England & Wales mortality monitor – COVID-19 update – week 26 of 2020

Summary

There have been around 62,500 more deaths in the UK from the start of the pandemic to 26 June 2020 than if mortality rates were similar to those experienced in 2019.

There were 7% fewer deaths registered in England & Wales in week 26 of 2020 than would have been expected if standardised mortality rates had been the same as week 26 of 2019. Mortality in week 25 of 2020 was 3% lower than in the corresponding week of 2019.

The cumulative mortality improvement in England & Wales for 2020 is –10.9% as at 26 June 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 weekly updates to the CMI Mortality Monitor. **We are reducing the frequency of mortality monitors, now that deaths are at a level close to what would typically be expected at this time of year.** We describe our plan for future monitors on page 8, which also describes software that we have made available to Authorised Users to carry out their own ad hoc analyses.

This update shows the position as at 26 June 2020 (week 26 of 2020), based on provisional deaths data published by the Office for National Statistics (ONS) on 7 July 2020. We have also published our usual quarterly update for Q2 of 2020, which uses the same ONS data, but contains additional analysis. The week 26 monitor contains two additional sections, to coincide with the Q2 monitor and mortality rates returning to normal levels. We do not intend to include these every week. 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.

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 weeks 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 26 of 2020 is higher than cumulative mortality to week 26 in any year since 2006, and is 7.0% 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

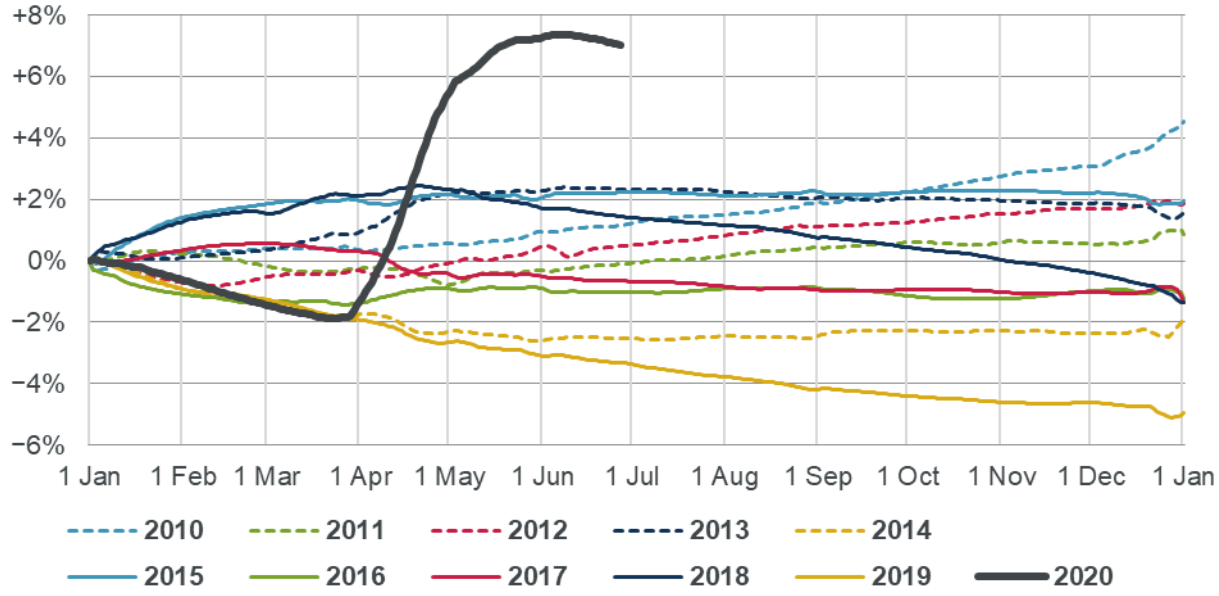
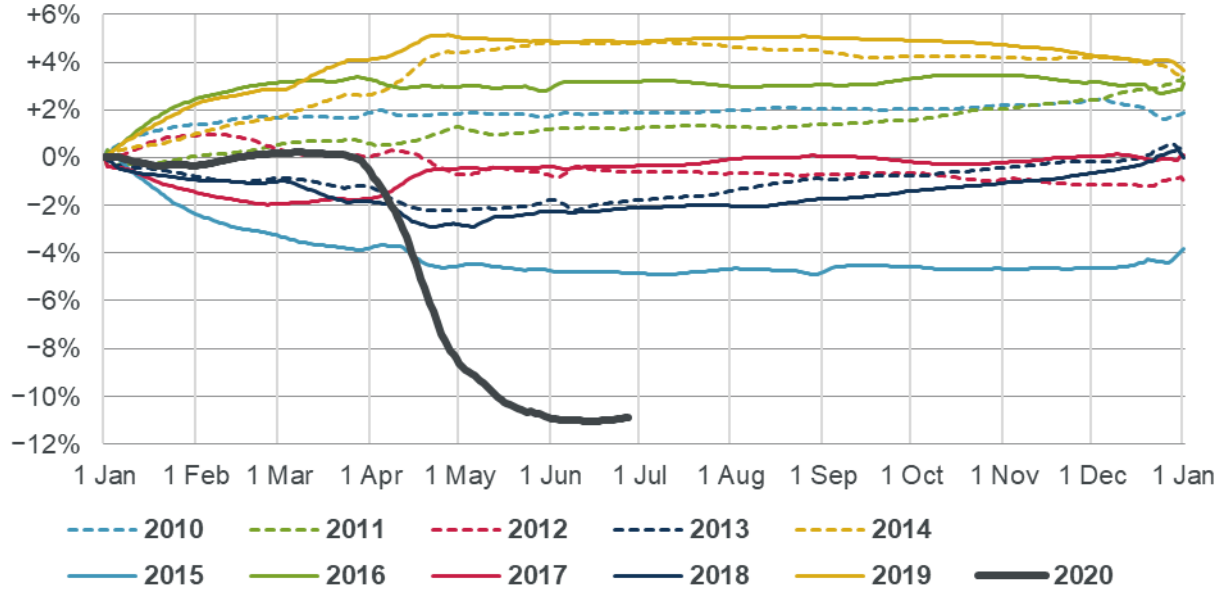


Chart 2 shows the cumulative annual standardised mortality improvement for 2020 and for the previous ten years. Note that Chart 2 shows cumulative improvements, so a higher value represents a higher improvement and lower mortality; whereas in Chart 1 a higher value represents higher mortality.

The cumulative mortality improvement is –10.9% as at 26 June 2020 (week 26 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 606 deaths registered in week 26 "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 week.
- 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 26 of 2020 if the SMRs for each gender and age-group had been the same in week 26 of 2020 as in week 26 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[1]. 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: Comparison of COVID-19 deaths and "excess" deaths

Description	Deaths in week 26 of 2020		
	Male	Female	Total
"Expected" registered deaths, if SMRs were the same in 2019 and 2020	5,028	4,613	9,641
Actual registered deaths, from all causes	4,500	4,479	8,979
"Excess" registered deaths (actual minus expected)	-528	-134	-662
Registered deaths where COVID-19 was mentioned on the death certificate	339	267	606
Excess as a proportion of expected	-10%	-3%	-7%

[1] 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 reduced the excess deaths by 107 (from -662 to –768) in week 22, and reduced the cumulative excess at week 26 (shown in Chart 4) from 57,762 to 52,052, a difference of 10%. 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.

Table 1 shows that:

- Actual deaths in week 26 are 7% lower than expected: 10% lower than expected for males and 3% lower for females. In week 25 they were 3% lower than expected: 3% lower for males and 2% lower for females.
- Weeks 25 and 26 are the only weeks since late March that mortality in 2020 has been lower than in 2019.
- Although excess deaths are negative, there were 606 registered deaths reported by the ONS where COVID-19 was mentioned on the death certificate.

Chart 3 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 4 is similar to Chart 3, but plots the cumulative numbers of deaths, since week 13.

The number of excess deaths was much higher than the number of deaths where COVID-19 was mentioned on the death certificate in weeks 13 to 17, but this is not the case in later weeks. Excess deaths have been lower than mentions of COVID-19 in weeks 21 to 26, and negative in weeks 25 and 26.

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

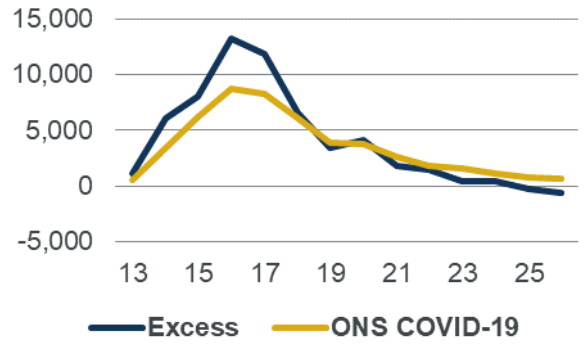
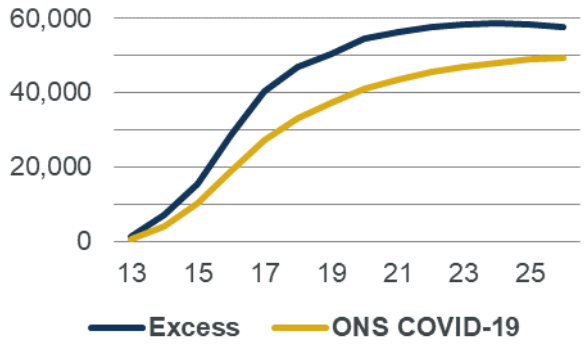


Chart 4: Comparison of cumulative registered deaths (see text for details)



Charts 5 and 6 show excess deaths as a proportion of expected deaths by age band for each week. This has tended to be higher for older age bands throughout 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 5: Excess as a proportion of expected in each week – males (see text for details)

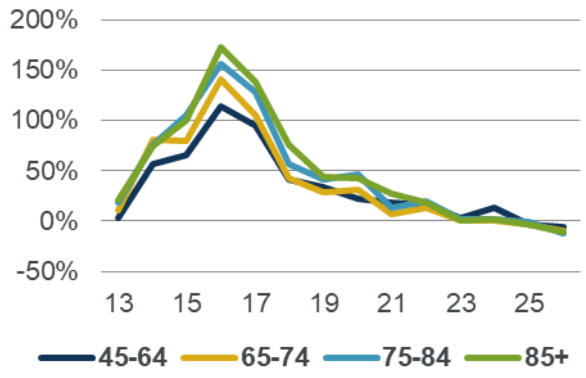
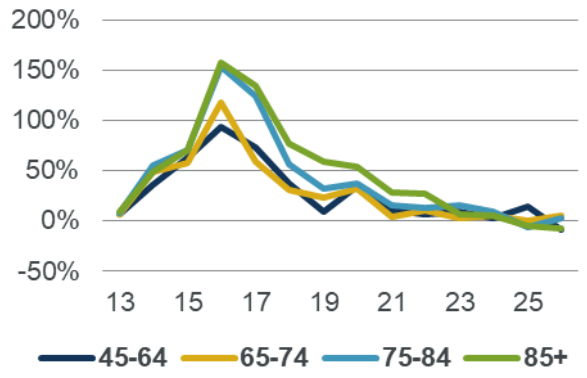


Chart 6: Excess as a proportion of expected in each week – females (see text for details)



Additional analysis – Cumulative excess mortality to week 26

Chart 7 shows cumulative excess deaths by age band for weeks 11 to 26 inclusive, as a proportion of expected for the same period, together with 95% confidence intervals. The calculation method and age ranges used are consistent with Charts 5 and 6.

Chart 7: Excess deaths for weeks 11 to 26 as a proportion of expected (broad age bands)

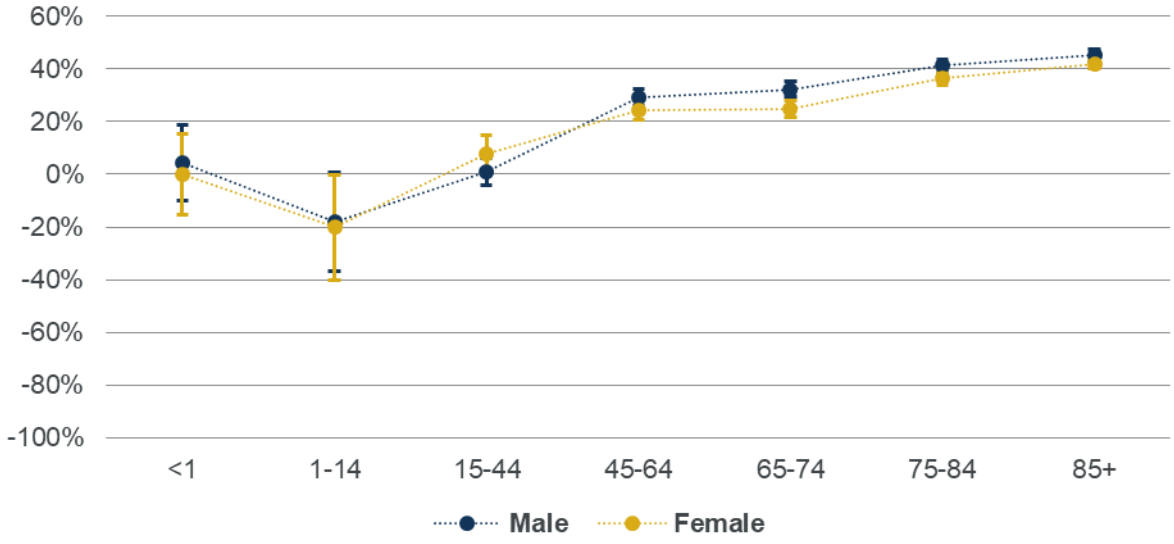
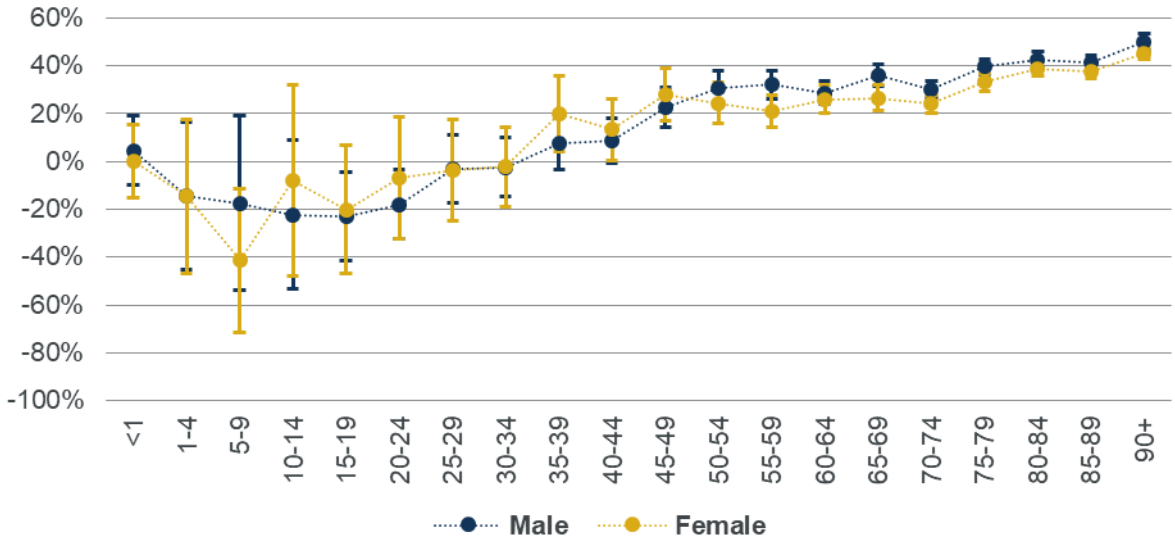


Chart 8 is similar to Chart 7, but uses the more detailed age ranges for which the ONS has published provisional weekly deaths data in 2020. We have estimated the split of expected deaths between these age bands using a method consistent with Working Paper 111.

Chart 8: Excess deaths for weeks 11 to 26 as a proportion of expected (narrow age bands)



Charts 7 and 8 show that:

- Mortality for ages 1 to 30 tended to be lower than expected during the pandemic, although the confidence intervals at these ages are wide due to the low numbers of deaths.
- Mortality for ages 35 and above was higher than expected, and the ratio tends to increase with age.
- The relative increase in mortality during the pandemic was higher for males than females for ages 50 and above, but was lower for males than females for most age bands below 50.

Additional analysis – Mortality by Index of Multiple Deprivation

In this section, we consider how mortality has varied by Index of Multiple Deprivation (IMD) during the pandemic. The provisional weekly deaths data published by the ONS does not include IMD, so we have used an alternative publication, for monthly deaths for March, April and May.

Elsewhere in this report we have compared actual deaths to expected deaths, using 2019 SMRs for the expected deaths. We do not have monthly SMRs by IMD for 2019, so we cannot do the same comparison here. Instead we compare the monthly SMRs for March, April and May 2020 with one-twelfth of the SMR for 2018 – the latest full year for which data is currently available. While this does not allow for seasonal variations during 2018, it provides a broad indication of how changes in mortality during the pandemic has varied by IMD.

- Charts 9 and 10 show monthly SMRs by IMD for males and females. In all four periods shown, mortality has been highest for the most deprived decile (decile 1) and lowest for the least deprived decile (decile 10).
- Charts 11 and 12 show SMRs in 2020 relative to 2018. The charts show little variation by IMD, suggesting that the pandemic has acted as a multiplier to mortality rather than an addition.

Chart 9: Monthly standardised mortality rate by IMD decile – England males

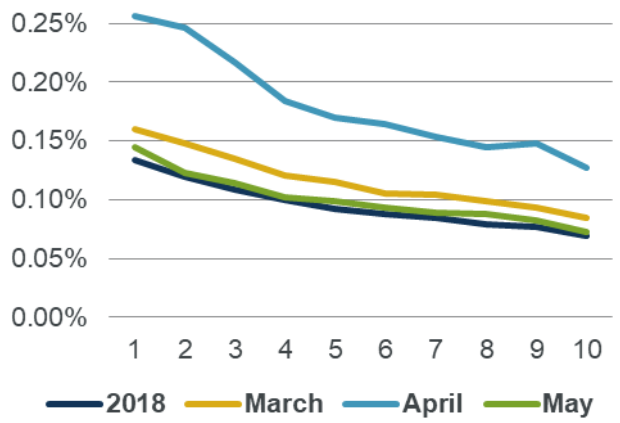


Chart 10: Monthly standardised mortality rate by IMD decile – England females

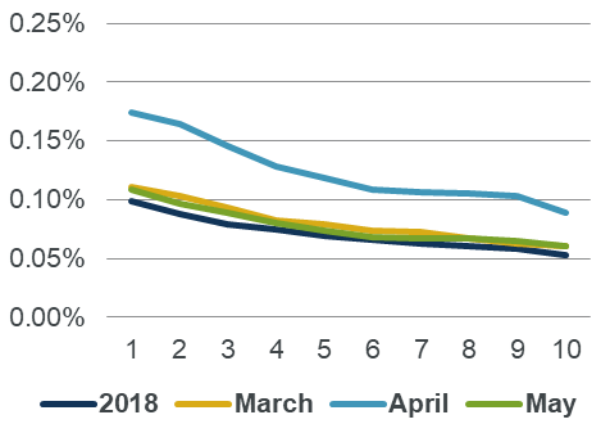


Chart 11: Standardised mortality rate relative to 2018 by IMD decile – England males

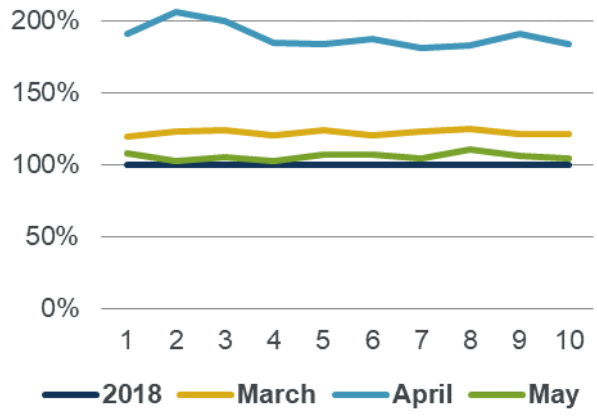
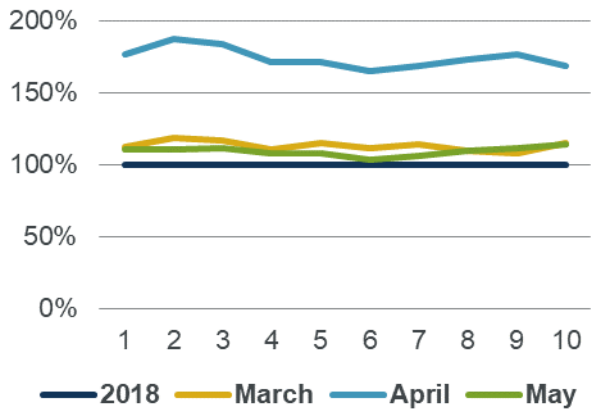


Chart 12: Standardised mortality rate relative to 2018 by IMD decile – England females



While we have only shown variations in mortality by IMD in this section, we note that the ONS has published a wealth of analysis showing material variations in mortality during the pandemic by factors including region, ethnicity, place of death (home, hospital, care home etc), urban/rural classification, and cause of death.

Deaths not reported yet

We have previously published up-to-date estimates of excess deaths, beyond the period covered by the ONS data, based on COVID-19 deaths from other sources. These estimates were reasonable earlier in the pandemic when large numbers of COVID-19 deaths were being reported after the period covered by ONS data, but have now become less relevant and reliable as the number of COVID-19 deaths has fallen significantly. At this stage of the pandemic, excess deaths could be materially affected not only by COVID-19 deaths, but also by improvements in non-COVID mortality rates, misattribution of cause of death, mortality acceleration, and statistical noise. We are no longer including an up-to-date estimate of deaths in this section.

Public Health England (PHE), for England, and the Department of Health and Social Care (DHSC), for the devolved administrations of Northern Ireland, Scotland and Wales, publish daily information on deaths of people who have had a positive test result for the coronavirus confirmed by a Public Health or NHS laboratory. We refer to this data as just "PHE data" in this report for brevity.

The PHE figures are not directly comparable to the ONS figures, and could be higher or lower for any given week. That is because, although the PHE definition for COVID-19 deaths is narrower than the ONS definition (as it is limited to those who have tested positive for the coronavirus), PHE may report on deaths before they have been registered.

Table 2 shows PHE figures for deaths in England & Wales to 26 June 2020, reported by 5pm on 5 July 2020. A further 809 deaths between 27 June and 6 July 2020 were reported by PHE. The table compares the PHE figures to our estimates of excess mortality, from all causes. It shows that the relationship between the CMI and PHE figures varies significantly over time. The ratio has tended to fall, but is affected by public holidays.

Table 2 shows around 58,000 cumulative excess registered deaths in England & Wales by 26 June 2020. We estimate 62,500 excess registered deaths in the UK by the same date.

Table 2: Comparison of PHE's reported COVID-19 deaths with CMI's estimate of excess deaths

Period	PHE reported[2]	CMI excess	CMI ÷ PHE
Week 26 (20 – 26 June 2020)	824	-662	-0.80
Week 25 (13 – 19 June 2020)	957	-247	-0.26
Week 24 (6 – 12 June 2020)	1,187	402	0.34
Week 23 (30 May – 5 June 2020)	1,586	429	0.27
Week 22 (23 – 29 May 2020)	2,102	1,449	0.69
Weeks 18-21 (25 April - 22 May 2020)	12,305	16,080	1.31
Weeks 14-17 (28 March - 24 April 2020)	20,297	39,179	1.93
Weeks 10-13 (29 February - 27 March 2020)	1,127	1,350	1.20
TOTAL	**40,385**	**57,981**	**1.49**

[2] These figures reflect the revisions made by PHE to include deaths outside of a hospital setting, and cases identified through "pillar 2" testing: https://coronavirus.data.gov.uk/about

Future plans

We publish two versions of the mortality monitor:

- We have published "quarterly" mortality monitors since Q4 of 2018, and intend to continue to publish these in the same format for the foreseeable future. We have published the Q2 2020 monitor alongside this week 26 monitor, using the same ONS provisional weekly deaths data.
- We have published "pandemic" mortality monitors weekly since week 14 of 2020. We intend to reduce the frequency of pandemic mortality monitors, with the next version being for week 28, due on 21 July 2020.

Weekly mortality monitoring was valuable earlier in the pandemic, but there is less need for it now that excess mortality has fallen to close to normal levels. Our decision to reduce the frequency of the pandemic mortality monitors does not indicate that we think the pandemic is over, and we may increase the frequency of publication if we see higher levels of excess mortality (positive or negative) in future.

All mortality monitors 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) which will also show when we expect to release the next updates to quarterly and pandemic monitors.

Mortality monitor software

We have released a "beta" version of software that allows Authorised Users to produce their own ad hoc updates whenever they wish. The software produces the output that is included in the quarterly mortality monitors, including Charts 1 and 2 of the pandemic mortality monitor, but not calculations of excess mortality.

The software and an accompanying user guide are available from https://www.actuaries.org.uk/learn-and-develop/continuous-mortality-investigation/other-cmi-outputs/mortality-monitor.

Although the mortality monitors are publicly available, the software is restricted to Authorised Users: employees of CMI subscribers, and researchers for non-commercial use. The CMI website has details of how to become an Authorised User, if you are not already.

Data sources

ONS provisional weekly deaths:
https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/weeklyprovisionalfiguresondeathsregisteredinenglandandwales

ONS data by IMD for 2020:
https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/deathsinvolvingcovid19bylocalareasanddeprivation/deathsoccurringbetween1marchand31may2020/relateddata

ONS data by IMD for earlier years:
https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthinequalities/datasets/changingtrendsinmortalitybynationalindicesofdeprivationenglandandwales

PHE data: https://coronavirus.data.gov.uk/

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 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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