



## England & Wales mortality monitor – COVID-19 update – week 49 of 2020

### Summary

There have been around 69,500 more deaths in the UK from the start of the pandemic to 4 December 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 49 of 2020, there were 12% 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 48 was also +12%.

The cumulative mortality improvement in England & Wales for 2020 is –12.0% as at 4 December 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 4 December 2020 (week 49 of 2020), based on provisional deaths data published by the Office for National Statistics (ONS) on 15 December 2020. We intend to publish the next monitor, for week 50, on 22 December 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.

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### 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 49 of 2020 is higher than cumulative mortality to week 49 in any year since 2008, and is 6.8% 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**

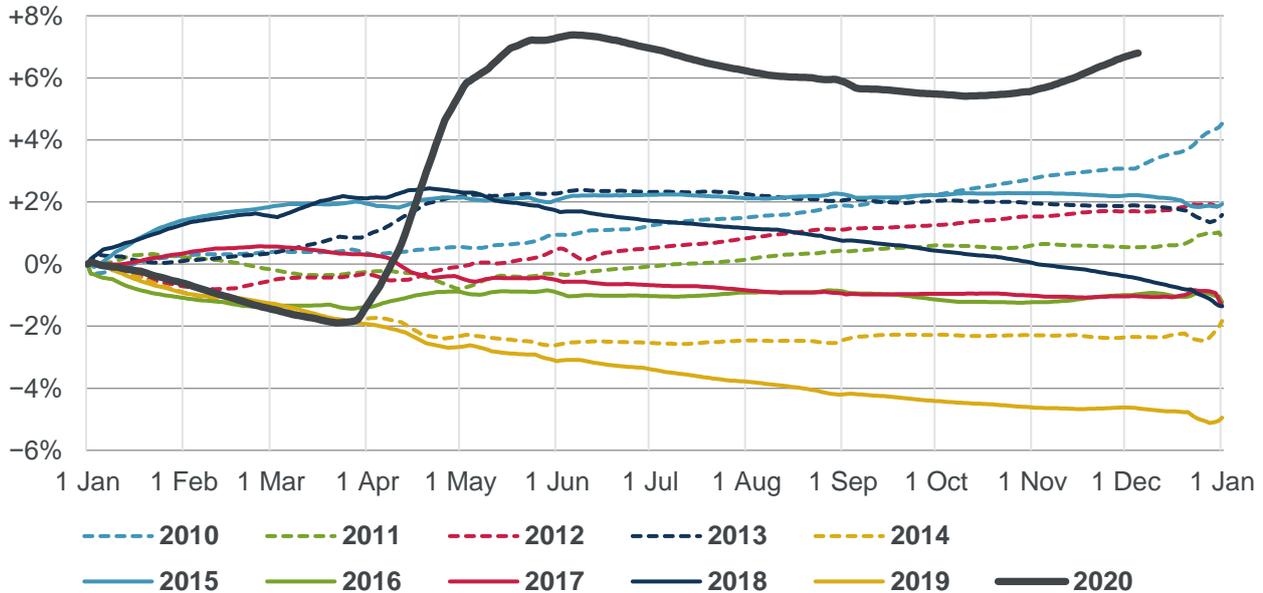
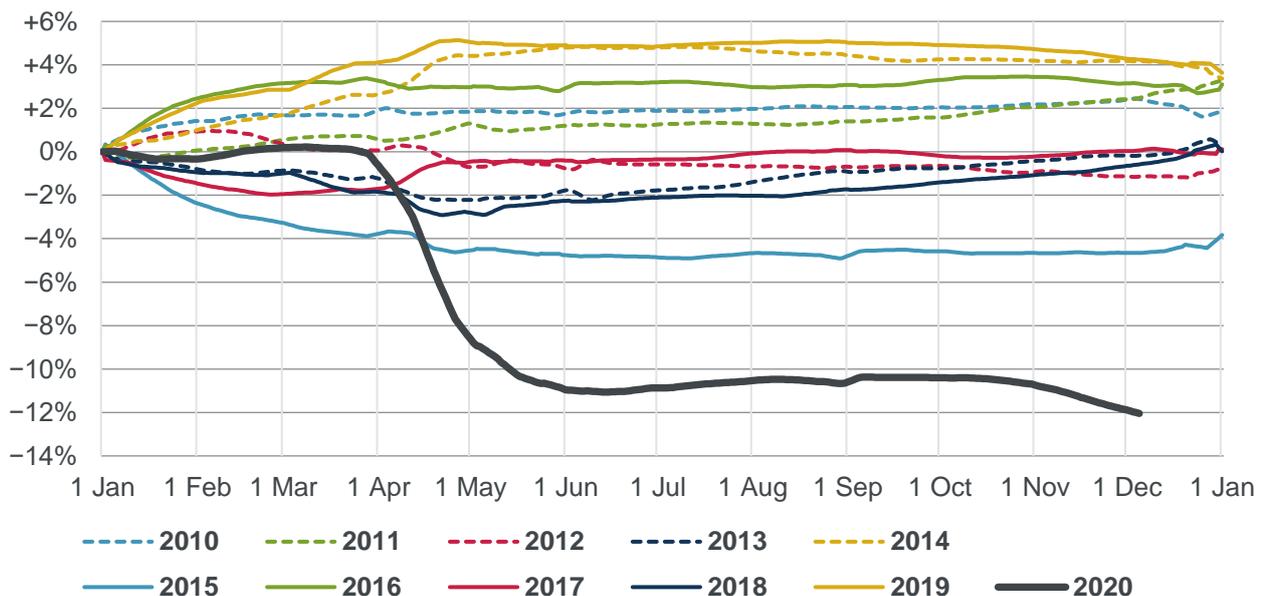


Chart 2 shows the cumulative annual standardised mortality improvement for 2020 and for the previous ten years. Note that Chart 2 shows cumulative improvements, so a higher value represents a higher improvement and lower mortality; whereas in Chart 1 a higher value represents higher mortality.

The cumulative mortality improvement is -12.0% as at 4 December 2020 (week 49 of 2020), a new low, compared to +0.1% as at week 12, before the coronavirus pandemic had a material impact.

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





## Impact of coronavirus on total deaths

The ONS data shows 2,835 deaths registered during week 49 “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 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 week 49 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 49, compared to week 48. Actual deaths have been higher than expected in both weeks:

- Actual deaths in week 49 are 12% higher than expected: 15% higher than expected for males and 9% higher than expected for females.
- In the previous week, week 48, deaths were 14% higher than expected for males and 10% higher than expected for females.

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

Description	Week 49 of 2020			Week 48
	Male	Female	Total	Total
“Expected” registered deaths, if SMRs were the same in 2019 and 2020	5,490	5,494	<b>10,984</b>	11,128
Actual registered deaths, from all causes	6,313	5,990	<b>12,303</b>	12,456
“Excess” registered deaths (actual minus expected)	+823	+496	<b>+1,319</b>	+1,328
Registered deaths where COVID-19 was mentioned on the death certificate	1,556	1,279	<b>2,835</b>	3,040
Excess as a proportion of expected	+15%	+9%	<b>+12%</b>	+12%

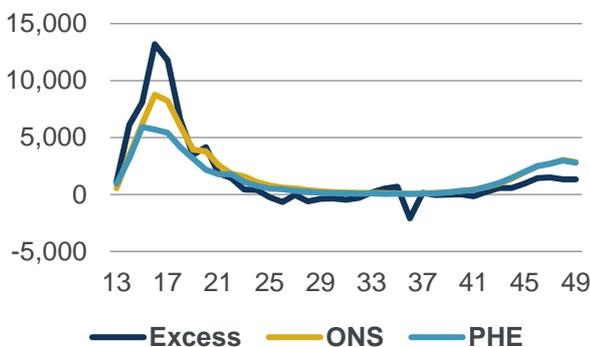
<sup>1</sup> Our calculation of excess deaths depends on the historical period that we use to estimate expected deaths. If we had used the average standardised mortality rates for 2015-19 rather than only 2019 to calculate expected deaths, without allowing for mortality improvements, then this would have decreased excess deaths by 249 (from +1,319 to +1,070) in week 49, and reduced the cumulative excess to week 49 (shown in Chart 4) from 62,701 to 53,478, a difference of 15%. 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.



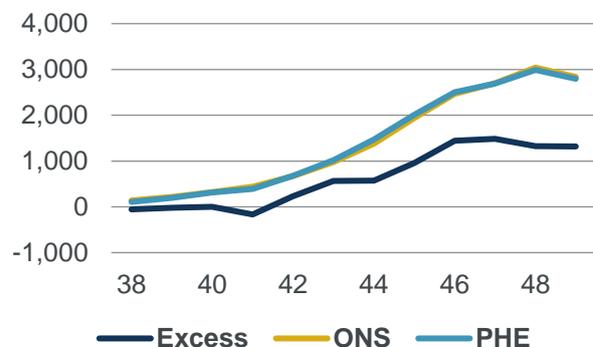
Chart 3A compares three measures of COVID-19 mortality during the pandemic: our calculation of “excess” registered deaths, ONS data for registered deaths where COVID-19 was mentioned on the death certificate, and Public Health England (PHE) data for deaths of people within 28 days of a positive test result for COVID-19. While there were some deaths from COVID-19 before week 13, 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 to Chart 3A, but shows figures since week 38, to allow the detail of the “second wave” to be seen more clearly.

The relationship between the three measures has varied considerably during the pandemic. In weeks 13 to 17, the number of excess deaths was much higher than for the other two measures, but this has not been the case since then. In recent weeks the ONS and PHE measures have shown similar results. The PHE deaths increased from under 100 deaths in week 37 to 2,990 in week 48, before falling to 2,797 in week 49. Excess deaths are currently about half of the ONS and PHE figures, 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 3A: Comparison of weekly measures of COVID-19 deaths (see text for details)**

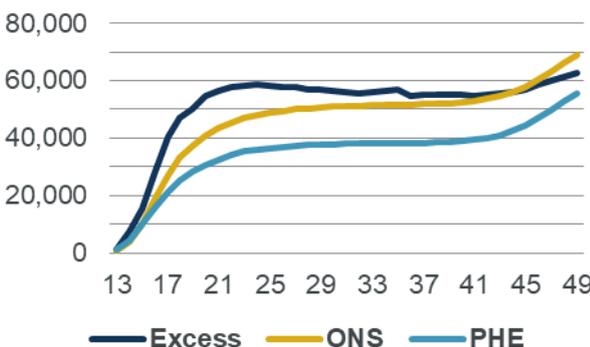


**Chart 3B: Version of Chart 3A for recent weeks**

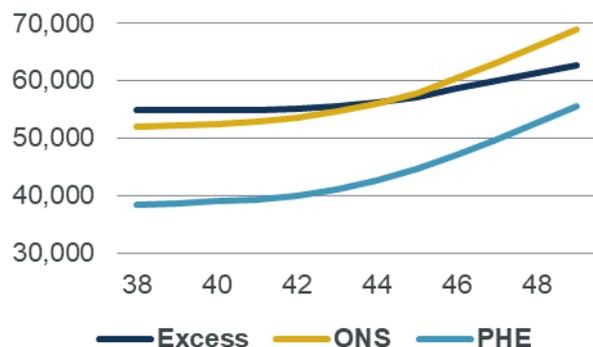


Charts 4A and 4B are similar to Charts 3A and 3B, but show cumulative numbers of deaths since week 13. For most of the period shown the cumulative number of excess deaths was higher than for the other two measures. However, the cumulative number of deaths where COVID-19 was mentioned on the death certificate is now higher than cumulative excess deaths. This is a consequence of excess deaths being lower than mentions of COVID-19 on the death certificate in recent weeks.

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



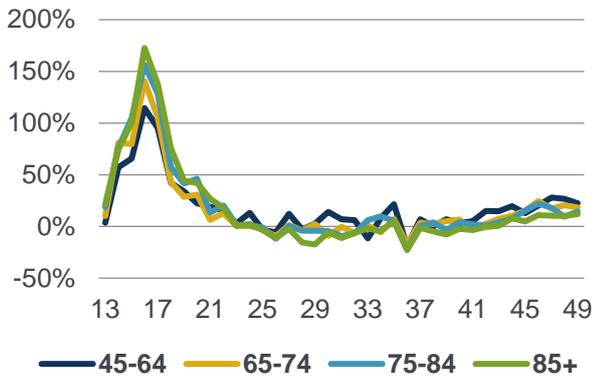
**Chart 4B: Version of Chart 4A for recent weeks**



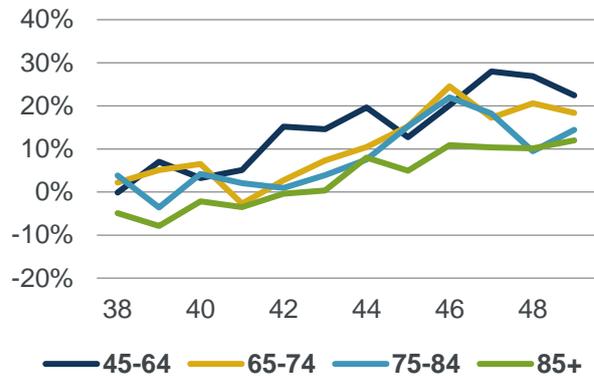


Charts 5A, 5B, 6A and 6B show excess deaths as a proportion of expected deaths by age band for each week. This tended to be higher for older age bands earlier in the pandemic. We do not show results for ages below 45 as the relatively low numbers of deaths at those ages means that estimates of expected deaths would be unreliable.

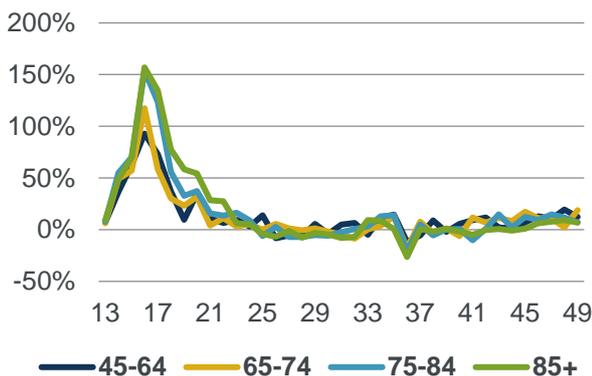
**Chart 5A: Excess as a proportion of expected in each week – males (see text for details)**



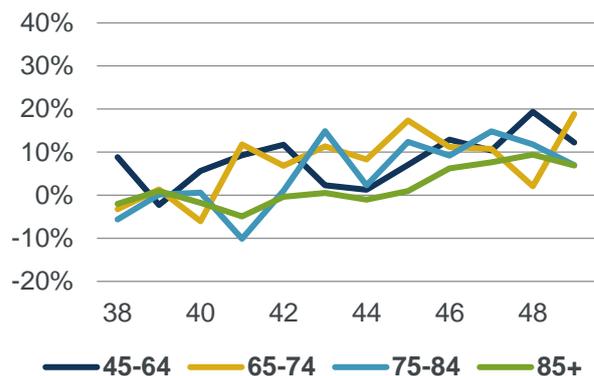
**Chart 5B: Version of Chart 5A for recent weeks**



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



**Chart 6B: Version of Chart 6A for recent weeks**





## Excess deaths for the United Kingdom

The previous sections of this report are based on registered deaths data for England & Wales to 4 December 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 4 December 2020 are:

- 62,900 for England & Wales<sup>2</sup>; and
- 69,500 for the United Kingdom.

Of these, 7,700 excess deaths for England & Wales and 8,600 for the United Kingdom have occurred since the start of the second wave<sup>3</sup>.

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 49 figure for Northern Ireland is not yet available, so we have assumed that excess deaths in Northern Ireland in this week is the same as in week 48.

The figures above do not include deaths that occurred after 4 December. 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 2,906 COVID-19 deaths reported for the UK in week 50 (5 to 11 December 2020), compared to 3,068 in week 49.

## 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 from week 10 onwards. This is slightly different to that in footnote 1, which shows the cumulative figure since week 13.

<sup>3</sup> For this purpose, we treat the second wave as being 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.

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