

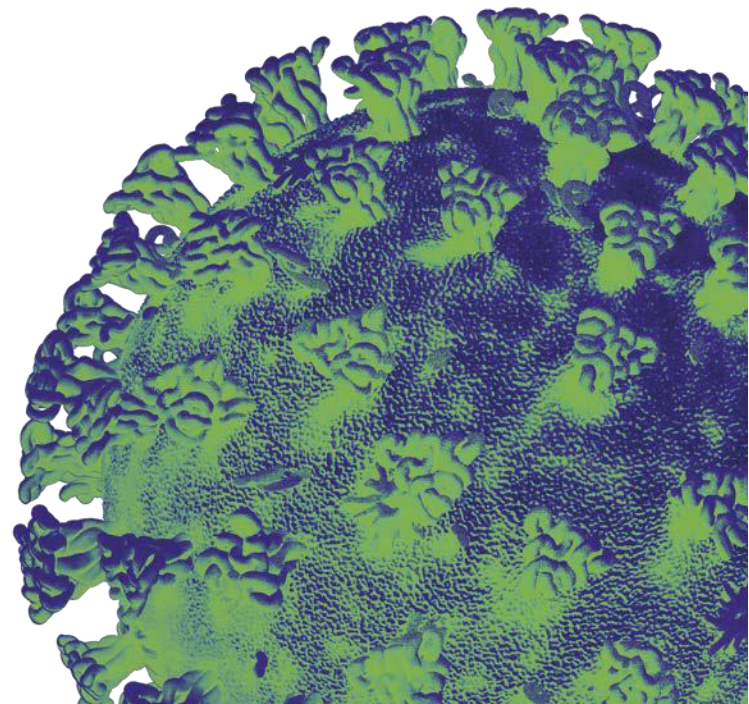
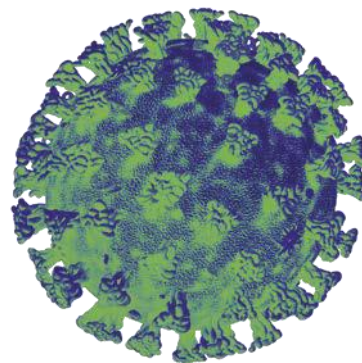
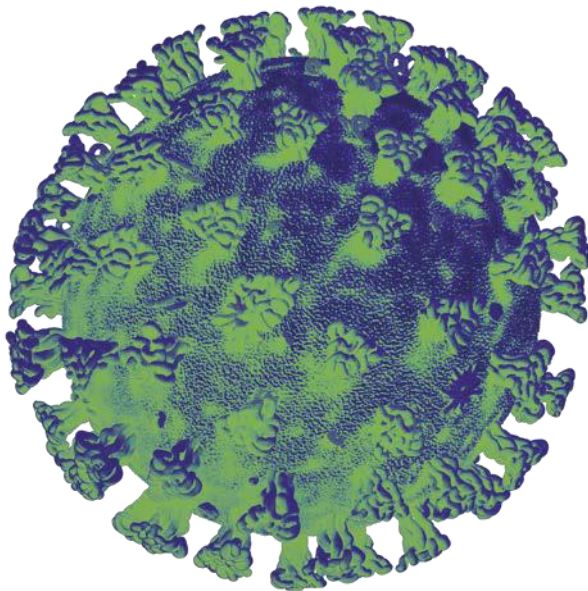


Llywodraeth Cymru
Welsh Government

Technical Advisory Group

Examining Deaths in Wales associated with COVID-19

24 March 2021



Examining Deaths in Wales associated with COVID-19

Introduction

As the first period of the COVID-19 pandemic subsided in July we previously looked back at the data for us to learn from the terrible loss of life that the virus has brought¹. By examining COVID-19 related deaths over the first peak of the infection we tried to understand what caused the spread, what made our population vulnerable and what policies may be most effective in reducing all harms in future periods. Since autumn 2020, the second period of the COVID-19 pandemic has hit Wales and the UK, and is still in progress. The narrative below investigates COVID-19 related deaths to date, and draws on comparisons between the first period and the second period across Wales and the UK.

Key findings

- Wales had fewer excess deaths than many other parts of the UK during the first period of the pandemic, but is currently broadly similar for the second period.
- Whilst the second period is still underway, most other parts of the UK are currently showing a lower proportion of excess deaths than the first period. However, this may reflect regions peaking at different time periods.
- 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 learn from our experience to mitigate any future harm.

Data

There are two main sources of COVID-19 mortality statistics:

- rapid mortality surveillance data produced by Public Health Wales (PHW)
- data produced by the Office for National Statistics (ONS) based on the information collected on the death certificate.

PHW started to collect and produce surveillance data to give an earlier indication of the overall trend of COVID-19 deaths. The ONS data provides a more comprehensive picture on mortality as it covers deaths in all settings, with PHW's data predominately capturing deaths in hospitals. Further information on the differences between both sources are explained in the Chief Statistician's [blog](#).

Understanding the data

There are a number of ways to measure and explain the impact from COVID-19 in terms of mortality. We can use total numbers of deaths involving COVID-19, but this 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.

¹ [Examining Deaths in Wales Associated with COVID-19](#), July 2020, Technical Advisory Group

This does not take into account the vulnerability of a population to COVID-19 infection. We still need to consider the differences in demographics to understand the true effect of this coronavirus. We can also use “age-standardised mortality rates”. 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 demographic factors and indirect impacts of the pandemic.

This paper will generally focus on excess deaths, which is a key measure of quantifying the number of deaths in a given year.

Definitions

Throughout this paper we refer to specific terminology, to explain mortality and COVID-19 related mortality. The section below explains how these are defined.

Excess deaths

This refers to the difference between the number of deaths registered over a set time period, compared with the average number of deaths for the same time period over the previous five years. A positive value means that we are seeing more deaths than the historical average, with a negative value showing fewer deaths (i.e. no excess).

Deaths involving/not involving COVID-19

Deaths involving refer to where COVID-19 was mentioned anywhere on the death certificate as a contributory cause of death. Deaths not involving refer to where COVID-19 was not mentioned anywhere on the death certificate as a contributory cause of death.

Deaths due to COVID-19

These refer to where COVID-19 was identified as the underlying (main) cause of death on the death certificate. Up to January 2021, 89% of registered deaths involving COVID in Wales were due to COVID-19².

What have we learnt to date

So far, we know that the highest death rates are in older people³, people from Black, Asian and Minority Ethnic backgrounds⁴ and deprived communities⁵. The majority of excess deaths are deaths involving COVID-19. However, up to December 2020 around 83% of deaths due COVID-19 had other [pre-existing conditions reported](#). Deaths have been high in care homes⁶ and in people in receipt of domiciliary care⁷. Data for England and Wales shows elevated death rates in certain occupations such as care workers and factory workers⁸.

² Monthly Mortality analysis, England and Wales, [Office for National Statistics](#)

³ Covid-19 recovery profile, [Public Health Wales](#)

⁴ Deaths involving the coronavirus and all deaths by ethnic group, [Office for National Statistics](#)

⁵ Covid-19 recovery profile - [Public Health Wales](#)

⁶ Covid-19 and the deaths of care home residents, [Nuffield Trust](#)

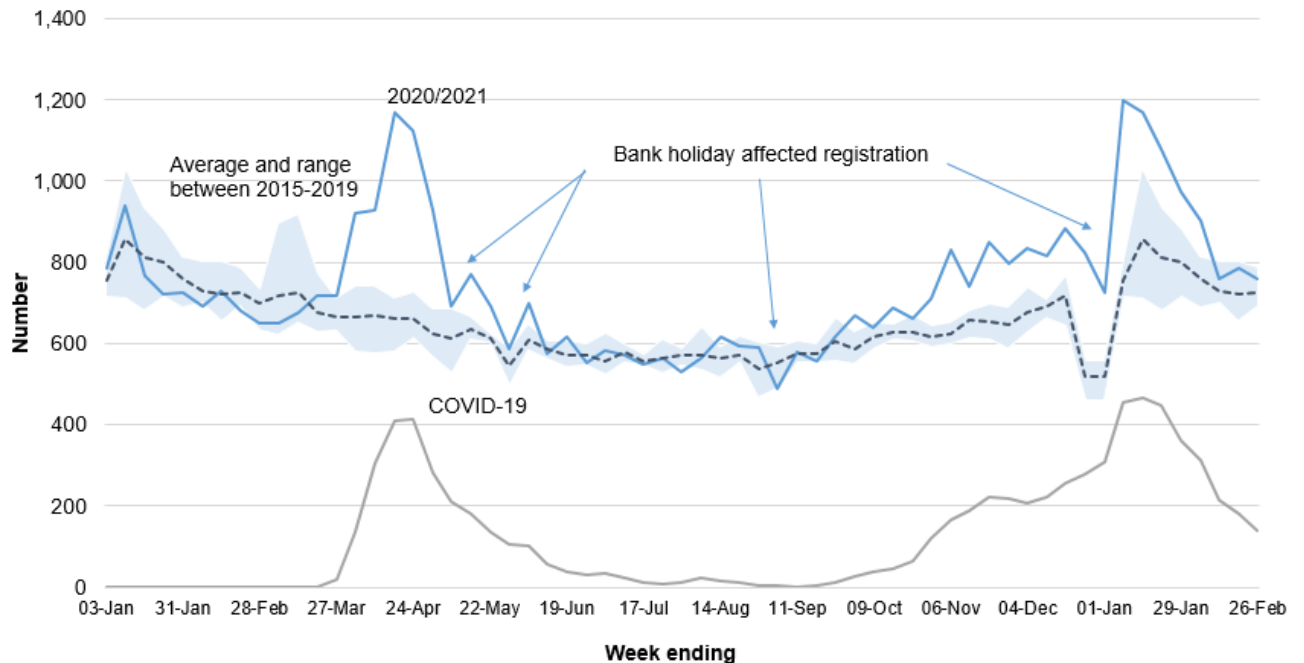
⁷ Deaths involving COVID-19 in the care sector, [Office for National Statistics](#)

⁸ Coronavirus (COVID-19) related deaths by occupation, [Office for National Statistics](#)

Analysis of Excess Deaths in Wales

Figure 1 shows the number of registered deaths from all causes, and of which those involving COVID-19, in 2020 and the start of 2021. To contextualise this information we also show the 5-year average and the range within those 5 years to understand how the pandemic deviates from years gone by, such as years with “bad” flu seasons. Note that when comparing 2021, the five-year average continues to be 2015-19 in order compare to a period not affected by the pandemic.

Figure 1: Number of weekly deaths registered, 3 January 2020 to 26 February 2021



Source: [Office for National Statistics](#)

The chart shows that from the start of the pandemic in March 2020 deaths in Wales were below the 5 year average, representing a somewhat mild flu season. As the first period of the COVID-19 pandemic began we see deaths involving COVID-19 increase peaking in the first period in mid-April. During this time the rate of deaths from all causes increases at a similar rate. From peaking in mid-April deaths involving COVID-19 subsequently decreased to the start of July. Deaths from all causes decreased at a slightly quicker rate than deaths involving COVID-19. Therefore for the purpose of this analysis the first period of interest is defined as Week 11 to Week 27 (from the 7 March to 3 July 2020).

From July, deaths from all causes broadly tracked the 5-year average number of deaths to late September. There were very few deaths involving COVID-19 during this period. From late September the number of registered deaths involving COVID-19 started to increase. Alongside this, the number of all cause deaths rose above the 5-year average and has continued to be above average for the remainder of 2020 and the start of 2021. For the purpose of this analysis the second period of interest is considered to start from Week 40 (from the week ending 2 October).

The second period showed a more gradual increase in the number of deaths involving COVID-19 than the first period but for a longer time period. The second

period peaked in the week ending 15 January, surpassing the weekly peak of the first period. The data within the first two weeks of 2021 are likely to be affected by delays in registrations due to the Christmas bank holidays. Although the peak in deaths for the second period exceeded the first, we usually see more deaths in winter than spring, therefore the weeks with the highest proportion of excess deaths remain in the first period.

Within the second period of the pandemic we have now sadly seen more people die involving COVID-19 than the first period. As outlined above, we are still in the midst of the second period of the COVID-19 pandemic across Wales and the UK, therefore the analysis of the second period does not necessarily illustrate the final picture. As we are seeing the weekly number of registered deaths involving COVID-19 decrease, if this pattern continues, the excess mortality percentages are also likely to decrease further in the overall and period 2 analysis.

This analysis will consider registered deaths for the pandemic period so far (week starting 7 March 2020 to 26 February 2021), as well as for two distinct periods - Period 1 (the week starting 7 March to 3 July 2020) and Period 2 (from the week ending 2 October to 26 February 2021) to investigate any changes in trend from the first period of the pandemic. Note there is a gap between the first and second period therefore the average of these will not equal the pandemic period. The dates used within this report provide a general overview of the two main periods of the pandemic to date. These should not be considered in absolute terms, as different areas will have experienced peaks at different time periods.

Excess deaths by UK country, regions and within Wales

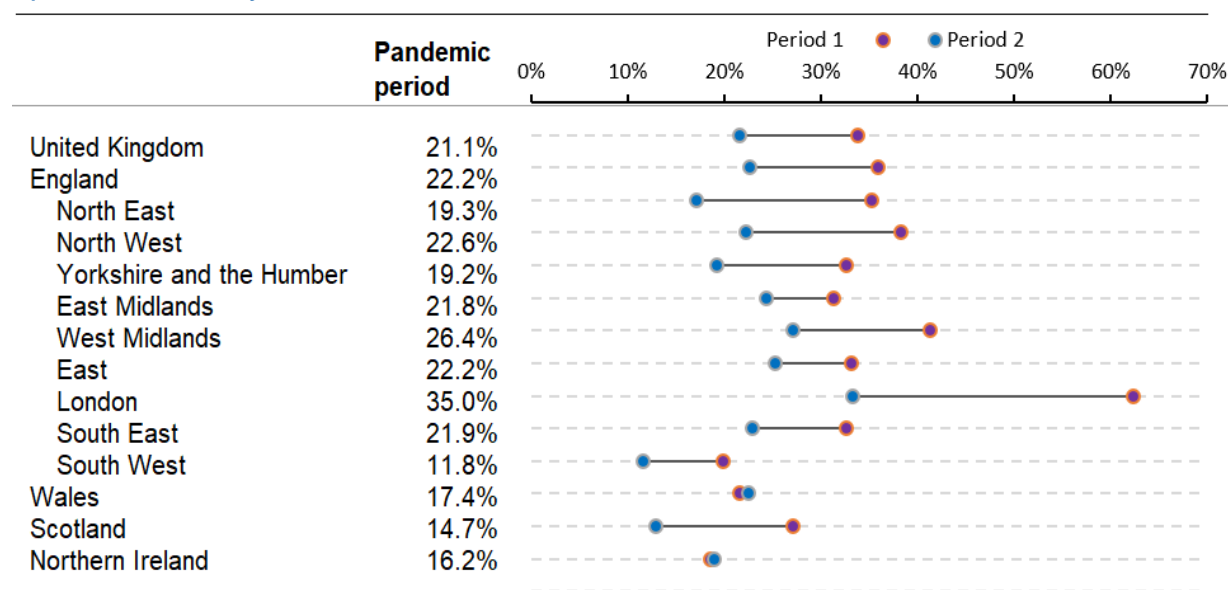
UK Countries and English Regions

Figure 2, below, shows a comparison of excess deaths between Wales and the other UK countries and English regions. Since the start of the pandemic Wales has seen a lower proportion of excess deaths than England (17.4% vs 22.2%). However the pandemic has affected the UK countries differently between the first and second period.

In the first period of the pandemic, analysis suggests that Wales and Northern Ireland had a lower proportion of excess deaths than England and Scotland (21.5% and 18.5% vs 36.0 and 27.1%). The pattern has changed in the second period, with Wales seeing a similar proportion of excess deaths to the first period. Similar to Wales, Northern Ireland has seen a similar pattern, but England and Scotland have currently seen smaller proportions of excess deaths in the second period.

Figure 2 allows further comparisons of the change within English regions between the first and second period of the pandemic. In the first period Wales had a relatively lower percentage of excess deaths than all English regions except the South West. For the second period the relative percentage of excess deaths in Wales has been more similar to English regions. All regions of England have to date seen a smaller proportion of excess deaths in the second period than the first.

Figure 2: Excess registered deaths by country and English region and period, data up to 26 February 2021^{a, b, c}



^a based on date death was registered not when it occurred, so may differ slightly from other figures.

^b the weeks used for Scotland and Northern Ireland may differ slightly to England and Wales.

^c Pandemic period: week starting 7 March to 26 February; Period 1: week starting 7 March to 3 July 2020; Period 2: week ending 2 October to 26 February 2021.

Source: Welsh Government analysis of data from [Office for National Statistics](#), [National Records of Scotland](#) & [Northern Ireland Research and Statistics Agency](#)

European countries

In March 2021, after the analysis for this report was complete, the Office for National Statistics published a report⁹ on mortality comparisons between selected European countries for 2020. The results from that report are not comparable with the analysis in this paper for two reasons:

- It covered a different time period – January to December 2020 – so including the early weeks of 2020 when mortality rates were generally below average, but excluding the second peak seen in January 2021.
- It used a different methodology, based on comparing age-standardised mortality rates with the average rather than, as we have done, comparing the number of deaths.

This suggested that the UK and constituent countries saw some of the highest mortality peaks experienced by European countries in the spring of 2020. By the end of 2020, cumulative mortality rates in the UK and constituent countries were above average, but were neither the highest nor lowest in Europe. Within the UK, the report suggests that by the end of 2020, cumulative excess mortality rates were highest in England and lowest in Wales. This contrasts slightly with our analysis, which found highest levels of excess deaths in England, followed by Wales. This may be due to the differences noted above in the time periods covered and the methodology used.

⁹ [Comparisons of all-cause mortality between European countries and regions: 2020](#)

Whilst these trends provide a retrospective view on mortality during the pandemic, they will be influenced by the virus spreading at different times across different geographies.

Sub Wales Analysis

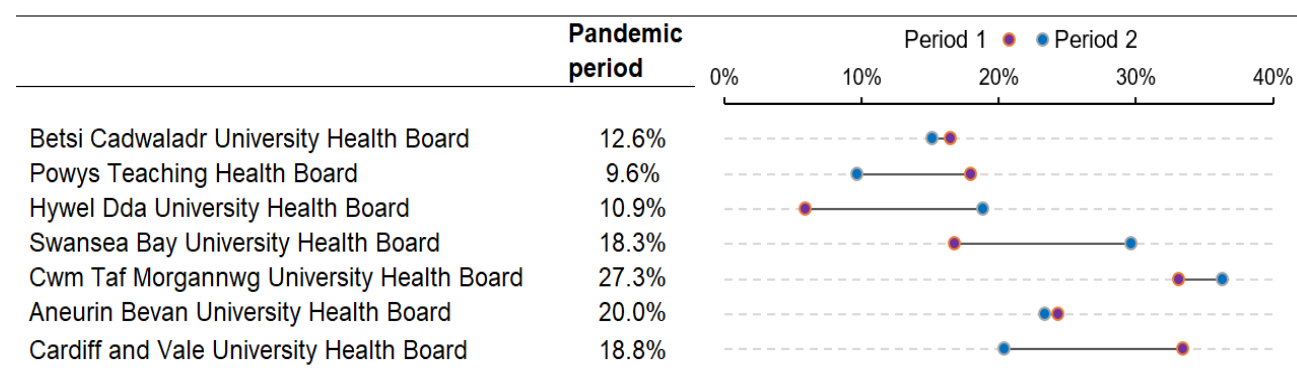
As we've seen across the UK there are regional patterns and these are currently different from the first period. Figure 3 looks at the variation of excess deaths within Wales.

Since the start of the pandemic we have seen excess deaths across all health boards in Wales compared with 2015-19. This ranged from 9.6% in Powys to 27.3% in Cwm Taf Morgannwg. In the first period of the pandemic, we saw excess deaths across all health boards for all causes, with a larger proportion of excess deaths across South Wales.

In the second period, all regions are observing more deaths than the 5-year average, with Cwm Taf Morgannwg having the highest proportion of excess deaths from all causes (36.3%), followed by Swansea Bay (29.7%).

The two health boards with the largest populations (Betsi Cadwaladr and Aneurin Bevan) have shown the greatest level of consistency in the percentage of excess deaths in the first and second period.

Figure 3: Excess deaths by health board, up to week ending 26 February 2021^a



^a Pandemic period: week starting 7 March to 26 February; Period 1: week starting 7 March to 3 July 2020; Period 2: week ending 2 October to 26 February 2021.

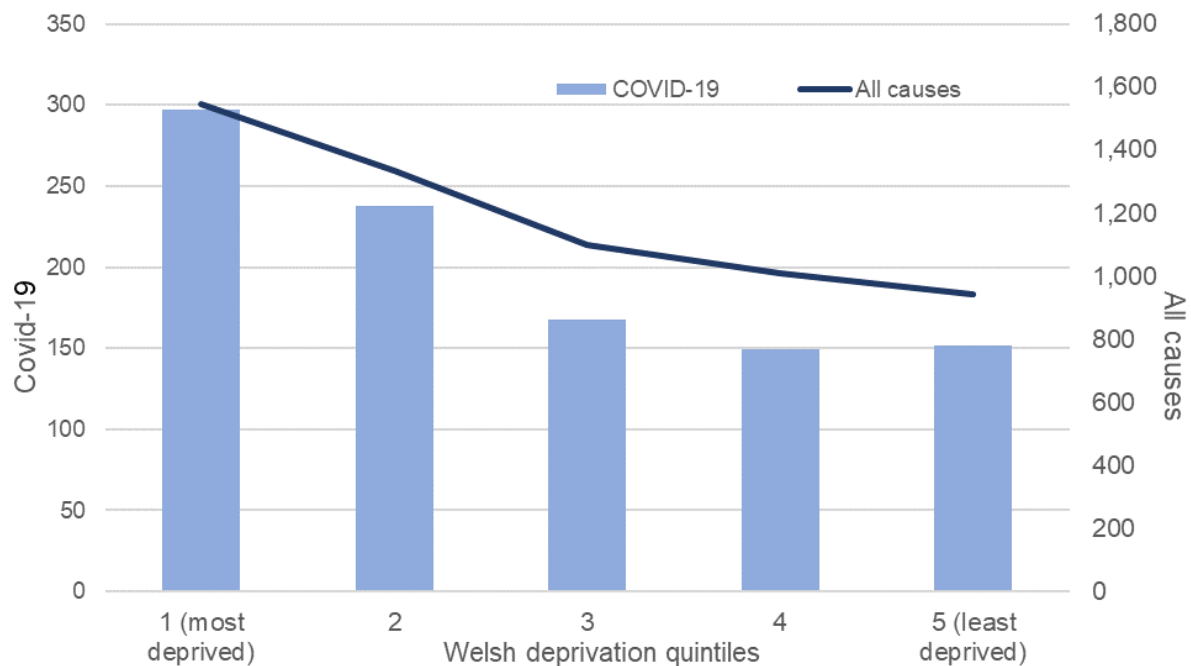
Source: Welsh government analysis of data from the [Office for National Statistics](#)

Deprivation

Through using the Welsh Index of Multiple Deprivation we can break down areas of Wales from *least deprived* to *most deprived*. Figure 4 shows the age standardised rates of deaths from March 2020 to January 2021 by deprivation quintile.

In Wales, the age-standardised mortality rate due to COVID for the 11 months March 2020 to January 2021 in the most deprived areas was almost twice the mortality rate in the least deprived areas. Whilst a similar pattern is seen for deaths from all causes the difference for deaths due to COVID is greater.

Figure 4: Age standardised deaths per 100,000 people by deprivation quintile, Wales; Data from 1 March 2020 to 31 January 2021



Source: Welsh government analysis of data from the [Office for National Statistics](#)

Excess deaths in Wales by Cause

Understanding how the pandemic has impacted deaths from other causes is also important to consider the wider context of mortality. Figure 5 investigates the broad underlying causes of death categories in 2020 (not including COVID-19), showing the number of registered deaths for the 11 months since the start of the pandemic to January 2021. This data represent deaths registered between March 2020 and 31 January 2021. Registration of certain deaths (such as external causes) are often delayed because of coroners' inquests, therefore this table does not necessarily reflect when these deaths took place.

We see fewer deaths from *Respiratory diseases* and *external causes* in the 11 months compared to the 2015-19 average. The data shows an increase in deaths from causes such as *Diabetes Mellitus* (23.4%), *Nervous System diseases (excluding Alzheimer's)* (18.0%) and *Dementia and Alzheimer's* (3.0%). Whilst we see a greater proportion of deaths from *Diabetes Mellitus*, it is worth noting the relatively small number of deaths in this category, makes the calculation more sensitive to change.

Whilst we see a slight increase in deaths due to *Dementia and Alzheimer's*, this has not been consistent across the 11 months. Between March to June 2020 we saw more deaths than the average, but more recently between October 2020 to January 2021, there were fewer deaths than the average. Earlier on in the pandemic the [ONS](#) looked at deaths due to *Dementia and Alzheimer's*, and provided some possible explanations to the observed increase in the first period, such as difficulty in identifying COVID-19 symptoms.

Figure 5: Leading causes of registered deaths, March 2020 to January 2021^a

ICD 10 code	Leading Cause	Count	Five-year average	Excess deaths
A00-B99	Infectious diseases	265	335	-21.0%
C00-C97 (excluding C44)	Cancer (of which:)	8,242	8,243	0.0%
C18-C21	Bowel cancer	899	881	2.1%
C33-C34	Lung cancer	1,627	1,759	-7.5%
C61	Prostate cancer	629	548	14.7%
E10-E14	Diabetes Mellitus	420	340	23.4%
F00, F01, F03, G30	Dementia and Alzheimers	3,451	3,351	3.0%
G00-G99 excluding G30	Nervous system diseases excluding Alzheimer	896	759	18.0%
I00-I99	Circulatory (of which:)	7,799	7,853	-0.7%
I20-I25	Coronary heart disease	3,369	3,509	-4.0%
I60-I69	Cerebrovascular	1,739	1,859	-6.5%
J00-J99	Respiratory (of which:)	3,431	4,644	-26.1%
J09-J18	Flu and pneumonia	1,166	1,935	-39.7%
J40-J47	Chronic lower respiratory diseases	1,543	1,864	-17.2%
K00-K99	Digestive (of which:)	1,576	1,525	3.3%
K70-K76	Cirrhosis and other diseases of the liver	582	516	12.8%
N00-N99	Genitourinary	564	576	-2.1%
V00-Y99	External (of which:)	1,002	1,242	-19.3%
V01-X59	Accidents	714	865	-17.4%

^a Fluctuations in trends are expected due to smaller numbers as a result of the breaking down the underlying cause categories, operating in tandem with shorter monthly data in which annual reporting would usually smooth out.

Source: Welsh government analysis of ONS data supplied by [Public Health Wales](#)

Deaths by setting

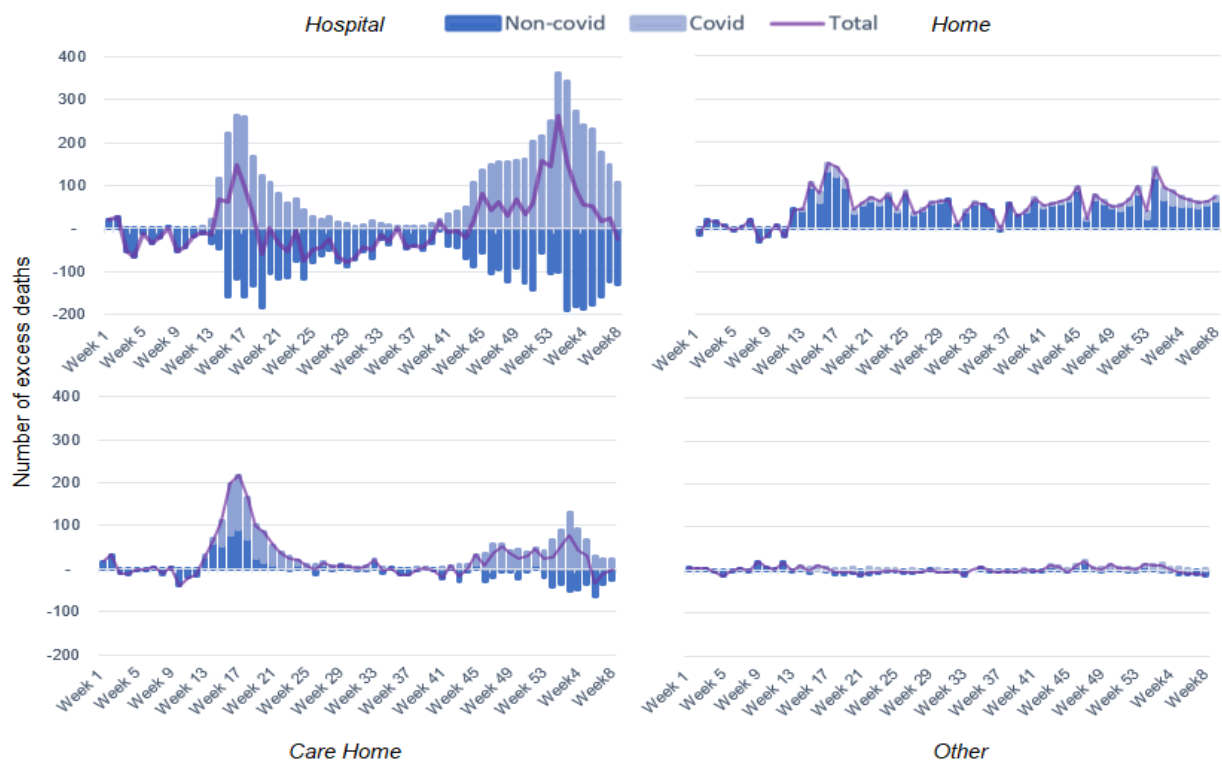
Figure 6 shows the breakdown of excess deaths by setting, week and cause (involving/not involving COVID-19). If the data is above zero, this means there were more deaths than the 5-year average. This captures deaths of Welsh residents, and therefore some of these individuals may have died outside of Wales (i.e. in English hospitals). Deaths in care homes refer to deaths which occurred in the setting and not to care home residents (who could have died in other settings).

The top left chart shows the change in deaths occurring in hospitals compared to the 5-year average. Since the start of the pandemic in week 11, deaths not involving COVID-19 were generally below the 5-year average, with the excess deaths being driven by the deaths involving COVID-19. The chart shows two distinct peaks for deaths involving COVID-19. Comparing the two distributions, the levels of excess deaths persisted for a longer time period in the second period than the first period.

Deaths occurring at home (top right chart), shows that since the start of the pandemic there were more deaths at home than the 5-year average. Unlike deaths occurring in hospitals, the excess is largely driven by deaths not involving COVID-19.

For deaths in care homes (bottom left chart) we see a more pronounced first spike around week 17. The excess deaths observed in this setting are from a mixture of deaths involving and not involving COVID-19. The weekly number of excess deaths observed in the second period is currently lower than the first. This may be as a result of better protocols in place to reduce the virus from entering care homes in the first place, and/or that care home residents could have been transferred and subsequently passed away in different settings (i.e. hospitals).

Figure 6: Excess deaths by setting and cause of death, up to week 8 2021.



Source: Welsh government analysis of [Office for National Statistics](#) data

Conclusions and Areas for Further Work

Over the course of the pandemic so far, Wales has experienced lower levels of excess deaths than some parts of the UK. However the level of excess deaths has been largely unchanged in Wales between period 1 and period 2, whereas it fell considerably in Scotland and many regions of England. There has been considerable variation within Wales, with Swansea Bay and Hywel Dda seeing large relative increases in excess deaths, sizeable falls in rates in Cardiff and the Vale but Cwm Taf Morgannwg seeing relatively high rates for both periods. The reasons for these different patterns are not yet fully understood but may reflect the different geographical spread of the virus at different points in the year.

Vaccines are now being rolled out over Wales, with more than a million vaccines having been administered as reported on 9 March. Despite the rollout of the vaccine, due to the timings of the data used in this report it is too early to draw any firm conclusions on the impact the vaccine has had on mortality. Work is underway across the UK to assess the impact of the vaccine on mortality.

Whilst looking back retrospectively is important to assess what we can learn from the pandemic, it also proposes unexplored questions. As in the July 2020 report on excess deaths, our questions are focused on whether there are factors government can influence to reduce the harm of COVID-19 within Wales and the UK.

- Controllable factors:
 - Was there a significant effect from non-lockdown interventions?
 - Was there a significant effect from lockdown interventions?

- What impact and actions have been introduced to minimise nosocomial infection within different settings?
- Wider/future questions
 - What impact has the emergence of new variants of COVID-19 had on excess mortality?
 - What will the long term impact from the pandemic be on deaths over the next few years due to backlog in delayed treatment?
 - How long will the vaccine rollout take to see the benefits?
 - What are the biggest mediating factors that make inequalities in COVID-19 mortality wider than other diseases; are they housing, occupation, health behaviours, time taken to seek help, etc?
 - How has the vaccine affected mortality?
 - Has vaccine roll out impacted on absolute and relative health inequalities?
 - What are the long term health consequence of having COVID-19 on all-cause mortality? For instance, will there be an increase in deaths from other causes in covid survivors, particularly those who have been left with multi-system damage?
 - Has a relationship been observed between management of long term conditions like diabetes during the pandemic, and deaths from these conditions?