

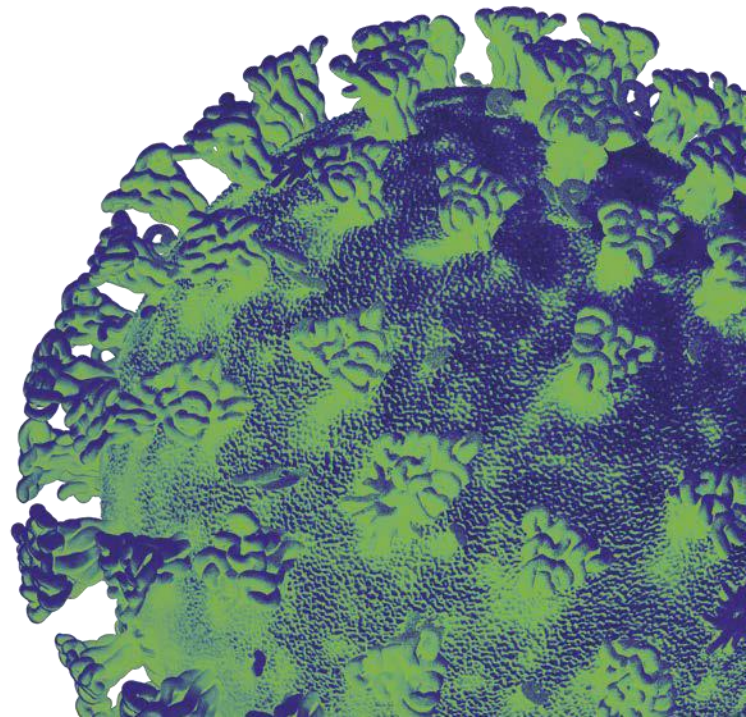
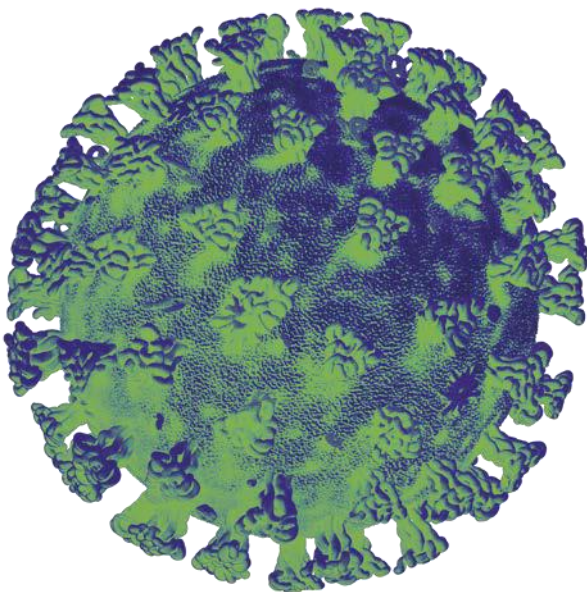
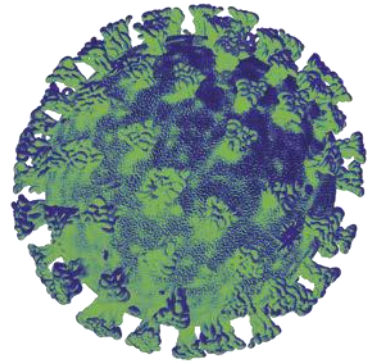


Llywodraeth Cymru
Welsh Government

Technical Advisory Group

Examining Deaths in Wales associated
with COVID-19

15 July 2020



Examining deaths in Wales associated with COVID-19

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Key findings

- There were proportionally fewer deaths in Wales than in the UK as a whole during the first wave of the COVID-19 pandemic and fewer than most parts of England.
- As yet we do not fully understand why this is the case
- Further work is required at a UK level to understand the relationship between COVID-19, policy interventions and deaths in each of the four countries, so that we can mitigate as much harm as possible in future waves.

As the first wave of the COVID-19 pandemic in the UK subsides, there is a small window for us to learn from the terrible loss of life that the virus has brought. In order to plan measures to minimise harms from further waves of infection it is critical that we learn everything we can from the cases that have come before. By examining COVID-related deaths over the first peak of the infection we hope to understand what caused the spread, what made our population vulnerable and what policies may be most effective in reducing all harms in future waves. The narrative below is supported by a collection of evidence presented in the accompanying annex.

What do we know?

The countries of the UK have not suffered equally from COVID-19. In the three months from 1 March to 31 May 2020 there were 180,586 deaths recorded in England and Wales. COVID-19 was the underlying cause of death for 43,763 people and involved in a further 2,924 deaths a quarter of all of the deaths in this period. In Wales there were 2,257 deaths involving COVID-19 between 1 March and 31 May.¹ When we look at the data in more detail, we find that the percentage of excess deaths during the equivalent period (29 February – 5 June 2020) was 24.1% for Wales and 42.0% for England². If Wales had the same percentage of excess deaths as England, there would have been a further 1,628 deaths in those three months. It did not, but we do not yet know why. Scotland and Northern Ireland had

¹ Source: ONS data on death registrations. These figures are higher than the rapid surveillance data published by Public Health Wales for a number of reasons. See: <https://digitalanddata.blog.gov.wales/2020/05/05/chief-statisticians-update-explaining-covid-19-mortality-data-sources-for-wales>

² Ad hoc advice to Welsh Ministers, 18 June 2020. See <https://gov.wales/sites/default/files/statistics-and-research/2020-06/excess-deaths-calculation-up-to-5-june-2020.ods>

different percentages again, and these may have had to do with the difference of COVID-19 spread.

Measuring the impact from COVID-19 is difficult. Indeed, even measuring the deaths from COVID-19 is difficult. Using total numbers of deaths as above is a crude measure that does not offer much granularity of information. Instead, we can select a proportional measure of comparison, like deaths per 100,000 people. This does not take into account the vulnerability of a population to COVID-19 infection. We still need to consider the differences in age, in gender, ethnicity, health, vulnerability and population density, to name but a few, if we are to understand the true effect of this coronavirus.

The ONS calculated “age-standardised mortality rates” from all causes. These are a better comparative measure of mortality between areas than the number of deaths, as they account for the population size and age structure. However they do not capture or account for the range of other potential factors described above. If we can understand what the difference was, and whether we have any control over it, **then we could save lives across the UK** in future waves of the pandemic.

What is the plan?

We want to examine the problem by considering the excess deaths and the proportionate deaths from COVID-19 against a number of variables across the four countries of the UK.

Interrogating our own data within the NHS, the SAIL databank and the genomics consortium will offer an insight into what may have worked in Wales. There are also variations within Wales which can be investigated. However looking across the UK will tell us far more about the spread and impact of the outbreak across the UK what effect different interventions had, as they have been introduced at different times and in different ways.

We should pay particular attention to the outbreaks in hospitals and institutions, which have played a major role in transmitting the disease during this period.

Analysis

Analysis of excess deaths by week and by country or region shows a similar pattern in all regions but with small differences in the timeline and scale of the peak. Excess deaths (that is levels of mortality above recent average for that time of year) were first seen in London and the South East a little earlier than the rest of the country. Overall, by the end of April, the number of deaths in Wales was 25% higher than the 5 year average, lower than England (46%) and Scotland (37%). London has the largest age standardised COVID-19 mortality rate across England and Wales. The figure for Wales is similar to the East Midlands, East of England and South East, and otherwise higher only than the South West.³

Figure 1⁴ was produced in July, but includes the time period under consideration.

³ <https://digitalanddata.blog.gov.wales/2020/06/16/chief-statisticians-update-how-does-covid-19-mortality-in-wales-compare-with-the-rest-of-the-uk-and-how-does-it-vary-within-wales>

⁴ <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/death-registeredweeklyinenglandandwalesprovisional/weekending3july2020#deaths-by-region-in-england-and-wales>

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Deaths by regions in England, and Wales, week ending 3 July 2020

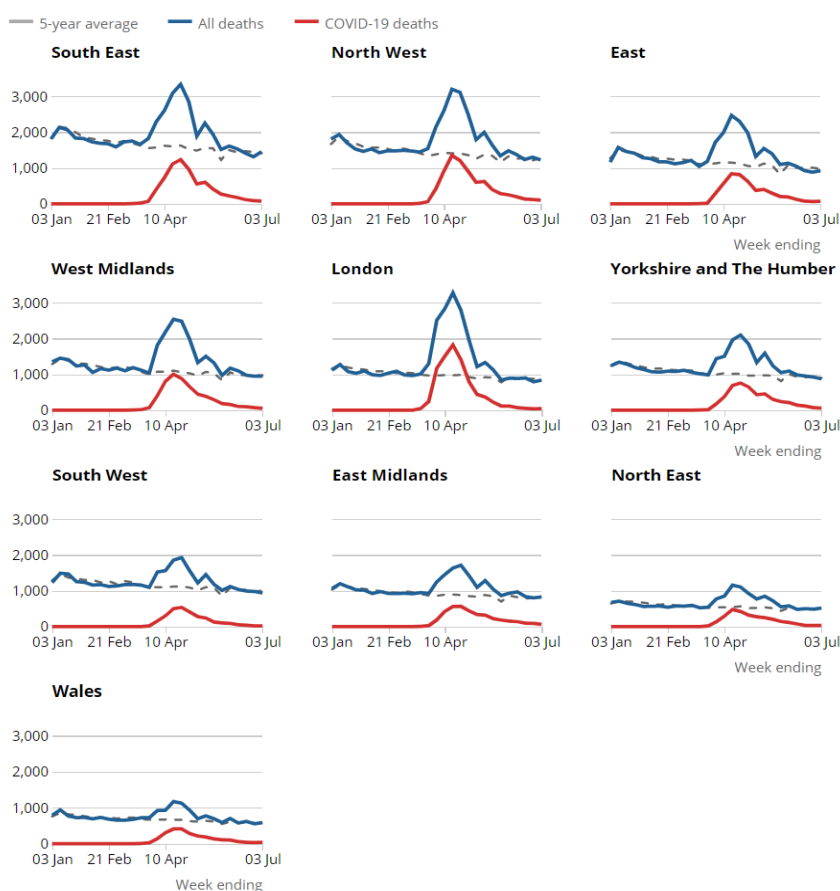


Figure 2⁵ shows excess deaths as a percentage of the 5-year average, by local authority (England and Wales) or council areas (Scotland). Bubble size represents the population size.

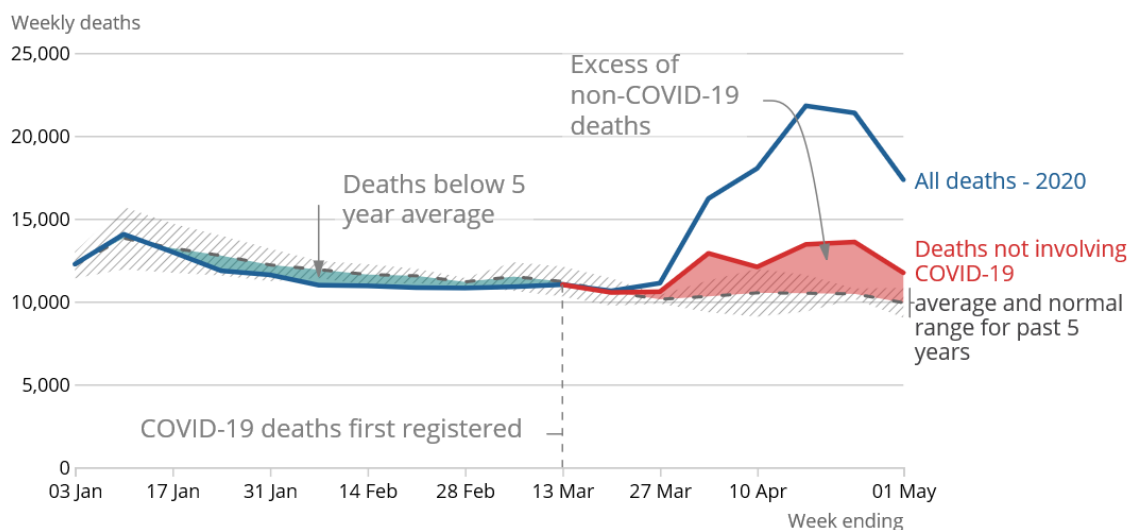


Within Wales, mortality rates were highest in Cardiff and Vale Health Board. This is despite the nosocomial outbreak in Aneurin Bevan early in the pandemic. The pandemic seemed to travel along the major routes from England, along the M4 from Bristol in the South, and from Chester and Liverpool from the North. The lowest rates of infection were in Hywel Dda and Powys health boards.

⁵ ONS via The Health Foundation, deaths registered between week ending 22 March and week ending 22 May

Deaths in the first quarter of 2020 were below average for the past five years, potentially due to a mild winter. This could have increased the age and vulnerability of the population in the initial phase of the outbreak.

Figure 3⁶. Weekly number of excess deaths and non COVID-19 deaths, registered up to 1 May, England and Wales



What can we conclude?

It will not be possible to truly understand the impact of SAR-COV-2 on Wales and the wider UK for many years. The data that are available show that there are a complex picture of short and long term harms to understand, and history shows us that further waves of a pandemic like this could be more severe.

We have asked the ONS to do as full a study as they can with the data available now on the excess deaths across the UK and by country, in the hope of identifying any methods or risk factors that will help us reduce the harm of further waves.

So far, we know that the highest death rates are in older people, people from BAME backgrounds⁷ and deprived communities⁸ so there needs to be a continued focus on identifying and protecting the most vulnerable people in society.

Men have consistently higher mortality rates across all ethnic groups.⁹

The majority of excess deaths are due to COVID-19 with a small proportion accounted for by deaths where COVID-19 was involved but was not the underlying cause and a larger proportion, about a third, accounted for by non-COVID-19 deaths. At an individual level, risk of death is known to be strongly associated with increasing age and also with deprivation, and ethnicity.

Country and regional variation in excess deaths broadly echoes variation in age-standardised mortality.

The most critical factors in reducing excess deaths in any future wave of COVID-19

⁶ ONS Analysis of death registrations not involving coronavirus

⁷<https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/articles/coronavirusrelateddeathsbyethnicgroupenglandandwales/2march2020to10april2020>

⁸<https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/deathsinvolvingcovid19bylocalareaanddeprivation>

⁹ Source?

are likely to be:

1. **Early recognition of a resurgence of infection in the community.** This requires sensitive early warning systems provided by good epidemiological surveillance through, for example, real-time monitoring of key metrics in the Test, Trace and Protect programme and early identification of outbreaks.
2. **A continued focus on identifying and protecting the most vulnerable people in society.** Highest death rates are in older people, people from BAME backgrounds and deprived communities.

Further work

There are many unexplored questions that could have affected the variation in the proportion of excess deaths from COVID-19 across different parts of the UK.

Our questions are focussed on whether there are factors that we can influence to reduce the harm of COVID-19 within the UK.

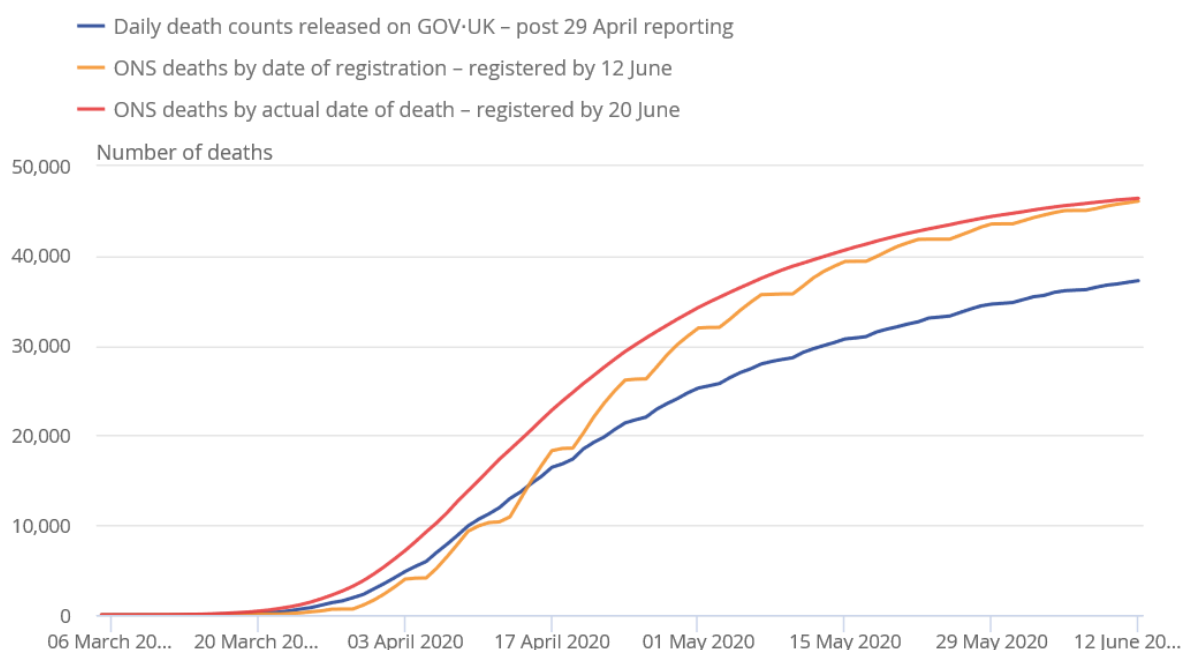
- Uncontrollable factors:
 - Did Wales, Scotland and Northern Ireland have more time to prepare for the virus than England?
 - Was the virus more widely seeded than initially expected or modelled?
 - Is population density significant in the spread?
 - Was there variation by country in compliance with lockdown?
 - How much of the variation for is accounted for by the underlying health conditions of the population?
 - What can we tell about the numbers of excess deaths seen in care homes and any differences in rates of adults in care homes in different parts of the country?
- Controllable factors:
 - What was the proportion of overseas travellers?
 - Did mass gatherings have a significant effect?
 - Was there a significant effect from non-lockdown interventions?
 - How did mobility compare across different parts of the country?
 - What effect did contact tracing have?
 - Is there an effect from availability of personal protective equipment?
 - What action was taken to tackle nosocomial infection in hospitals and in care homes?
 - Was there variation in access to health care services for those with COVID-19 and those with other health issues?
- Wider questions
 - How were super spreader events managed?
 - Was there a decline in deaths from other causes, e.g. road traffic injuries?
 - How effective was shielding policy?

Annex

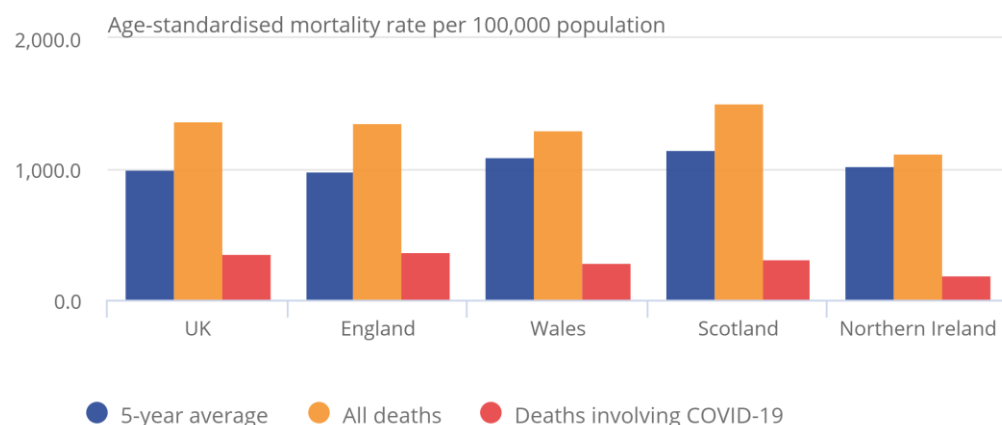
Below are a selection of data tables and visualisations drawn from ONS, GOV.UK, DHSC and others to inform the narrative paper “Examining deaths from COVID-19 in Wales”. Much of the data are shared between England and Wales, and care should be taken in the interpretation of these data without the narrative itself.

1. Cumulative number of deaths involving COVID-19 in England and Wales, using different data sources, up to 20 June¹⁰

This graph shows that there are a substantially high number of COVID-19 deaths from COVID-19 recorded by ONS.



2. Age-standardised mortality rates for all deaths and for COVID-19 deaths by country, March and April 2020¹¹

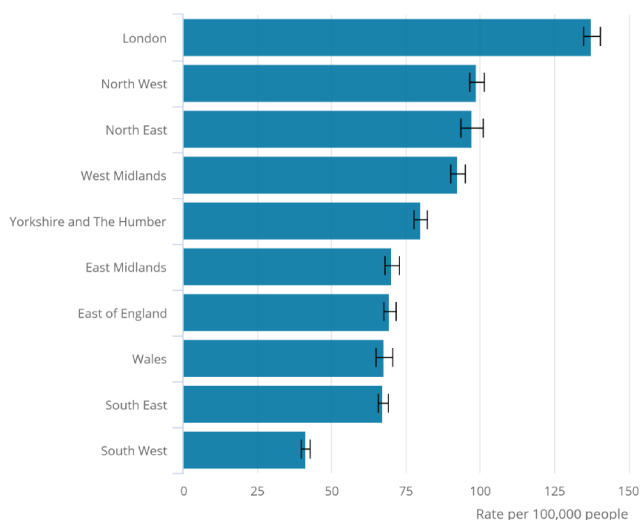


¹⁰ ONS Comparison of weekly death occurrences in England and Wales

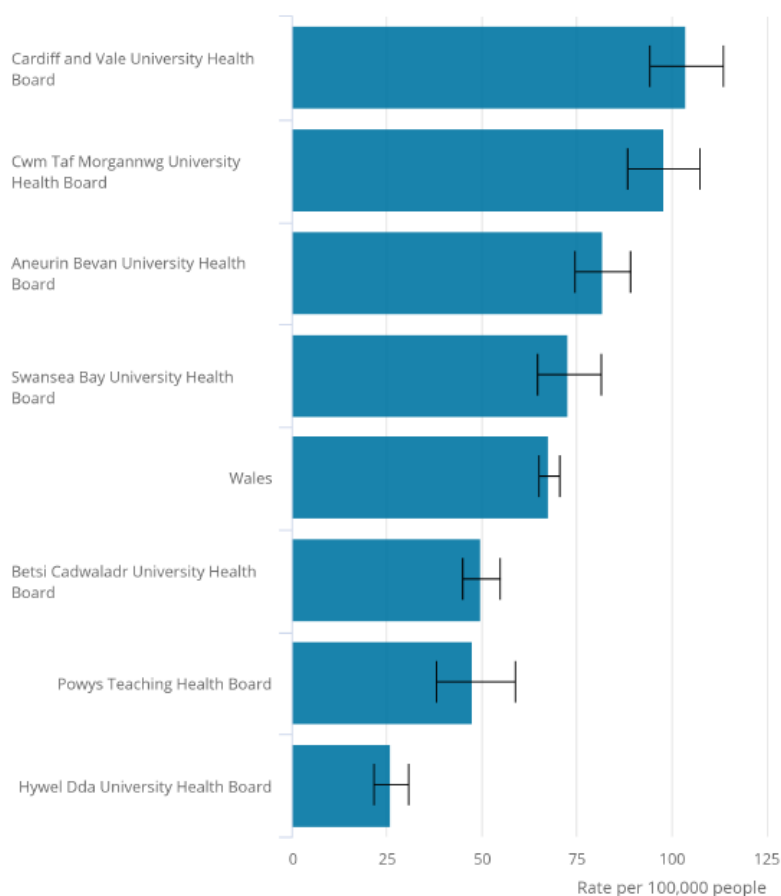
¹¹ ONS Deaths involving COVID-19, UK

3. Age-standardised mortality rates for deaths involving COVID-19 by region and country, England and Wales, 1 March to 31 May¹²

This graph shows further analysis of age-standardised mortality rates, indicating that they vary widely.



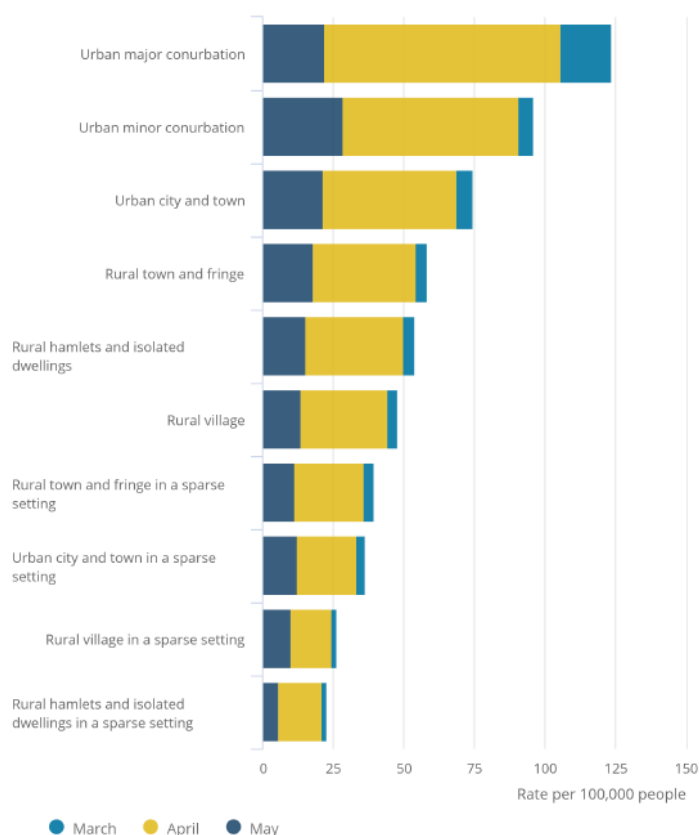
4. Age-standardised mortality rates for deaths involving COVID-19 by Health Board, Wales, 1 March to 31 May¹³



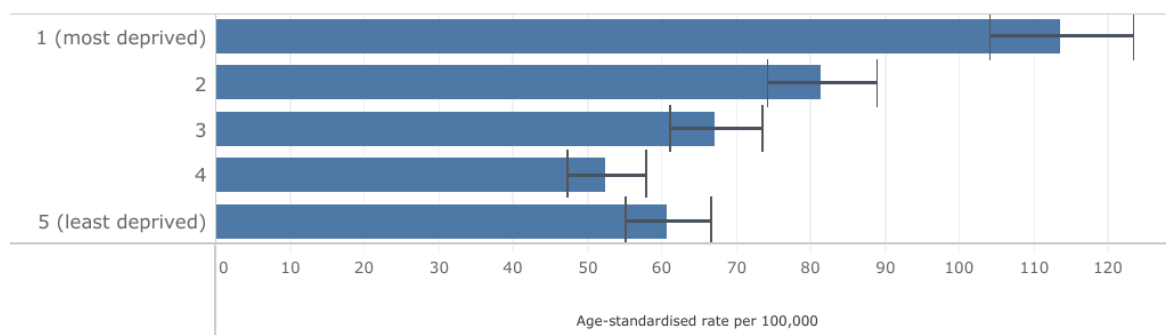
¹² ONS Deaths involving COVID-19

¹³ ONS Deaths involving COVID-19

5. Age-standardised mortality rates for deaths involving COVID-19, urban and rural areas, England and Wales, 1 March to 31 May¹⁴



6. Age-standardised mortality rates from COVID-19 by deprivation fifth, Wales, up to 12 June¹⁵



Deprivation fifths are based on WIMD 2019.

This graph shows that, as with many other diseases, COVID-19 mortality has a clear gradient with deprivation. In Wales people in the most deprived quintile have mortality rates significantly higher than any other quintile and almost twice that of people in the least deprived quintile.

¹⁴ ONS Deaths involving COVID-19

¹⁵ ONS via Public Health Wales dashboard

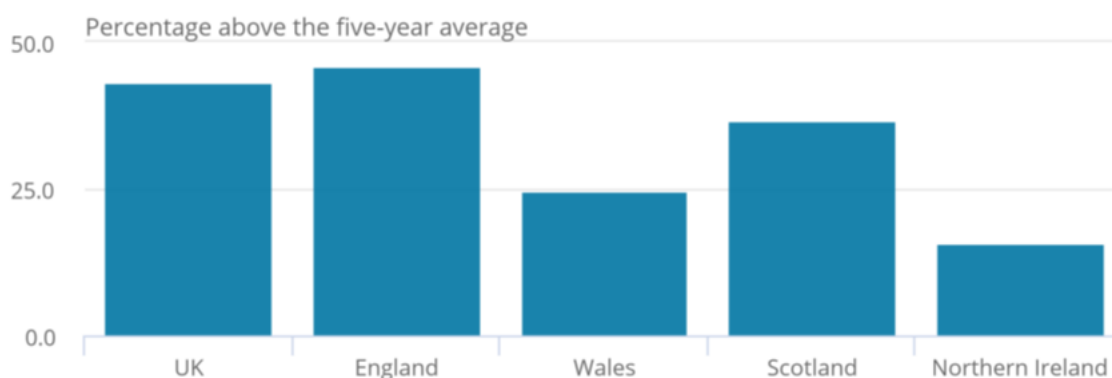
7. Age-standardised mortality rates for deaths involving COVID-19 (per 100,000 people) by sex and ethnic group, 2 Mar to 15 May, England and Wales¹⁶

Ethnic Group	Males			Females		
	Rate	CI lower	CI higher	Rate	CI lower	CI higher
White	87.0	85.7	88.3	52.0	51.1	52.8
Mixed	144.4*	120.3	168.5	75.9*	60.5	91.3
Indian	157.5*	144.8	170.3	86.8*	77.9	95.6
Bangladeshi\Pakistani	191.0*	172.9	209.1	100.8*	87.9	113.7
Chinese	119.4*	94.2	149.2	65.4	48.4	86.3
Black	255.7*	238.1	273.3	119.8*	109.5	130.1
Other ethnic group	167.7*	150.1	185.3	83.4*	72.0	94.8

* Statistically significant raised rate compared to those with White ethnicity.

Mortality rates also vary substantially by sex and ethnic group. This table shows that men have consistently higher mortality rates across all ethnic groups. It also shows significantly higher rates in all ethnic minority groups (except Chinese women) when compared with mortality rates in the White ethnic group. The death rate in Black men is almost three times that in White men and the death rate in Black women is more than twice that in White women. The next highest death rates are in the Bangladeshi/Pakistani group with a death rate in men over twice that in White men and in women nearly twice that in White women.

8. Percentage of deaths above the 5-year average by UK country, March and April 2020, registered up to 15 May¹⁷



¹⁶ ONS Coronavirus (COVID-19) roundup, 19 June 2020

¹⁷ ONS Deaths involving COVID-19, UK, 1 March to 30 April 2020

There were 43.0% more deaths (44,449 deaths) than the five-year average in the UK in March and April 2020. England had the most with 39,020 deaths, 45.8% above the five-year average. The lowest was in Northern Ireland, with 413 deaths, 15.7% above the five-year average.

9. Registered deaths and excess deaths for the pandemic period, registered up to 12 June, by UK country applying Wales rate to other countries and other countries' rates to Wales¹⁸

	Wales	England	Scotland	N Ireland
deaths (all causes)	11,852	198,794	21,169	5,353
5-year average deaths	9,679	142,217	16,284	4,503
excess death number	2,173	56,577	4,885	850
excess death %	22.5	39.8	30.0	18.9

* Based on deaths registered not deaths occurring

Figures for Scotland cover a period starting and ending 2 days later

as their reporting week runs from Monday to Sunday rather than Saturday to Friday

This table, including an extra week of data, shows, by country, the total number of deaths, total number of excess deaths and percentage of excess deaths, by date of registration, for the pandemic period (from 29 February up to 12 June). In Wales, there were 2,173 excess deaths which was 22.5% above the five year average. This was considerably lower than the percentage of excess deaths in England (39.8%) and Scotland (30.0%), but higher than Northern Ireland (18.9%).

When the proportion of excess deaths in Wales is applied to the other UK countries, England has over 24,000 fewer deaths, Scotland has over 1,200 fewer deaths and Northern Ireland has almost 200 more deaths. When the proportion of excess deaths in other UK countries is applied to Wales, there would have been almost 1,700 more deaths, over 700 more deaths and over 300 fewer deaths using England, Scotland and Northern Ireland rates respectively.

Applying Wales rate of excess death to other countries**

	England	Scotland	N Ireland
deaths if Wales excess rate applied	174,146	19,940	5,514
difference in deaths	-24,648	-1,229	161

Applying other country rate of excess deaths to Wales**

	England	Scotland	N Ireland
deaths if other country excess rate applied	13,530	12,583	11,506
difference in deaths	1,678	731	-346

** Estimation based on published weekly death figures

The pandemic period covers deaths registered from 29 February up to 12 June 2020. Crude rate per 100,000 population, not adjusted for differences in age profile between different areas. Based on date deaths were registered not date they occurred.

¹⁸ ONS, NRS, NISRA with additional calculations by Welsh Government

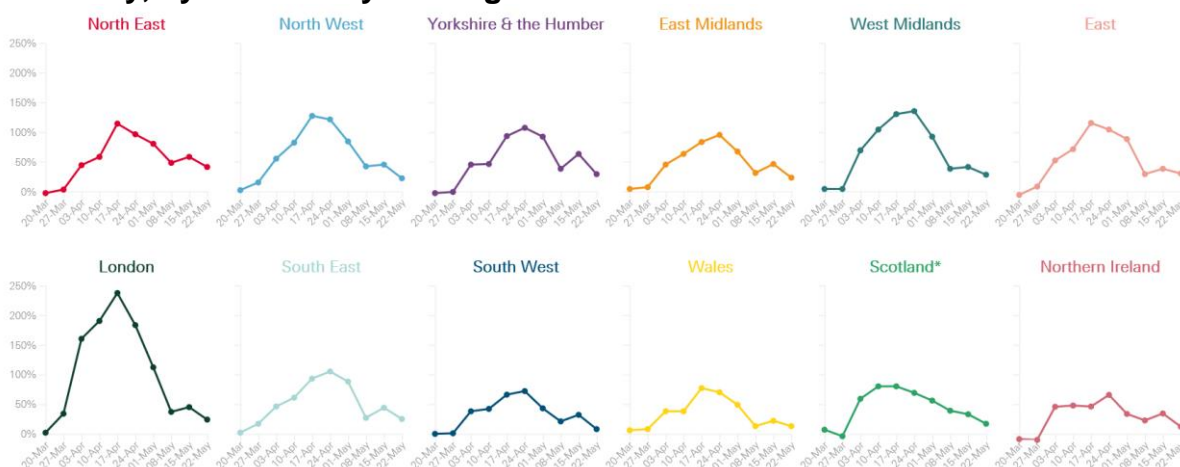
10. A comparison of ONS weekly deaths for the pandemic period, registered up to 12 June, by English regions and Wales¹⁹

Area	All causes	5-year average registered deaths	Covid as a % of all cause deaths	Excess deaths as a % of the 5 year-average	Total COVID 19 deaths per 100k population
North East	10,957	7,943	24.6%	37.9%	100.9
North West	29,091	20,444	24.8%	42.3%	98.2
Yorkshire and the Humber	20,266	14,900	21.8%	36.0%	80.3
East Midlands	17,352	13,017	20.4%	33.3%	73.1
West Midlands	22,806	15,676	23.6%	45.5%	90.7
East	22,568	16,392	20.9%	37.7%	75.8
London	23,889	14,131	34.7%	69.1%	92.5
South East	31,855	23,308	21.2%	36.7%	73.6
South West	20,010	16,406	13.9%	22.0%	49.5
Wales	11,852	9,679	19.8%	22.5%	74.6
England	198,794	142,217	23.0%	39.8%	81.4
England (exc London)	174,905	128,086	21.4%	36.6%	79.2

The pandemic period covers deaths registered from 29 February up to 12 June 2020. Crude rate per 100,000 population, not adjusted for differences in age profile between different areas. Based on date deaths were registered not date they occurred.

An analysis of excess deaths by region (Table 3) for the pandemic period (from 29 February up to 12 June) shows that these were highest in London (69.1%) but also high in the West Midlands (45.5%) and the North West (42.3%). Among the English regions only the South West (22.0%) had fewer excess deaths than Wales (22.5%).

11. Weekly excess deaths as a percentage of the 5-year average, registered up to 22 May, by UK country and region²⁰

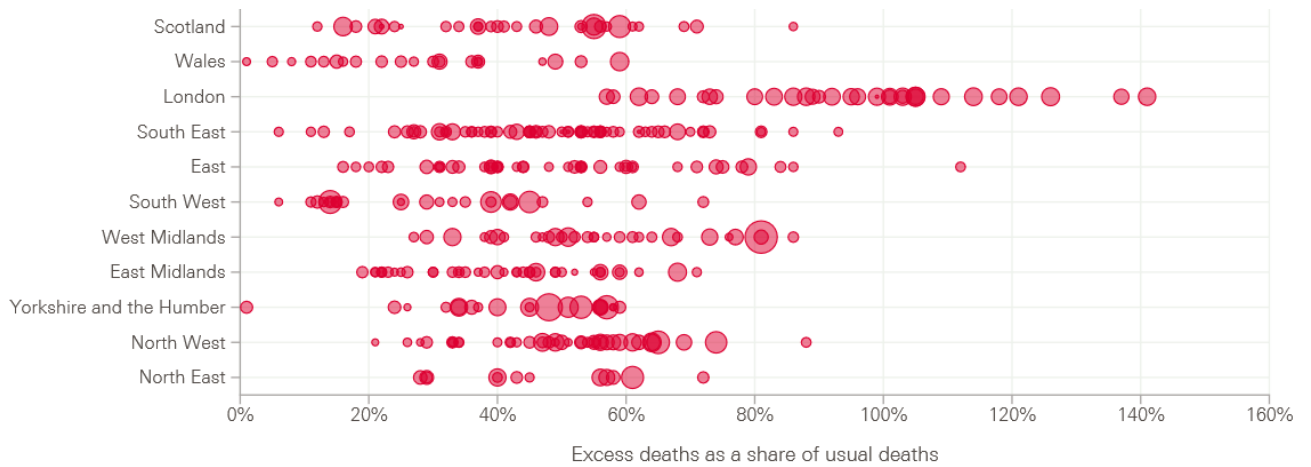


Analysis of excess deaths by week and by country or region shows a similar pattern in all regions but with small differences in the timeline.

¹⁹ ONS weekly deaths with additional calculations by Welsh Government

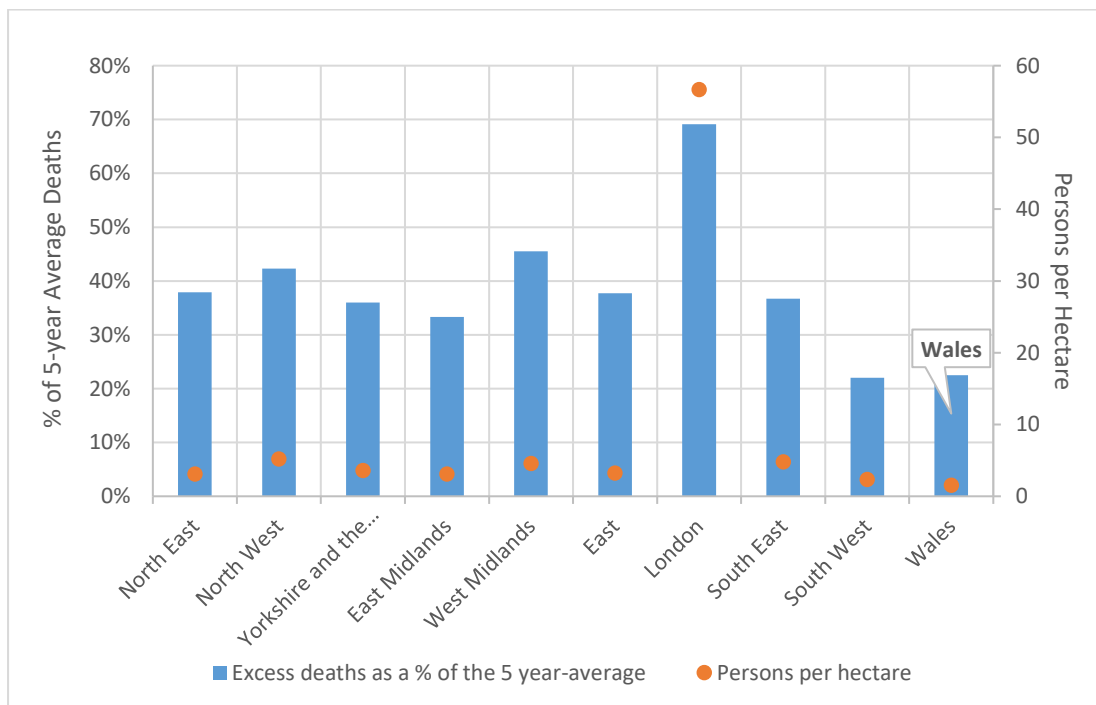
²⁰ ONS via The Health Foundation

12. Excess deaths as a percentage of the 5-year average, by local authority, health board (Wales) or council areas (Scotland). Bubble size represents the population size²¹.



This shows excess deaths by local authority. Almost half of all local authorities had excess deaths exceeding 50% of usual deaths.

13. Excess deaths for the pandemic period, registered up to 12 June, and population density by region, England and Wales²²



The pandemic period covers deaths registered from 29 February up to 12 June. Crude rate per 100,000 population, not adjusted for differences in age profile between different areas. Based on date deaths were registered not date they occurred.

²¹ ONS via The Health Foundation, deaths registered between week ending 22 March and week ending 22 May

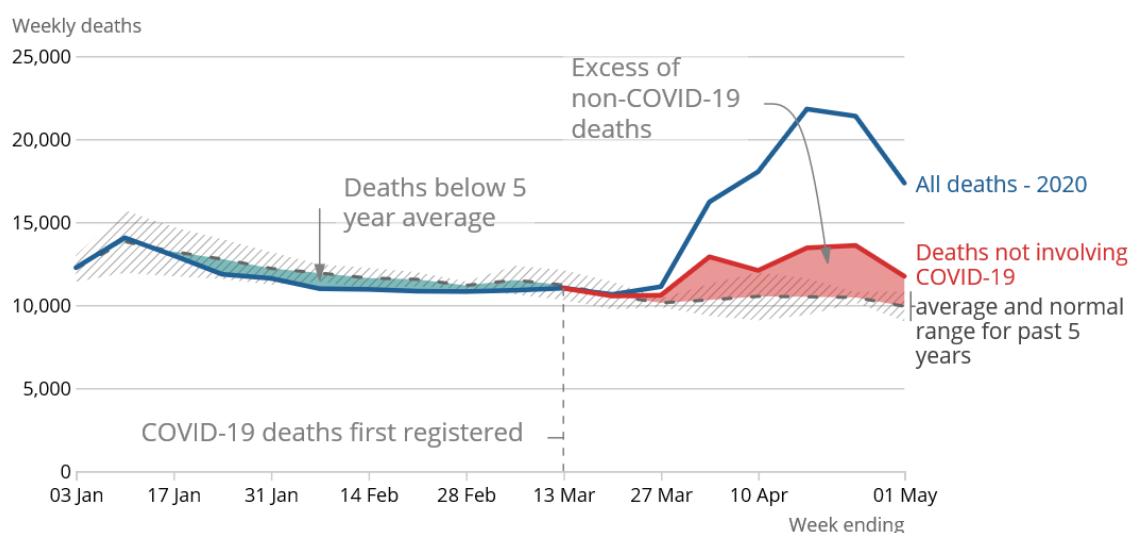
²² ONS via Welsh Government

This graph shows excess deaths due to COVID-19 for the English regions and Wales, compared with population density for the same areas as at 2018.

These differences between areas have several possible explanations:

- **demography** (older populations or populations with a higher proportion of people from BAME backgrounds may have more excess deaths)
- **deprivation** (more deprived areas may have more excess deaths due partly to higher levels of underlying disease and more people in vulnerable groups)
- **exposure to the virus** (areas with more intense infection rates may have more excess deaths).

14. Weekly number of excess deaths and non COVID-19 deaths, registered up to 1 May, England and Wales²³



This graph shows, for England and Wales, the total weekly death registrations in 2020 with the corresponding five-year average and its standard deviation. Periods of slightly below or above average deaths are not uncommon because of the impacts of, for example, winter influenza.

Between mid-January and mid-March, the numbers of deaths registered each week were below the five-year average. From the end of March there is an excess in deaths most of which is accounted for by COVID-19 deaths, but also with an excess in non-COVID-19 deaths (the area shaded in red).

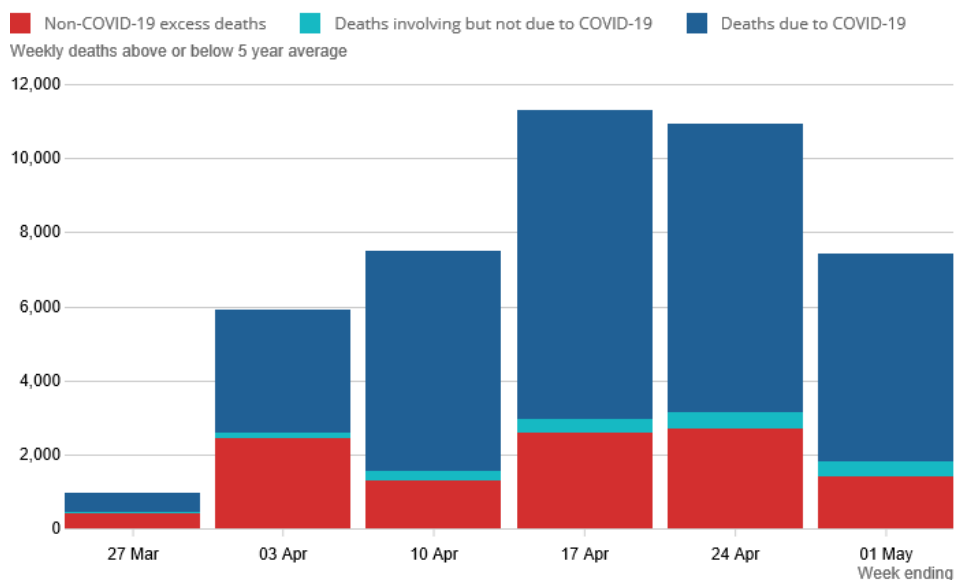
15. Weekly excess deaths due to COVID-19, involving COVID-19 and non COVID-19 deaths, registered up to 1 May, England and Wales²⁴

This graph shows a detailed breakdown of excess deaths from week ending 27 March to week ending 1 May. Deaths involving COVID-19 have been split into those

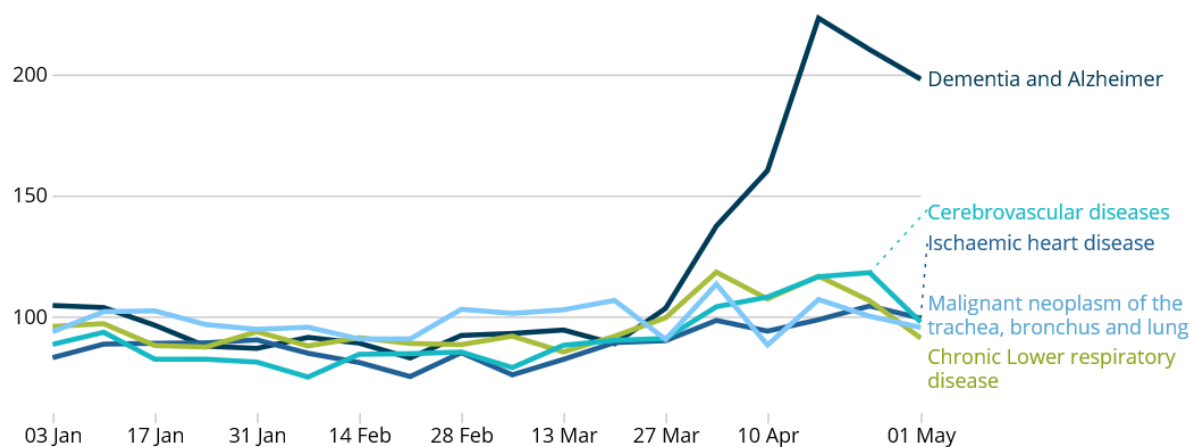
²³ ONS Analysis of death registrations not involving coronavirus

²⁴ ONS Analysis of death registrations not involving coronavirus

due to COVID-19 and those where COVID-19 was involved but was not the underlying cause. The majority of excess deaths are due to COVID-19 but there are also a substantial number of non COVID-19 excess deaths particularly since the beginning of April.



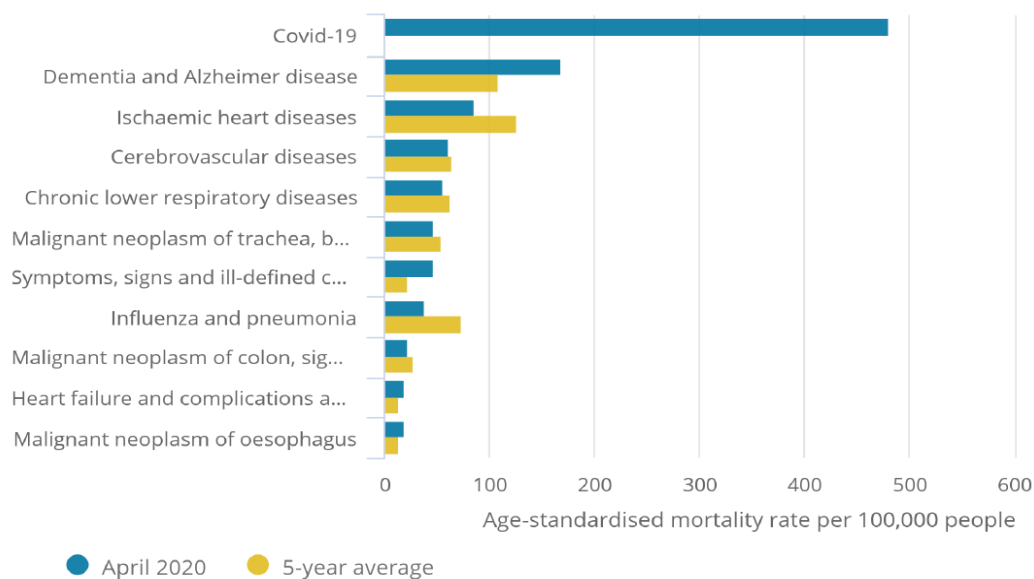
16. Weekly number of excess non COVID-19 deaths by cause, registered up to 1 May, England and Wales²⁵



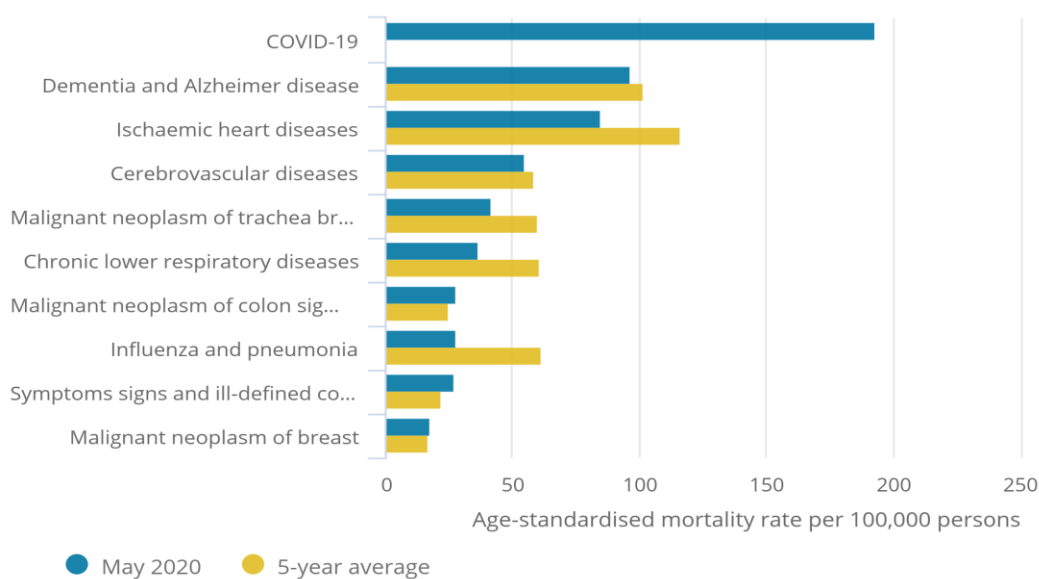
Here are excess deaths by cause of death. From week ending 3 April onwards, there has been a general increase in most leading causes of death, especially in deaths due to dementia and Alzheimer disease. These reach a maximum of 2,775 deaths (220.8% of five-year average) in the week ending 17 April. There are also increases in deaths from chronic lower respiratory disease, cerebrovascular disease and lung cancer over the same period and a small increase in deaths from ischaemic heart disease at the end of April.

²⁵ ONS Analysis of death registrations not involving coronavirus

17. Age-standardised mortality rate for the top 10 causes of death per 100,000 persons, Wales, April 2020²⁶



18. Age-standardised mortality rate for the top 10 causes of death per 100,000 persons, Wales, May 2020²⁷



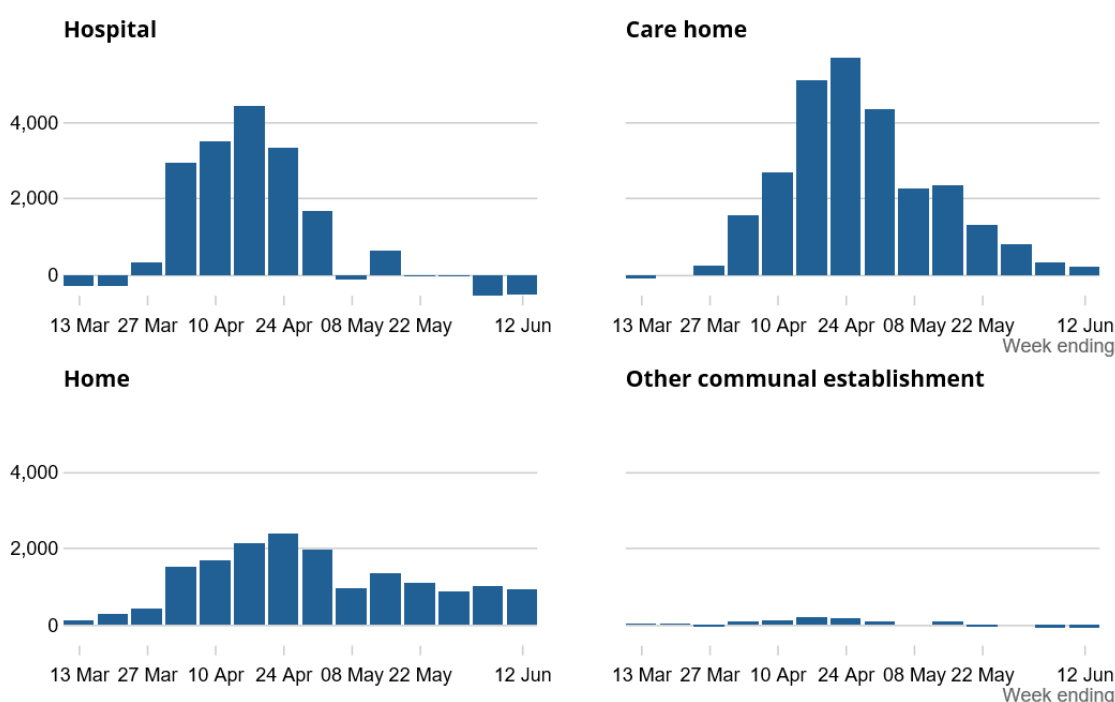
The two graphs above show age-standardised mortality rates for deaths by cause compared with the 5-year average for April and May respectively (note difference in X-axis scale). COVID-19 is the most frequent underlying cause of death in Wales in both months accounting for 1,326 deaths (33.0% of all deaths) and 553 deaths (19.3%) in May.

²⁶ ONS Deaths involving COVID-19 April 2020 and May 2020
²⁷ ONS Deaths involving COVID-19 April 2020 and May 2020

Some possible explanations for this pattern are:

- **misattribution** of deaths because of undiagnosed COVID-19, especially where the symptoms of COVID-19 are difficult to recognise in the presence of comorbidities. This is particularly problematic in people with dementia who may not be able to express their symptoms
- **failure to list COVID-19** on the death certificate because no confirmatory test result was available
- **a ‘catch-up’ effect** among very frail people because of a period earlier in the year of deaths below the 5-year average, perhaps due to a mild influenza season.

19. Number of excess deaths by place of death, registered up to 12 June, England and Wales²⁸



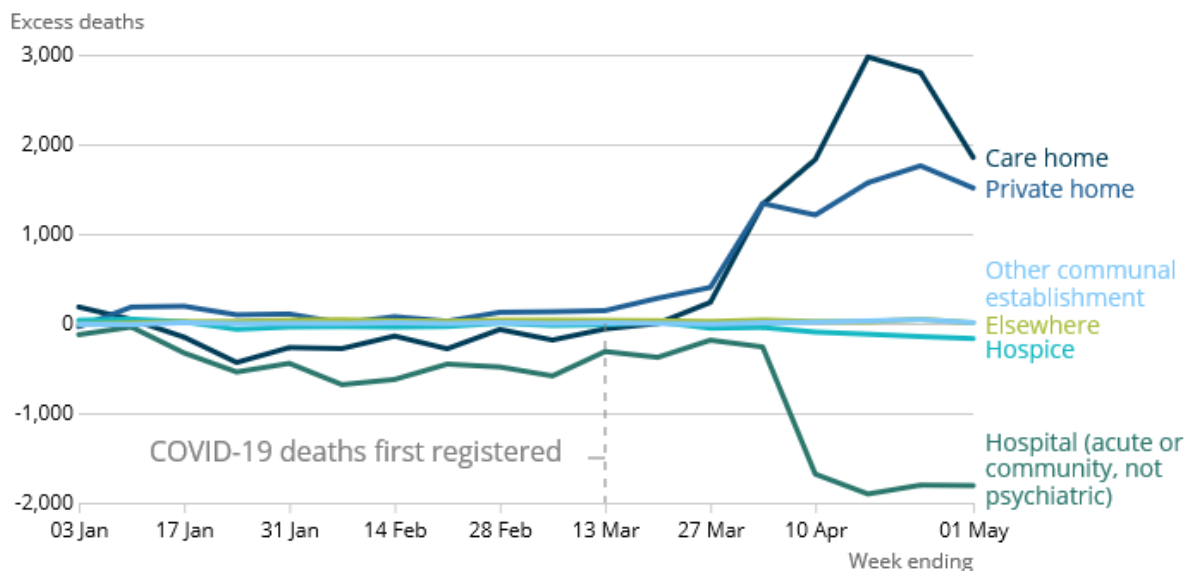
The number of excess deaths by place of death is shown above. The largest number of excess deaths occurred in care homes, followed by hospitals. The peak in the number of excess deaths occurred in the week ending 17 April in hospitals and in the week ending 24 April in care homes and private homes.

20. Weekly number of non COVID-19 excess deaths by place of death, registered up to 1 May, England and Wales

Below are the number of non-COVID-19 excess deaths by place of death. The highest numbers are seen in care homes, with a maximum of 2,975 in the week ending 17 April. Non-COVID-19 deaths in private homes also increased whereas

²⁸ ONS Deaths registered weekly in England and Wales, up to 12 June

non-COVID-19 deaths in hospital fell below the five-year average from week ending 3 April 2020 onwards. The excess deaths in care homes occur predominantly in women, whereas the increase in deaths occurring in private homes do not show much difference by sex. This is likely to be because there are almost three times as many women as men in care homes (Census 2011).



References

1. Office of National Statistics. Deaths involving COVID-19, England and Wales: deaths occurring in May 2020. (accessed 26 Jun 2020)

<https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletin/deathsinvolvingcovid19englandandwales/deathsoccurringinmay2020>

2. Office of National Statistics. Deaths registered weekly in England and Wales, provisional, up to 12 June 2020. (accessed 26 Jun 2020)

<https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/weeklyprovisionalfiguresondeathsregisteredinenglandandwales>