



## England & Wales mortality monitor – COVID-19 update – week 45 of 2020

### Summary

There have been around 63,200 more deaths in the UK from the start of the pandemic to 6 November 2020 than 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).

During week 45 of 2020, there were 9% more deaths registered in England & Wales than would have been expected if Standardised Mortality Rates had been the same as in the corresponding weeks of 2019. The corresponding figure for week 44 was +6%.

The cumulative mortality improvement in England & Wales for 2020 is –10.9% as at 6 November 2020, compared to +0.1% as at 20 March 2020, before the coronavirus pandemic had a material impact.

### Background

During the coronavirus pandemic we have been publishing frequent updates to the CMI Mortality Monitor. This update shows the position as at 6 November 2020 (week 45 of 2020), based on provisional deaths data published by the Office for National Statistics (ONS) on 17 November 2020. We intend to publish the next monitor, for week 46, on 24 November 2020. 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 their own ad hoc analyses: <https://www.actuaries.org.uk/learn-and-develop/continuous-mortality-investigation/other-cmi-outputs/mortality-monitor>.

### 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 have included versions of Charts D and E from the standard quarterly monitor, which show results for males and females combined, for ages 20-100:

- Chart 1 (like Chart D from the quarterly report) shows cumulative standardised mortality for each year, relative to the average for 2010-2019.
- Chart 2 (like Chart E from the quarterly report) shows cumulative standardised mortality improvements for each year (i.e. the progression of annual mortality improvements over the course of each year).
- 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 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.

### 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

Chart 1 shows cumulative standardised mortality rates compared to the 2010-2019 average. Cumulative mortality to week 45 of 2020 is higher than cumulative mortality to week 45 in any year since 2008, and is 5.7% above the 2010-19 average. It was 1.9% below the 2010-19 average at week 12, before the coronavirus pandemic had a material impact. The highest value was +7.4% at week 23.

**Chart 1: Cumulative standardised mortality rate compared to the 2010-2019 average**

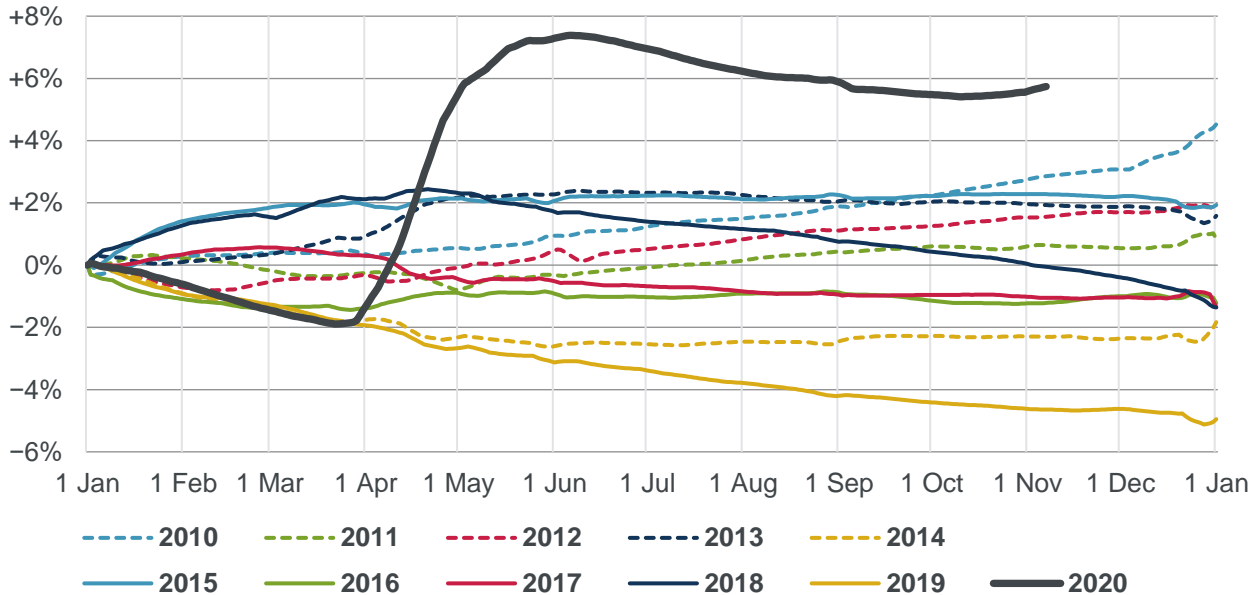
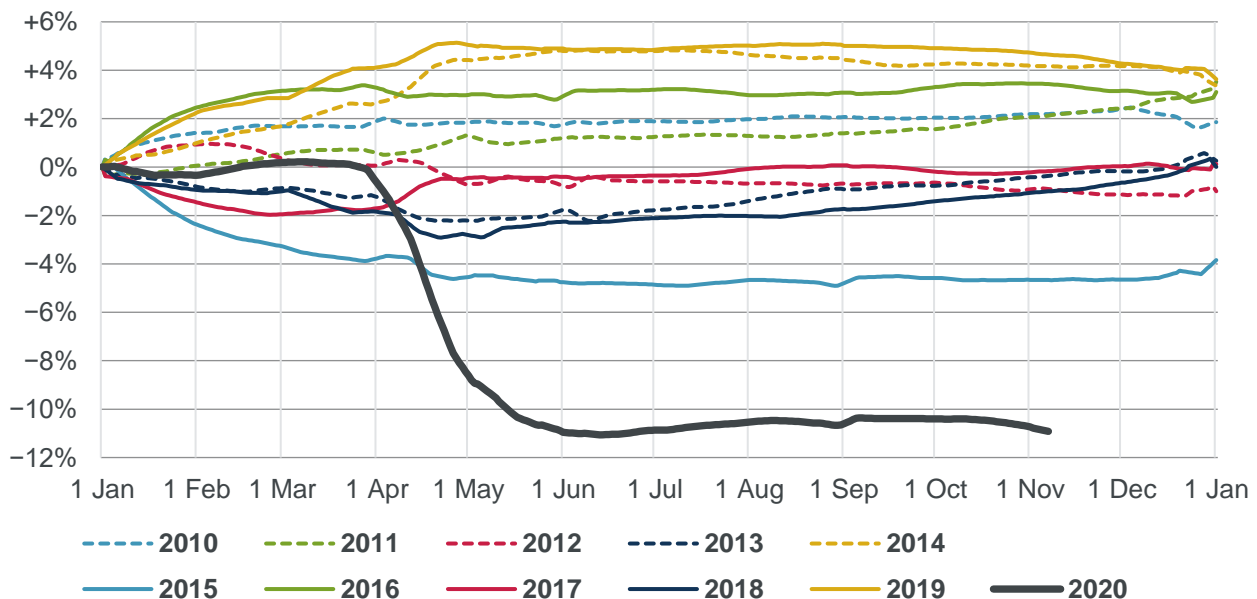


Chart 2 shows the cumulative annual standardised mortality improvement for 2020 and for the previous ten years. Note that Chart 2 shows cumulative improvements, so a higher value represents a higher improvement and lower mortality; whereas in Chart 1 a higher value represents higher mortality.

The cumulative mortality improvement is -10.9% as at 6 November 2020 (week 45 of 2020), compared to +0.1% as at week 12, before the coronavirus pandemic had a material impact. The lowest value was -11.1% as at week 24.

**Chart 2: Cumulative annual standardised mortality improvement**





## Impact of coronavirus on total deaths

The ONS data shows 1,937 deaths registered during week 45 “where COVID-19 was mentioned on the death certificate”. The overall impact of the coronavirus pandemic on total deaths may be different:

- 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 the 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 due to the coronavirus; for example, changes in traffic, pollution and mental health.

To consider the possible impact of the pandemic on total deaths, we have estimated the number of deaths that we would have seen in week 45 of 2020 if the SMRs for each gender and age-group had been the same in those weeks as in the corresponding weeks of 2019. As mortality in the first 12 weeks of 2019 and 2020 was similar, as seen in Charts 1 and 2, this gives a broad indication of “expected” mortality in the absence of the coronavirus pandemic<sup>1</sup>. 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.

We have not made any adjustment for differences in the timing of public holidays in 2019 and 2020. While such differences may affect expected, actual and excess results for individual weeks, positive and negative impacts for different weeks should cancel out over time in cumulative results.

Table 1 shows results for week 45, compared to week 44. Actual deaths have been higher than expected in both weeks:

- Actual deaths in week 45 are 9% higher than expected: 11% higher than expected for males and 7% higher than expected for females.
- In the previous week, week 44, deaths were 10% higher than expected for males and 1% higher than expected for females.

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

Description	Week 45 of 2020			Week 44
	Male	Female	Total	Total
“Expected” registered deaths, if SMRs were the same in 2019 and 2020	5,424	5,433	<b>10,857</b>	10,316
Actual registered deaths, from all causes	6,021	5,791	<b>11,812</b>	10,887
“Excess” registered deaths (actual minus expected)	+597	+358	<b>+955</b>	+571
Registered deaths where COVID-19 was mentioned on the death certificate	1,088	849	<b>1,937</b>	1,379
Excess as a proportion of expected	+11%	+7%	<b>+9%</b>	+6%

<sup>1</sup> Our calculation of excess deaths depends on the historical period that we use to estimate expected deaths. If we had used the average standardised mortality rates for 2015-19 rather than only 2019 to calculate expected deaths, without allowing for mortality improvements, then this would have increased excess deaths by 16 (from 955 to 971) in week 45, and reduced the cumulative excess at week 45 (shown in Chart 4) from 57,127 to 47,794, a difference of 16%. We reiterate our preference for using 2019 to estimate expected deaths in the absence of a pandemic, as 2019 and 2020 had similar mortality experience for weeks 1 to 12.

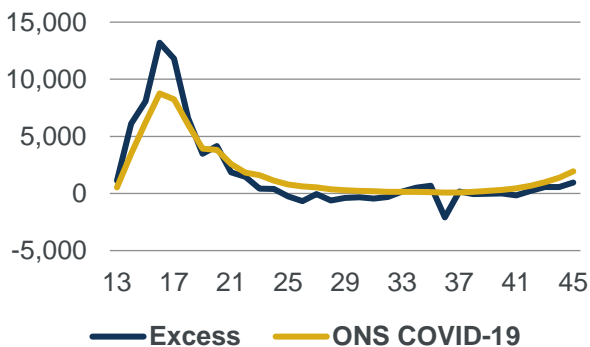


Chart 3A compares “excess” registered deaths and registered deaths where COVID-19 was mentioned on the death certificate in each week since week 13. While there were some deaths in weeks 11 and 12 where COVID-19 was mentioned on the death certificate, the level of excess deaths in those weeks is small compared to typical weekly volatility in deaths, so cannot be reliably estimated. Chart 3B is similar, but shows figures from week 23 onwards, to allow the detail of recent weeks to be seen more clearly.

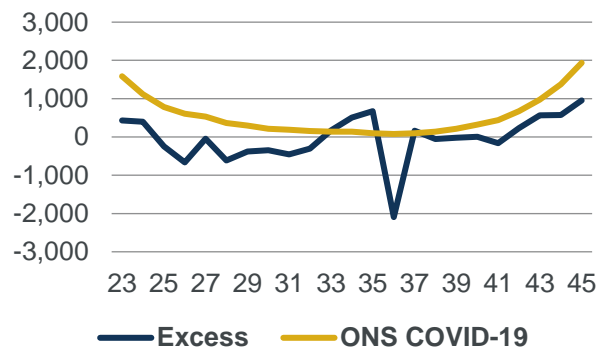
In weeks 13 to 17, the number of excess deaths was much higher than the number of deaths where COVID-19 was mentioned on the death certificate, but this is not the case in later weeks. Excess deaths were lower than mentions of COVID-19 in weeks 21 to 32, and negative in weeks 25 to 32. Excess mortality was positive in weeks 33 and 34, likely due to the heatwave from August 7 to 12. Results for weeks 35 and 36 are affected by the different timings of the late-August public holidays in 2019 and 2020.

Mentions of COVID-19 on the death certificate have risen in recent weeks, from under 100 in each of weeks 36 and week 37, to 1,937 in week 45. Excess deaths remained fairly close to zero in weeks 37 to 41, but increased in weeks 42 to 45.

**Chart 3A: Comparison of deaths registered in each week (see text for details)**

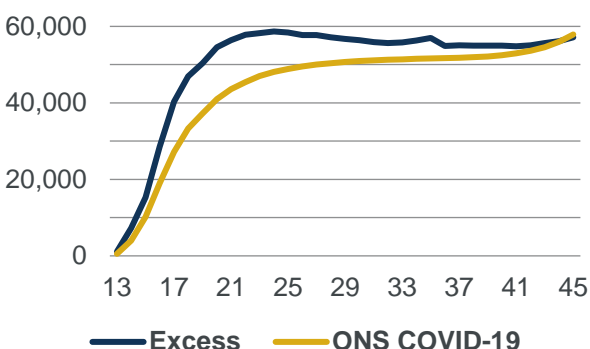


**Chart 3B: Version of Chart 3A from week 23 onwards**

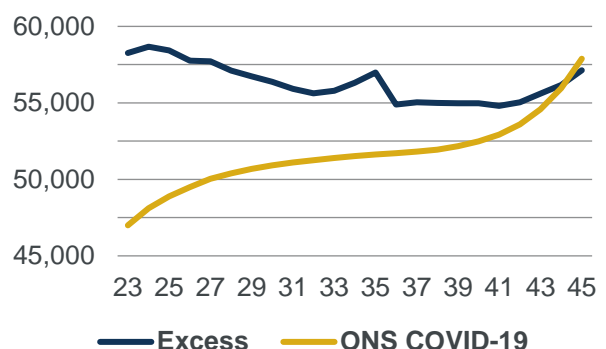


Charts 4A and 4B are similar to Charts 3A and 3B, but plot the cumulative numbers of deaths, since week 13. They show that cumulative excess mortality has increased in recent weeks. The cumulative number of deaths where COVID-19 was mentioned on the death certificate is now higher than cumulative excess mortality: 759 higher up to week 45.

**Chart 4A: Comparison of cumulative registered deaths (see text for details)**



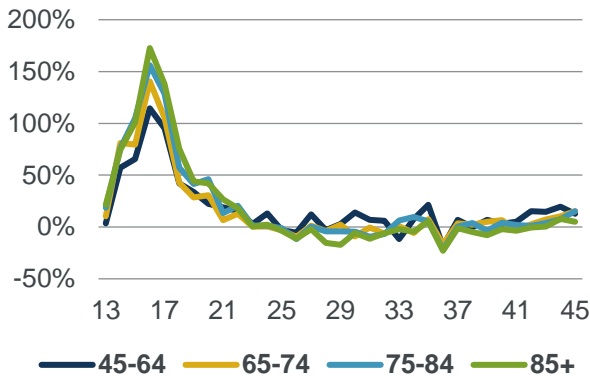
**Chart 4B: Version of Chart 4A from week 23 onwards**



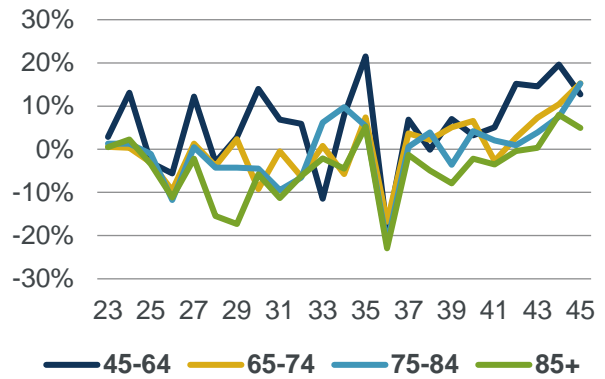


Charts 5A, 5B, 6A and 6B show excess deaths as a proportion of expected deaths by age band for each week. This tended to be higher for older age bands earlier in the pandemic. We do not show results for ages below 45 as the relatively low numbers of deaths at those ages means that estimates of expected deaths would be unreliable. Similarly, we no longer show a table of excess mortality by age band, as the figures have become more uncertain as the numbers of deaths have reduced.

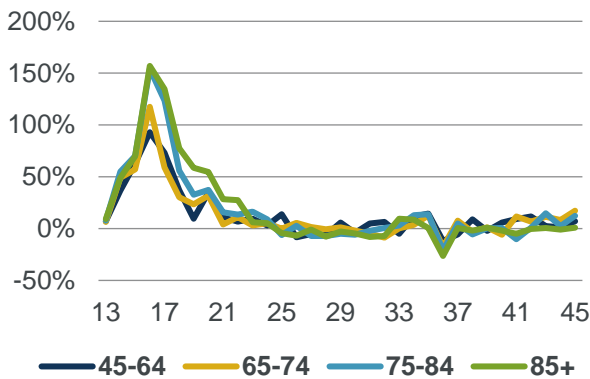
**Chart 5A: Excess as a proportion of expected in each week – males (see text for details)**



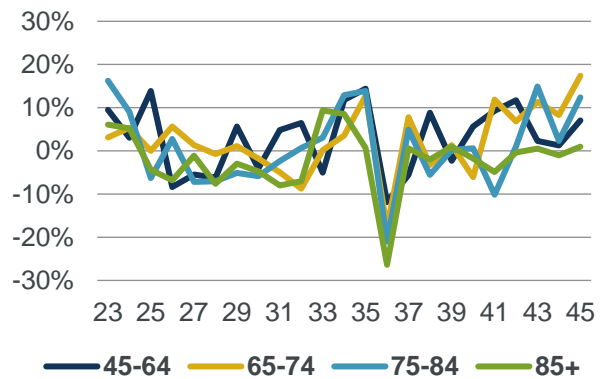
**Chart 5B: Version of Chart 5A from week 23 onwards**



**Chart 6A: Excess as a proportion of expected in each week – females (see text for details)**



**Chart 6B: Version of Chart 6A from week 23 onwards**





## Excess deaths for the United Kingdom

The previous sections of this report are based on registered deaths data for England & Wales to 6 November 2020, 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 6 November 2020 are:

- 57,300 for England & Wales<sup>2</sup>; and
- 63,200 for the United Kingdom.

As in earlier sections, excess deaths compare registered deaths in 2020 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. We note that the week 45 figure for Northern Ireland is not yet available, so we have assumed that excess deaths in Northern Ireland in week 45 are the same as in week 44.

The figures above do not include deaths that occurred after 6 November. We note that Public Health England (PHE) publishes daily data published for deaths of people within 28 days of a positive test result for COVID-19. The PHE data shows 2,829 COVID-19 deaths reported for the UK in week 46 (7 November to 13 November 2020), compared to 2,246 in week 45.

## 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://data.gov.scot/coronavirus-covid-19/data.html>

NISRA (Northern Ireland): [https://www.nisra.gov.uk/sites/nisra.gov.uk/files/publications/Weekly\\_Deaths.xls](https://www.nisra.gov.uk/sites/nisra.gov.uk/files/publications/Weekly_Deaths.xls)

The daily PHE 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> This cumulative figure, since the start of the pandemic, is slightly different to that in footnote 1, which shows the cumulative figure since week 13.





## 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 allowing 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.