



England & Wales mortality monitor – COVID-19 update – week 1 of 2021

Important note for this week's monitor: results for weeks 52 and 53 of 2020 and week 1 of 2021 are affected by the timing of bank holidays and are not consistent with each other or with 2019. The mortality monitor for week 53 of 2020 discusses this further.

Summary

There have been around 80,100 more deaths in the UK from the start of the pandemic to 8 January 2021 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).

Considering week 53 of 2020 and week 1 of 2021 together, to reduce the impact of the timing of bank holidays, there were 17% more deaths registered in England & Wales than would have been expected under pre-COVID mortality rates.

Background

During the coronavirus pandemic we have been publishing frequent updates to the CMI Mortality Monitor. This update shows the position as at 8 January 2021 (week 1 of 2021), based on provisional deaths data published by the Office for National Statistics (ONS) on 19 January 2021. We intend to publish the next monitor, for week 2 of 2021, on 26 January 2021. 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 and 2021 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 – Standardised mortality rates

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

Standardised mortality in week 1 of 2021 is higher than in 2011-2019. This is likely to reflect a combination of genuinely high mortality and the impact of the timing of bank holidays.

Chart 1: Weekly standardised mortality rates for 2011 to 2021

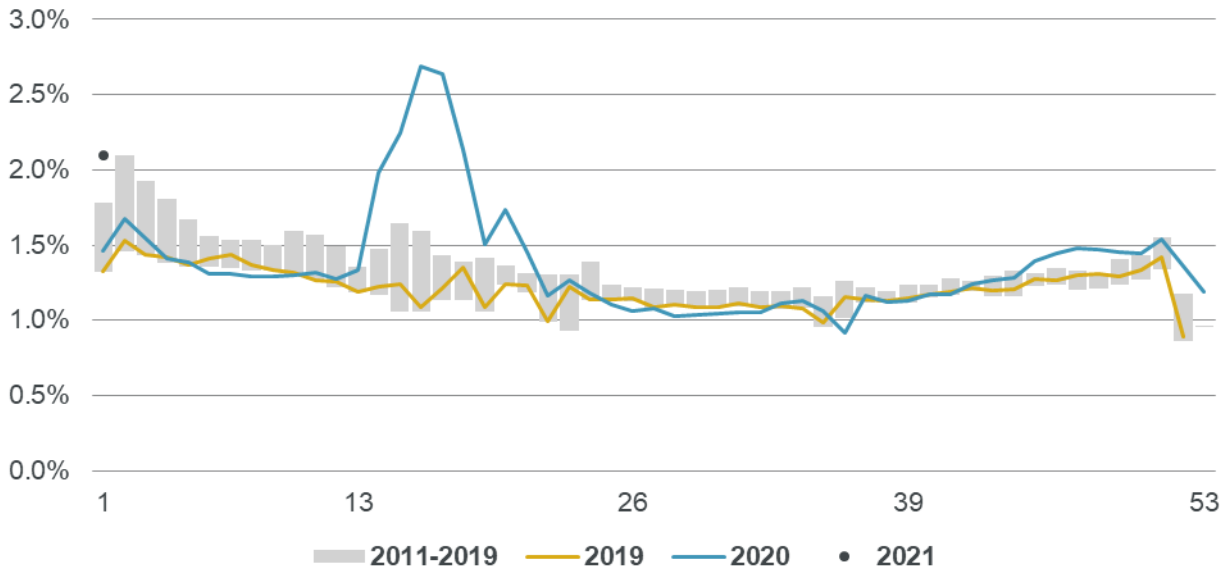
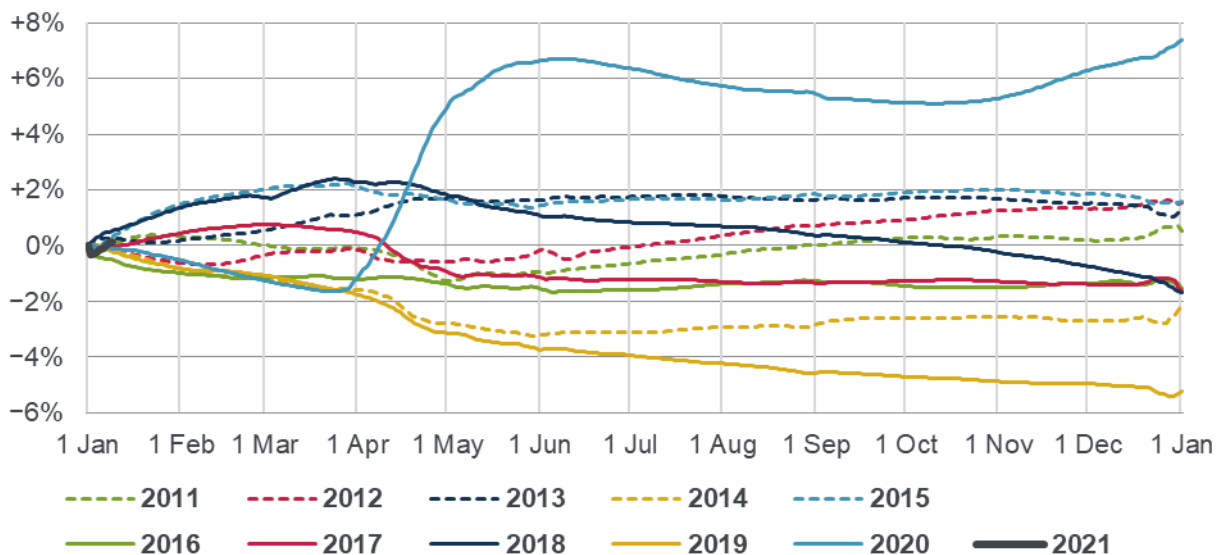


Chart 2 shows cumulative standardised mortality rates relative to the 2011-2020 average¹. Cumulative mortality to week 1 of 2021 is 0.1% above the 2011-2020 average.

Chart 2: Cumulative standardised mortality rate compared to the 2011-2020 average



¹ Showing relative mortality rather than absolute mortality makes it easier to make comparisons between years. The choice of 2011-2020 as a comparator is somewhat arbitrary and should not be interpreted as our expectation of mortality in 2021.



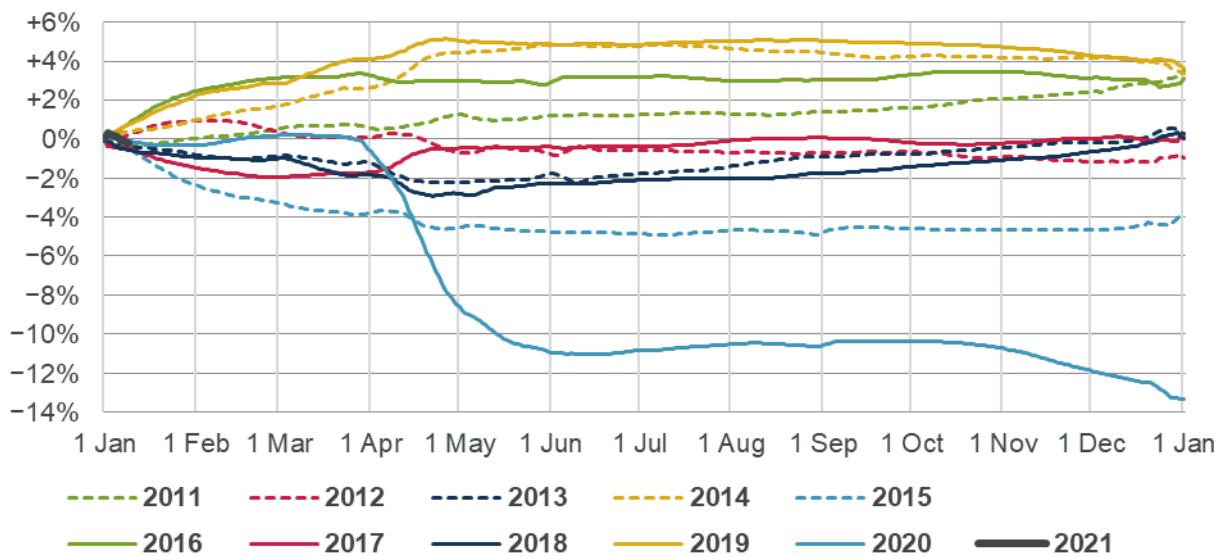
Chart 3 shows the cumulative annual standardised mortality improvement for 2021 and the previous ten years.

Note that:

- 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 2021 compares experience in 2021 to that in 2020, so if mortality in 2021 returns to pre-pandemic levels then we would see a material mortality improvement in 2021.

The cumulative mortality improvement to week 1 of 2021 is -0.2% .

Chart 3: Cumulative annual standardised mortality improvement



Results – Excess and COVID-19 deaths

The ONS data shows 6,057 deaths registered during week 1 of 2021 “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 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.

To consider the possible impact of the pandemic on total deaths, we have estimated the number of deaths that we would have seen in each week of the pandemic (in 2020 and 2021) 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. As mortality in the first 12 weeks of 2019 and 2020 was similar, as seen in Charts 2 and 3, this gives a broad indication of “expected” mortality in the absence of the coronavirus pandemic². However, as there

² 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



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 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, but we note that there are material differences in the timing of Christmas, Boxing Day and New Year’s Day holidays between the 2019/20 and 2020/21 holiday periods. These differences will particularly affect results for weeks 52 and 53 of 2020 and week 1 of 2021, and may also affect later weeks. However, while such differences affect individual weeks, positive and negative impacts for different weeks should cancel out over time in cumulative results.

Table 1 shows results for week 1 of 2021, compared to week 53 of 2020, and for the two weeks combined:

- Actual deaths in week 1 of 2021 are 57% higher than expected: 65% higher than expected for males and 50% higher than expected for females.
- In the previous week, week 53 of 2020, deaths were 15% lower than expected for males and 23% lower than expected for females.
- As noted above, comparisons between these weeks should be treated with caution, due to the different impact of public holidays in the two weeks. Excess deaths are likely to be lower in week 53 of 2020 and higher in week 1 of 2021 than if there were no bank holidays.
- The right-hand column shows results for week 53 of 2020 and week 1 of 2021 combined, which partly mitigates the impact of bank holidays. In these weeks, deaths were 17% higher than expected, compared to 8% higher in weeks 50 and 51 of 2020 combined, the last two weeks that were unaffected by bank holidays.

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

Description	Week 1 of 2021			Week 53 of 2020	Weeks 53 and 1
	Male	Female	Total	Total	Total
“Expected” registered deaths	5,412	5,891	11,303	12,460	23,762
Actual registered deaths, from all causes	8,922	8,829	17,751	10,069	27,820
“Excess” registered deaths (actual minus expected)	+3,510	+2,938	+6,448	–2,391	+4,058
Registered deaths where COVID-19 was mentioned on the death certificate	3,221	2,836	6,057	3,144	9,201
Excess as a proportion of expected	+65%	+50%	+57%	–19%	+17%

deaths, without allowing for mortality improvements, then this would have decreased excess deaths by 1,741 (from 6,448 to 4,707) in week 1 of 2021, and reduced the cumulative excess to week 1 of 2021 (shown in Chart 5) from 72,672 to 59,332, a difference of 18%. We reiterate our preference for using SMRs for 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 4 compares three measures of COVID-19 mortality during the pandemic: our calculation of “excess” registered deaths, ONS data for registered deaths where COVID-19 was mentioned on the death certificate, and Public Health England (PHE) data for deaths of people within 28 days of a positive test result for COVID-19.

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. The PHE deaths for England & Wales increased from under 100 deaths in week 37 of 2020 to over 5,000 in week 1 of 2021. In recent weeks the ONS and PHE measures have tended to show similar results. However, excess deaths have been considerably lower (apart from the impact of bank holidays), indicating that non-COVID deaths have been lower than would have been expected in the absence of the pandemic. We noted possible reasons for such differences on page 3.

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

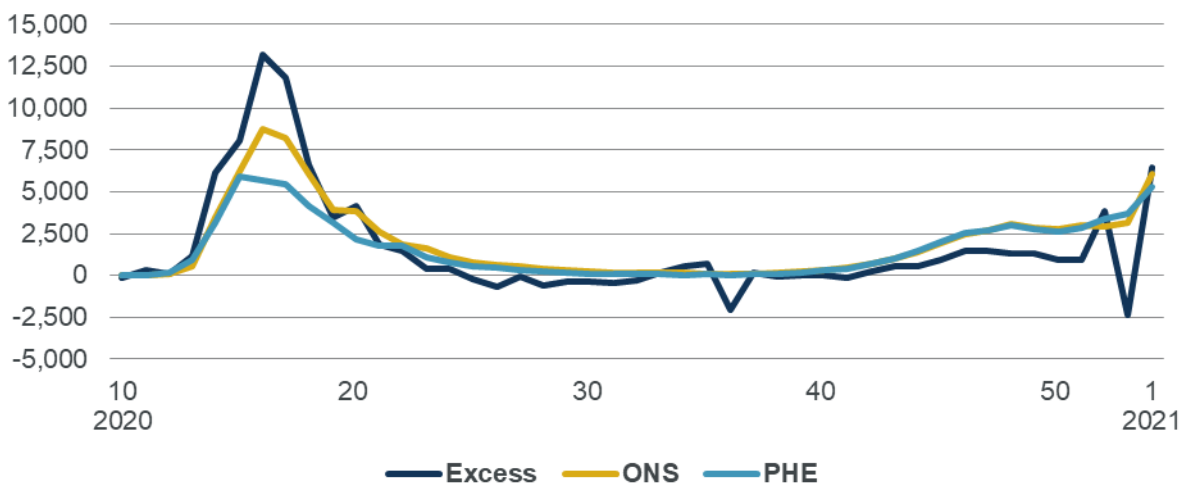
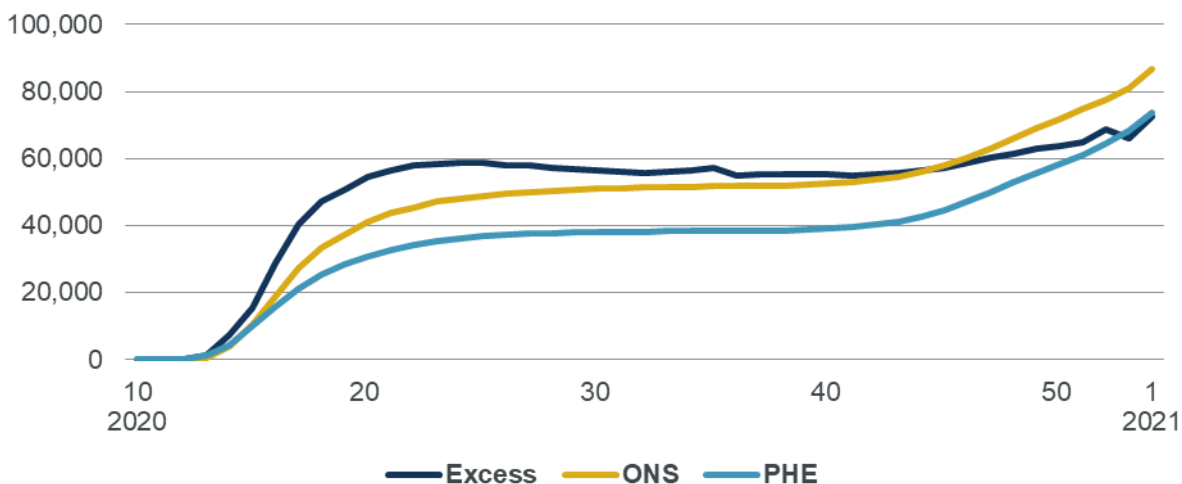


Chart 5 is similar to Chart 4, but shows cumulative numbers of deaths since week 10 of 2020. For most of the period shown, the cumulative number of excess deaths was higher than both the cumulative number of deaths where COVID-19 was mentioned on the death certificate, and the cumulative number of deaths 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 lower than the other measures in recent weeks.

Chart 5: Comparison of cumulative measures of COVID-19 deaths (see text for details)





Charts 6 and 7 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.

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

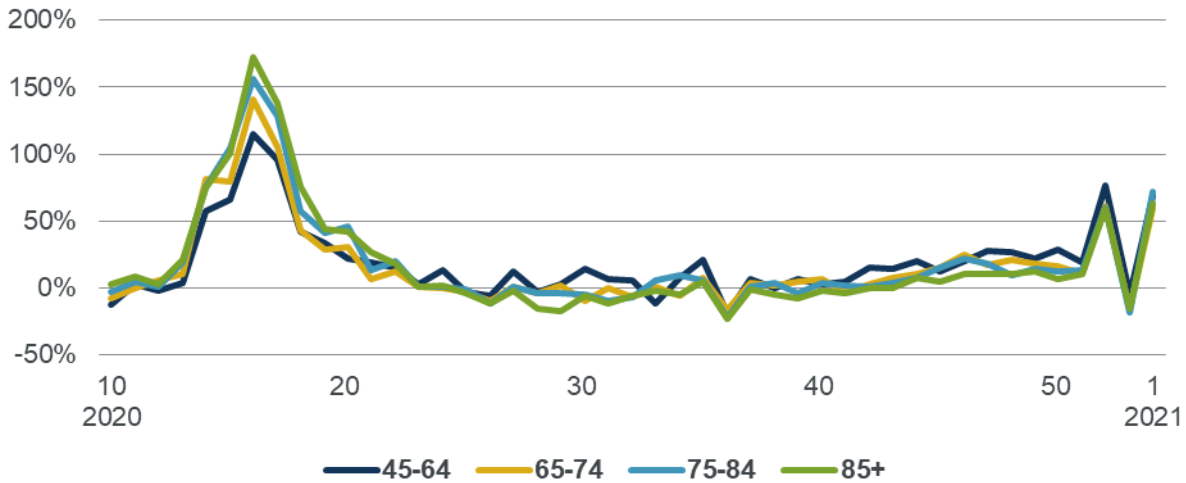
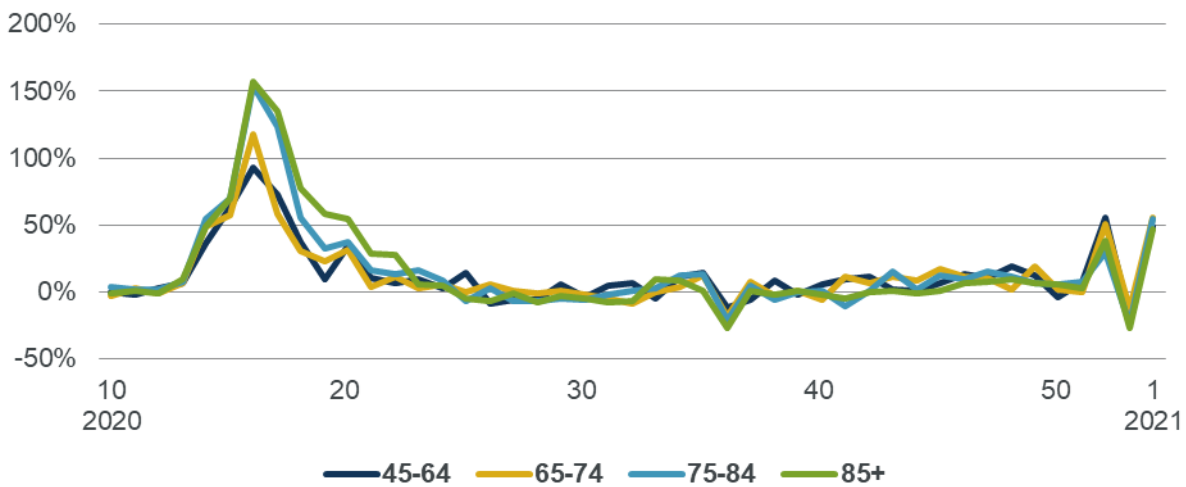


Chart 7: Excess as a proportion of expected in each week – females (see text for details)





Results – Excess deaths for the United Kingdom

The previous sections of this report are based on registered deaths data for England & Wales to 8 January 2021, 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 8 January 2021 are:

- 72,700 for England & Wales³; and
- 80,100 for the United Kingdom.

Of these, 17,400 excess deaths for England & Wales and 19,400 for the United Kingdom have occurred since the start of the second wave⁴.

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.

The figures above do not include deaths that occurred after 8 January 2021. We note that PHE publishes daily data published for deaths of people within 28 days of a positive test result for COVID-19. The PHE data shows 7,462 COVID-19 deaths reported for the UK in week 2 of 2021 (9 to 15 January 2021), compared to 5,665 in week 1 of 2021.

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/publications/weekly-deaths>

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>

³ The cumulative figures, since the start of the pandemic, are for deaths registered from week 10 onwards; i.e. from 29 February 2020.

⁴ For this purpose, the second wave is for deaths registered from week 38 onwards, i.e. from 12 September 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: 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)

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