

Covid-19 related deaths and pre-existing conditions in Northern Ireland: March 2020 to February 2021

Key Points

Covid-19 related deaths, March 2020 to February 2021

- There were 2,806 Covid-19 related deaths registered in Northern Ireland between 1st March 2020 and 28th February 2021;
- Covid-19 was reported in the causal chain of events leading to death for 2,451 deaths (87.3%); and
- For 216 of these 2,451 deaths (8.8%), there were no pre-existing conditions.

Covid-19 as underlying cause of death, March to December 2020

- Covid-19 was the underlying cause of death for 1,626 deaths (88.8%) of 1,831 Covid-19 related deaths registered in Northern Ireland between 1st March and 31st December 2020;
- There were no pre-existing conditions for 157 deaths (9.7% of Covid-19 deaths);
- Just over half (816) of Covid-19 deaths (50.2%) had one or two pre-existing conditions.
- The average number of pre-existing conditions was 2.42; and
- Dementia and Alzheimer’s disease was the most common pre-existing condition, appearing in 524 deaths (32.2% of Covid-19 deaths). The next most common pre-existing conditions were diabetes (335 deaths) and hypertensive diseases (332).

Contents

Background	2
Death registrations and cause of death coding	3
Covid-19 deaths: mentions vs. underlying cause.....	3
Presence of pre-existing conditions – March 2020-February 2021	5
Number of pre-existing conditions – March-December 2020	6
Type of pre-existing conditions – March-December 2020.....	9
Future analysis	10
Links to relevant publications	12
Contact Details	12
List of Tables.....	12
Annex A: Methodology: pre-existing conditions of Covid-19 related deaths.....	14

Published 31 March 2021

Background

The Northern Ireland Statistics & Research Agency (NISRA) publishes timely but provisional weekly counts of death registrations in Northern Ireland. To allow for registration and processing, these figures are published seven days after the week ends. From 3rd April 2020¹, the NISRA weekly deaths release was supplemented with deaths relating to Covid-19 (that is, where Covid-19 was mentioned anywhere on the death certificate, including in combination with other health conditions).

This bulletin contains analyses of Covid-19 related deaths that occurred in Northern Ireland from March 2020 to February 2021, as well as analysis of deaths due to Covid-19 (i.e. where Covid-19 was the underlying cause of death) based on data currently available from March to December 2020. This is an update to the report published on 23rd December 2020². The report focuses on the presence, number and type of pre-existing conditions. Box 1 includes some definitions used throughout this report.

In producing this report, NISRA wish to acknowledge the guidance provided from the ONS Health Analysis and Life Events Division and officials within the Department of Health's Office of the Chief Medical Officer.

Box 1: Definitions

<u>Covid-19 related death:</u>	Death with mention of Covid-19, coronavirus, SARS-Cov-2, etc., anywhere on the Medical Certificate of Cause of Death (MCCD) including suspect or probable cases.
<u>Part 1 of MCCD:</u>	Recorded causal chain of events leading to death
<u>Part 2 of MCCD:</u>	Contributory cause(s) involved in a death
<u>Underlying cause of death:</u>	Disease or injury which initiated the train of morbid events leading directly to death
<u>Covid-19 death:</u>	Death where Covid-19 was found to be the underlying cause of death
<u>Pre-existing condition of Covid-19:</u>	Any mention on the death certificate of a condition that pre-dated or was independent of Covid-19

This report is an Official Statistics publication and statistics are produced to the high professional standards as set out in the [Code of Practice for Official Statistics](#). This analysis has been supported by the ADR-NI³. The content of this bulletin will be kept under review and more detail may be presented in future bulletins.

¹ Publication date 3rd April reporting on deaths up to week ending 27 March 2020.

² Covid-19 related deaths and pre-existing conditions: March to November 2020, available at <https://www.nisra.gov.uk/publications/covid-19-related-deaths-and-pre-existing-conditions>

³ <https://www.adruk.org/about-us/our-partnership/adr-northern-ireland/>

Death registrations and cause of death coding

This section briefly describes the processing of cause of death information. Death registrations in Northern Ireland are carried out by District Registrars, who record information provided by the informant, including the Medical Certificate of Cause of Death (MCCD)⁴, which has been signed off by a medical professional. The MCCD contains two parts: Part 1 gives the conditions leading directly to death. This could be either a single condition, or a sequence of conditions split over multiple lines in the MCCD (1a-1c). In principle, the lowest line of Part 1 should be the underlying cause of death. Part 2 contains conditions that contributed to the death but are not directly causal.

Cause of death coding to the ICD-10⁵ classification is carried out by the Office for National Statistics (ONS) on NISRA's behalf. The process uses the text fields from the MCCD and applies a series of complex rules to establish the underlying cause of death, which in some cases may be counter to the order in which they are recorded on the MCCD. This is done to preserve consistency of cause of death recording across all medical professionals, time and place.

Statistics reporting deaths according to underlying cause are available up to the fourth quarter of 2020 (October-December 2020) at the time of writing⁶. Further detail is available in the document 'Quality and Methodology Information (QMI) for Northern Ireland death statistics' published on the NISRA website⁷.

Covid-19 deaths: mentions vs. underlying cause

NISRA's weekly deaths reports have defined *Covid-19 related deaths* as those where Covid-19 was mentioned anywhere on the death certificate including probable or suspect cases. These figures have been released in a timely fashion, as they do not rely on causes of death being coded according to the ICD-10. Figure 1 compares the number of deaths each month where Covid-19 was mentioned on the death certificate (2,806 in total from March 2020 to February 2021), and where Covid-19 was subsequently confirmed to be the underlying cause of death (up to end December; 1,626 in total).

Figure 1 also shows the number of deaths where Covid-19 was mentioned in Part 1 of the MCCD, i.e. the medical professional considered Covid-19 to be either the underlying cause of death or part of the causal chain of events leading to death. Covid-19 was reported in the causal chain for 2,451 of the 2,806 Covid-19 related deaths (87.3%) over the twelve-month period March 2020 to February 2021.

⁴ The Department of Health has published guidelines for completing a MCCD:

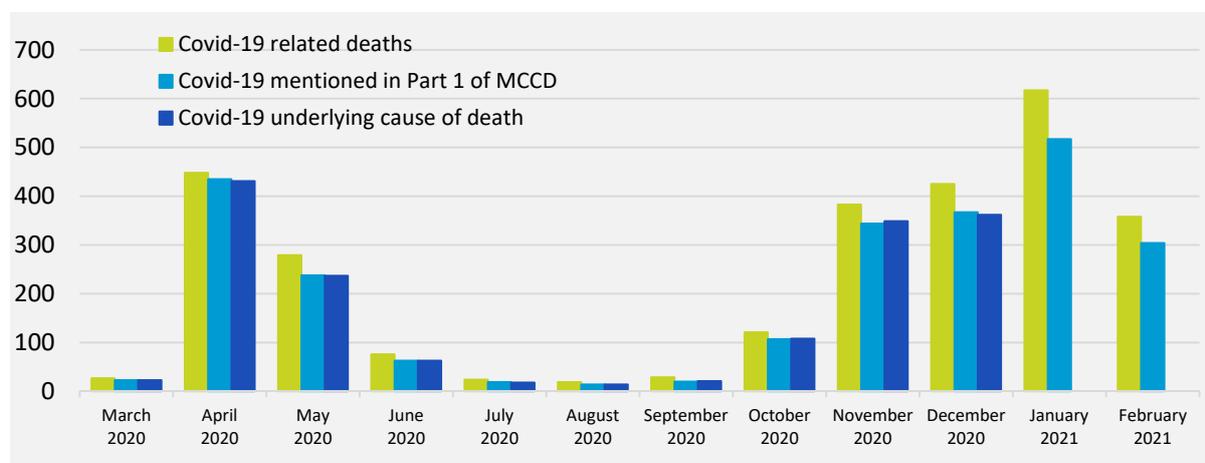
<https://www.health-ni.gov.uk/publications/guidelines-death-certification-issuing-mccd-using-niecr>

⁵ 10th edition of the International Classification of Disease Codes (ICD-10 codes)

⁶ Registrar General Quarterly Tables 2020: <https://www.nisra.gov.uk/publications/registar-general-quarterly-tables-2020>

⁷ Vital Statistics documentation: <https://www.nisra.gov.uk/publications/vital-statistics-documentation>

Figure 1: Number of (a) Covid-19 related deaths, (b) deaths where Covid-19 was mentioned in Part 1 of MCCD, and (c) deaths where Covid-19 was the underlying cause of death, by registration month, March 2020 to February 2021



The first Covid-19 related death in Northern Ireland occurred on 18th March 2020, and numbers peaked in April before reducing in May and June. There were relatively few Covid-19 related deaths from July to September, however, deaths increased again in late 2020, peaking in January 2021 and falling again in February 2021.

Deaths where Covid-19 was mentioned in Part 1 of the MCCD follow the same pattern but at a lower level. By the end of February 2021, these accounted for 87.3% of all Covid-19 related deaths. The ICD-10 coding of death registrations has been completed for registrations up to the fourth quarter of 2020. Up to 31st December, the number of deaths where Covid-19 was the underlying cause (1,626) is very close to the number of deaths with mentions in Part 1 (1,630) for the same period. Figure 2 shows both figures as a proportion of Covid-19 related deaths (all mentions) for each month from March 2020 to February 2021.

Figure 2: Proportion of Covid-19 related deaths that were (a) mentioned in Part 1 of MCCD certificate, and (b) the underlying cause of death, by month of registration, March 2020 to February 2021

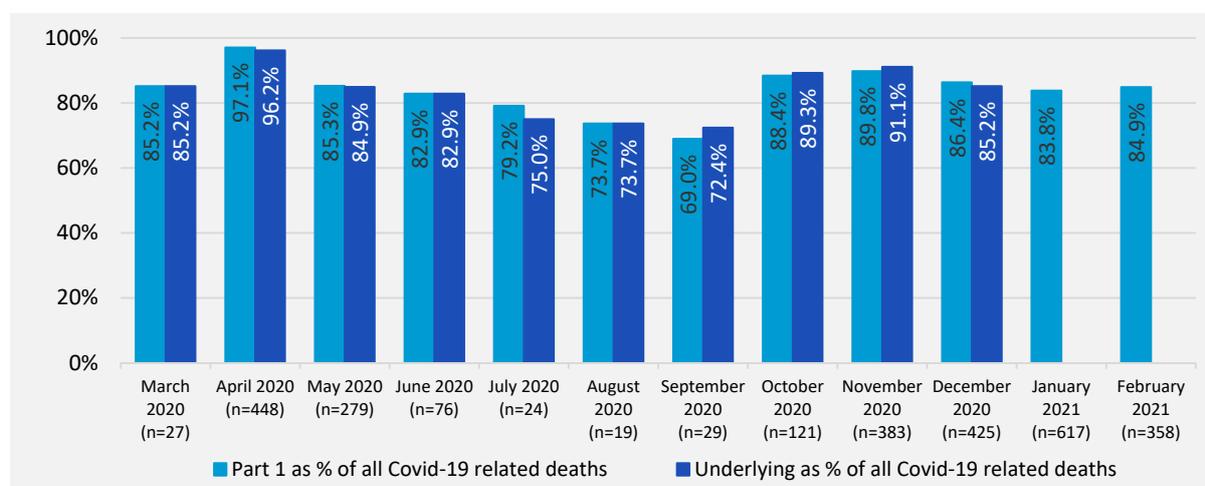


Figure 2 confirms that both series are closely aligned. Of the 1,626 Covid-19 deaths in 2020, only for 28 deaths (1.7%) was Covid-19 not mentioned in Part 1 but once coded was considered to be the underlying cause of death. From Figure 2 it appears that both proportions were highest in April, and dropped in consecutive months before rising again in October. In other words, for one in every ten Covid-19 related deaths in the first three months (March-May), Covid-19 was a contributory rather than a causal factor to the death, whilst over the summer (July-September) this was the case for one in every four Covid-19 related deaths. Note that the number of Covid-19 related deaths from July to September was relatively small. In the last three months of 2020, for roughly one in eight Covid-19 related deaths, Covid-19 was only a contributory rather than a causal factor.

Early indications for January-February 2021 suggests that this proportion has risen since, although not to the levels seen over the summer of 2020. The remainder of this report will focus on the presence, counts and types of pre-existing conditions associated with Covid-19 related deaths.

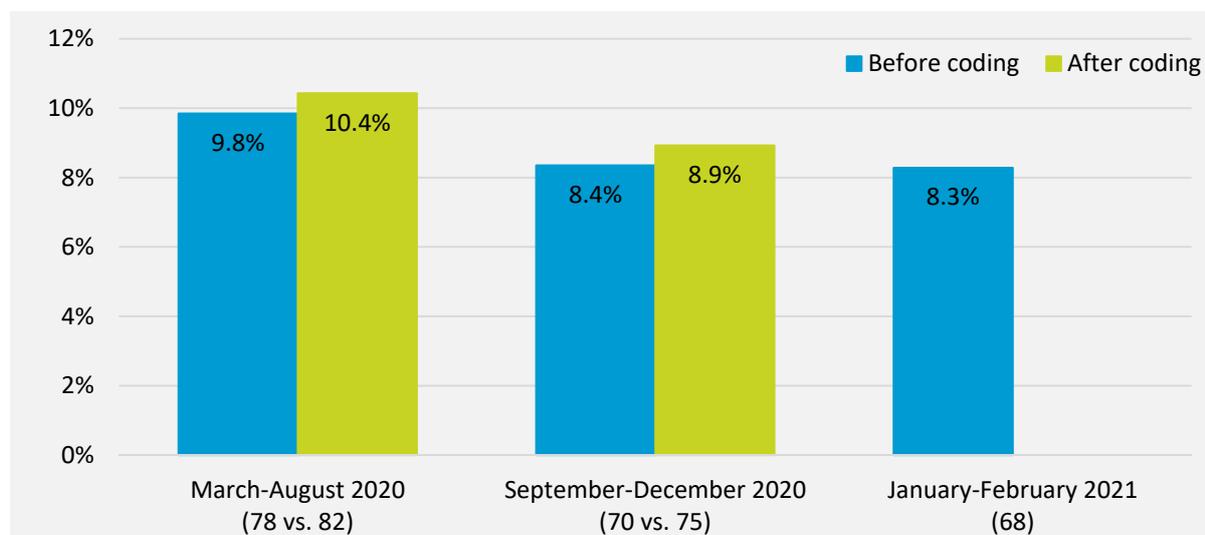
Presence of pre-existing conditions – March 2020-February 2021

The definition of a pre-existing condition used in this paper is any mention on the death certificate of a condition that pre-dated or was independent of Covid-19. Conversely, deaths without pre-existing conditions are those where Covid-19 is the only cause of death recorded, or where other causes mentioned are known to be the direct result of Covid-19.

As highlighted earlier, the lowest line of Part 1 should be the underlying cause of death, and Part 2 contains conditions that contributed to the death but are not directly causal. This means that a Covid-19 death without pre-existing conditions should have Covid-19 recorded in the lowest line of Part 1, and should have no contributory conditions recorded in Part 2.

For 2,451 of the 2,806 (87.3%) Covid-19 related deaths registered from March 2020 to February 2021, Covid-19 was recorded in the causal chain of death (Part 1). Within this group, for 216 deaths (8.8%) Covid-19 was the last mention in Part 1 and no contributory conditions (Part 2) were recorded. Prior to coding and determining the underlying cause of death, this could serve as a proxy for the proportion of Covid-19 deaths that had no pre-existing conditions. Figure 3 compares the proportion of Covid-19 deaths without pre-existing conditions, before and after coding, for March to August 2020 (first wave), September to December 2020, and January/February 2021.

Figure 3: Proportion of Covid-19 deaths without pre-existing conditions, before and after coding, by registration period, March 2020 to February 2021



The number of Covid-19 deaths without pre-existing conditions was slightly higher after the coding was completed, as certain codes were excluded from being a pre-existing condition, for example, 'old age' as a condition was deemed too vague to be meaningful (see methodology in Annex A). The proportion of Covid-19 deaths without pre-existing conditions was higher in the first wave (10.4% in March to August 2020) than at the start of the second wave (8.9% in September to December 2020). Based on the available information prior to coding, there appears to be a similar proportion without pre-existing conditions in September to December 2020 (8.4%) and early 2021 (8.3%).

A more in-depth analysis of pre-existing conditions of Covid-19 related deaths relies on the coding of cause of death. Such information is not yet available for the 975 Covid-19 related deaths registered in January and February 2021. In this two-month period, 821 deaths had Covid-19 recorded in the causal chain of event, of which 68 deaths (8.3%) had this mention in the last line of Part 1 and did not have any contributory conditions (Part 2).

The remainder of this bulletin will focus on deaths where Covid-19 was found to be the underlying cause of death in the period March to December 2020.

Number of pre-existing conditions – March-December 2020

There were 1,626 deaths registered up to 31st December 2020 where Covid-19 was identified as the underlying cause of death (88.8% of the 1,831 Covid-19 related deaths). For 157 out of these 1,626 deaths (9.7%), there were no pre-existing conditions. This is a slightly higher proportion than reported in the previous section (8.8%), which covered the longer period of deaths occurring up to 28th February 2021 and was based on information recorded on Part 1 of the death certificate available prior to establishing the underlying cause of death.

In Scotland⁸, 6.8% of deaths involving Covid-19 from March to December 2020 had no pre-existing conditions. In the same period, the Office for National Statistics⁹ found 12.5% and 17.2% of Covid-19 deaths had no pre-existing conditions in England and Wales respectively. The Health Protection Surveillance Centre¹⁰ in the Republic of Ireland found that those who died with confirmed Covid-19 up to 12th December 2020, 93.4% reported an underlying medical condition. The differences in these proportions between countries could be due to differences in the methodology and demographic make-up of each country.

Figure 4 shows the proportion of Covid-19 deaths without pre-existing conditions by age group. It shows that the highest proportion (11.4%) appears in those aged 90 and over, whilst the lowest proportion (8.0%) was found in those aged 70 to 79 years.

Figure 4: Proportion of Covid-19 deaths without pre-existing conditions by age group, March to December 2020

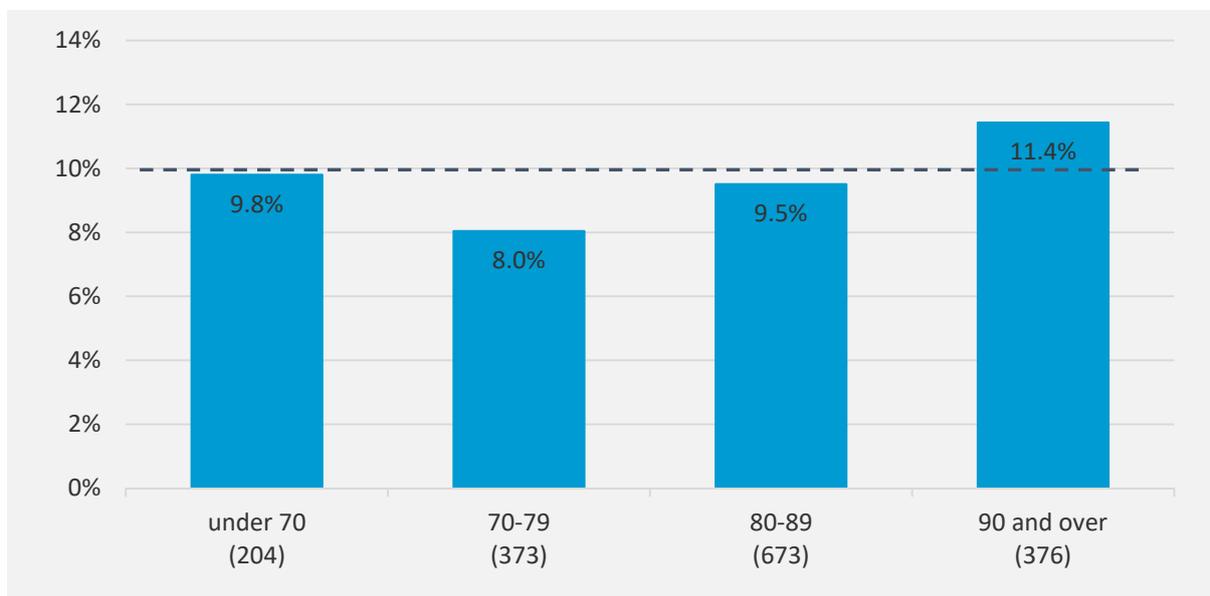


Figure 5 shows the number of Covid-19 deaths, registered up to 31st December 2020, by the number of pre-existing conditions.

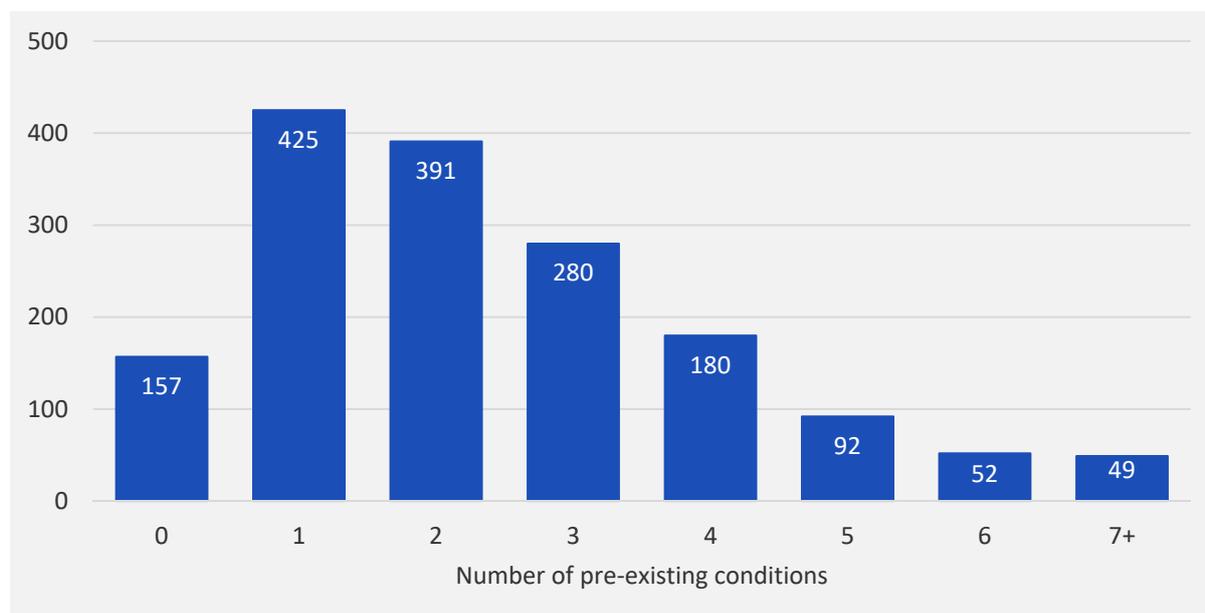
⁸ See table 'Figure 9 data' relating to 'Deaths involving Covid-19 in Scotland', 2021, week 2: <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/vital-events/general-publications/weekly-and-monthly-data-on-births-and-deaths/deaths-involving-coronavirus-covid-19-in-scotland>

⁹ See Table 2 of the dataset for pre-existing conditions (Section 8) of 'Monthly mortality analysis, England and Wales: February 2021':

<https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/monthlymortalityanalysisenglandandwales/february2021>

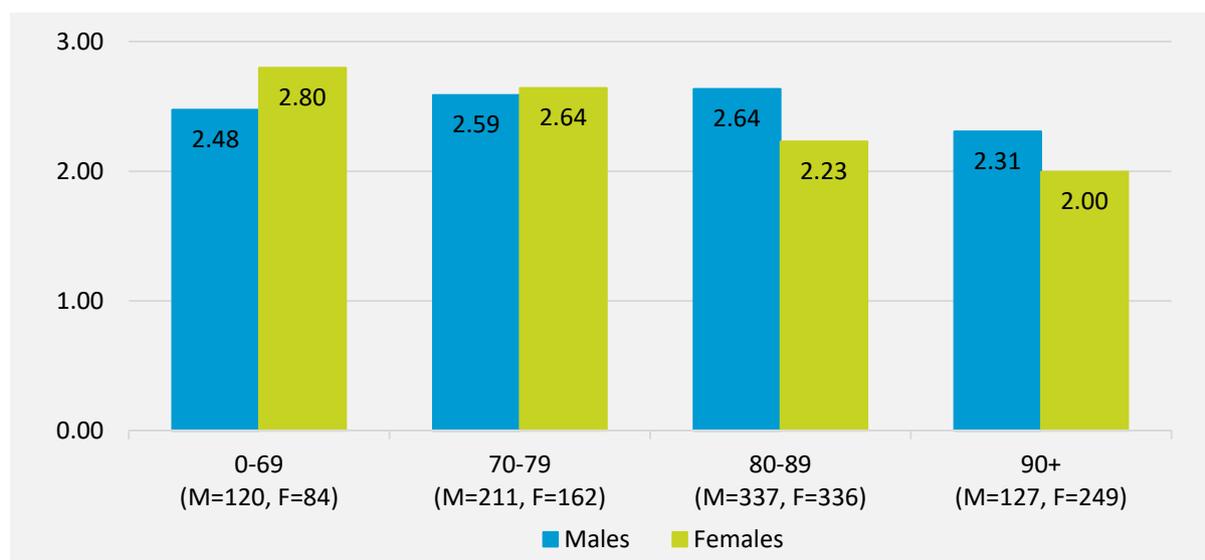
¹⁰ It also quotes 2.7% of deaths without underlying conditions, and 4.0% unknown, see Table 1 of <https://www.hpsc.ie/a-z/respiratory/coronavirus/novelcoronavirus/surveillance/underlyingconditionsreports/>

Figure 5: Frequency of Covid-19 deaths by number of pre-existing conditions, March to December 2020



Just over half (816) of Covid-19 deaths (50.2%) had one or two pre-existing conditions. The average number of pre-existing conditions was 2.42. This is higher than numbers reported for England (1.99) and Wales (1.77) for the period March to December 2020¹¹. Figure 6 shows the average number of pre-existing conditions in Northern Ireland by sex and age group.

Figure 6: Average number of pre-existing conditions of Covid-19 deaths, by age and sex, March to December 2020



¹¹ See Table 2 of the dataset for pre-existing conditions (Section 8) of 'Monthly mortality analysis, England and Wales: February 2021':

<https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/monthlymortalityanalysisenglandandwales/february2021>

For each of these groups, more than half of deaths had at most two pre-existing conditions, with the exception of females aged under 70 (47.6%). The average number of pre-existing conditions was greater than two due to smaller numbers of deaths with many pre-existing conditions in this cohort.

Type of pre-existing conditions – March-December 2020

Further analysis into specific pre-existing conditions of Covid-19 deaths provides some indication of populations most at risk. Individual ICD-10 codes are combined into groups of codes, using the ONS's leading causes of deaths groupings¹². Table 1 shows the number of Covid-19 deaths for the most common pre-existing conditions.

Table 1: Most common pre-existing conditions in Covid-19 deaths in Northern Ireland, registrations from March to December 2020

ICD10 codes	Pre-existing condition	Number of deaths*	Proportion of Covid-19 deaths	Proportion mentioned in deaths 2017-19
F01, F03, G30	Dementia and Alzheimer disease	524	32.2%	22.7%
E10-E14	Diabetes	335	20.6%	14.0%
I10-I15	Hypertensive diseases	332	20.4%	17.2%
N00-N39	Diseases of the urinary system	257	15.8%	18.1%
J40-J47	Chronic lower respiratory diseases	254	15.6%	15.1%
I20-I25	Ischaemic heart diseases	240	14.8%	23.2%
I47-I49	Cardiac arrhythmias	200	12.3%	13.5%
I50-I51	Heart failure and complications and ill-defined heart disease	166	10.2%	16.8%
I60-I69	Cerebrovascular diseases	130	8.0%	13.0%
R00-R99	Symptoms, signs and ill-defined conditions	128	7.9%	11.2%

* Sum of pre-existing conditions exceeds total deaths, as individual deaths can have multiple pre-existing conditions

Dementia and Alzheimer's disease is by far the most common pre-existing condition, appearing in 32.2% of the 1,626 Covid-19 deaths. This may not be surprising given that nearly two-thirds (64.5%) were aged 80 or over. The next most common pre-existing conditions were diabetes (335 or 20.6% of Covid-19 deaths) and hypertensive disease (20.4%).

¹² See

<https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/methodologies/userguidetomortalitystatistics/leadingcausesofdeathinenglandandwalesrevised2016>

Table 1 also shows for each of these pre-existing conditions, how often they were recorded in the previous three years (2017-2019), either in the causal chain or as a contributory cause, as a proportion of all deaths (See Annex A.4). This could help to assess whether the reported pre-existing conditions in Covid-19 deaths are more or less common than in deaths with a similar age profile in previous years. The three most common pre-existing conditions were proportionally more often recorded for Covid-19 deaths than mentioned in deaths registered from 2017 to 2019: dementia and Alzheimer’s disease (32.2% vs. 22.7%), diabetes (20.6% vs. 14.0%) and hypertensive diseases (20.4% vs. 17.2%). The remaining conditions were recorded at either similar or lower rates.

Dementia and Alzheimer’s disease was also the most common pre-existing condition in Scotland¹³ (28.1%), England (25.5%) and Wales (21.8%)¹⁴ over the same period, albeit at lower proportions than in Northern Ireland.

The Health Protection Surveillance Centre¹⁵ in the Republic of Ireland reported on underlying medical conditions in individuals who died with confirmed Covid-19 up to 12th December 2020. Their largest two categories of underlying medical conditions – chronic heart disease (41.3%) and chronic neurological disease (32.3%) – do not align with those in Table 1, although there are several groups of pre-existing conditions relating to the circulatory system, and dementia can be classed as a chronic neurological disease. Broadly similar proportions were found for hypertension (19.4%), chronic respiratory disease (18.2%), and diabetes mellitus (15.5%).

The [accompanying tables](#) provide an extended list of pre-existing conditions, plus lists by sex and age groups.

Future analysis

This report was released at a time when Northern Ireland was coming to the end of the second wave of Covid-19 related deaths, more than half the adult population had received a first dose of the vaccine, and tentative steps were taken by the Northern Ireland Executive to ease out of the national lockdown. There will be continued interest in further analysis of Covid-19 related deaths specifically, and all-cause mortality in general. NISRA is considering further updates of the analyses of age-standardised mortality rates of Covid-19 related deaths, as well as the excess mortality during the Covid-19 pandemic.

¹³ See Table 3a/b of the dataset for pre-existing conditions (Section 8) of ‘Monthly mortality analysis, England and Wales: February 2021’:

<https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/monthlymortalityanalysisenglandandwales/february2021>

¹⁴ March to June, see Table 5 of

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

¹⁵ <https://www.hpsc.ie/a-z/respiratory/coronavirus/novelcoronavirus/surveillance/underlyingconditionsreports/>

The analysis of Covid-19 related deaths registered thus far in 2021 was limited by the absence of coded cause of death information, which helps to identify the number and types of pre-existing conditions. This information will become available once the first quarterly report of the Registrar General is published, and could be used to make a comparison between Covid-19 related deaths in the first and second wave, and potentially identify the first impacts of the vaccination policy that prioritised those in care homes, frontline health staff, the older population, and those identified as clinically extremely vulnerable.

Approval has been received to undertake a data linkage project using the Northern Ireland Mortality Study (NIMS). This research will provide a more in-depth analysis of Covid-19 related deaths with a specific focus on socio-demographic associations, in particular the self-reported general health and limited long-term conditions in relation to pre-existing conditions.

This report was created within the Administrative Data Research Northern Ireland (ADR NI), a partnership between the Administrative Data Research Centre Northern Ireland (ADRC NI, comprising Queen's University Belfast and Ulster University), and the Northern Ireland Statistics and Research Agency (NISRA). Together they support the acquisition, linking and analysis of administrative data sets, developing cutting-edge research to improve knowledge, policymaking and public service delivery.

Links to relevant publications

A range of data and analyses on Covid-19 in Northern Ireland and its effect on the economy and society can be accessed at: <https://www.nisra.gov.uk/statistics/ni-summary-statistics/coronavirus-covid-19-statistics>

Weekly death registrations in Northern Ireland, 2021

<https://www.nisra.gov.uk/publications/weekly-deaths>

Covid-19 related deaths in Northern Ireland: March 2020 to January 2021

<https://www.nisra.gov.uk/publications/covid-19-related-deaths-northern-ireland>

Excess Mortality and Covid-19 Related Deaths in Northern Ireland: March to December 2020

<https://www.nisra.gov.uk/publications/excess-mortality-covid-19-related-deaths>

Department of Health's report on coronavirus related health inequalities

<https://www.health-ni.gov.uk/articles/coronavirus-related-health-inequalities>

Northern Ireland Department of Health daily COVID-19 figures: <https://www.health-ni.gov.uk/news> and daily dashboard

Monthly mortality analysis, England and Wales

<https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/monthlymortalityanalysisenglandandwales>

Deaths involving coronavirus (Covid-19) in Scotland <https://www.nrscotland.gov.uk/covid19stats>

Covid-19 Health Surveillance Monitor (Ireland)

<https://www.gov.ie/en/service/0039bc-view-the-covid-19-coronavirus-dashboard-showing-the-latest-stats-and/>

Report on underlying conditions in confirmed cases of COVID-19 <https://www.hpsc.ie/a-z/respiratory/coronavirus/novelcoronavirus/surveillance/underlyingconditionsreports/>

Vital statistics (Central Statistics Office, Ireland)

<https://www.cso.ie/en/statistics/birthsdeathsandmarriages/>

Contact Details

We welcome feedback from users, please contact NISRA Vital Statistics, Northern Ireland Statistics and Research Agency, Colby House, Stranmillis Court, Belfast BT9 5RR

E-mail: demography@nisra.gov.uk

Telephone: +44 (0)300 200 7836

<https://www.nisra.gov.uk/statistics>

Twitter: @NISRA



List of Tables

Data accompanying this bulletin are available from the [NISRA website](#) in Excel format. The spreadsheet includes the following tables.

Table 1: Number of (a) Covid-19 related deaths, (b) deaths where Covid-19 was mentioned in Part 1 of the MCCD, and (c) deaths where Covid-19 was the confirmed underlying cause of death, by registration month, March 2020 to February 2021

Figure 1a: Number of (a) Covid-19 related deaths, (b) deaths where Covid-19 was mentioned in Part 1 of the MCCD, and (c) deaths where Covid-19 was the confirmed underlying cause of death, by registration month, March 2020 to February 2021

Figure 1b: Proportion of Covid-19 related deaths that were (a) mentioned in Part 1 of death certificate, and (b) the underlying cause of death, by month, March 2020 to February 2021

Table 2: Number of (a) Covid-19 related deaths, (b) deaths where Covid-19 was mentioned in Part 1 of the MCCD, and (c) deaths where Covid-19 was the confirmed underlying cause of death, by registration month, March 2020 to February 2021

Figure 2: Proportion of Covid-19 deaths without pre-existing conditions, before and after coding, by registration period, March 2020 to February 2021

Table 3: Covid-19 related deaths, mentions in Part 1 and Covid-19 as last mention in Part 1, by age and sex, registrations from March 2020 to February 2021

Figure 3a: Proportion of Covid-19 related deaths that were mentioned in Part 1 of death certificate, by age and sex, March 2020 to February 2021

Figure 3b: Proportion of Covid-19 mention in Part 1, where Covid-19 is the last mention and Part 2 is blank, by age and sex, March 2020 to February 2021

Table 4: Covid-19 deaths, by number of pre-existing conditions, registrations from March to December 2020

Figure 4: Covid-19 deaths by number of pre-existing conditions, registrations from March to December 2020

Table 5: Covid-19 deaths, by age, sex and number of pre-existing conditions, March to December 2020

Figure 5a: Proportion of Covid-19 deaths without pre-existing conditions, by age, March to December 2020

Figure 5b: Average number of pre-existing conditions for Covid-19 deaths, by age and sex, March to December 2020

Table 6: Most common pre-existing conditions of Covid-19 deaths, March to December 2020

Table 7: Most common pre-existing conditions of Covid-19 deaths, by sex and age group, March to December 2020

Annex A: Methodology: pre-existing conditions of Covid-19 related deaths

A.1: Registration of Cause of Death

Death registrations in Northern Ireland are carried out by District Registrars, who record information provided by the informant, including the Medical Certificate of Cause of Death (MCCD). This form contains two parts: Part 1 gives the conditions leading directly to death. This could be either a single condition, or a sequence of conditions split over multiple lines (1a, 1b, 1c). Part 2 contains conditions that contributed to the death but are not directly causal.

As an example, assume the following MCCD:

- 1a: Respiratory failure
- 1b: Pneumonia
- 1c: Covid-19
- 2: Dementia

In this example, a person who was already diagnosed with dementia (Part 2), got infected by the coronavirus (1c), developed pneumonia (1b) and died from respiratory failure (1a).

Coding for cause of death in Northern Ireland is carried out by the Office for National Statistics (ONS) according to the World Health Organisation (WHO) International Classification of Diseases (ICD tenth revision). This process consists of two steps. Firstly, the text on the MCCD is converted into codes. Using the example above, the coded causes of deaths become:

- 1a: J96
- 1b: J18
- 1c: U07
- 2: F03

Where the codes (J96, J18, U07 and F03) correspond with the causes and their position on the MCCD.

In general, the underlying cause of death is the condition on the lowest line of Part 1. However, in practice, it is identified by applying detailed and complex rules. This second step is done to maintain consistency and thus allow comparability over time and place. In some cases, the last mention in Part 1 is not the underlying cause of death, but has been recorded under Part 2 (11% of registrations) or does not appear on the MCCD at all (2% of registrations).

A.2: Pre-existing conditions of Covid-19 related deaths – ONS methodology

The methodology for identifying pre-existing conditions for Covid-19 related deaths was initially based on that developed by the Office for National Statistics¹⁶. Their definition of a pre-existing condition was any mention on the death certificate that predated or was independent of Covid-19.

¹⁶

<https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/methodologies/measuringpreexistinghealthconditionsindeathcertificationdeathsinvolveingcovid19march2020>

Pre-existing conditions are all those recorded in Part 2, plus the last mention of Part 1, excluding the Covid-19 itself. This step will distinguish Covid-19 related deaths into those with or without pre-existing conditions. Furthermore, it will establish the number of pre-existing conditions for individual deaths, and derive the average number of pre-existing conditions for a group of deaths.

A.3: Pre-existing conditions – NISRA methodology

Minor changes to the ONS methodology were made for the analysis of Covid-19 related deaths in Northern Ireland, to align with the approach used to date in reporting.

A common mention on death certificates has been '*Covid-19 pneumonia*', which has been coded as '*U07, J18*', representing the ICD10 codes for Covid-19 (U07) and pneumonia (J18). The ONS methodology would dictate that, if this was the lowest mention in Part 1, then Pneumonia would be regarded as a pre-existing condition. To date, NISRA has responded to queries on the number of deaths where Covid-19 was the sole mention, by including those where Part 2 was blank and Covid-19 pneumonia was the lowest mention in Part 1. To remain consistent with that approach, in similar cases, pneumonia will not be considered as a pre-existing condition if mentioned alongside Covid-19.

In Northern Ireland, there were 27 registrations where Covid-19 (U07) was found to be the underlying cause of death, despite being recorded in Part 2 and hence would have been excluded from the analysis according to the ONS methodology. In other words, Covid-19 should have been the lowest mention in Part 1. One option would be to add these records to the analysis, and considering the other mentions in Part 2 to be the pre-existing conditions. However, it is not possible to postulate how the MCCD would have looked if Covid-19 was mentioned in Part 1. For this reason, these cases will continue to be excluded from the analysis to establish the main pre-existing condition.

There have also been registrations where Covid-19 was mentioned in Part 1, but was not found to be the underlying cause of death. Instead, another mention in either Part 1 or 2 was identified at the underlying cause of death. In these cases, the main pre-existing condition should equate to the underlying cause of death, regardless of other pre-existing conditions and their rankings.

Additional changes to the methodology have been made compared to the previous bulletin published on 23rd December 2020. As such, the results are not directly comparable. Firstly, the analyses used only those deaths where Covid-19 (ICD10 code U07) was the underlying cause of death, or for deaths registered in 2021, where Covid-19 was recorded in the causal chain (Part 1). In the previous report, all deaths with mentions of Covid-19, whether in the causal chain or as a contributory condition, were included.

The ICD10 codes for malaise and fatigue (R53) and senility or old age (R54) have been excluded from being a pre-existing conditions on the basis that they are too vague to be meaningful. This reduced the number of pre-existing conditions for 58 out of 1,626 Covid-19 deaths. For deriving the (average) number of pre-existing condition, the full ICD10 code

including decimals are considered; in the previous report, duplicate three-character codes (without decimals) were removed. This affected 17 of the 1,626 Covid-19 deaths, all of them with four or more pre-existing conditions.

A.4: Mentions in 2017-19

As a comparison, the frequency of pre-existing condition mentioned of deaths in the previous three years (2017-2019) were calculated as a proportion of all deaths by sex and five-year age band. Given the age/sex breakdown of Covid-19 deaths from March to June 2020, an expected proportion of deaths where these conditions were mentioned was calculated. For example, dementia and Alzheimer's disease was mentioned on 19.0% of deaths in 2017-19, but given seven out of eight (85.4%) Covid-19 deaths are aged 70 and over, the age/sex adjusted proportion for dementia and Alzheimer's disease was higher at 22.5%.

Box A: Background Changes to the death certification and registration process during the Covid-19 pandemic

During the Covid-19 pandemic, a number of changes have been made to the usual process of certifying and registering a death which have been enabled by the Coronavirus Act 2020. More detail is available from the Department of Health website <https://www.health-ni.gov.uk/publications/covid-19-guidance-surrounding-death>. This includes guidance to medical practitioners on how to complete the Medical Certificate of Cause of Death (MCCD) in Covid-19 related cases. In relation to who can complete the MCCD, upon which these weekly statistics are based, usual practice is that the MCCD must be signed by a doctor (Dr A) who has seen the deceased within the last 28 days or refer the case to the coroner. However, in the pandemic situation, if Dr A has treated the deceased within the last 28 days but is unable to complete the MCCD or it is impracticable for them to do so, another practitioner (Dr B) from the same hospital or GP practice, can complete the MCCD, provided the deceased died as a result of a natural illness and Dr B can state, to the best of their knowledge and belief, the cause of death. In the event that neither Dr A nor Dr B is able to complete the MCCD, any medical practitioner (Dr C) can complete it, as long as the death was as a result of a natural illness and they can state the cause of the death, to the best of their knowledge and belief. Dr C does not have to have treated the deceased within the last 28 days. Coroners' cases will still be treated in the usual way - more detail on this is available on page 3 of the quality and methodology background information for NI death statistics at https://www.nisra.gov.uk/sites/nisra.gov.uk/files/publications/Northern%20Ireland%20Death%20Statistics%20Quality%20Assessment_0.pdf.

The process by which an informant registers a death has also been adapted. Usual practice is that the informant attends their local Registration Office to register a death, bringing the MCCD with them. During the pandemic, the MCCD can be sent to the General Register Office (GRO) electronically, directly from the hospital or General Practitioner certifying the death. Information required from the informant can be provided to GRO by telephone and no signature is required from the informant.