



## England & Wales mortality monitor – COVID-19 update – week 39 of 2022

### Summary

There have been around 137,800 excess deaths from all causes in the UK from the start of the pandemic to 30 September 2022. We calculate excess deaths by comparing deaths to those expected if mortality rates were similar to those experienced in 2019. This estimate uses data from National Records Scotland (NRS) and the Northern Ireland Statistics and Research Agency (NISRA) as well as the Office for National Statistics (ONS).

In week 39 of 2022, there were 11% more deaths registered in England & Wales than would have been expected if Standardised Mortality Rates had been the same as in the corresponding week of 2019. The corresponding figure for week 38 of 2022 was 11% fewer deaths. The bank holiday on Monday of week 38 is likely to have led to delays in registering deaths in week 38 and a subsequent “catch-up” in week 39.

### Background

During the coronavirus pandemic we have been publishing frequent updates to the CMI Mortality Monitor. This update shows the position as at 30 September 2022 (week 39 of 2022), based on provisional deaths data published by the Office for National Statistics (ONS) on 11 October 2022.

In future weeks, we plan to publish:

- A weekly “summary” pandemic monitor. The next is planned for week 40 of 2022 on Tuesday 18 October 2022.
- More detailed information quarterly. The next is planned for week 52 of 2022 in January 2023.

All updates are publicly available from the [CMI pages of the Institute and Faculty of Actuaries website](#), together with software that we have made available to Authorised Users to carry out ad hoc analyses.

### Notes

Full details of the methods used for results based on the ONS data are included in [Working Paper 111](#). Our analysis is based on Standardised Mortality Rates (SMRs). These adjust the provisional weekly deaths data published by the ONS to control for changes in the size, age and gender distribution of the population over time. We note that mortality rates and mortality improvements vary by age, and the results shown are sensitive to the age distribution of the chosen standard population (the 2013 European Standard Population).

Our calculations rely on data for registered deaths, and we are conscious that in recent months deaths may have been registered earlier or later than in previous years. Consequently, comparisons of mortality between 2020, 2021 and 2022 and earlier years may not be on a like-for-like basis. Also, results for individual weeks may not be consistent between years due to the timing of public holidays.

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 early 2023.

### Use of this document

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 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.



### Results – Standardised mortality rates

Chart 1 shows how SMRs in 2019, 2020, 2021 and 2022 compare to the range of SMRs in the same week in the 2011-2019 period. (Note that most years do not have a week 53 – there was no week 53 in 2019 or 2021, and the 2011-2019 range for week 53 only relates to 2015.)

Ignoring the volatility caused by bank holidays, standardised mortality in the third quarter of 2022 has tended to be near or above the top of the 2011-2019 range.

**Chart 1: Weekly standardised mortality rates for 2011 to 2022**

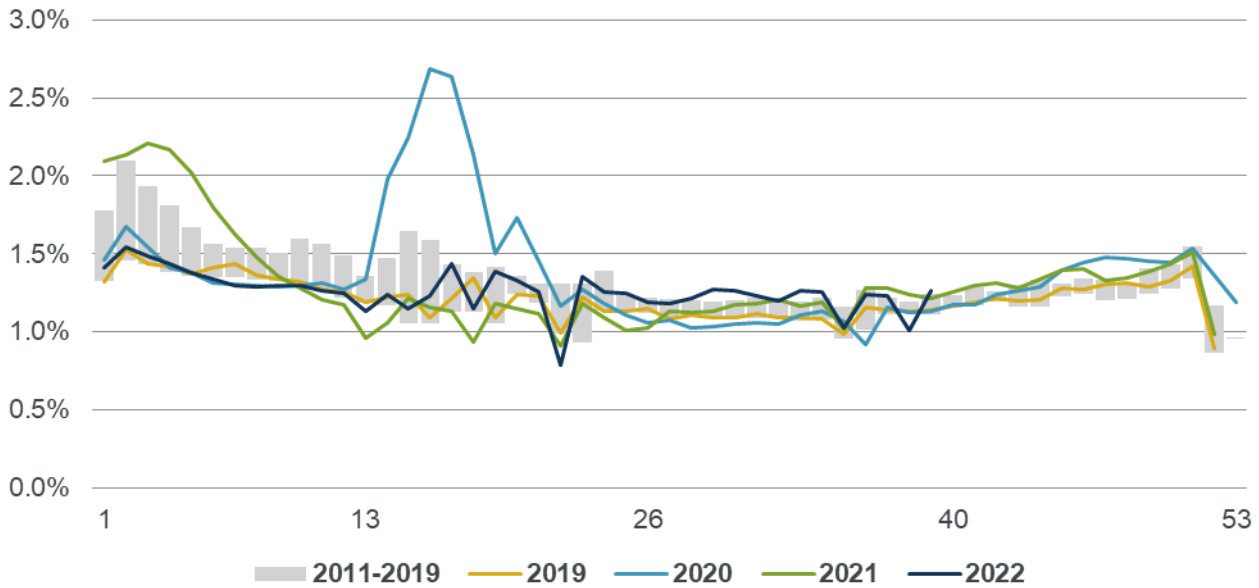
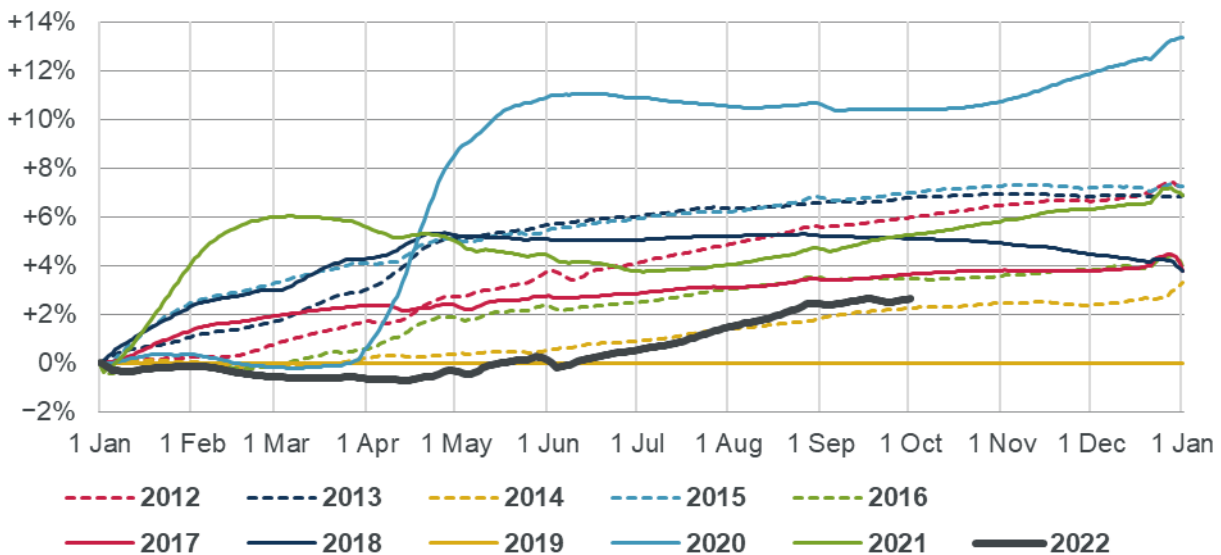


Chart 2 shows cumulative standardised mortality rates relative to 2019, as a proportion of mortality for 2019 as a whole<sup>1</sup>. Cumulative mortality to week 39 of 2022 is 2.6% above 2019.

**Chart 2: Cumulative standardised mortality rate compared to 2019**



<sup>1</sup> Showing relative mortality rather than absolute mortality makes it easier to make comparisons between years. We use 2019 as the comparator as this is consistent with the excess deaths calculations in this report.

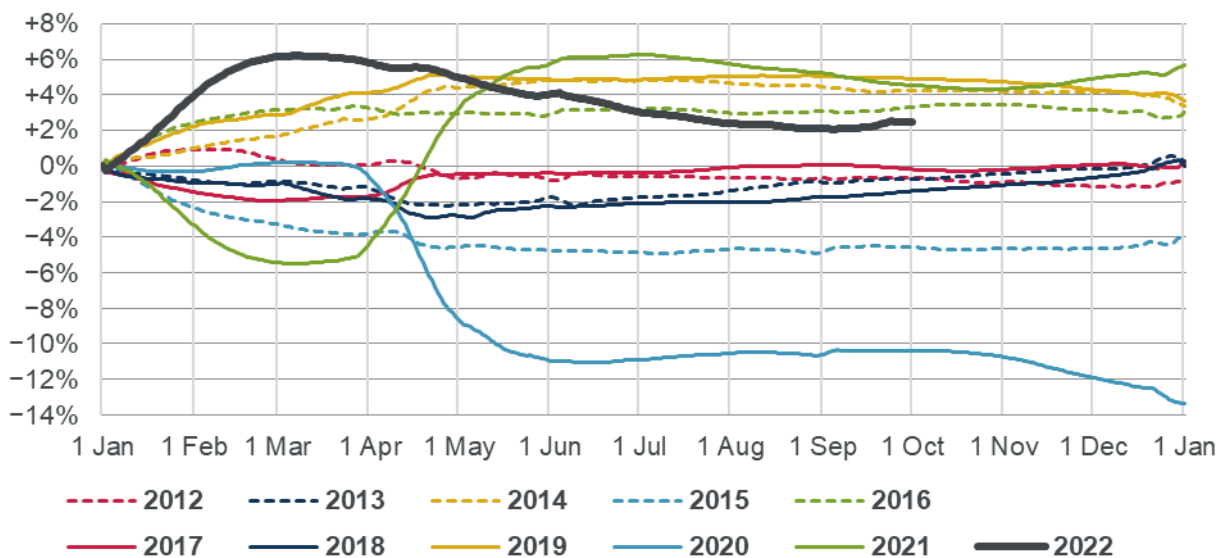


Chart 3 shows the cumulative annual standardised mortality improvement for 2022 and the previous ten years. The cumulative mortality improvement to week 39 of 2022 is +2.4%.

Please note:

- The cumulative improvement for year N is the reduction in cumulative mortality from year N-1 to year N, as a proportion of full-year mortality for year N-1.
- Chart 3 shows cumulative improvements, so a higher value represents a higher improvement and lower mortality; whereas in Chart 2 a higher value represents higher mortality.
- The cumulative mortality improvement for 2022 compares experience in 2022 to that in 2021, and so reflects the relatively high mortality in 2021 as well as experience in 2022.

Chart 3: Cumulative annual standardised mortality improvement for 2012 to 2022



The cumulative (non-annualised) standardised mortality improvement between 2019 and 2022 to week 39 (consistent with Chart F in the quarterly monitor) is -2.6%.

### Results – Excess and COVID-19 deaths

The ONS data shows 301 deaths registered during week 39 of 2022 “where COVID-19 was mentioned on the death certificate”. The overall impact of the coronavirus pandemic on total deaths has differed during the pandemic for various reasons:

- There may have been some deaths that were wholly or partially due to COVID-19 but where COVID-19 was not mentioned on the death certificate.
- Some deaths where COVID-19 was mentioned on the death certificate may not be “excess” deaths, as the deceased might have died from another cause in the same period, in the absence of coronavirus.
- There may have been “forward mortality displacement”: some deaths that occurred earlier in the pandemic would otherwise have occurred in this period.
- There may have been indirect impacts on deaths due to restrictions on movement and changes in behaviour during the pandemic. For example, access to healthcare, reductions in other infectious diseases, and changes in traffic, pollution and mental health.
- The pandemic has led to increased pressures on the NHS and the provision of social care.
- In the absence of the pandemic, we would have expected mortality to tend to fall over time, but with some volatility from year to year.



To consider the possible impact of the pandemic on total deaths, we have estimated the number of “expected” deaths that we would have seen in each week of the pandemic (in 2020, 2021 and 2022) if the SMRs for each gender and age-group had been the same in that week as in the corresponding week of 2019, the last full “normal” year before the pandemic.

We can then subtract the expected deaths from actual deaths to estimate the “excess” deaths that, in the absence of other likely causes, may be attributable to the pandemic.

Excess death calculations depend on the historical period used to estimate expected deaths. We initially used 2019 as our measure of “expected” mortality because of the similarity of SMRs in the first 12 weeks of 2019 and 2020, before the pandemic had a material impact on mortality.

While we would have expected to see mortality improvements since 2019 in the absence of a pandemic, we still consider 2019 to be a reasonable measure of expected mortality, for the reasons set out in the appendix to our mortality monitor for week 52 of 2021.

As there was no ISO week 53 in 2019, we have instead used week 1 of 2020 to calculate expected deaths for 53 week of 2020.

We have not made any adjustment for differences in the timing of public holidays. While such differences affect individual weeks, the positive and negative impacts for different weeks should cancel out over time in cumulative results.

Table 1 shows results for week 39 of 2022 compared to week 38 of 2022:

- Actual deaths in week 39 of 2022 were 11% higher than expected: 8% higher than expected for males and 14% higher than expected for females.
- In week 38 of 2022 deaths were 11% lower than expected: 9% lower than expected for males and 12% lower than expected for females.
- The bank holiday on Monday of week 38 is likely to have led to delays in registering deaths in week 38 and a “catch-up” in week 39.

**Table 1: Comparison of COVID-19 deaths and “excess” deaths**

Description	Week 39			Week 38
	Male	Female	Total	Total
“Expected” registered deaths	5,124	4,772	<b>9,896</b>	9,810
Actual registered deaths, from all causes	5,530	5,430	<b>10,960</b>	8,751
“Excess” registered deaths (actual minus expected)	406	658	<b>1,064</b>	–1,059
Registered deaths where COVID-19 was mentioned on the death certificate	159	128	<b>287</b>	235
Excess as a proportion of expected	8%	14%	<b>11%</b>	–11%



Chart 4 compares three measures of COVID-19 mortality during the pandemic: our calculation of “excess” registered deaths from all causes, ONS data for registered deaths where COVID-19 was mentioned on the death certificate, and data for deaths of people within 28 days of a positive test result for COVID-19, from the UK Health Security Agency (UKHSA) COVID-19 dashboard.

The relationship between the three measures has varied considerably during the pandemic. Early in the pandemic, the number of excess deaths was much higher than for the other two measures, but this has not been the case since then. During the second half of 2021, all three measured tended to show broadly similar results. Excess deaths were markedly lower than ONS and UKHSA figures at the start of 2022, and negative in some weeks. However, in the past quarter the number of excess deaths has tended to be higher than the other two measures.

**Chart 4: Comparison of weekly measures of COVID-19 deaths (see text for details)**

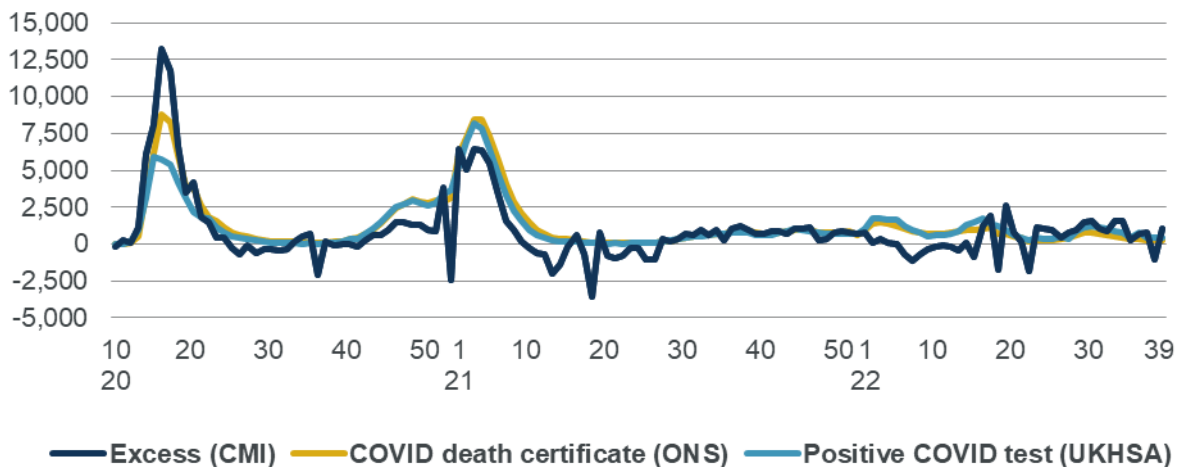
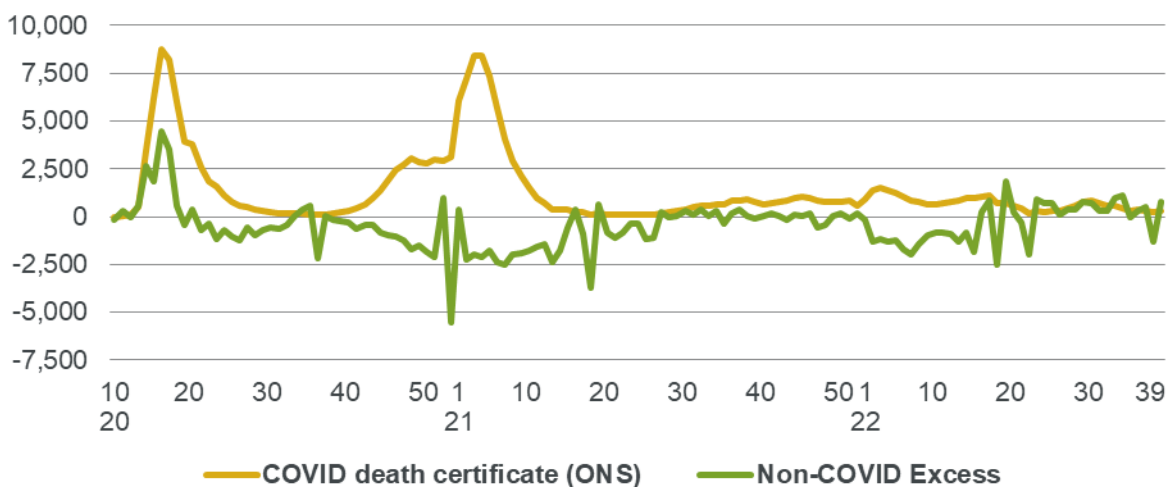


Chart 5 shows the split of excess deaths into deaths where COVID-19 was mentioned on the death certificate and “Non-COVID excess” (i.e. excess deaths minus deaths with COVID-19 mentioned on the death certificate). For most of the period, the Non-COVID excess has tended to be negative; i.e. deaths from causes other than COVID-19 were lower than in the corresponding part of 2019. However, the Non-COVID excess has been positive during much of the third quarter of 2022.

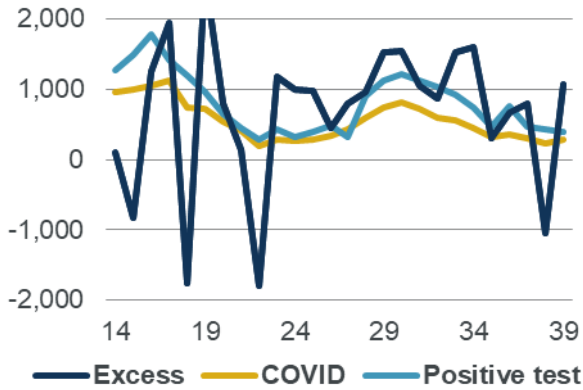
**Chart 5: Split of Excess deaths into COVID and Non-COVID Excess**





Charts 4B and 5B are “zoomed in” versions of Charts 4 and 5, showing greater detail of the past 26 weeks, with a narrower y-axis range. Note that some points are outside the y-axis range, particularly due to bank holidays.

**Chart 4B: Recent detail of Chart 4**



**Chart 5B: Recent detail of Chart 5**

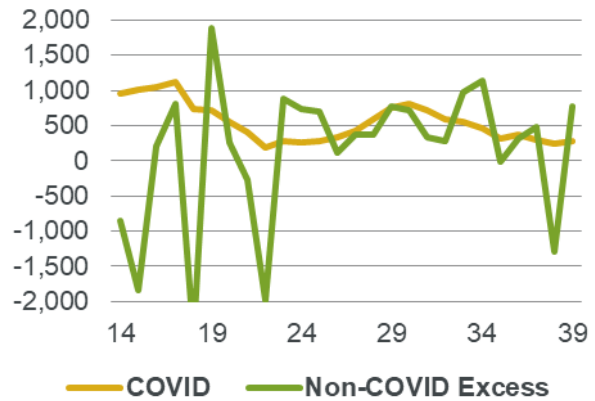
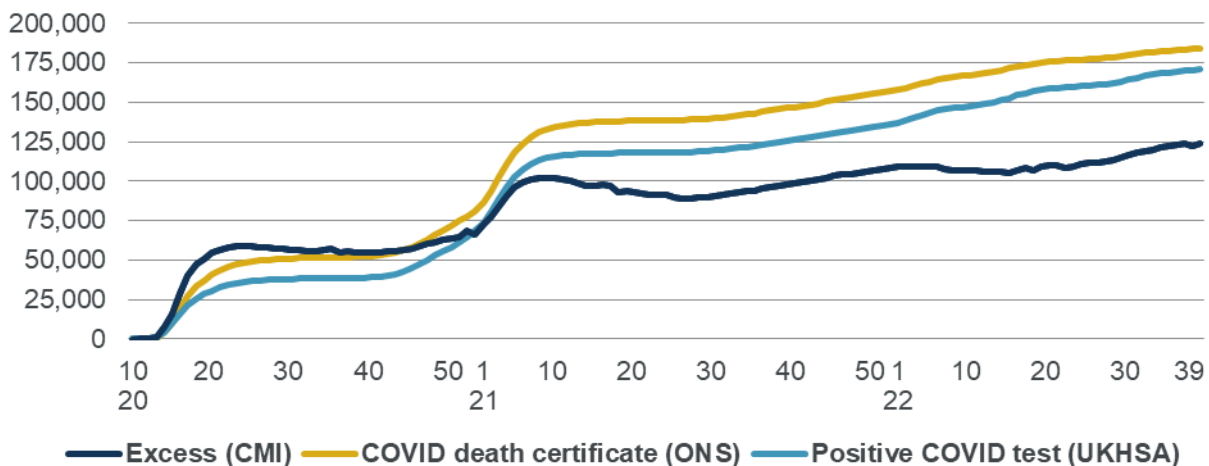


Chart 6 is similar to Chart 4, but shows cumulative numbers of deaths since week 10 of 2020. In the earlier part of the period shown, the cumulative number of excess deaths from all causes was higher than both the cumulative number of deaths where COVID-19 was mentioned on the death certificate, and the cumulative number of deaths within 28 days of a positive test. However, cumulative excess deaths are now lower than both of those measures – a consequence of weekly excess deaths being generally lower than the other measures, and sometimes negative.

**Chart 6: Comparison of cumulative measures of COVID-19 deaths (see text for details)**



Charts 7 and 8 show excess deaths as a proportion of expected deaths by age band for each week during the pandemic. Charts 7B and 8B show the same information, for the most recent 26 weeks, in more detail. For much of the period excess deaths as a proportion of expected have tended to be lower for the older age groups, but there is no clear pattern by age in recent weeks. We do not show results for ages below 45 as the relatively low numbers of deaths at those ages means that estimates of expected deaths would be unreliable.





Chart 7: Excess as a proportion of expected in each week – males (see text for details)

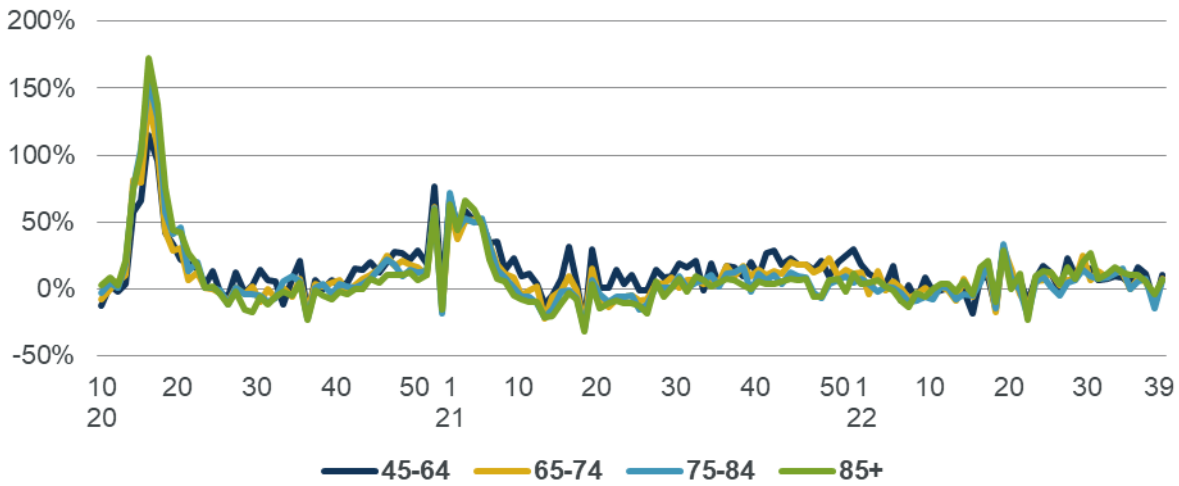


Chart 8: Excess as a proportion of expected in each week – females (see text for details)

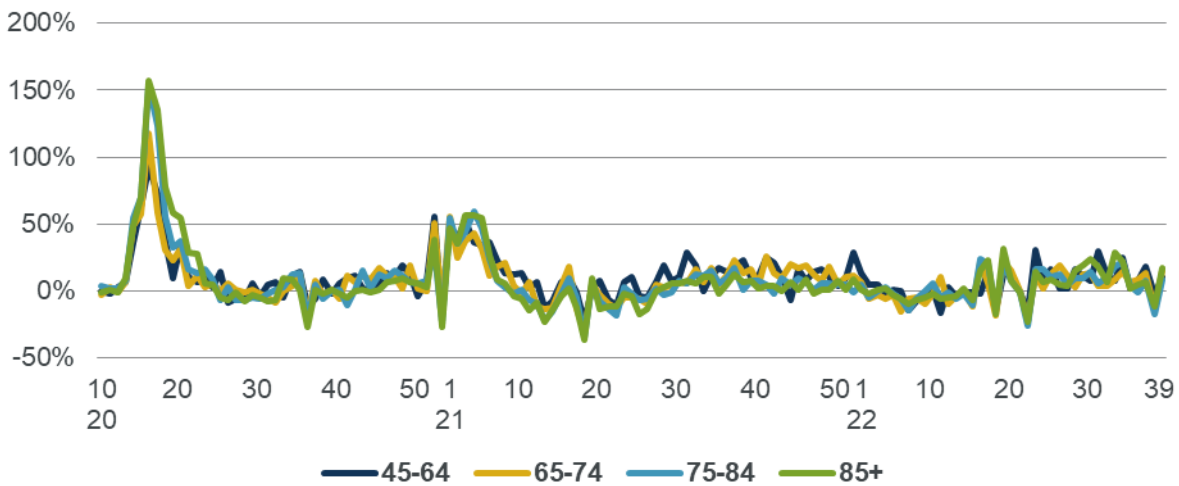


Chart 7B: Recent detail of Chart 7 – males

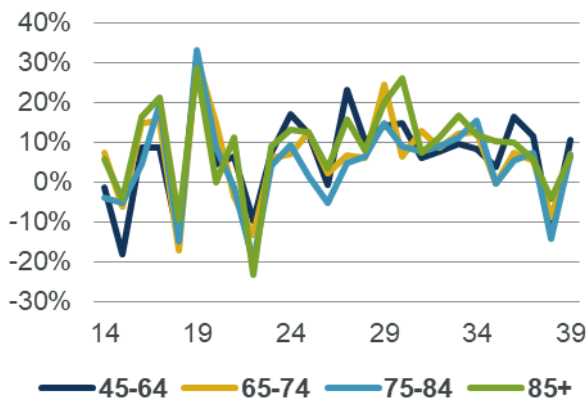
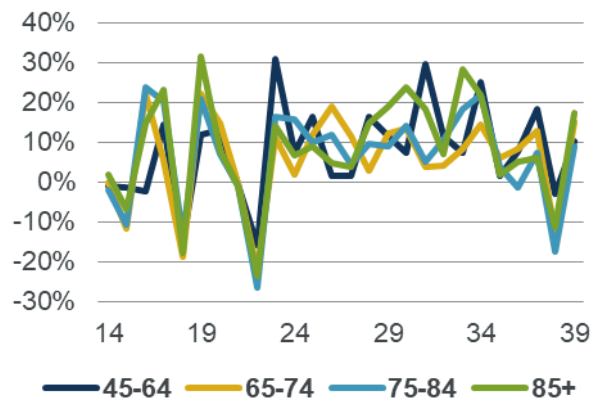


Chart 8B: Recent detail of Chart 8 – females





## Results – Excess deaths for the United Kingdom

The previous sections of this report are based on registered deaths data for England & Wales to 30 September 2022, published by the ONS. In this section we extend our analysis to the United Kingdom as a whole.

We estimate that the numbers of excess deaths from the start of the pandemic to 30 September 2022 are:

- 123,600 for England & Wales<sup>2</sup>; and
- 137,800 for the United Kingdom.

The numbers of excess deaths since week 1 of 2022 (1 January 2022) are 15,400 for England & Wales and 17,400 for the United Kingdom.

As in earlier sections, excess deaths compare registered deaths to those that we would have seen if standardised mortality rates were the same as in the corresponding period in 2019. Our calculations use data for all-cause mortality from National Records Scotland (NRS) and the Northern Ireland Statistics and Research Agency (NISRA) in addition to the ONS data.

## Data sources

The provisional weekly deaths are available from:

- ONS (England & Wales)  
<https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/weeklyprovisionalfiguresondeathsregisteredinenglandandwales>
- NRS (Scotland)  
<https://www.nrscotland.gov.uk/covid19stats>
- NISRA (Northern Ireland)  
<https://www.nisra.gov.uk/publications/weekly-deaths>

The daily UKHSA data for deaths of people within 28 days of a positive test result for COVID-19 are available from <https://coronavirus.data.gov.uk/details/deaths>

---

<sup>2</sup> The cumulative figures since the start of the pandemic are for deaths registered from week 10 of 2020 onwards; i.e. from 29 February 2020.





## Reliances and limitations

The purpose of the weekly mortality monitor is to provide regular updates on standardised mortality in England & Wales during the coronavirus pandemic, adjusting ONS data to allow for changes in the size and age of the population.

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 data published by third parties, particularly the ONS data which is 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.

**Disclaimer:** This document has been prepared by and/or on behalf of Continuous Mortality Investigation Limited (CMI). The CMI does not accept any responsibility and/or liability whatsoever for the content or use of this document. Whilst care has been taken during the development of the document, CMI does not (i) warrant its accuracy; or (ii) guarantee any outcome or result from the application of this document or of any of CMI’s work (whether contained in or arising from the application of this document or otherwise). You assume sole responsibility for your use of this document, and for any and all conclusions drawn from its use. CMI hereby excludes all warranties, representations, conditions and all other terms of any kind whatsoever implied by statute or common law in relation to this document, to the fullest extent permitted by applicable law. If you are in any doubt as to using anything produced by CMI, please seek independent advice.

**Copyright:** You may reproduce the contents of this document free of charge in any format or medium provided it is:

1. reproduced accurately and is unaltered;
2. not used in a misleading context; and
3. correctly referenced and includes both CMI’s Disclaimer notice set out above and CMI’s copyright notice, as follows:

© Continuous Mortality Investigation Limited.

Continuous Mortality Investigation Limited (“CMI”) is registered in England & Wales  
Company number: 8373631  
Registered Office: 7<sup>th</sup> 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](mailto:info@cmilimited.co.uk)  
Tel: 020 7776 3820

Website: [www.cmilimited.co.uk](http://www.cmilimited.co.uk) (redirects to [www.actuaries.org.uk](http://www.actuaries.org.uk))

Continuous Mortality Investigation Limited is wholly owned by the Institute and Faculty of Actuaries.