

Article

# Analysis of death registrations not involving coronavirus (COVID-19), England and Wales: 28 December 2019 to 10 July 2020

Exploration of trends in non-COVID-19 deaths since 2 May 2020, how they compare with the five-year average, and how the nature of deaths from 2 May to 10 July may have changed from previous years when total numbers of non-COVID-19 deaths have returned to more expected levels.

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# 1 . Main points

- This analysis investigates deaths that did not involve the coronavirus (COVID-19) (non-COVID-19 deaths), in England and Wales, that were registered between 28 December 2019 and 10 July 2020 inclusive.
- In our previous analysis, between 7 March and 1 May 2020, non-COVID-19 deaths were 15.3% above five-year average levels for that period; from then up until 10 July, non-COVID-19 deaths have been 6.0% below the average.
- Weekly non-COVID-19 deaths now look comparable with early 2020, before deaths involving COVID-19 were registered.
- The older age groups (80 years and over), which experienced the greatest increase in non-COVID-19 mortality from mid-March to the start of May, have also experienced the largest decreases in non-COVID-19 mortality from May to 10 July, compared with five-year average mortality rates.
- The increase in deaths for some groups, followed by a reduction in deaths for the same groups in the following weeks, may be because some deaths have been “brought forward” causing fewer deaths to be observed later on.
- Non-COVID-19 registrations for deaths that occurred in care homes have decreased since peaking in mid-April, returning to pre-COVID-19 levels.
- Deaths in private homes (a personal residence) are still occurring above five-year average levels; since week ending 26 July, there have been more excess (above average) non-COVID-19 deaths in private homes than COVID-19 deaths in all settings (hospitals, care homes, private homes and others combined) each week.
- Non-COVID-19 deaths occurring in hospitals remain below five-year average levels, with 13,706 non-COVID-19 death registrations below average between 2 May and 10 July.
- Most leading causes of death that increased between 7 March and 1 May – including dementia and Alzheimer’s disease, and chronic lower respiratory diseases – have since returned to levels more consistent with the start of the year.
- Some underlying causes of death that were recorded earlier in the year remain above five-year average levels, including deaths involving diabetes, hypertensive diseases, and several heart-related conditions such as cardiac arrhythmias and cardiomyopathy.

## 2 . Overview of non-COVID-19 death registrations

This article examines trends in deaths that did not involve the coronavirus (COVID-19) registered since 1 May 2020. Up to that point in 2020, non-COVID-19 deaths had exceeded five-year average levels every week since the first registered death from COVID-19 in week ending 13 March, and the reason for this trend was not clear.

Here we present provisional analysis of death registrations that did not involve COVID-19 in 2020 from Week 1 (ending 3 January) to Week 28 (ending 10 July), focusing on the period between Week 19 (ending 8 May) and Week 28. This follows on from the period covered in our previous analysis on [death registrations not involving COVID-19](#). We break down the weekly non-COVID-19 death registrations in 2020 by age, sex, place of occurrence, regions of England, Wales, and particular causes of death (both deaths due to those causes and involving those causes).

The articles in this series present weekly deaths compared with the five-year average for the corresponding weeks in 2015 to 2019. We use the term “relative non-COVID-19 deaths” to refer to the comparison between the non-COVID deaths registered in 2020 and the five-year average. Depending on the breakdown, this may be presented as the difference in counts or the percentage change.

This analysis uses the date a death was registered in order to allow a more accurate comparison between weeks because, particularly for recent weeks, a proportion of deaths that have occurred have not yet been registered. The implications of potential changes in time between a death occurring and being registered are considered in this analysis as this could affect the numbers and nature of deaths registered each week. More information on this issue can be found in our [impact of registration delays release](#).

There are elements of non-COVID-19 death patterns that will only be understood with more time. Some of this is because of certain causes of death having a longer registration delay than others, so they will not appear in death registration data until later in the year. There are other factors, such as how many deaths are registered later in the year, which can help us add context to the deaths observed so far in 2020. There will be some trends in death registrations that we may not ever understand fully.

In this article, we use the term “due to COVID-19” when referring only to deaths with an underlying cause of death of COVID-19, and we use the term “involving COVID-19” when referring to deaths that had COVID-19 mentioned anywhere on the death certificate, whether as underlying cause or not. We use the term “non-COVID-19 deaths” to refer to deaths that did not have COVID-19 recorded on the death certificate, and “excess deaths” when deaths occur above five-year average levels.

We split the weekly death registrations in 2020 into three periods for ease of comparing between different points of the year where the pattern of non-COVID-19 deaths differs, and to compare between the analysis in this article and our previous analysis. These periods are shown in Table 1.

Table 1: The weekly death registrations in this report are split into three periods to allow for comparison between different times of the year 2020

<b>Week 1 (ending 3 March) to Week 10 (6 March)</b>	The period before the first death involving COVID-19 was registered.
<b>Week 11 (ending 13 March) to Week 18 (ending 1 May)</b>	The week that the first death involving COVID-19 was registered, to the last week analysed in our previous report. Week 18 is also the last successive week where non-COVID-19 death registrations were above the five-year average.
<b>Week 19 (ending 8 May) to Week 28 (ending 10 July)</b>	The week after our previous analysis finished, to the latest week analysed in this report. Week 19 is also the first week that non-COVID-19 death registrations are below the five year average after six successive weeks of above five-year average levels.

Source: Office for National Statistics

### 3 . Numbers of non-COVID-19 death registrations

Non-COVID-19 death registrations have been below the five-year average level since Week 19 (ending 8 May 2020), with the exception of Week 20 (ending 15 May), where they were slightly above average levels. This is probably because of the bank holiday in the preceding week on 3 May, resulting in a backlog of registrations.

This contrasts with the period presented in the [previous article](#) up to Week 18 (ending 1 May), where non-COVID-19 deaths were above average levels from Week 13 (ending 27 March) to Week 18. The first deaths involving COVID-19 were registered in Week 11 (ending 13 March).

**Figure 1: The non-COVID weekly death registrations have been below or similar to the five-year average since Week 19 in 2020, having previously been above average between Weeks 13 and 18**

## Weekly total death registrations and non-COVID-19 death registrations in 2020 for England and Wales, compared with the five-year average for equivalent weeks up to Week 28

[Download the data](#)

### Notes:

1. Figures include deaths of non-residents.
2. Based on date a death was registered rather than occurred.
3. All figures for 2020 are provisional.
4. The ICD-10 definitions for COVID-19 are U07.1 and U07.2. 5. Individual weeks may not sum to the year-to-date analysis as previous weeks have been recalculated in order to have the most up-to-date figures.
5. The number of deaths registered in Weeks 19, 20, 22 and 23 were impacted by the early and late May Bank Holidays (Friday 8 May 2020 in Week 19 and Monday 25 May 2020 in Week 22); the impact of the early May Bank Holiday was analysed in our [weekly death registrations bulletin for Week 20](#).

## 4 . Characteristics of non-COVID-19 death registrations

The percentage change of non-COVID-19 deaths from the five-year average level for males and females in 10-year age groups is plotted in Figure 2. The trend of higher than average non-COVID-19 deaths in Weeks 13 to 18, followed by lower than average non-COVID-19 deaths in later weeks, is most apparent as age increases.

Higher numbers of deaths in earlier weeks could be contributing to the lower levels observed in recent weeks, because some people who may have otherwise died in the later weeks could have died a few weeks earlier. This effect is referred to in this article as “mortality displacement”. We cannot yet quantify how much of the fall is because of mortality displacement. At the end of the calendar year we can assess this further using a cumulative age-standardised mortality rate, discussed later in this article and in the [Technical Report](#).

Total deaths were also below or very similar to five-year average levels earlier in the year from Weeks 4 to 10, possibly because of the relatively mild winter and low levels of circulating flu, with females aged 80 years and over showing this most clearly. The current low relative non-COVID-19 death levels in the 80 years and over age groups are similar for both men and women, and are similar to the level observed for women during Weeks 4 to 10 for these age groups.

The younger age groups see high variation in the relative non-COVID-19 deaths because of lower numbers of total deaths, so small changes in numbers have a bigger effect on the relative non-COVID-19 deaths. There is no consistent trend in relative non-COVID-19 deaths for men compared with those for women.

The later weeks of the earlier period (Weeks 11 to 18) present different results to the previous article. This is related to the change in data used for analysis and access to more data. More information on the different mortality rates used in this article, and the change in data between articles, is available in the [Technical Report](#).

**Figure 2: Non-COVID-19 deaths have been below the five-year averages for both men and women overall since Week 21, and particularly for men and women aged 80 years and over**

## The percentage change of non-COVID-19 excess deaths in 2020 from the respective five-year averages for men and women, by age, England and Wales

[Download the data](#)

### Notes:

1. Figures include deaths of non-residents.
2. Based on date a death was registered rather than occurred.
3. All figures for 2020 are provisional.
4. Individual weeks may not sum to the year-to-date analysis as previous weeks have been recalculated in order to have the most up-to-date figures.

Relative age-specific mortality rates, calculated as the difference between the 2020 non-COVID-19 mortality rate and the corresponding five-year average mortality rate, are shown in Figure 3 for different age groups. The figures for the under-65 years and all ages groups have been age-standardised to the 2013 European Standard Population. More information on the methods can be found in the accompanying [Technical Report](#).

In Weeks 11 to 18, males and females in the older age groups had the highest relative age-specific mortality rates for non-COVID-19 deaths. In the more recent period to Week 28, these age groups have the lowest relative age-specific mortality rates for non-COVID-19 deaths, especially men. This further supports a mortality displacement effect, because the groups with higher mortality in the earlier period experience the lowest relative mortality in the later period. The COVID-19 mortality rate is particularly high for men during the Week 11 to 18 period, so this could explain the lower relative non-COVID-19 mortality rates for men than women in Weeks 19 to 28.

### **Figure 3: The groups by age and sex which had the highest relative age-specific non-COVID mortality rates in Weeks 11 to 18, have the lowest relative non-COVID-19 mortality rates in Weeks 19 to 28**

**Relative non-COVID-19 mortality rate (difference between the 2020 non-COVID-19 mortality rate and the five-year average mortality rate) for men and women by age group, England and Wales, for Weeks 11 to 18 and Weeks 19 to 28**

[Download the data](#)

### Notes:

1. Figures include the deaths of non-residents.
2. Based on date a death was registered rather than occurred.
3. All figures for 2020 are provisional.
4. The ICD-10 definitions for COVID-19 are U07.1 and U07.2.
5. Age-standardised mortality rates allow valid comparisons to be made between areas with different population age-structures.
6. Age-specific and age-standardised mortality rates per 100,000 population, standardised to the 2013 European Standard Population. Rates are adjusted to allow for comparisons with annual rates. For more information see our [Technical Report](#).
7. The two time periods presented are of different lengths.

Relative cumulative age-standardised mortality rates (rcASMR) provide a way to compare the mortality rate in all of 2020 up to a certain week with that of the five-year average, expressed as a percentage of the five-year average cumulative mortality rate for whole years. The rcASMRs for total and non-COVID-19 deaths are presented for men and women separately in Figure 4. For information on how the rcASMR is calculated, see our [Technical Report](#).

Until around Week 13 (ending 27 March), the rcASMRs for men and women were very similar, steadily moving away from the five-year average. This increasing distance from five-year average cumulative mortality rates occurred because 2020 mortality rates were consistently lower each week than the five-year average for the same week.

The rcASMRs for both sexes increase once COVID-19 deaths begin to be registered. Despite moving further below the five-year average in the first period of the year, total cumulative deaths for men and women increase to over five-year average levels once COVID-19 death registrations start to be observed. The rcASMR for men dying of all causes is greater than that for women, because more men have died of COVID-19. For both sexes this all-cause mortality rate peaks around Week 23 (ending 5 June) and begins to move back towards the five-year average.

Non-COVID-19 deaths also begin to increase around Week 14, but not to the same extent; non-COVID-19 mortality never quite reaches the five-year average cumulative mortality for the same point in the year. In Week 18, non-COVID-19 rcASMR for women is almost at 0% difference from the five-year average, but begins to reduce below the average again. From this point onwards, the non-COVID-19 rcASMR for women is higher than that for men, but both follow similar patterns.

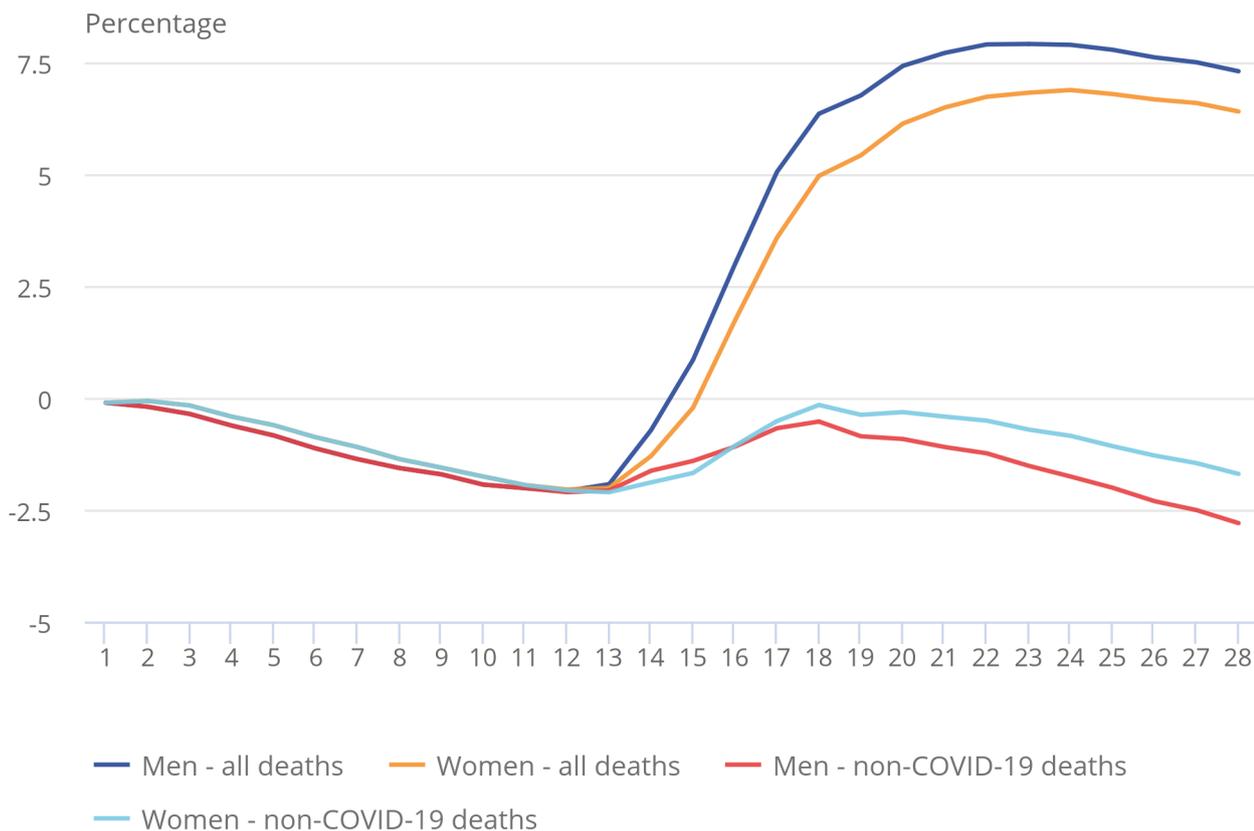
The rcASMR could be reducing again because some deaths that would have occurred in 2020 due to other causes, have occurred due to COVID-19 instead. However, it also reflects the fact that mortality levels from the beginning of 2020 were lower than average, possibly because of a mild winter and low circulating influenza.

**Figure 4: The relative cumulative age-standardised mortality rate (rcASMR) is higher for men than women when observing deaths from all causes, but higher for women when observing non-COVID-19 deaths only**

The relative cumulative age-standardised mortality rate (rcASMR) for non-COVID-19 deaths and deaths due to all causes in 2020, for men and women, England and Wales up to Week 28

Figure 4: The relative cumulative age-standardised mortality rate (rcASMR) is higher for men than women when observing deaths from all causes, but higher for women when observing non-COVID-19 deaths only

The relative cumulative age-standardised mortality rate (rcASMR) for non-COVID-19 deaths and deaths due to all causes in 2020, for men and women, England and Wales up to Week 28



Source: Office for National Statistics

Notes:

1. Figures include the deaths of non-residents.
2. Based on date a death was registered rather than occurred.
3. All figures for 2020 are provisional.
4. Age-standardised mortality rates allow valid comparisons to be made between areas with different population age-structures.
5. Age-standardised to the 2013 European Standard Population. For more information see our Technical Report.

Age-standardised mortality rates (ASMR) for regions of England, and Wales, are plotted in Figure 5 for total and non-COVID-19 deaths in 2020 and for the five-year average. All regions have seen a decrease in non-COVID-19 deaths compared with the five-year average after peaking around Week 16 to 17.

**Figure 5: All regions of England, and Wales, have had an age-standardised mortality rate for non-COVID-19 deaths close to or below the five-year average for that region since Week 19**

**Age-standardised mortality rates for total and non-COVID-19 deaths 2020, and the five-year average 2015 to 2019, for regions in England and Wales, Weeks 1 to 28**

[Download the data](#)

**Notes:**

1. Figures include deaths of non-residents.
2. Based on date a death was registered rather than occurred.
3. All figures for 2020 are provisional.
4. The ICD-10 definitions for COVID-19 are U07.1 and U07.2.
5. Individual weeks may not sum to the year-to-date analysis as previous weeks have been recalculated in order to have the most up-to-date figures.
6. Age-standardised mortality rates allow valid comparisons to be made between areas with different population age-structures.

Relative ASMRs for non-COVID-19 deaths for Weeks 11 to 18 and 19 to 28 are plotted in Figure 6. These are the difference between the non-COVID-19 ASMR in 2020 and the five-year average, expressed as a percentage of the five-year average mortality rate for that period for the region.

All regions had below average overall non-COVID-19 ASMRs in Weeks 19 to 28, and above average ASMRs in Weeks 11 to 18. The non-COVID-19 ASMR for Wales in Weeks 11 to 18 is very similar to the five-year average ASMR, but in the weeks since, the ASMR for Wales is in line with other regions.

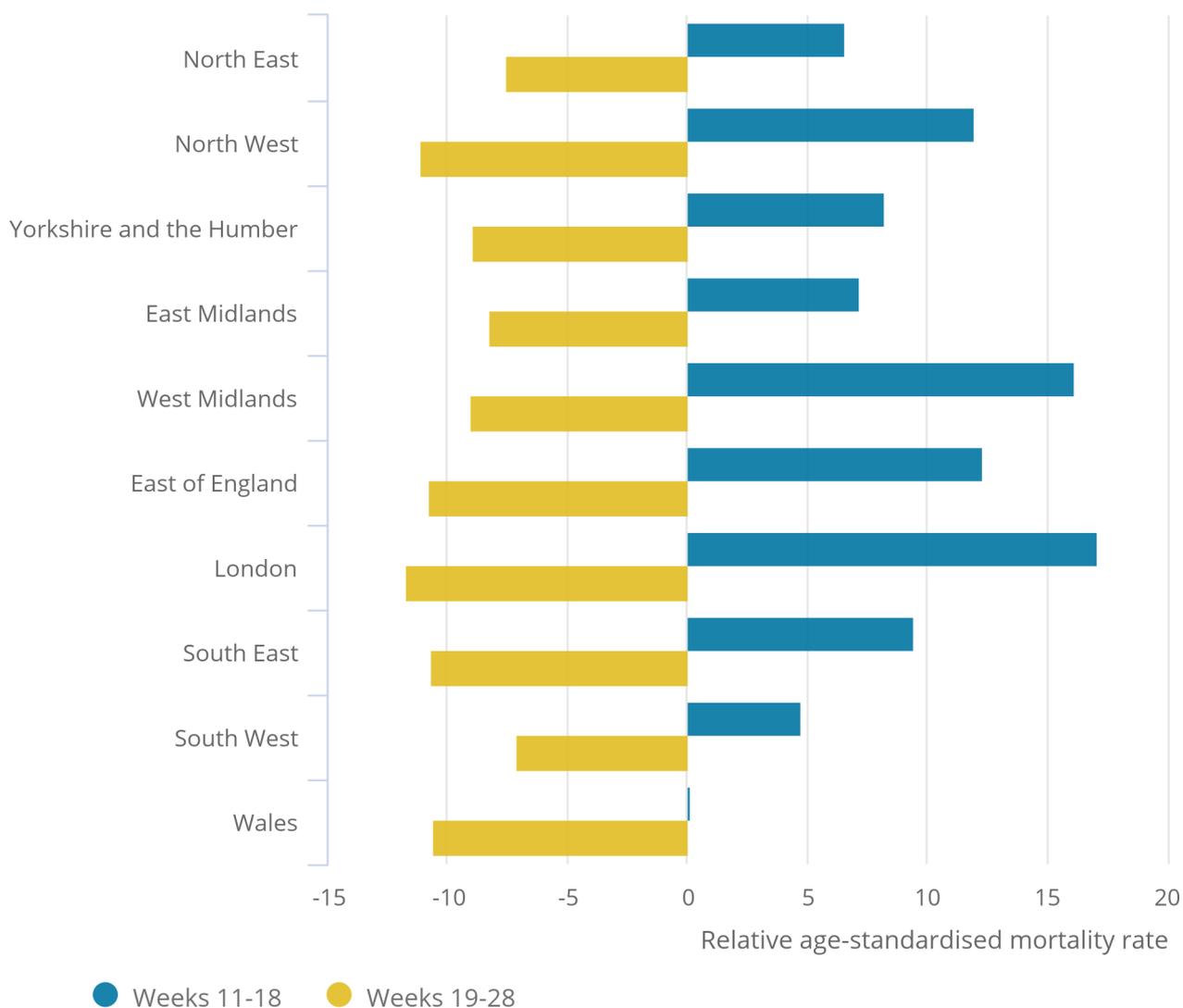
The highest relative non-COVID-19 ASMRs in Weeks 11 to 18 were in London, closely followed by the West Midlands. In Weeks 19 to 28, the highest relative non-COVID ASMRs were seen in the South West, followed by the North East, although all are negative during these weeks. London had both the highest relative ASMR in the earlier period, and the lowest relative ASMR in the later period.

**Figure 6: Relative non-COVID-19 age-standardised mortality rates (ASMRs) are negative in all regions of England, and Wales, in Weeks 19 to 28**

The relative non-COVID-19 age-standardised mortality rates (ASMRs) in regions of England and Wales, for Weeks 11 to 18 and Weeks 19 to 28

Figure 6: Relative non-COVID-19 age-standardised mortality rates (ASMRs) are negative in all regions of England, and Wales, in Weeks 19 to 28

The relative non-COVID-19 age-standardised mortality rates (ASMRs) in regions of England and Wales, for Weeks 11 to 18 and Weeks 19 to 28



Source: Office for National Statistics

Notes:

1. Figures include the deaths of non-residents.
2. Based on date a death was registered rather than occurred.
3. All figures for 2020 are provisional.
4. Age-standardised mortality rates allow valid comparisons to be made between areas with different population age-structures.
5. Data have been age-standardised to the 2013 European Standard Population. Rates are adjusted to allow for comparisons with annual rates. For more information see our [Technical Report](#).

Figure 7 shows the relative non-COVID-19 deaths (the number above or below five-year average levels) for death registrations by the type of location in which the death occurred. The trends differ between deaths occurring in hospitals, in care homes and in private homes (a person's own residence), the three locations where the majority of deaths occur.

In our previous article, we noted the rise in deaths occurring in both care homes and private homes from around Week 12, and the sudden drop in deaths occurring in hospitals from around Week 14. Since the period covered in that article (up to Week 18), deaths in hospitals have risen slightly but remain much lower than average levels, whereas deaths in care homes have fallen below average levels in Week 23. Deaths in private homes have also fallen but remain considerably above five-year average levels, to the extent that excess non-COVID-19 weekly deaths in private homes were higher than weekly COVID-19 deaths in all settings from Week 26.

Some of these deaths at home may be people who would have otherwise died elsewhere, particularly in hospitals, where we see much lower levels of mortality than is usual for the time of year. This could indicate patients are not being admitted to hospital or being discharged sooner. For deaths at older ages, it could be that individuals choose to die at home rather than be admitted to hospital. The increase in deaths in private homes, including the patterns for these deaths by age, will be investigated further in a future Office for National Statistics (ONS) article.

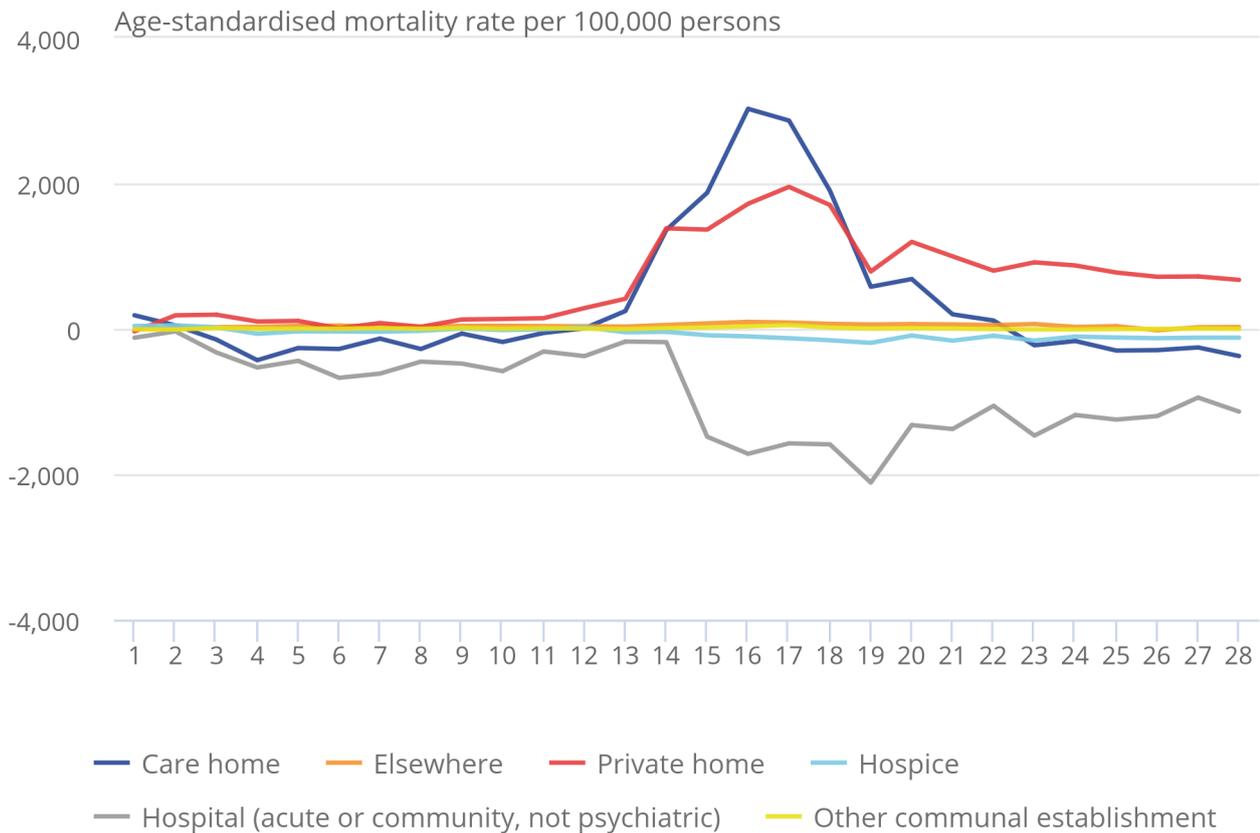
The reduction in non-COVID-19 deaths occurring in care homes coincides with falls in deaths of people aged 80 years and over, which makes sense given this age group are the most likely to be part of the care home population. The fall in deaths in care homes following a large increase above average levels could be further evidence of a mortality displacement effect.

**Figure 7: Non-COVID-19 deaths occurring in private homes have remained significantly above five-year average levels, despite total non-COVID deaths falling to below average levels**

Relative non-COVID-19 deaths (2020 non-COVID deaths minus five-year average total deaths) occurring in different types of location, England and Wales, deaths registered in Weeks 1 to 28

Figure 7: Non-COVID-19 deaths occurring in private homes have remained significantly above five-year average levels, despite total non-COVID deaths falling to below average levels

Relative non-COVID-19 deaths (2020 non-COVID deaths minus five-year average total deaths) occurring in different types of location, England and Wales, deaths registered in Weeks 1 to 28



Source: Office for National Statistics

Notes:

1. Figures include the deaths of non-residents.
2. Based on date a death was registered rather than occurred.
3. All figures for 2020 are provisional.

The relative cumulative ASMR (rcASMR) for deaths that occurred in private homes, hospitals and care homes are presented in Figure 8 for non-COVID-19 deaths. This is the weekly cumulative ASMR for 2020 minus the five-year average cumulative ASMR for the same weeks, expressed as a percentage of the five-year average annual ASMR.

Each setting presents a different trend in rcASMR from the other places of death. The rcASMR for non-COVID-19 deaths in private homes was in line with the five-year average for the first 13 weeks of the year, at which point it started to increase and has continued to rise since. The rcASMRs for deaths in care homes and hospitals for non-COVID-19 deaths followed the same downward trend from Week 3 until Week 13. After this point, the rcASMR for deaths in care homes increased from below zero to in line with deaths in private homes in Week 20, but has since gradually reduced as the weekly mortality rate has fallen again to below average levels as seen in Figure 1.

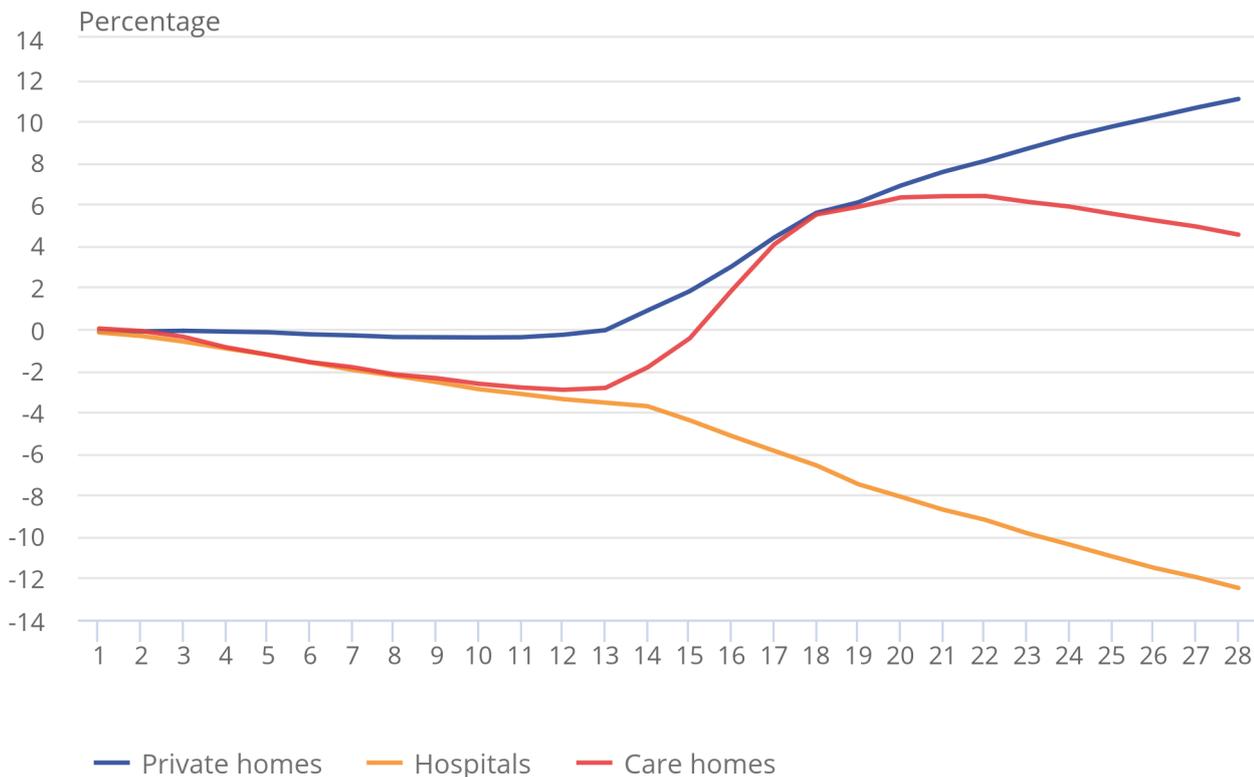
By Week 28, cumulative deaths in care homes in 2020 are 4.5% higher than average numbers by this point in the year. From Week 14 onwards, the rcASMR for non-COVID-19 deaths in hospitals started reducing more quickly, until by Week 28 the cumulative deaths in hospitals in the year so far are 12.5% lower than average levels by this point in the year.

**Figure 8: The rcASMR for non-COVID-19 deaths which occurred in private homes has increased since around Week 13, and continued to do so when deaths in other settings reduced**

The relative cumulative age-standardised mortality rate (rcASMR) for non-COVID-19 deaths occurring in private homes, hospitals and care homes, England and Wales, 2020

Figure 8: The rcASMR for non-COVID-19 deaths which occurred in private homes has increased since around Week 13, and continued to do so when deaths in other settings reduced

The relative cumulative age-standardised mortality rate (rcASMR) for non-COVID-19 deaths occurring in private homes, hospitals and care homes, England and Wales, 2020



Source: Office for National Statistics

Notes:

1. Figures include the deaths of non-residents.
2. Based on date a death was registered rather than occurred.
3. All figures for 2020 are provisional.
4. Age-standardised mortality rates allow valid comparisons to be made between areas with different population age-structures.
5. Age-standardised to the 2013 European Standard Population. For more information see our Technical Report.

Non-COVID-19 deaths have been classified according to their underlying cause of death using the Office for National Statistics (ONS) [leading causes of death](#) groupings, and the percentage change from the five-year average number of deaths for each cause is plotted in Figure 9, for the top five causes of death in 2019.

Deaths with an underlying cause of influenza and pneumonia, and symptoms, signs and ill-defined conditions are also plotted, as influenza and pneumonia exhibits symptoms similar to COVID-19, and symptoms, signs and ill-defined conditions was found in the previous article to have one of the largest increases compared with the five-year average from Week 11 to Week 18.

Non-COVID-19 deaths due to each cause plotted have returned to approximately pre-COVID-19 levels (pre Week 11) after peaking between Weeks 14 and 16. Deaths due to influenza and pneumonia peaked in Week 14 and fell sooner, reaching pre-COVID-19 levels around Week 18 and have since been slightly below pre-COVID-19 levels.

Deaths due to dementia and Alzheimer's disease, and symptoms, signs and ill-defined conditions peaked slightly later, in Week 16, and have fallen more slowly. This could indicate some deaths due to dementia and Alzheimer's disease are linked to longer-term changes, such as changes to practice in care homes to combat COVID-19.

These results also indicate that major causes of death have returned to more typical patterns following Weeks 11 to 18, while the composition of deaths by place of death observed earlier has continued to change. This is particularly interesting when care home and private home deaths both increased in Weeks 11 to 18, but have since presented different trends. The ONS's [analysis of deaths in the care sector](#) release, and the forthcoming report on deaths in private homes, explore these two settings in more detail, including by cause of death within each setting.

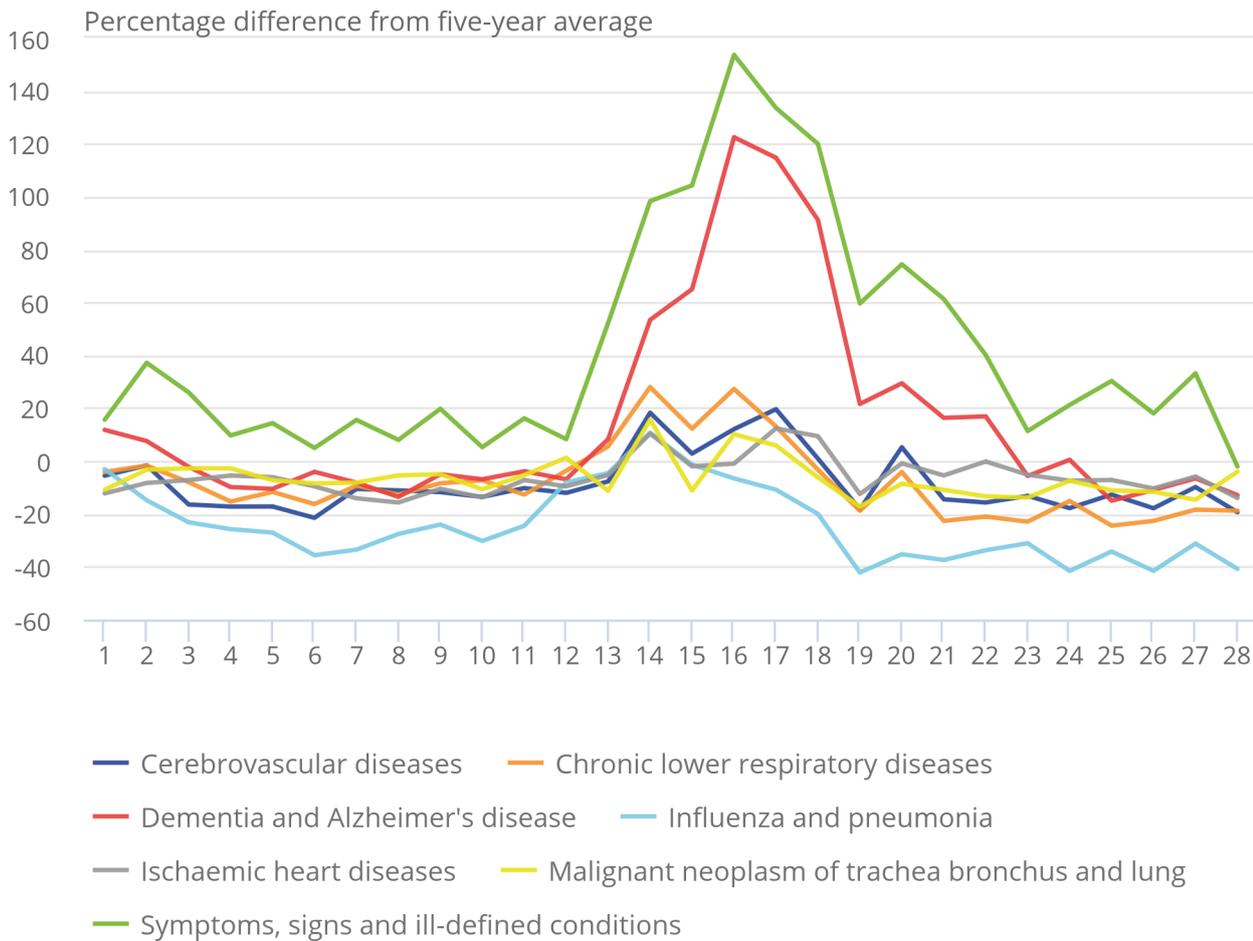
Deaths due to influenza and pneumonia were below the five-year average earlier in the year probably because of the relatively mild winter and low levels of circulating flu. After a brief rise in Weeks 11 to 18, the levels are back to slightly below average levels for this time of year, despite it no longer being the season for winter flu. It could be that increased social distancing has led to reduced infection rates for flu and other infectious conditions, or that some of the population susceptible to flu have died due to other causes such as COVID-19. As such this could be another example of mortality displacement.

**Figure 9: Deaths due to leading causes of death have returned to pre-COVID-19 levels after increases observed in Week 12 to Week 19**

Non-COVID-19 deaths as a percentage of the five-year average for each underlying cause of death grouping, England and Wales, deaths registered in Weeks 1 to 28 2020

Figure 9: Deaths due to leading causes of death have returned to pre-COVID-19 levels after increases observed in Week 12 to Week 19

Non-COVID-19 deaths as a percentage of the five-year average for each underlying cause of death grouping, England and Wales, deaths registered in Weeks 1 to 28 2020



Source: Office for National Statistics

Notes:

1. Figures include the deaths of non-residents.
2. Based on date a death was registered rather than occurred.
3. All figures for 2020 are provisional.
4. The ICD-10 definitions for the conditions plotted are: dementia and Alzheimer's disease (F01, F03 and G30), ischaemic heart disease (I20 to I25), chronic lower respiratory disease J40 to J47), cerebrovascular diseases (I60 to I69), malignant neoplasm of the trachea, bronchus and lung (C33 to C34), influenza and pneumonia (J09 to J18), all respiratory diseases (J00 to J99), and symptoms, signs and ill-defined conditions (R00 to R99).

## 5 . Causes of non-COVID-19 deaths

In order to investigate non-COVID-19 death registrations by underlying cause in the period since the [previous article](#) (Weeks 19 to 28), the percentage change between deaths in the five-year average and number of non-COVID-19 deaths in 2020 was calculated for this period as a whole. This allows conditions associated with smaller numbers of deaths to be more accurately compared than by analysing weekly numbers.

The underlying causes were grouped using the [Office for National Statistics \(ONS\) leading causes of death definitions](#). Investigating deaths involving a cause, rather than directly due to it, allows us to identify conditions that are sometimes but not always the cause and how their prevalence has changed over the COVID-19 pandemic.

Figures 10 to 13 present the percentage change in deaths involving various causes from five-year average levels, over 2020 so far. Results are split into the three periods outlined in Table 1: Weeks 1 to 10, Weeks 11 to 18 and Weeks 19 to 28. Figures 10 and 11 present the top 10 causes with greatest increase above five-year average levels in death registrations in Weeks 11 to 18. Figures 12 and 13 show the causes mentioned most in Weeks 19 to 28, which were not as highly ranked in the earlier period.

Causes of death for adults aged 65 years and over are considered separately from death registrations for working age adults and children, because the higher number of deaths among the older population could otherwise conceal trends in causes affecting younger age groups. In all cases, causes mentioned on fewer than 50 death certificates are not presented, because small changes in absolute numbers could have large impacts on proportional change results.

For deaths of those aged 65 years and over, registrations involving symptoms, signs and ill-defined conditions had the greatest increase compared with five-year average levels in Weeks 11 to 18. Deaths involving this cause occurred above five-year average levels in all three periods observed, including before the first death registration involving COVID-19.

Deaths involving acute respiratory conditions were also observed much more than five-year average levels in the second period for this age group, but much less than average in the earlier and later periods of the year. This is consistent with the milder winter period because there were fewer deaths involving this than average earlier in the year, and suggests the increase was directly related to COVID-19, given the return to below average levels as deaths from COVID-19 also declined.

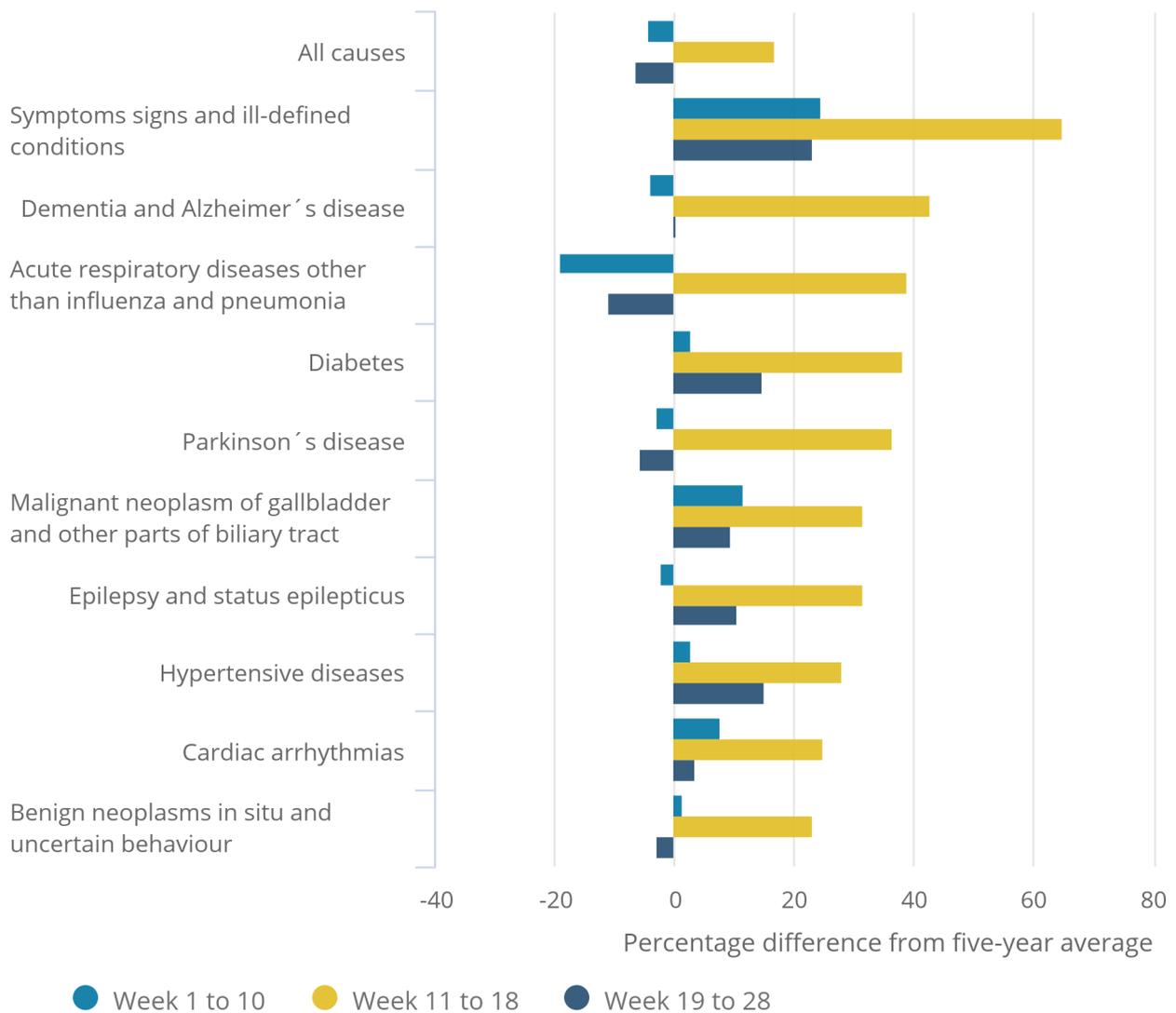
Diabetes, epilepsy and hypertensive diseases all increased above five-year average levels during Weeks 11 to 18, and have remained above those levels (but to a lesser extent) since. These causes could all be linked to delayed access to care, discussed in our previous article, because they could all be quickly fatal if treatment is delayed. There are international examples linking increases in non-respiratory underlying causes of death such as diabetes and Alzheimer's disease with COVID-19.

**Figure 10: Conditions which can quickly become fatal if not treated in time have continued to appear above five-year average levels during Weeks 19 to 28**

Percentage difference from the five-year average for non-COVID-19 deaths involving a leading cause, by cause, for deaths of people aged 65 years and over, in England and Wales, for the ten leading causes with the largest percentage difference in Weeks 11 to 18

Figure 10: Conditions which can quickly become fatal if not treated in time have continued to appear above five-year average levels during Weeks 19 to 28

Percentage difference from the five-year average for non-COVID-19 deaths involving a leading cause, by cause, for deaths of people aged 65 years and over, in England and Wales, for the ten leading causes with the largest percentage difference in Weeks 11 to 18



Source: Office for National Statistics

Notes:

1. Figures include the deaths of non-residents.
2. Based on date a death was registered rather than occurred.
3. All figures for 2020 are provisional.
4. The ICD-10 codes used for this analysis are provided in the Technical Report.
5. Leading causes with a median registration delay greater than 90 days have been removed.
6. Leading causes have been removed where there are insufficient data for analysis.

The causes of death that appeared most above five-year average levels for children and working age adults are presented in Figure 11. These include many cardiovascular conditions: hypertension, cardiomyopathy, pulmonary heart disease and heart failure. All of these occurred above the five-year average level in the earliest period of the year, more so in the middle period, and still occurred above average levels in the latest period of 2020.

There is some evidence from international examples that deaths due to cardiovascular conditions have increased since the COVID-19 pandemic, and suggestion that COVID-19 could cause problems with other organs such as the heart, even if a person does not die of COVID-19 itself. Chronic rheumatic heart disease was one of the top 10 most increased underlying causes of death for adults aged 65 years and over, and aortic aneurysm for working age adults and children; but neither occurred sufficiently to be included in the 10 most mentioned conditions.

Increases in deaths involving appendicitis could suggest delayed access to care is a factor, but deaths involving this cause have been occurring at levels above the five-year average since before the first death registration involving COVID-19.

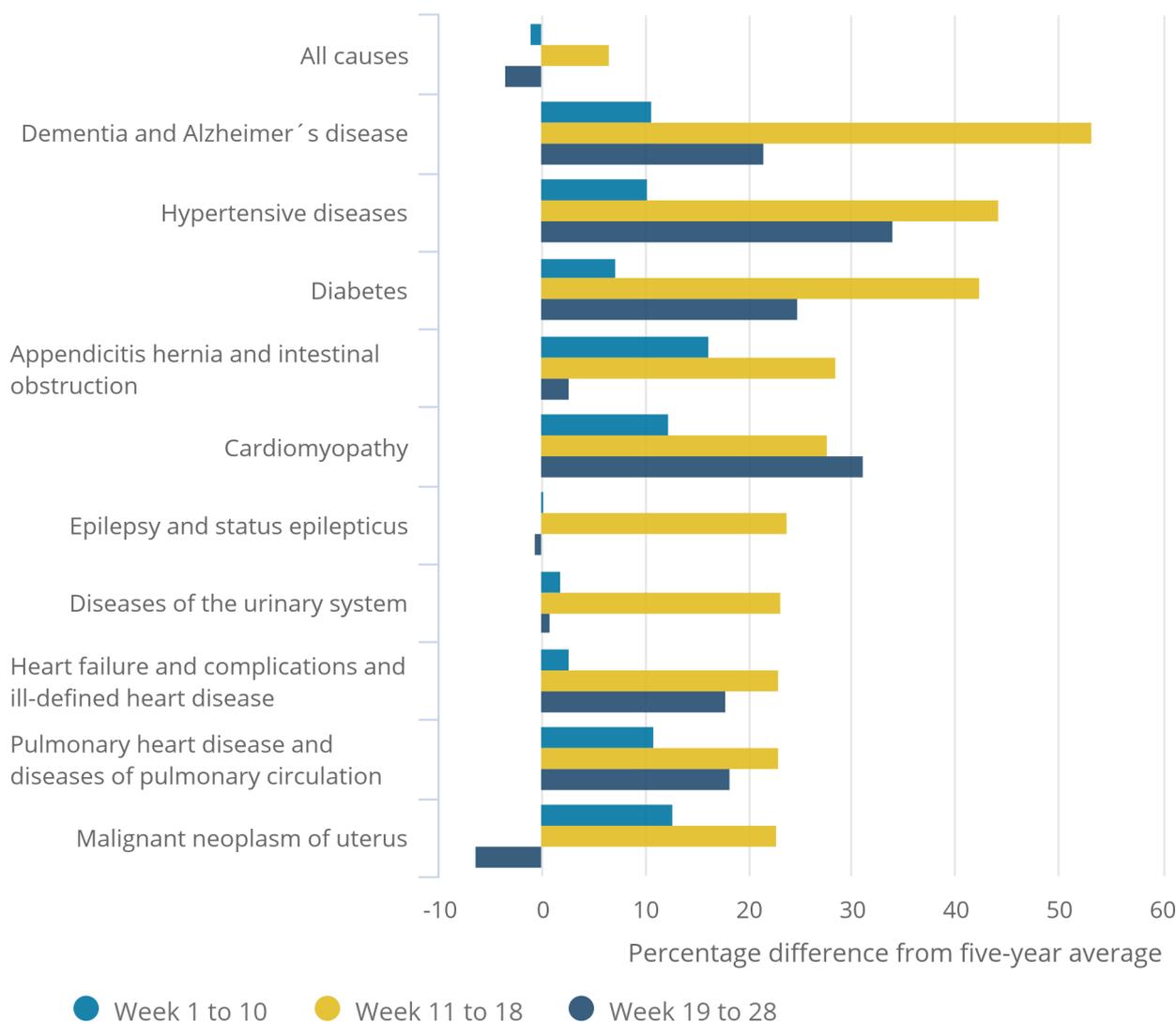
Deaths involving dementia and Alzheimer's disease have occurred above five-year average levels for all three periods of the year for this age group. This is likely occurring for adults closer in age to the 65 years and over bracket, but it is noteworthy that for deaths of those aged 65 years and over, deaths involving dementia and Alzheimer's disease have not occurred above five-year average levels for all three periods.

**Figure 11: Deaths involving heart conditions and conditions which can become fatal if not treated in time, have continued to appear above five-year average levels during Weeks 11 to 18**

Percentage difference from the five-year average for non-COVID-19 deaths involving a leading cause, by cause, for deaths of people aged under 65 years, in England and Wales, for the ten leading causes with the largest percentage difference in Weeks 11 to 18

### Figure 11: Deaths involving heart conditions and conditions which can become fatal if not treated in time, have continued to appear above five-year average levels during Weeks 11 to 18

Percentage difference from the five-year average for non-COVID-19 deaths involving a leading cause, by cause, for deaths of people aged under 65 years, in England and Wales, for the ten leading causes with the largest percentage difference in Weeks 11 to 18



Source: Office for National Statistics

Notes:

1. Figures include the deaths of non-residents.
2. Based on date a death was registered rather than occurred.
3. All figures for 2020 are provisional.
4. The ICD-10 codes used for this analysis are provided in the Technical Report.
5. Leading causes with a median registration delay greater than 90 days have been removed.
6. Leading causes have been removed where there are insufficient data for analysis.

Figures 12 and 13 present the causes occurring most compared with five-year average levels in the latest period, Weeks 19 to 28. The majority of the 10 causes occurring most for both age groups observed overlap with those in Figures 10 and 11 respectively.

Figure 12 presents these causes for death registrations of people aged 65 years and over. For this age group, deaths involving cerebral palsy and other paralytic syndromes have increased from below five-year average levels in the first period of 2020, to above average levels in the second and third periods. The sustained high level, after below average levels in the earliest weeks of the year, may be because of a mild winter leading to more vulnerable people surviving longer into the year than usual.

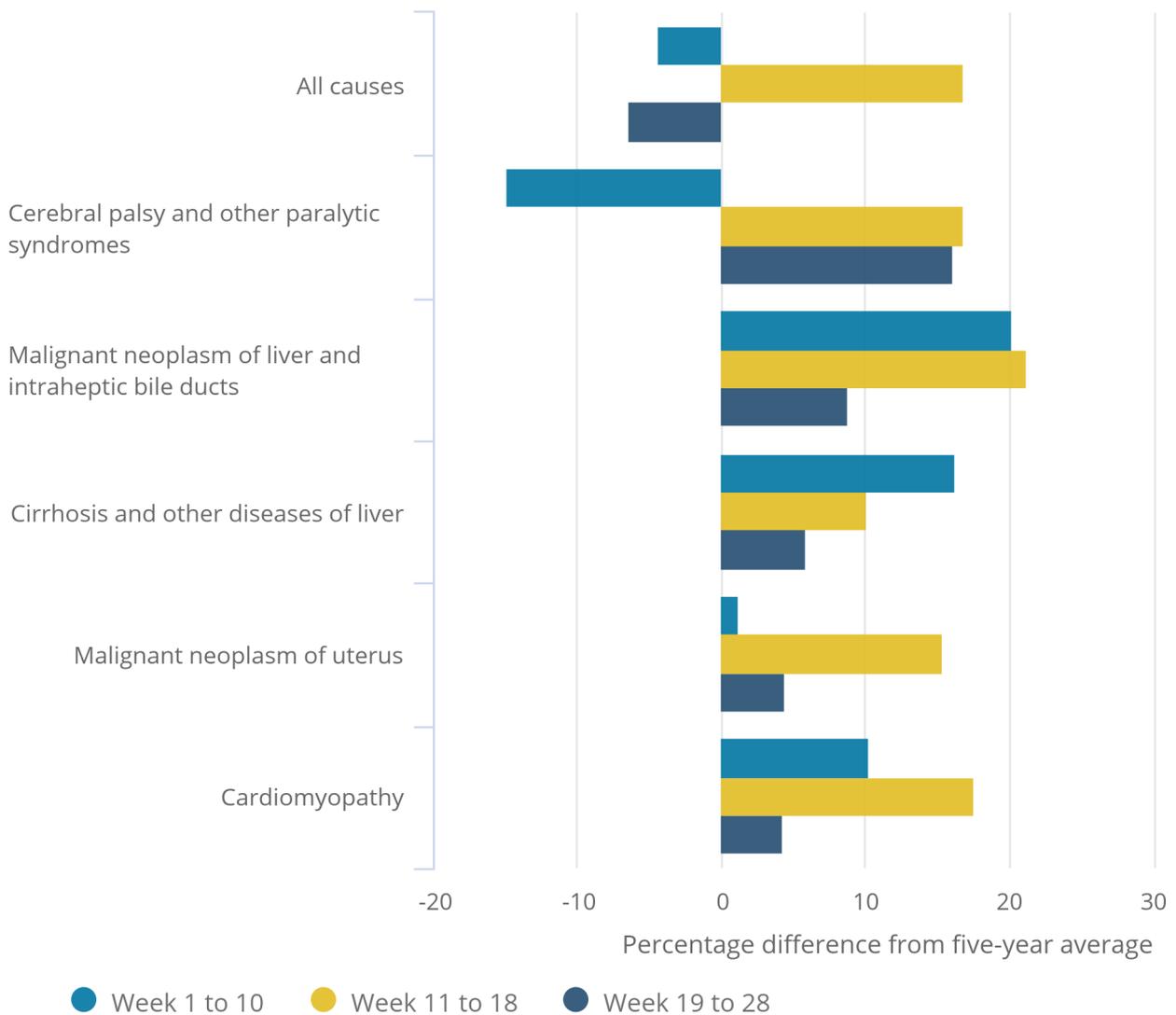
Deaths involving malignant neoplasm of liver, and cirrhosis and other diseases of liver, have occurred above five-year average levels in all periods of 2020 so far. This suggests the increase is not related to COVID-19, given the increase above average levels predates the first death registration involving COVID-19 in England and Wales.

**Figure 12: Levels of deaths involving cerebral palsy have remained high compared with the five-year average for deaths of those aged 65 years and over**

Percentage difference from the five-year average for non-COVID-19 deaths involving a leading cause, by cause, for deaths of people aged 65 years and over, in England and Wales, for the leading causes with the largest percentage difference in Weeks 19 to 28

**Figure 12: Levels of deaths involving cerebral palsy have remained high compared with the five-year average for deaths of those aged 65 years and over**

Percentage difference from the five-year average for non-COVID-19 deaths involving a leading cause, by cause, for deaths of people aged 65 years and over, in England and Wales, for the leading causes with the largest percentage difference in Weeks 19 to 28



Source: Office for National Statistics

Notes:

1. Figures include the deaths of non-residents.
2. Based on date a death was registered rather than occurred.
3. All figures for 2020 are provisional.
4. The ICD-10 codes used for this analysis are provided in the Technical Report.
5. Leading causes with a median registration delay greater than 90 days have been removed.
6. Leading causes have been removed where there are insufficient data for analysis.

Figure 13 presents the causes with greatest increase from five-year average levels in the latest period of 2020 for deaths of people aged under 65 years old. Deaths involving disorders of fluid electrolyte and acid-based balance (dehydration) are within the causes with greatest increase from five-year average levels in this period, and have also had deaths above average levels in the earlier periods of the year.

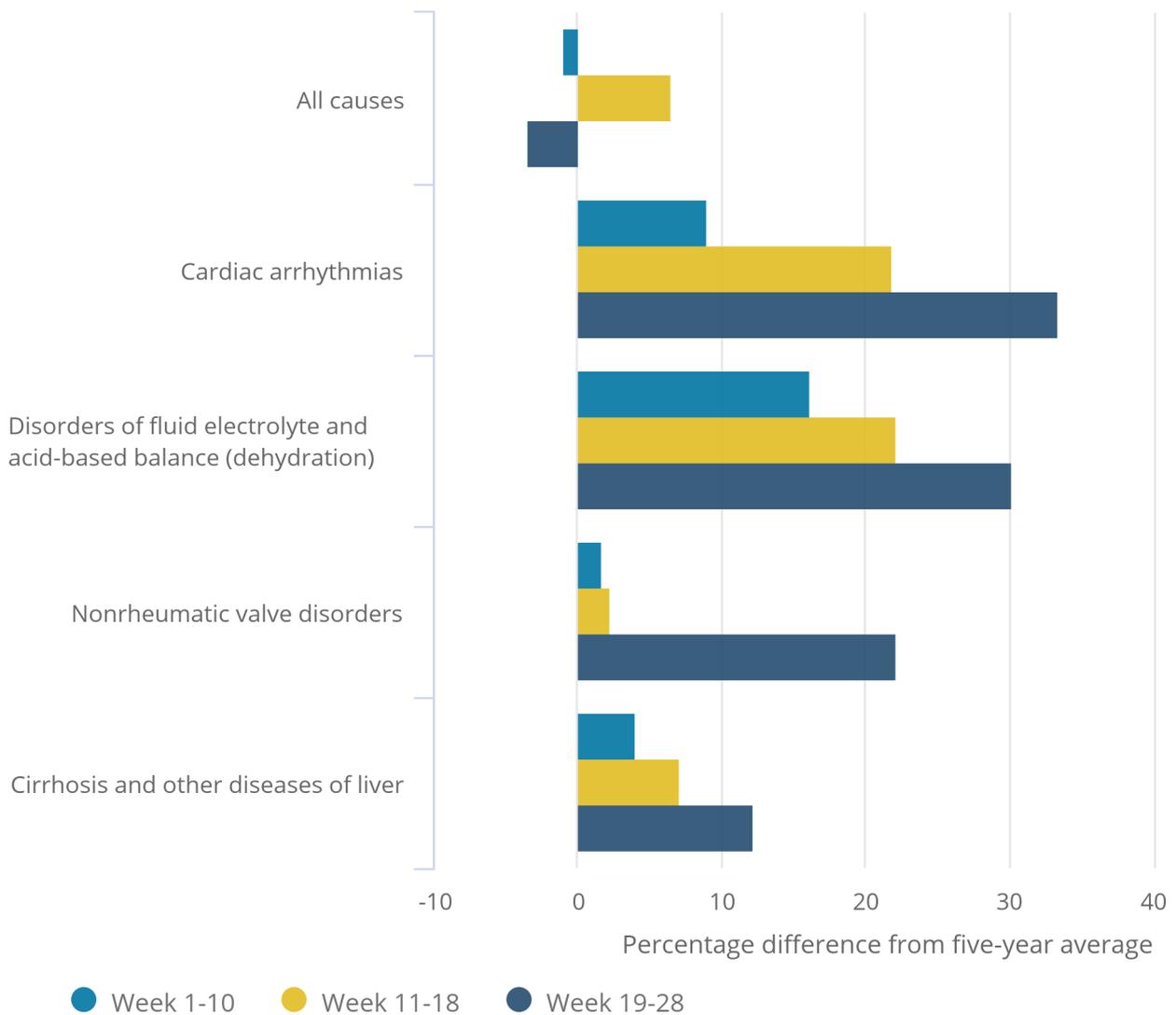
This trend could somewhat be related to COVID-19 but it is likely other factors that pre-date the first COVID-19 death registration are affecting this cause of death. The increases in cardiac arrhythmia and non-rheumatic valve disorders present more heart-related conditions with an increase in deaths above average levels, which could be linked to long-term health effects after contracting COVID-19 but not dying of COVID-19.

**Figure 13: Deaths involving cardiac arrhythmia and dehydration have both occurred more than average for deaths of people aged under 65 years**

Percentage difference from the five-year average for non-COVID-19 deaths involving a leading cause, by cause, for deaths of people aged under 65 years, in England and Wales, for the leading causes with the largest percentage difference in Weeks 19 to 28

**Figure 13: Deaths involving cardiac arrhythmia and dehydration have both occurred more than average for deaths of people aged under 65 years**

Percentage difference from the five-year average for non-COVID-19 deaths involving a leading cause, by cause, for deaths of people aged under 65 years, in England and Wales, for the leading causes with the largest percentage difference in Weeks 19 to 28



Source: Office for National Statistics

Notes:

1. Figures include the deaths of non-residents.
2. Based on date a death was registered rather than occurred.
3. All figures for 2020 are provisional.
4. The ICD-10 codes used for this analysis are provided in the Technical Report.
5. Leading causes with a median registration delay greater than 90 days have been removed.
6. Leading causes have been removed where there are insufficient data for analysis.

For information on the data and methodologies used to produce these statistics, including the ICD-10 codes used for all of the causes of death analysed in this report, see the accompanying [Technical Report](#) for this article. Data for all conditions are available in this report's datasets.

## 6 . Analysis of death registrations not involving coronavirus data

[Death registrations not involving coronavirus \(COVID-19\): England and Wales](#)

Dataset | Released 2 September 2020

Provisional counts of the number of total deaths and deaths not involving the coronavirus (COVID-19), between 28 December 2019 and 10 July 2020. This includes deaths disaggregated by age and sex; by region of England, and Wales, and place of death; and for underlying causes of death and deaths involving leading causes.

## 7 . Glossary

### Age-specific mortality rates

Age-specific mortality rates are used to allow comparisons between specified age groups.

### Age-standardised mortality rates

Age-standardised mortality rates (ASMRs) are used to allow comparisons between populations that may contain different proportions of people of different ages. The 2013 European Standard Population is used to standardise rates. [Mid-year population estimates](#) were used for the populations in 2015 to 2019 and [population projections](#) (2018-based) were used for the population in 2020. For more information see the [Technical Report](#). More information on the ASMRs and the relative ASMRs and cumulative relative ASMRs used in this report is available in the [Technical Report](#).

## Coronaviruses

The World Health Organization (WHO) defines coronaviruses as “a large family of viruses that are known to cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS)”. Between 2001 and 2018, there were 12 deaths in England and Wales due to a coronavirus infection, with a further 13 deaths mentioning the virus as a contributory factor on the death certificate.

## Coronavirus (COVID-19)

COVID-19 refers to the “coronavirus disease 2019” and is a disease that can affect the lungs and airways. It is caused by a type of coronavirus. Further information is available from the World Health Organization.

## Excess deaths

Excess deaths denote the number of deaths greater than the expected number of deaths. For example, suppose on average 100 people died on this day over the past five years, but 120 died on the same day this year; this would mean there are 20 excess deaths.

## Involving COVID-19

Involving COVID-19 refers to deaths that had COVID-19 mentioned anywhere on the death certificate, whether an underlying cause or not.

## Non-COVID-19 excess deaths

Non-COVID-19 excess deaths refer to the number of deaths greater than the expected number of deaths where COVID-19 was not mentioned on the death certificate. For example, suppose on average 100 people died on this day in the past five years, but 150 died on the same day this year where 30 of those deaths mention COVID-19; this would mean there are 20 non-COVID-19 excess deaths.

## Registration delay

Mortality statistics are compiled from information supplied when deaths are certified and registered as part of civil registration, a legal requirement. According to the [Births and Deaths Registration Act 1953](#), a death should be registered within five days unless it is referred to a coroner for investigation. Mortality statistics for a given time period can be based on occurrence (death date) or registration (registration date); registration delay is the difference between date of occurrence and date of registration.

## 8 . Data sources and quality

Statistics in this report use a dataset consistent with the [weekly death registrations publication](#). This differs from the data used to produce the analysis of non-COVID-19 deaths published in June. The difference in data used and the impact of that change is explained further in the [Technical Report](#). Further information on the registration data used for this analysis, how it compares with the data used in the previous report, and the use of the five-year average as a measure to compare 2020 death registrations to can be found in our [Technical Report](#).

## 9 . Related links

[Deaths registered weekly in England and Wales, provisional](#)

Bulletin | Weekly

Provisional counts of the number of deaths registered in England and Wales, including deaths involving the coronavirus (COVID-19) pandemic, by age, sex and region, in the latest weeks for which data are available.

[Deaths involving COVID-19 in the care sector, England and Wales: deaths occurring up to 12 June 2020 and registered up to 20 June 2020 \(provisional\)](#)

Article | Released 3 July 2020

Provisional figures on deaths involving the coronavirus (COVID-19) within the care sector, in England and Wales.

[Analysis of death registrations not involving coronavirus \(COVID-19\), England and Wales: Technical Report](#)

Methodology | Published 2 September 2020

The methodology used to calculate estimates in the “Analysis of death registrations not involving COVID-19” series, particularly the September edition (analysis to 10 July 2020).