



## England & Wales mortality monitor – Q1 2023

### Summary

Mortality in the first quarter of 2023 was higher than in the first quarters of 2019, 2020 or 2022.

At the end of Q1 2023, the cumulative standardised mortality rate for 2023 was 1.1% above the 2013-2022 average and 3.2% above 2019, the last full year before the pandemic.

### Background

This is the latest in a series of quarterly updates monitoring mortality in England & Wales. It is based on provisional weekly deaths data published by the Office for National Statistics (ONS) up to 31 March 2023 (i.e. week 13 of 2023) on 13 April 2023. We intend to publish the next quarterly update, for data to Q2 of 2023, in July 2023.

We are also publishing weekly updates which focus on “excess mortality”. Summary versions are published weekly, with a more detailed version every quarter. The monitor for week 13 of 2023 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 the timing of registration of deaths may have differed from previous years. Consequently, comparisons of mortality between years may not be entirely on a like-for-like basis.

Our calculations do not take account of the 2021 census in England & Wales. [Our blog](#) discusses the implications of the initial census results. We intend to analyse the impact of the census on the mortality monitor once the ONS has published revised mid-year population for mid-2012 to mid-2020, expected in May 2023.

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 2013-2022, 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 2023.

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.

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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 31 March 2023, 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, reaching 1.45% in September 2020, but has since fallen. The latest value, of 1.32%, is the highest since May 2021.

The quarterly average SMR shows that mortality typically peaks near the start of each year. However during the pandemic the quarterly average SMR peaked at 1.76% in week 15 of 2020 and 1.73% in weeks 1 and 2 of 2021. In contrast, the low of 1.06% in week 31 of 2020 was the lowest ever seen. Mortality in Q1 of 2023 has been relatively high, with the latest quarterly average SMR being 1.52%.

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

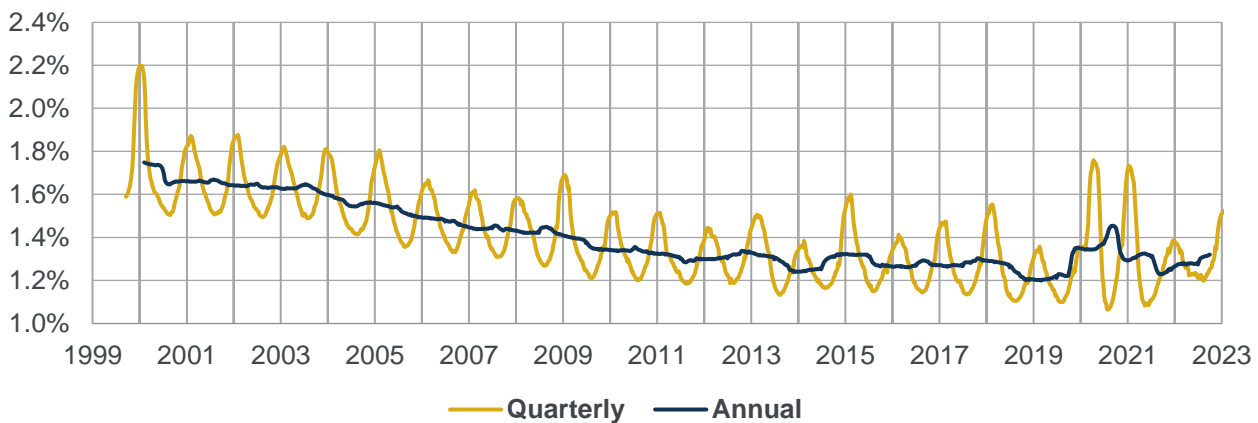


Chart B shows the same information as Chart A, magnified to show the current year and the previous five years more clearly.

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

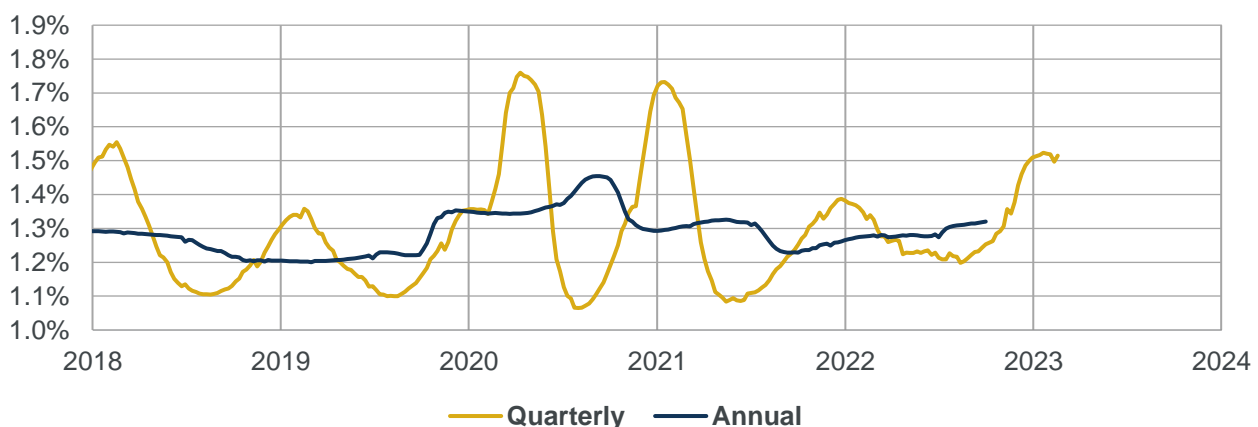
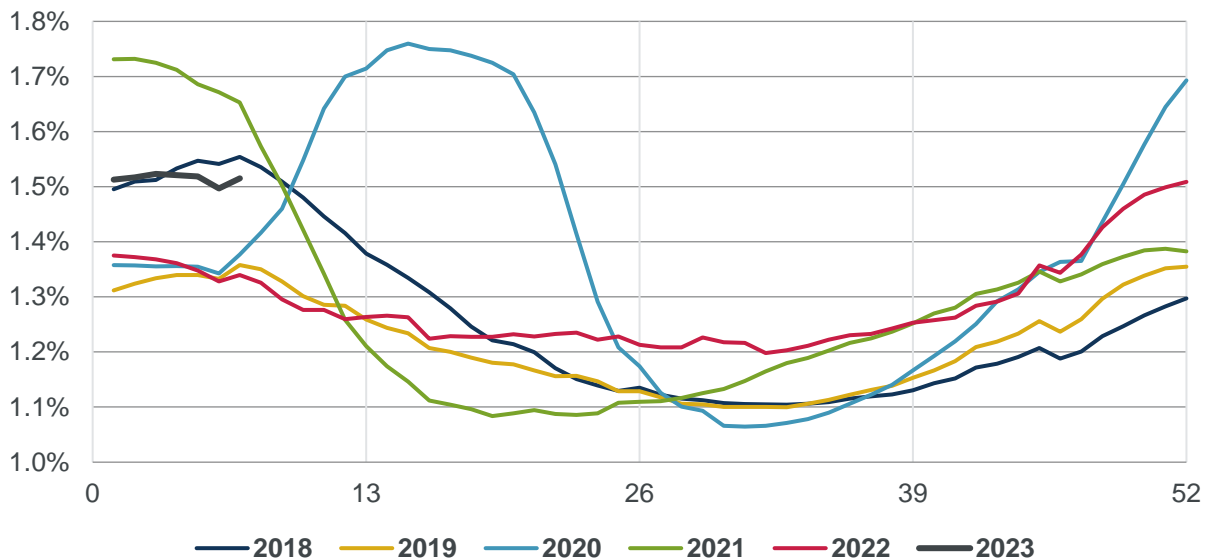




Chart C shows the quarterly average SMRs from Chart B for each year, with values plotted by week number to aid comparison. Although lines are labelled by calendar year, the quarterly averages for weeks towards the start and end of each year will be affected by mortality in earlier and later years respectively. 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. Mortality was unusually high in the summer of 2022 and the Q3 average was the highest seen since 2010. The latest figure is higher than at the corresponding point in 2019, 2020 or 2022.

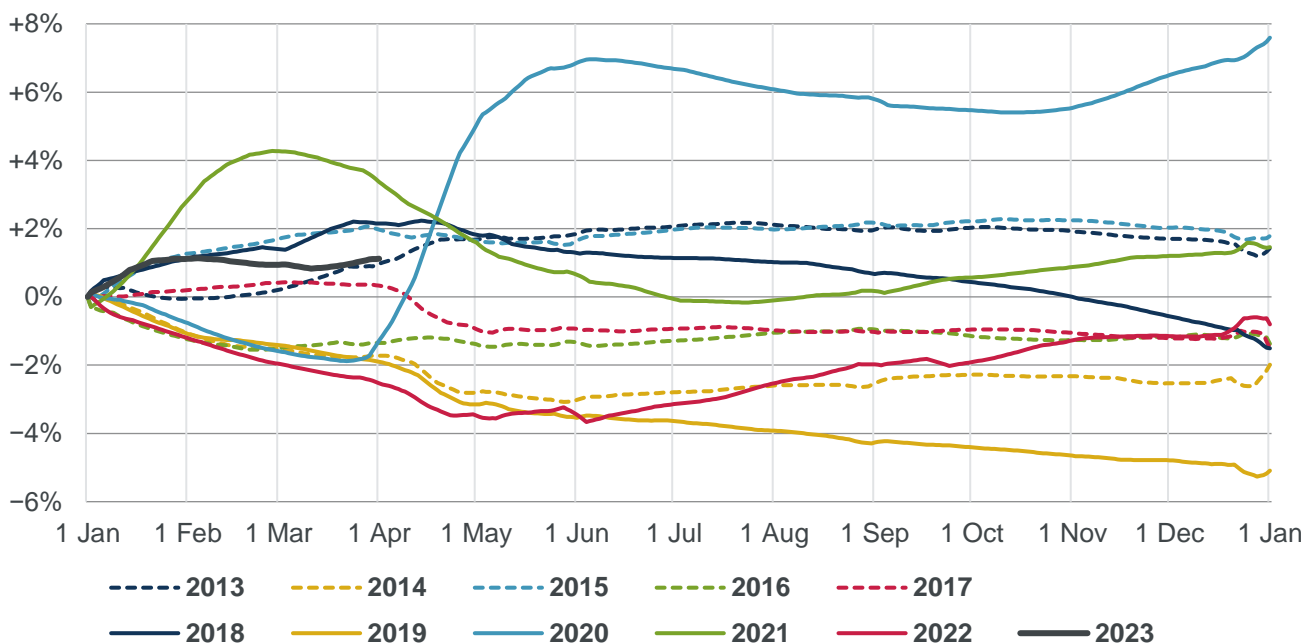
Chart C: Quarterly centred average SMRs, by week number



### Cumulative mortality

Chart D shows cumulative standardised mortality rates for 2022 and the previous ten years compared to the 2013-2022 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 2013-2022 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 2013-2022 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 (of the years shown).

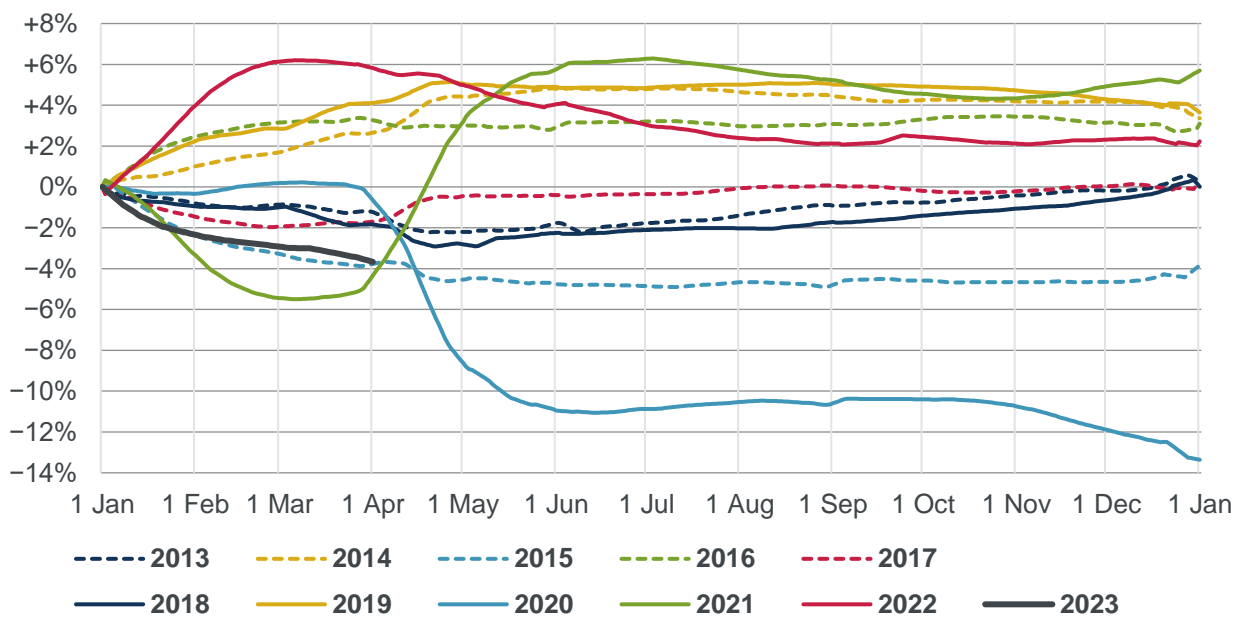
Chart D shows that cumulative standardised mortality in the first three months of 2023 was above the ten-year average. It ended the quarter at 1.1% above the ten-year average, equivalent to 3.2% above 2019.

Chart E shows the cumulative annual standardised mortality improvement (also described in Section 4.2 of Working Paper 111) for 2023 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 at the end of Q1 of 2023, relative to 2022, is  $-3.7\%$ .

Note that:

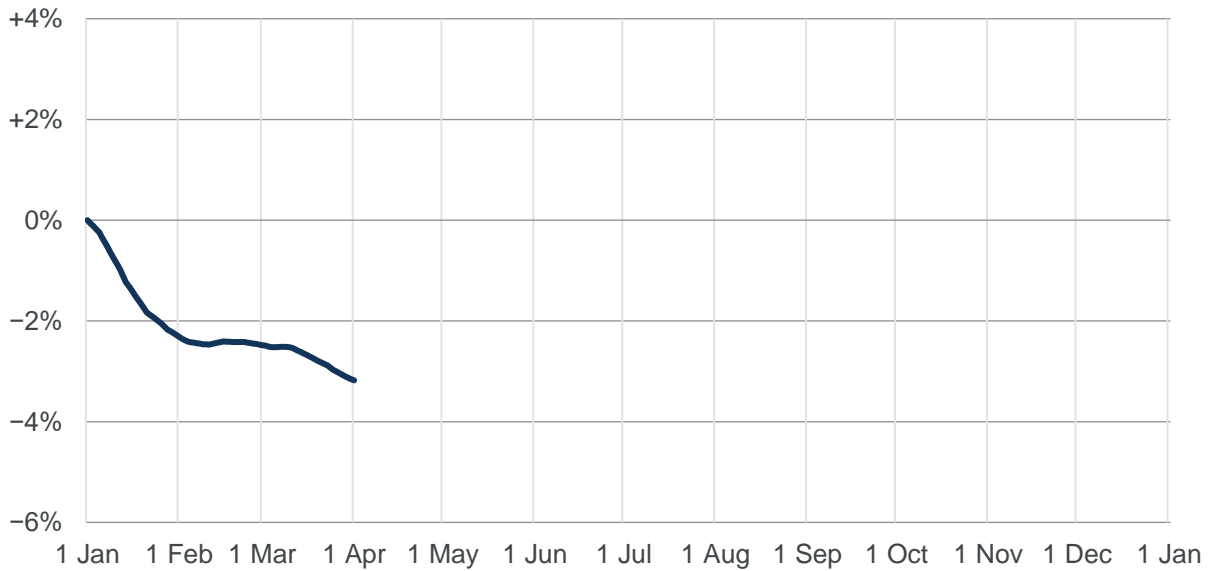
- The cumulative values at the end of the year in Charts D and E may not necessarily agree precisely with the corresponding values based on annual data. This is because some weeks span two years, requiring us to estimate in which year those deaths were registered.
- Mortality improvements vary by age (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 2023. The calculation in this chart is consistent with the method for 2023 used for Chart E, other than the starting mortality year being 2019 rather than 2022.



Up to the end of Q1 of 2023, mortality deteriorated compared to 2019, ending the quarter at  $-3.2\%$ .

**Chart F: Cumulative standardised mortality improvement between 2019 and 2023**



### Implication for CMI\_2023

The CMI has recently consulted on the method for CMI\_2022, with the results published in Working Paper 173. Following the publication of CMI\_2022 (expected to be by the end of June 2023) we will provide further analysis of the impact of mortality in 2023 on the results of CMI\_2023.



## 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 31 March 2023.

**Table 2: Cumulative standardised mortality rate (cSMR) compared to the 2013-2022 average, by gender and age-band, at 31 March 2023**

	0-64	65-84	85+	20-100	20-44	45-64	65-74	75-84
Male	+1.7%	+0.5%	+1.4%	<b>+1.0%</b>	+3.4%	+1.3%	+1.0%	+0.2%
Female	+1.3%	+0.7%	+1.8%	<b>+1.3%</b>	+3.7%	+0.9%	+1.3%	+0.4%
Combined	+1.6%	+0.6%	+1.6%	<b>+1.1%</b>	+3.5%	+1.1%	+1.1%	+0.3%

**Table 3: Cumulative annual standardised mortality improvement (cSMRI), by gender and age-band, at 31 March 2023**

	0-64	65-84	85+	20-100	20-44	45-64	65-74	75-84
Male	-1.7%	-2.9%	-4.3%	<b>-3.2%</b>	-2.5%	-1.4%	-2.5%	-3.1%
Female	-2.4%	-3.6%	-5.6%	<b>-4.2%</b>	-2.5%	-2.4%	-3.7%	-3.5%
Combined	-2.0%	-3.2%	-4.8%	<b>-3.7%</b>	-2.5%	-1.8%	-3.0%	-3.3%

For the period from 2011 to 2019:

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

Mortality rose during 2020 and 2021 due to the coronavirus pandemic:

- For ages 65 and above, mortality was higher in 2020 than in 2021.
- For ages 0-64, mortality was higher in 2021 than in 2020.

In 2022:

- Cumulative mortality rates for the older age groups are below the 2013-2022 average, but those for 20-44 are well above the 2013-2022 average.
- Cumulative mortality improvements are positive for almost all groups (the exception being the 85+ age group for both males and females) and are particularly high for the 45-64 age group.

In 2023:

- Cumulative mortality rates for the older age groups are relatively high compared to the other years shown. Mortality for the younger age groups is particularly high, with the 20-44 age group having similar levels of mortality as seen in the same period in 2021, the worst pandemic year for that age group.
- Cumulative mortality improvements are negative for all age groups shown, and are relatively low compared to other years shown.



Chart G: Cumulative standardised mortality rate (cSMR) compared to the 2013-2022 average, by gender and age-band

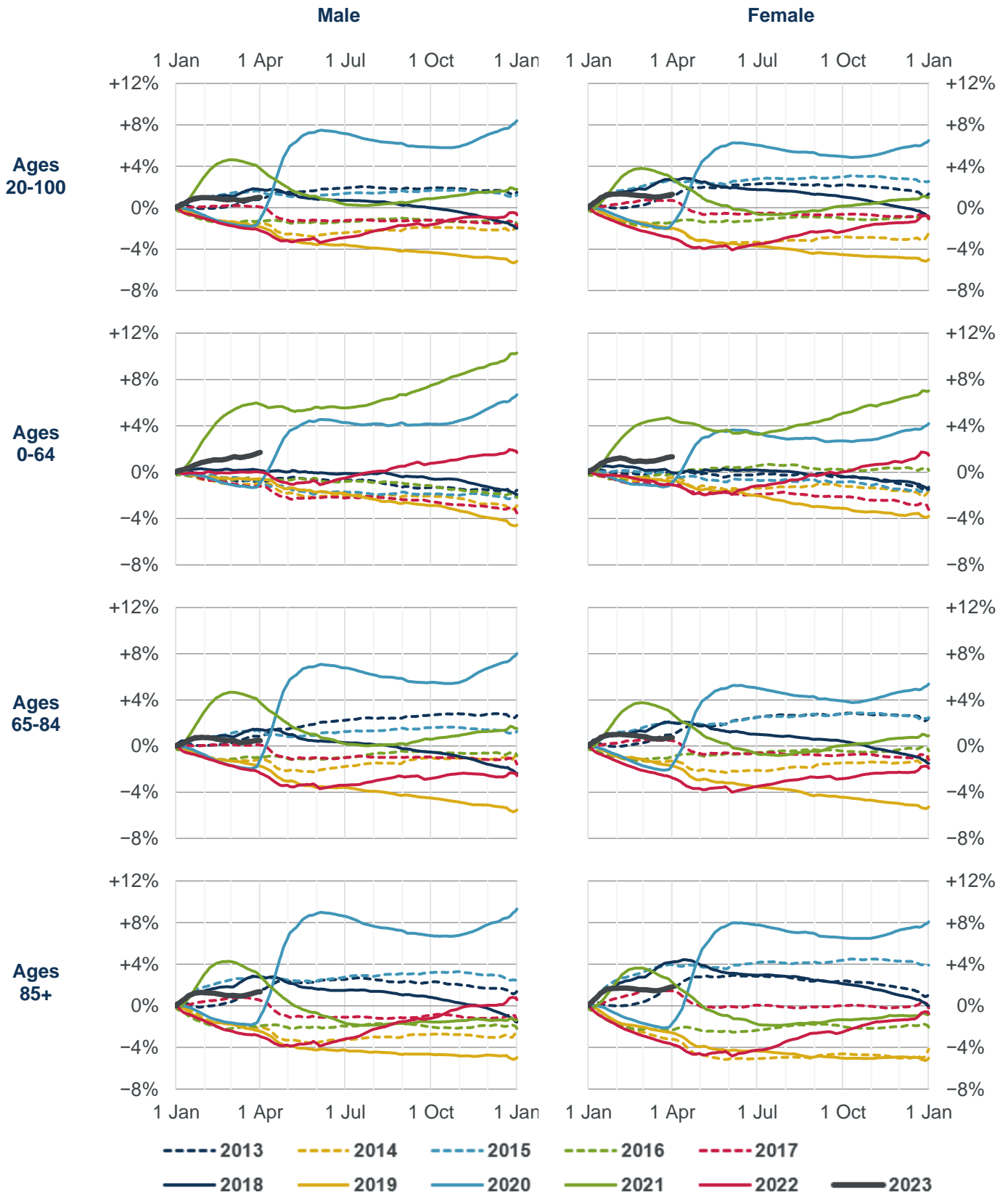






Chart G (cont): Cumulative standardised mortality rate (cSMR) compared to the 2013-2022 average, by gender and age-band

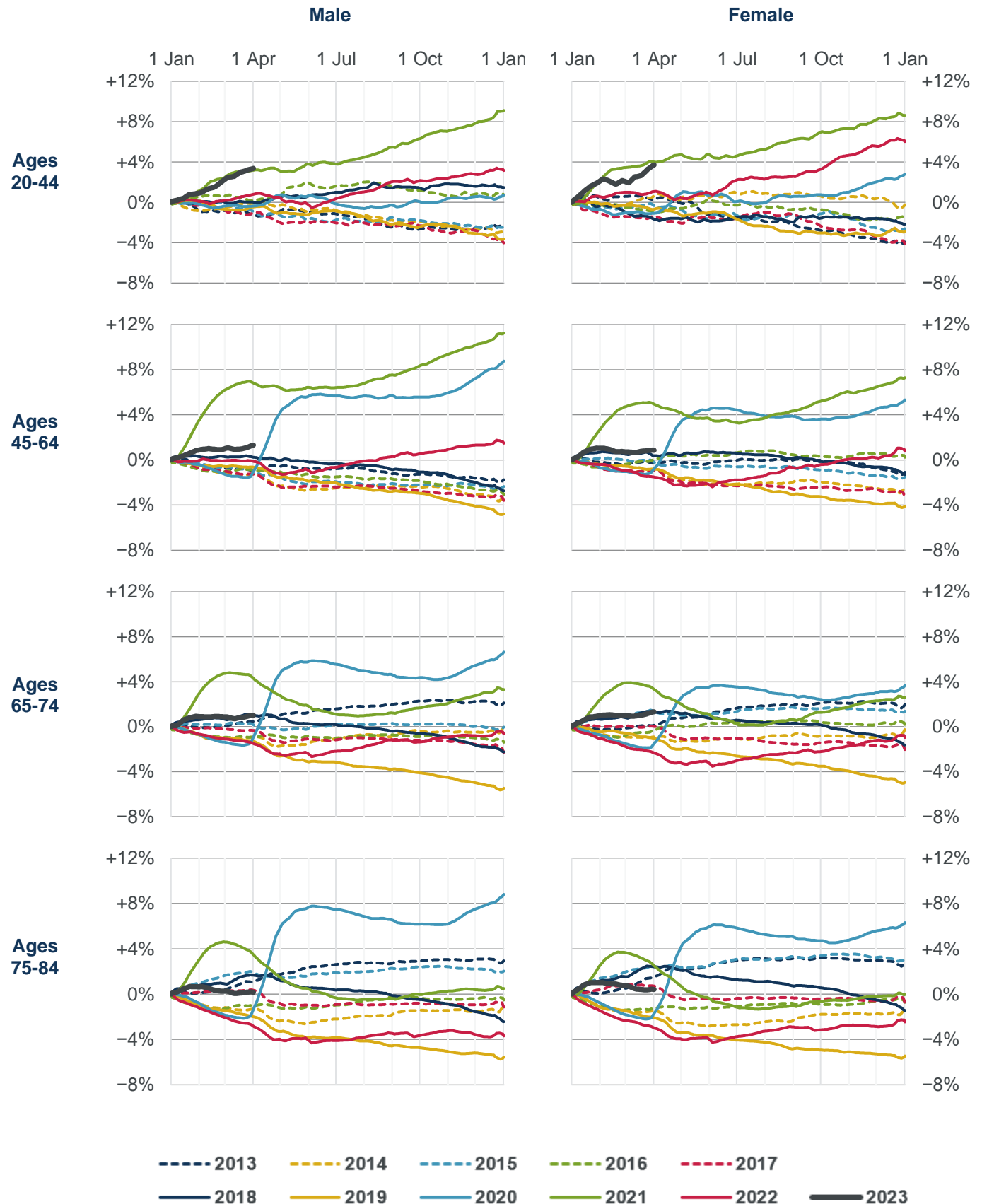




Chart H: Cumulative annual standardised mortality improvement (cSMRI), by gender and age band

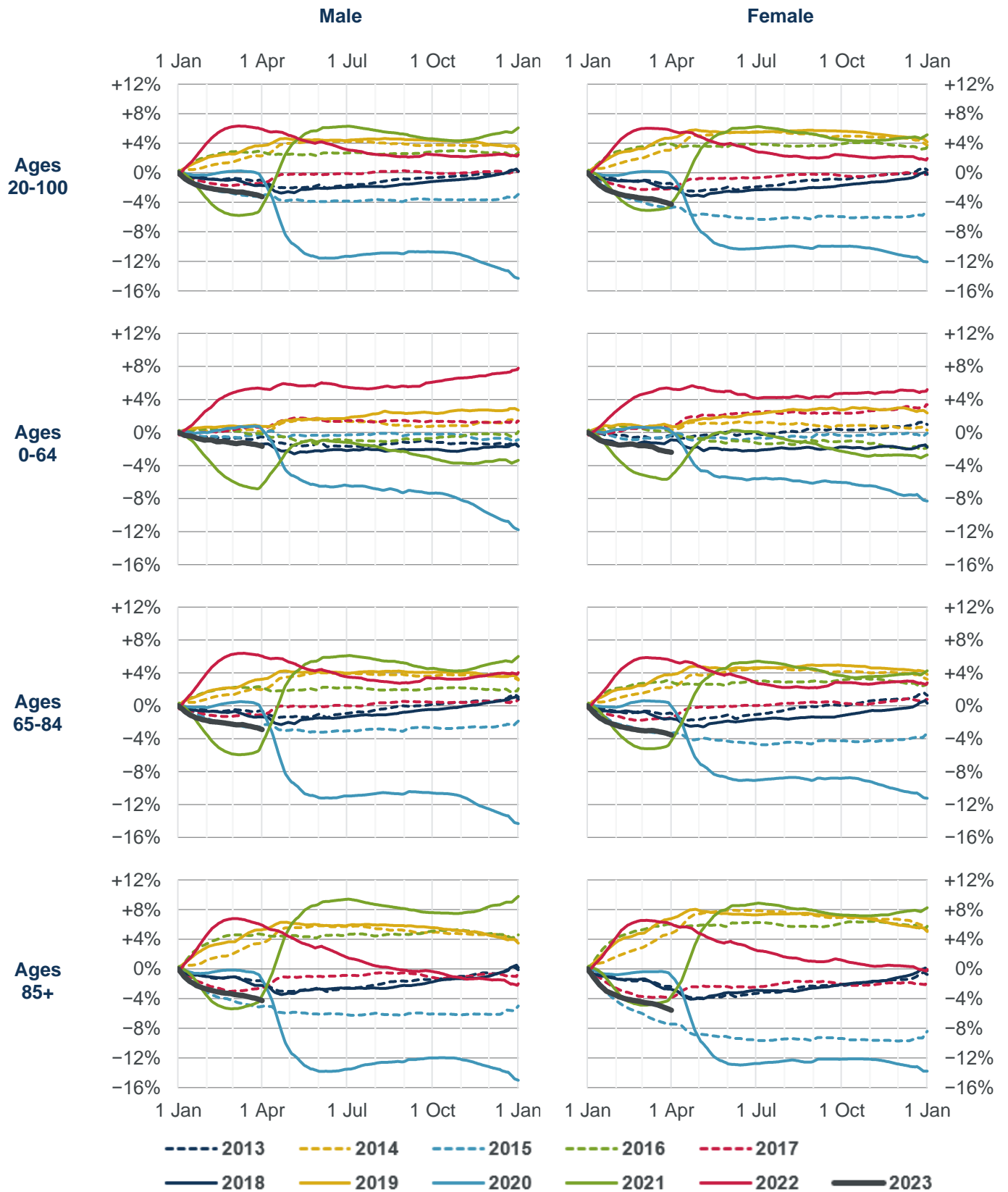
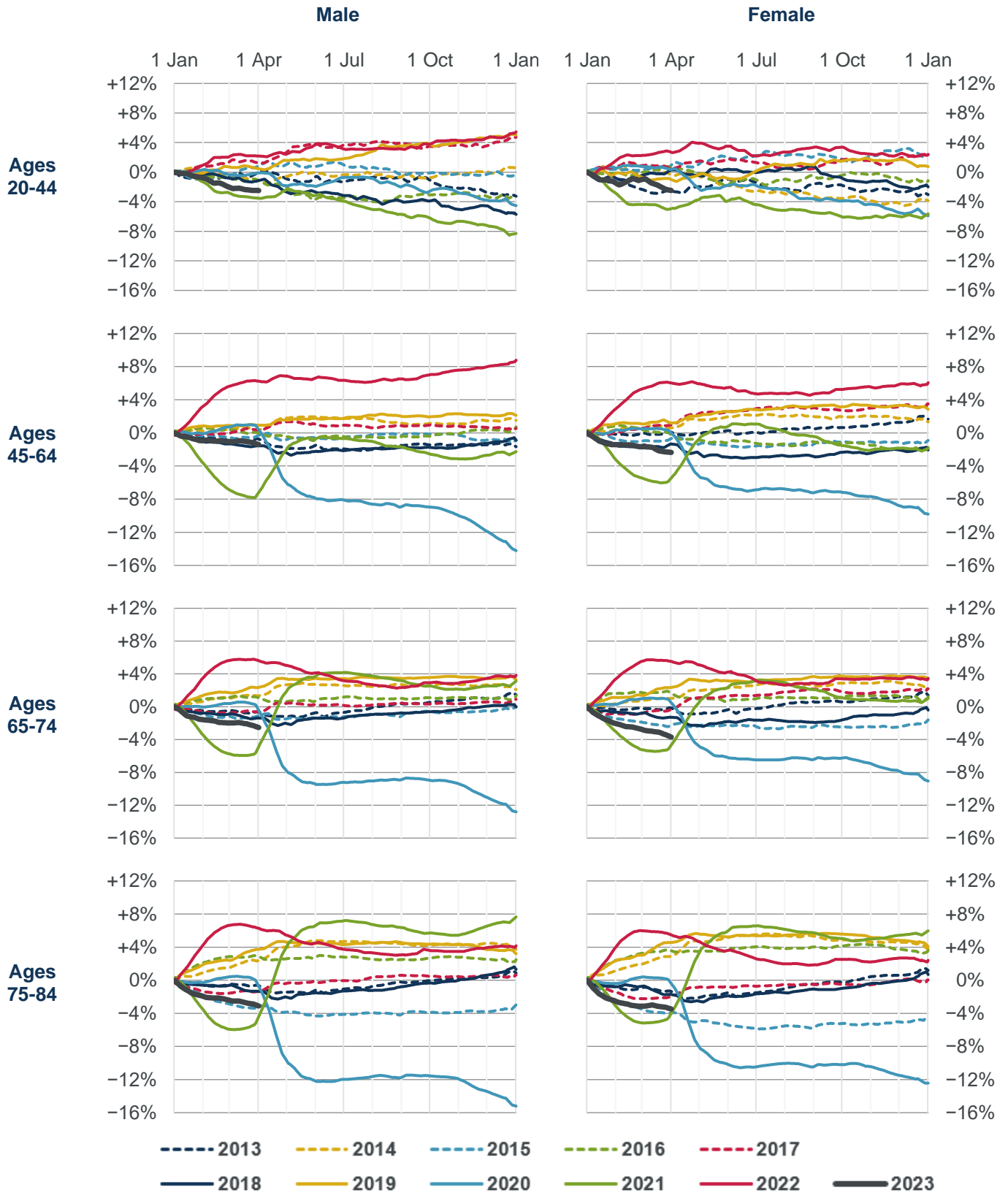




Chart H (cont): Cumulative annual standardised mortality improvement (cSMRI), by gender and age band





### Appendix – Accessible versions of charts D and E

Chart D2: Cumulative standardised mortality rate (cSMR) compared to the 2013-2022 average, showing 2013-2023 and highlighting individual years

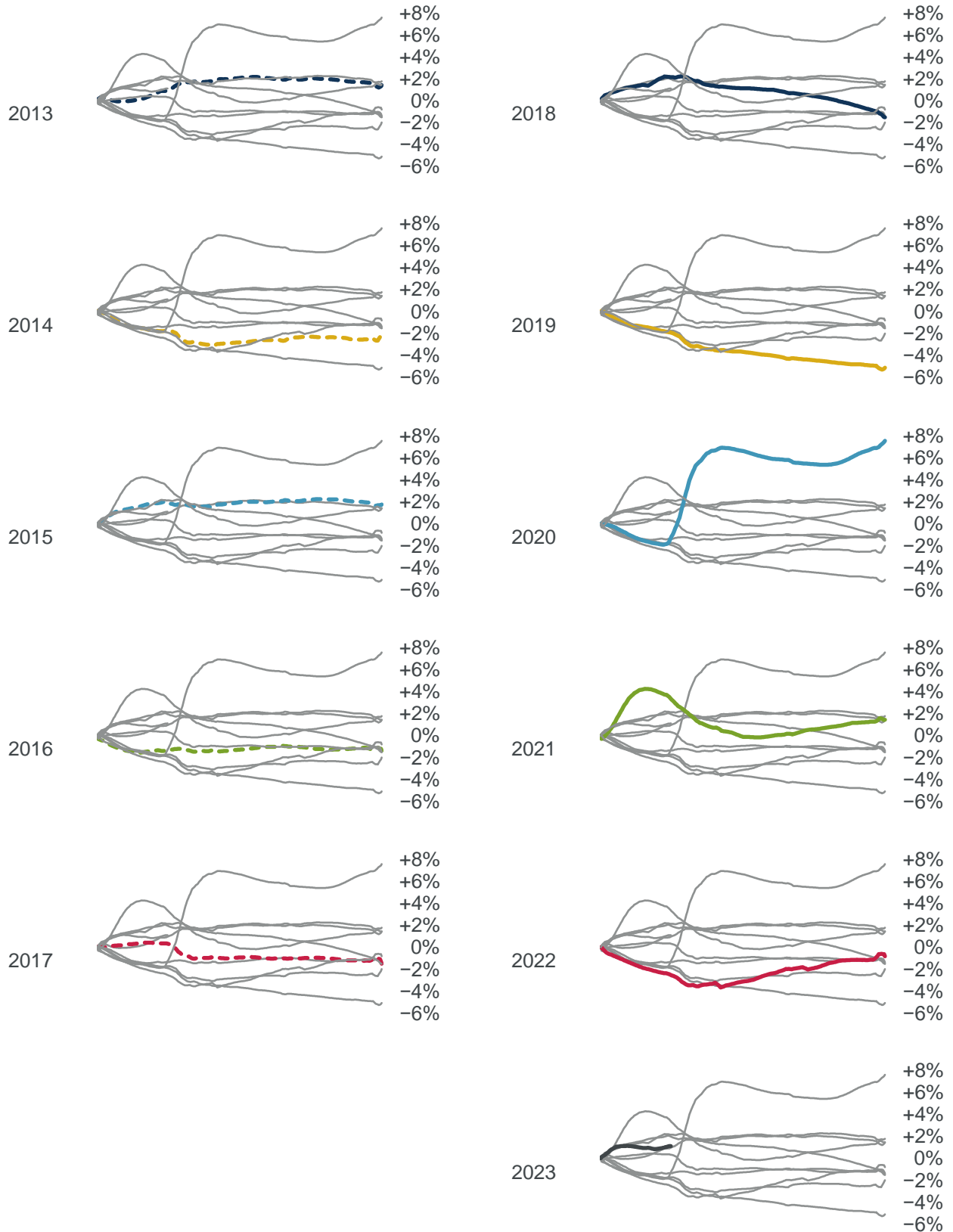
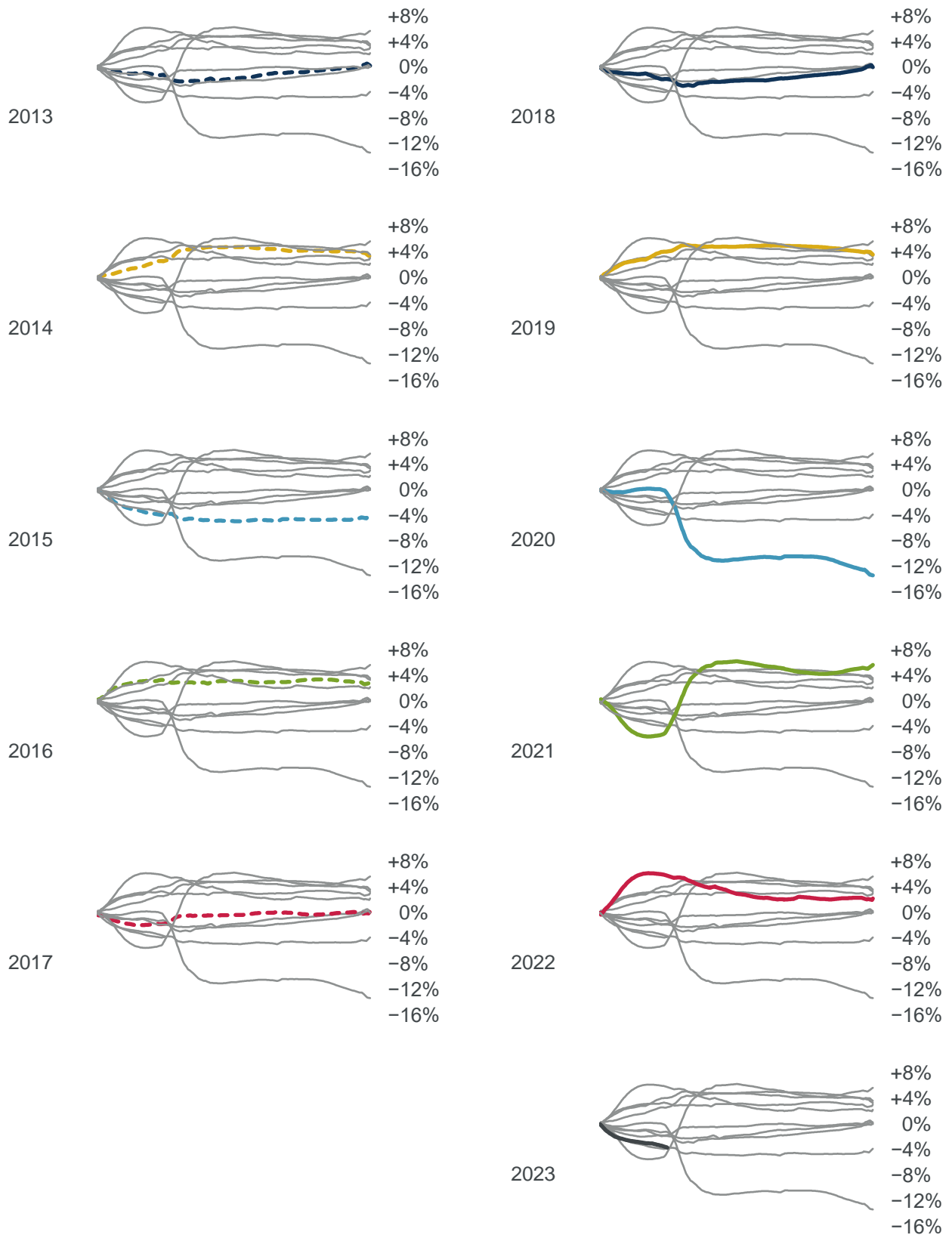




Chart E2: Cumulative annual standardised mortality improvement (cSMRI) for 2013-2023, highlighting individual years





## Reliances and limitations

The purpose of the mortality monitor is to provide regular updates on standardised mortality in England & Wales, adjusting ONS data to allow 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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