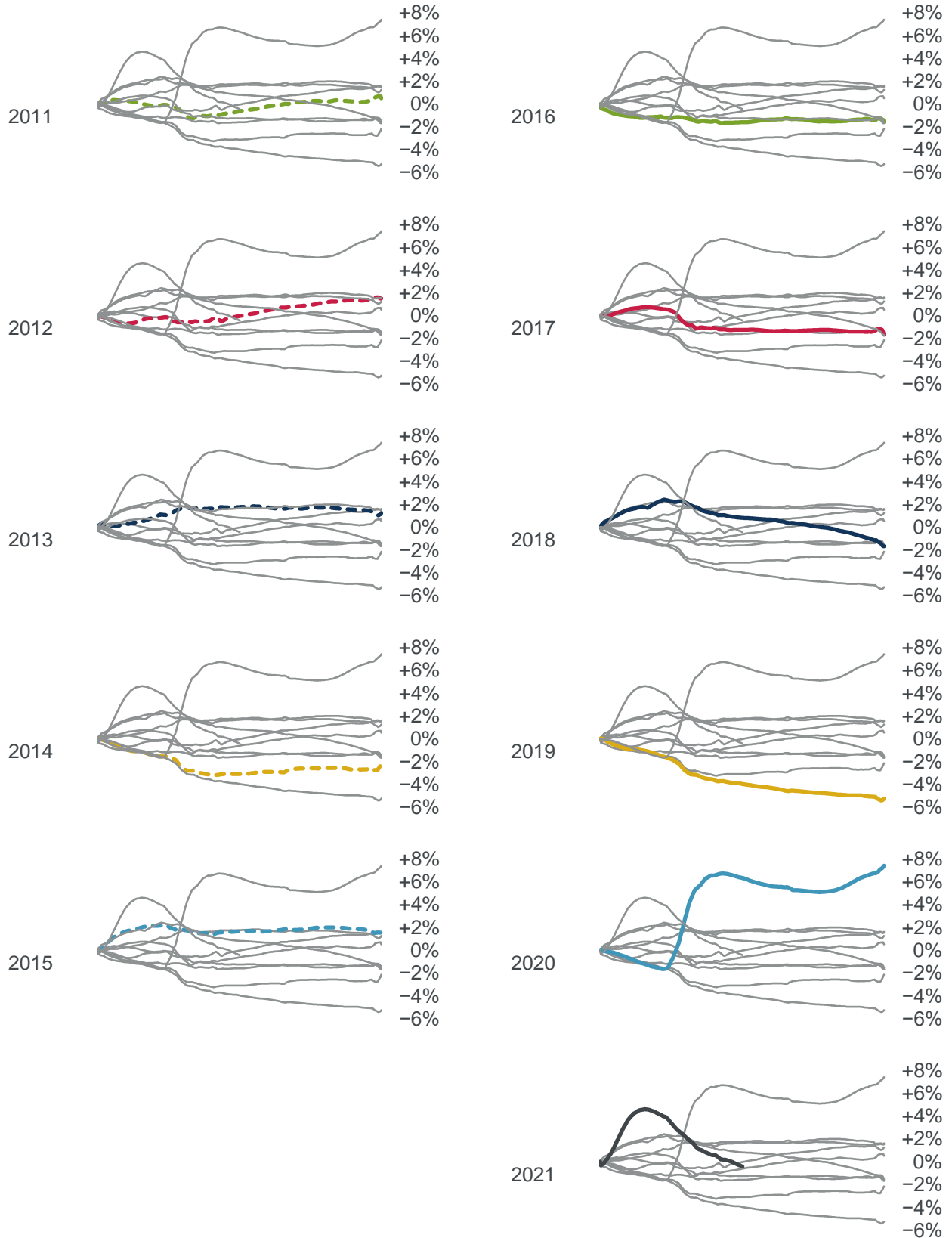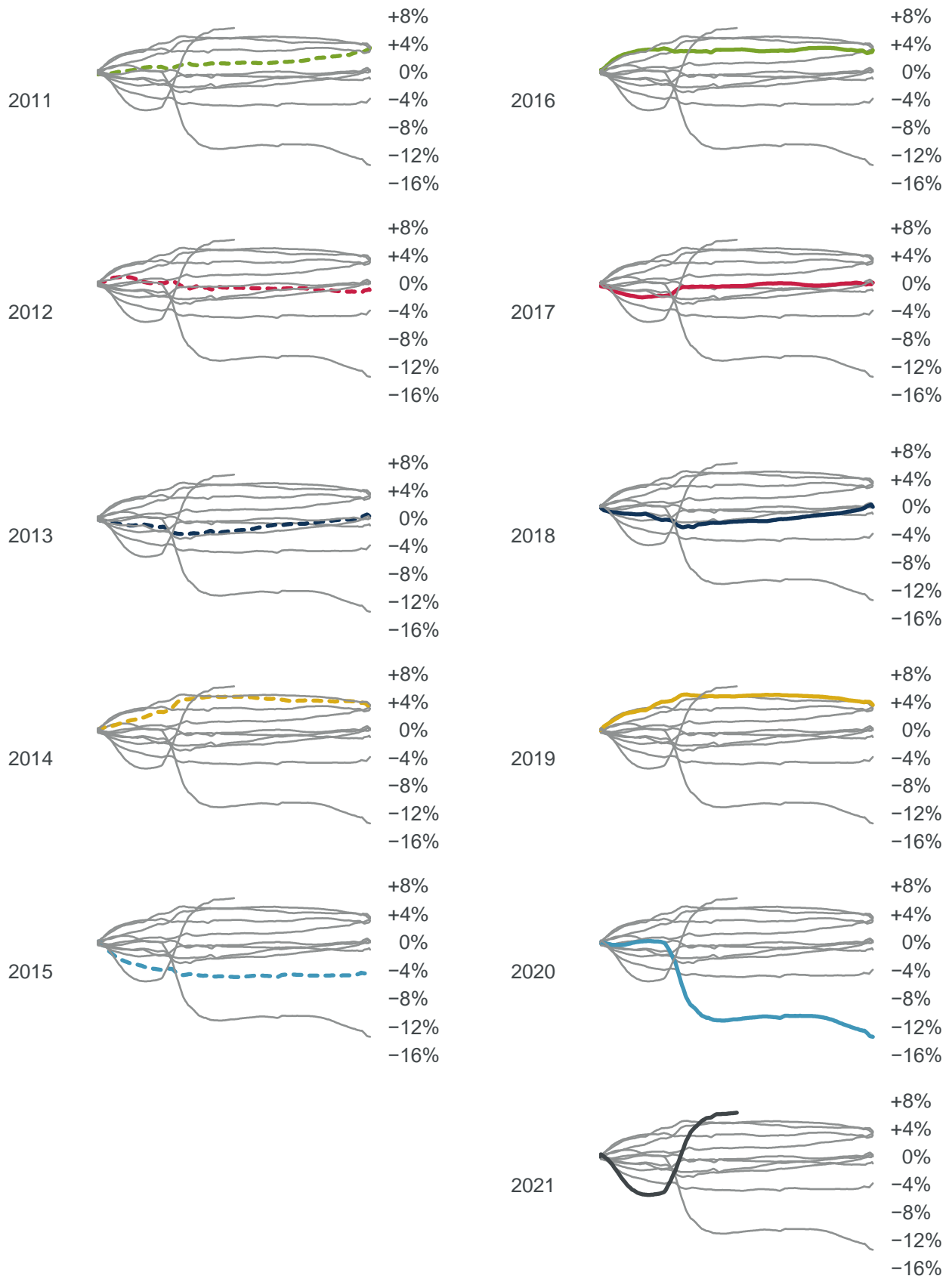
## Chart E2: Cumulative annual standardised mortality improvement (cSMRI) for 2011-2021, highlighting individual years

## 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, in the absence of any change in method.

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. This is particularly true during the coronavirus pandemic.

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