

EXCESS WINTER MORTALITY in NORTHERN IRELAND

December 2019 - March 2020

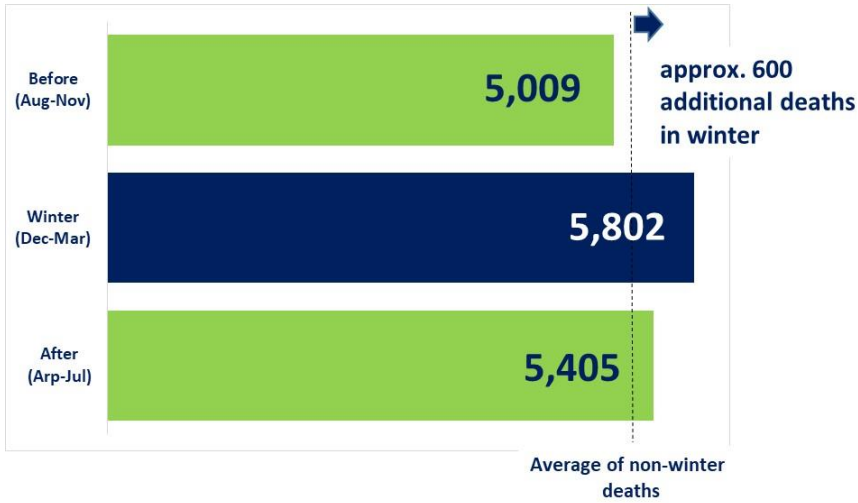
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Summary

Excess Winter Mortality 2019/20

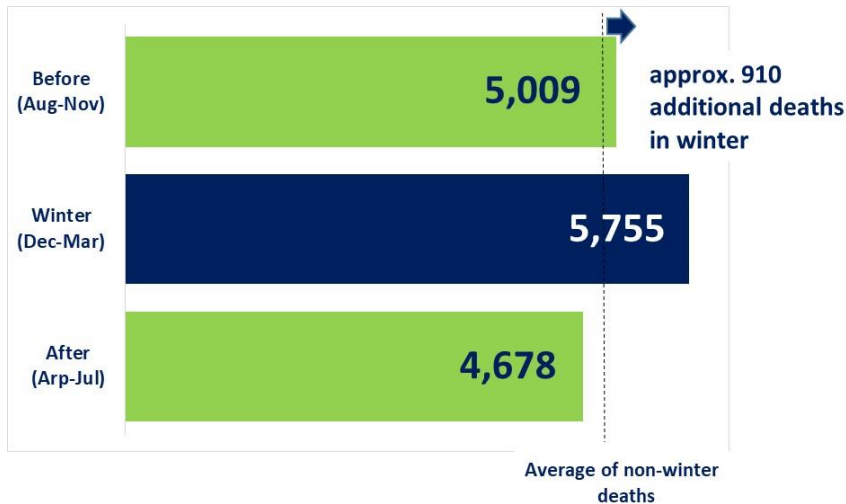
Figure 1: Deaths before, during and after winter 2019/20



The 5,802 deaths in Northern Ireland in the four months of winter 2019/20 (December to March) is the third highest number of winter deaths in the last 10 years. However, comparing this with the average for the two adjacent, 'non-winter' 4-month periods (5,207), the seasonal increase in mortality (i.e. the excess winter mortality or 'EWM') for winter 2019/20 was approximately 600. In the last 10 winters, EWM has ranged from approximately 560 to 1,620.

Impact of Covid-19 on Excess Winter Mortality

Figure 2: Deaths (excluding deaths from Covid-19) before, during and after winter 2019/20



The full impact of Covid-19 on mortality in Northern Ireland is still unfolding, but we can approximate what the excess winter mortality would have been if the pandemic had not happened. One way of doing this is by removing all deaths where Covid-19 was the *underlying cause of death* from the analysis and re-calculating EWM.

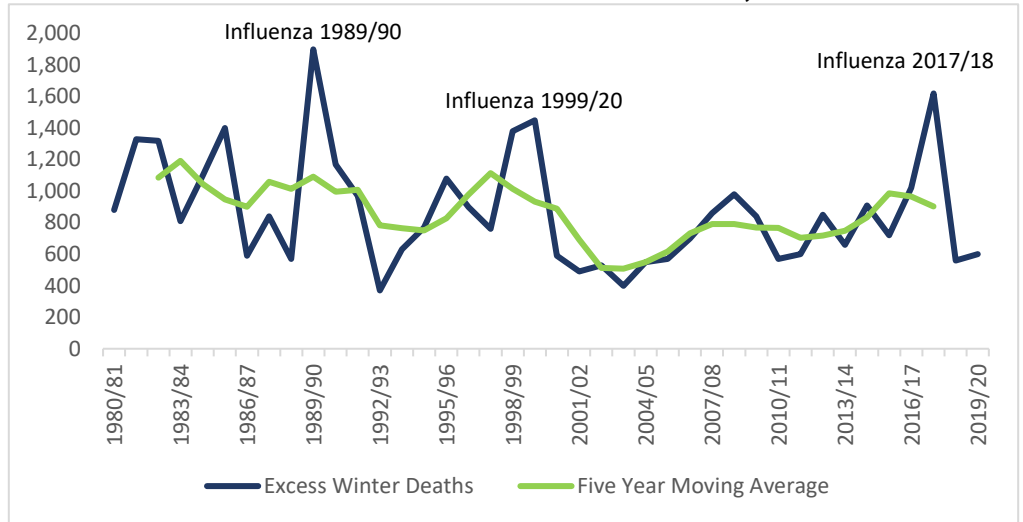
As a result, the estimate of excess winter mortality for 2019/20 would increase to 910, which is more in line with estimates for previous years. The effect of Covid-19 has been to inflate the number of deaths usually seen in non-winter months, April to July in particular, which in turn has led to a seasonal winter excess (600) being lower than usual.

Over Time

The long-term trend in excess winter mortality has been generally downward, but EWM can fluctuate greatly from winter to winter, with highest numbers of excess winter deaths seen in years which have experienced influenza outbreaks.

The five-year moving average of excess winter mortality was 904 in 2017/18 (based on years 2015/16 to 2019/20) (Figure 3).

Figure 3: Excess Winter Mortality and 5-Year Central Moving Average, Northern Ireland, 1980/81 to 2019/20

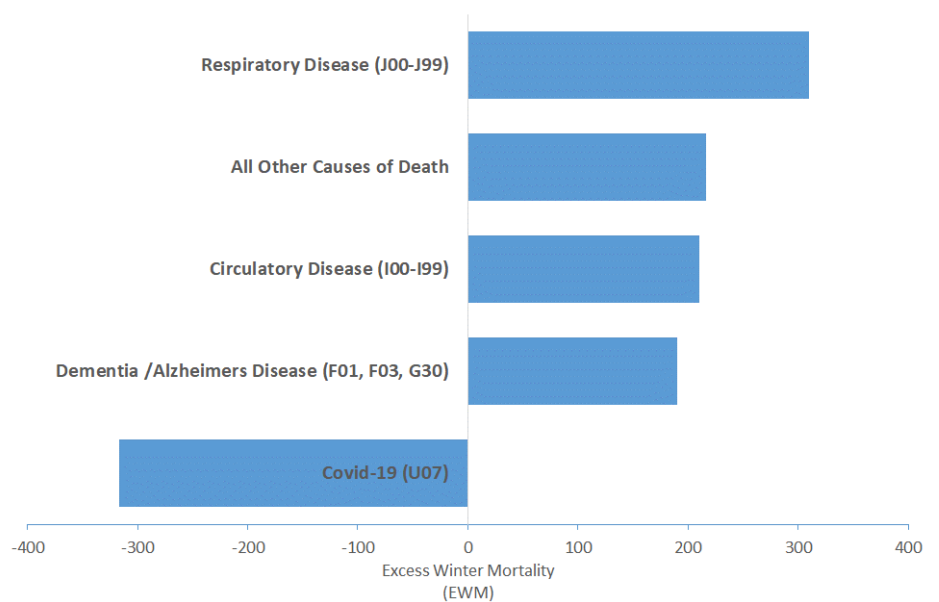


Cause of Death

Figure 4: Excess Winter Mortality by Cause of Death, Northern Ireland, 2019/20

Respiratory diseases remained the leading cause of EWM in 2019/20, followed by circulatory diseases and dementia/Alzheimer's diseases.

Covid-19 had a large negative impact on the estimate of winter mortality in 2019/20 by inflating the number of deaths in the non-winter period, in particular, April-July 2020.



Key Points

- In the winter period (December to March) of 2019/20 there were 5,802 deaths in Northern Ireland, the third highest number of winter deaths in the last 10 years. However, comparing this with the average number of deaths for the two adjacent, 'non-winter' four-month periods (the previous August to November 2019 and the following April to July 2020), the seasonal increase in mortality (i.e. excess winter mortality) for winter 2019/20 was estimated to be 600. This was 40 more than the corresponding estimate of 560 for the previous winter (2018/19), but was below the levels seen in seven of the previous ten winters.
- Without the impact of the Covid-19 pandemic, the seasonal increase in mortality in winter 2019/20 is estimated to have been 910 (Figure. 2), which is more in line with the five year average of excess winter mortality from 2014/15 to 2018/19 (967). This is because the effect of Covid-19 in 2020 was to inflate the number of deaths usually seen in the non-winter period, particularly April to July, which in turn has led to a winter seasonal increase (600) that was lower than usual.
- Excess winter mortality (EWM) continued to be higher in females compared with males, with females counting for 53.3 per cent (320) and males counting for 46.7 per cent (280) of the excess winter mortality in 2019/20.
- Respiratory diseases (not including Covid-19) continued to be the leading cause of excess winter deaths, accounting for 51.7 per cent of the excess winter mortality in 2019/20.
- In Northern Ireland, deaths in the winter months were 11.4 per cent higher than in the adjacent non-winter months – this proportion is the EWM Index (EWMI). The Health & Social Care Trust with the highest EWMI was the Western Trust, with 18.6 per cent more deaths occurring in the winter months. In comparison, in the South Eastern Trust, 6.3 per cent more deaths occurred in the winter months, than in the non-winter months.
- The highest regional EWMI in 2019/20 was in the Mid-Ulster Local Government District, where 25.9 per cent more deaths occurred in the winter months than in the non-winter months. Antrim & Newtownabbey had the lowest EWMI, with 3.8 per cent more deaths occurring in the winter months.

What You Need to Know

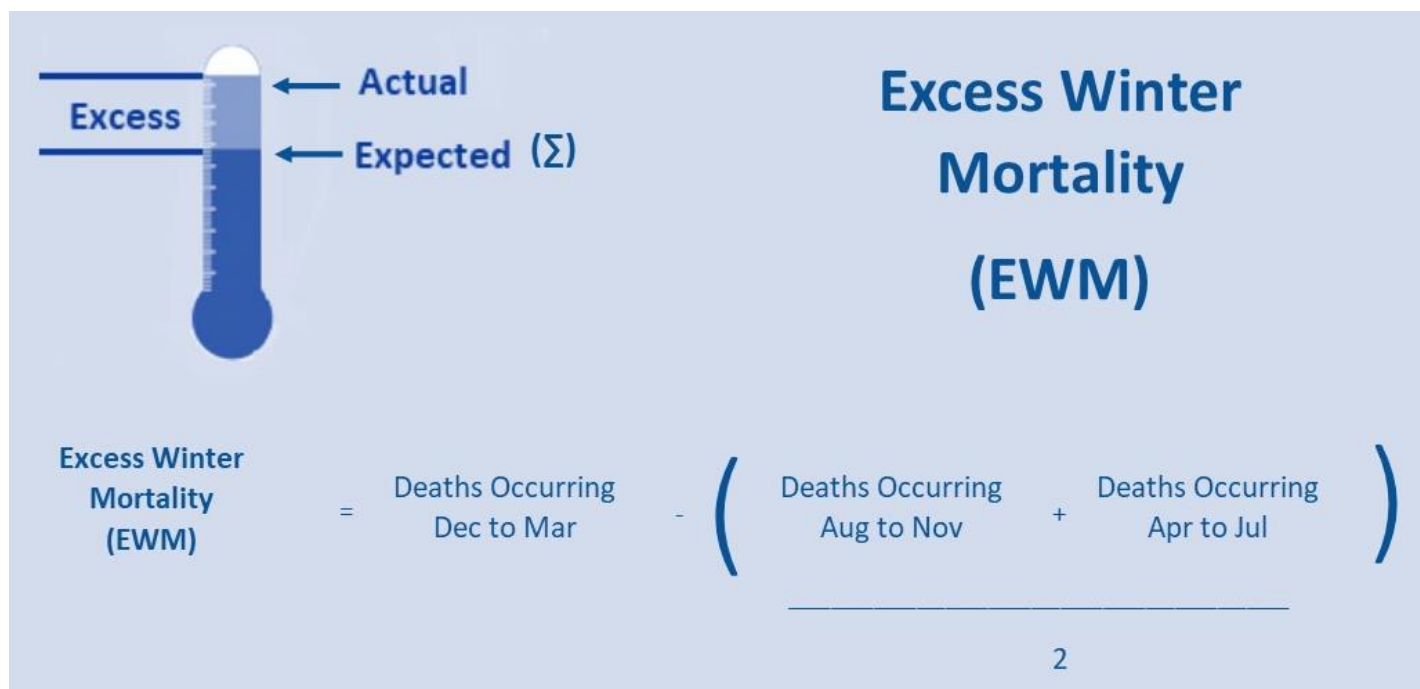
This statistical bulletin presents provisional figures for **excess winter mortality (EWM)** and the **excess winter mortality index (EWMI)** in Northern Ireland for the winter period 2019/2020. Historical trends from 1980/1981 onwards are also provided for comparison. Provisional figures are presented by sex, age, cause of death and geographical area. All figures are based on death **occurrences** (the date on which a death occurred) rather than death **registrations** (the date on which a death was registered) in order to more accurately assign the death to the appropriate season to reduce any influence of registration delay.

However, because the figures are occurrence-based, this means data could be incomplete because of registration delays. These figures are therefore provisional and the series will be revised each year to take account of late registrations. These revisions will be largest for the most recent year. Figures are also rounded to the nearest ten which helps account for differences in the numbers of days in non-winter/ winter periods in different years.

Figures by underlying cause (e.g. Covid-19) presented in this report will differ from those previously published as registered up to 30th June 2020¹, as they are occurrence-based and include deaths up to and including 31st July 2020.

EWM and the EWMI are both mathematical concepts; it is therefore not possible to identify if an individual death was an excess winter death. Equally, deaths can be attributed to specific causes (circulatory, respiratory etc.), yet cannot be automatically classed as excess deaths.

The following outlines the calculations used to create EWM. EWM is a statistical measure of the increase in mortality during winter months (December to March) compared with non-winter months (preceding August to November and following April to July).



¹ Registrar General Quarterly Tables, Q2, 2020 https://www.nisra.gov.uk/sites/nisra.gov.uk/files/publications/Tables_2020Q2%20-%20revised.xls

The Excess Winter Mortality Index (EWMI) is calculated as EWM divided by the average non-winter deaths expressed as a percentage. The EWMI is calculated separately for each population subgroup to enable comparisons between sexes, age groups and areas. The EWMI shows the percentage of extra deaths that occurred in the winter and is reported to one decimal place.

EWMI Index

$$\text{EWMI Index} = \left(\frac{\text{Excess Winter Mortality (EWM)}}{\text{Average non-winter deaths}} \right) \times 100$$

Differences between EWM and Excess Mortality Estimates

NISRA published *Excess Mortality and Covid-19 Related Deaths in Northern Ireland March to June 2020* on 28th July 2020. Estimates in that report are based on estimates of **Excess Mortality**, the difference between actual deaths in 2020 and the expected number of deaths in this period based on the average number of deaths observed in the same period over the previous five years. This measure is distinctly different from Excess Winter Mortality, which is a measure of seasonality within a 12-month period.

Excess Mortality is defined as:

$$\text{Actual total Deaths from all causes} - \text{Average number of total deaths for the same period over the last 5 years}$$

Excess winter mortality (EWM) in Northern Ireland – trends over time

It is not unusual that more people die in the winter than in the summer in Northern Ireland. In the winter period (December to March) of 2019/20, there were an estimated 600 excess winter deaths in Northern Ireland (Figure 3), compared with the average for the non-winter periods (previous August to November and the following April to July). The corresponding figure for 2018/19 was 560.

The seasonal increase in mortality has been calculated for the last 40 winters from 1980/81. The 2019/20 excess winter mortality figure of 600 was the thirteenth lowest in those 40 winters, and below the level seen in seven of the previous ten winters. The series peak (1,900) in 1989/90 corresponded with a major influenza outbreak. (Figure 3 and [Table 1](#)).

The long-term trend in winter mortality has been generally downward, but it can fluctuate greatly from year to year. A five-year moving average is included in Figure 3 above, to generally smooth out short-term fluctuations and make the trend over time clearer. There have been unusually high numbers of excess winter deaths in some years, including 1,020 for 2016/17 and 1,620 for 2017/18, which was the largest value since 1999/2000, all coinciding with influenza outbreaks.

Influenza

Influenza outbreaks do not necessarily result in many deaths directly attributed to this cause (there are less than 100 deaths registered each year in Northern Ireland with influenza recorded as the underlying cause²), but looking at deaths over time, as shown in Figure 3, the impact of influenza can be clearly seen on excess winter mortality – this is particularly evident in the statistics in 1989/90, 1999/2000 and 2017/18 when the last major influenza outbreaks happened in Northern Ireland.

The number of influenza deaths may, however, also be indirectly linked to excess winter deaths due to wider respiratory and circulatory related issues arising as a result of influenza infection. These diseases, as well as having direct effects, increase vulnerability to other diseases and conditions, which can result in hospitalisation or death. Those with underlying health conditions and the elderly are at greatest risk of developing complications.

Estimating the impact of Covid-19 on Excess Winter Mortality

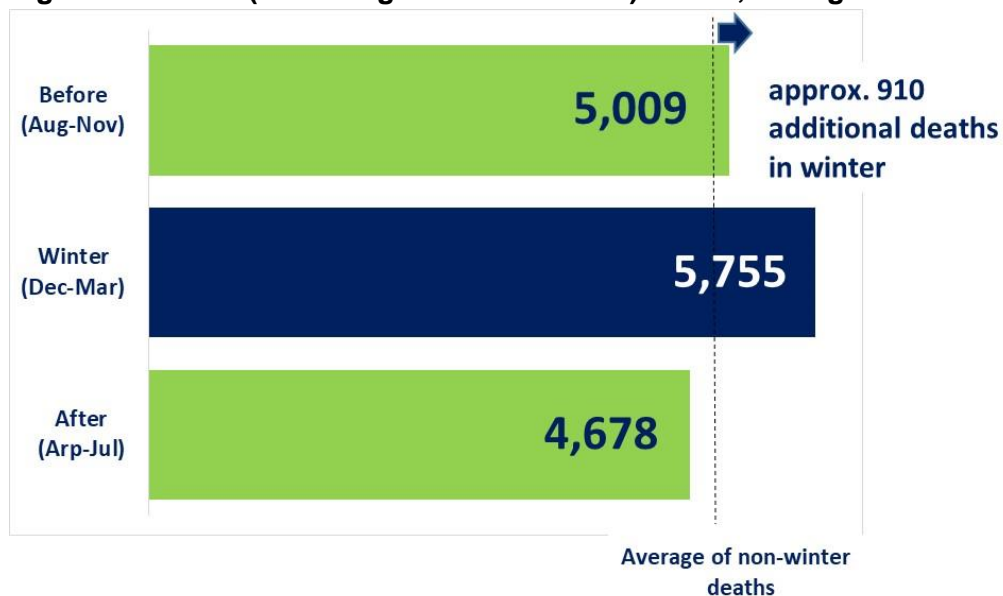
The true impact of Covid-19 on mortality in Northern Ireland is still unfolding, but the increase in deaths in the late March – July 2020 period has impacted on the EWM and EWMI results by decreasing the difference in total deaths in the winter and non-winter periods. We can estimate this impact on excess winter mortality in 2019/20 by removing all deaths where Covid-19 was the underlying cause of death from this analysis and re-calculating EWM.

Forty-seven deaths occurred where Covid-19 was determined to be the underlying cause of death from December 2019 to March 2020 and 727 from April to July 2020. Removing these from the calculation would lead to an excess winter mortality of approximately 910 (Figure 5). In this scenario the Northern Ireland EWMI increases from 11.4 to 18.8 per cent.

² Registrar General Annual Report, Northern Ireland, 2018

https://www.nisra.gov.uk/sites/nisra.gov.uk/files/publications/Cause_Death_Tables_2018.xlsx

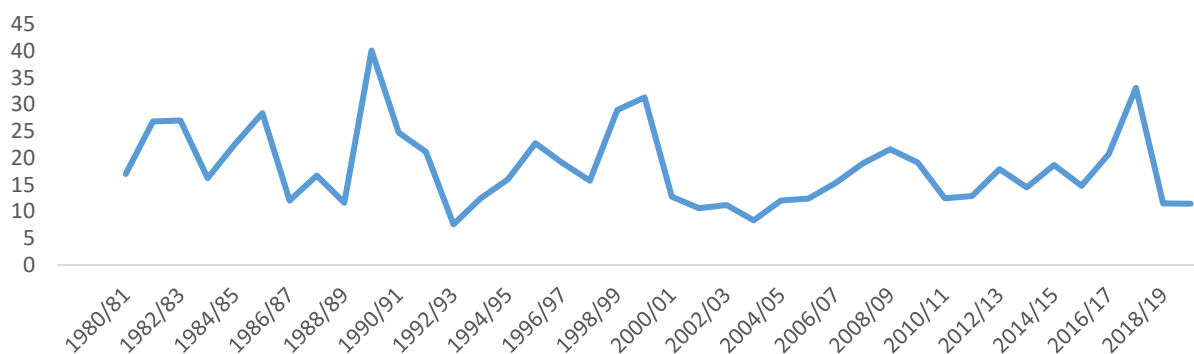
Figure 5: Deaths (excluding Covid-19 deaths) before, during and after winter 2019/20



Excess winter mortality Index (EWMI) in Northern Ireland

An excess winter mortality index is calculated for each sub-population group separately, in order to allow comparisons across key demographics such as sexes, age groups and regions. It is calculated as the number of excess winter deaths (unrounded) divided by the average non-winter deaths, expressed as a percentage (for that sub-group). Figure 6 shows the EWMI for Northern Ireland for 1980/81 to 2019/20.

Figure 6: Excess Winter Mortality Index, Northern Ireland, 1980/81 to 2019/20



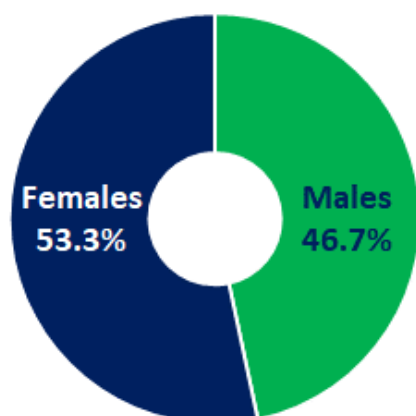
The excess winter mortality index (EWMI) for Northern Ireland in 2019/20 was 11.4 per cent, which means that 11.4 per cent more deaths occurred in the winter months compared with the non-winter months. The index peak was in 1989/90 (40.1 per cent) whilst 2017/18 showed the most recent spike at 33.1 per cent. The lowest EWMI over the 40-year period was 7.6 per cent (1992/93).

Excess winter mortality by sex and age

Of the estimated 600 excess winter deaths in 2019/2020, 46.7 per cent (280 deaths) were among males and 53.3 per cent (320 deaths) among females (Figure 7). Excess winter deaths are generally higher in females than males, which may partly be explained by the higher proportion of females aged 85 years and over in the general population compared with males; 65.2 per cent of the population aged 85 years and over are female.

In comparison with the previous winter period, the EWMI remains at the same level for both sexes at 11.0 per cent for males and 11.8 per cent for females. In contrast, in 2017/18 the EWMI was 26.1 per cent for males but much higher at 40.2 per cent for females ([Table 3](#)).

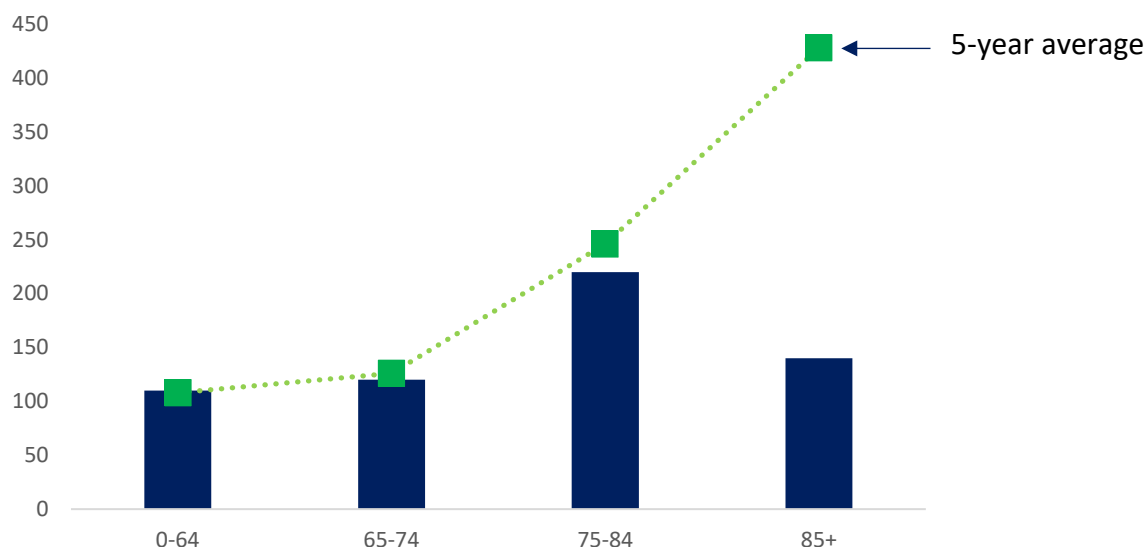
Figure 7: Excess Winter Mortality by Sex, Northern Ireland, 2019/20



In 2019/20, 60.0 per cent (360) of the estimated 600 excess winter deaths involved people aged 75 and over, with 23.3% (140) being in the 85 and over age group. However, the five year average of excess winter deaths for this age group is much higher at 428 (Figure 8).

Using the EWMI ([Table 2](#)) to compare with previous winters, this shows that, for those aged 85 and over, the index most recently peaked at 47.6 per cent in 2017/18 (coinciding with the influenza outbreak that winter) and then fell to 13.1 per cent in 2018/19 and 7.2 per cent in 2019/20, which is the lowest EWMI on record reported for this age group. The impact of Covid-19 will have contributed to this finding, as the largest number of Covid-19 related deaths in Northern Ireland at 30th October 2020 are those in the 85 and over age group (see [Weekly Deaths Bulletin](#) for further details).

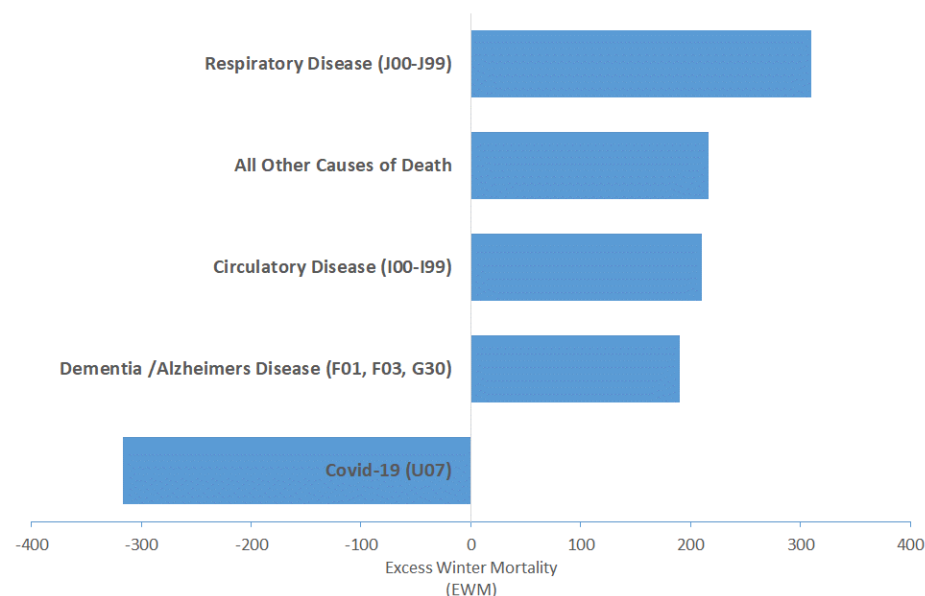
Figure 8: Excess Winter Mortality and 5-Year Average by Age Group, Northern Ireland, 2015/16 to 2019/20



Excess Winter Mortality by Underlying Cause of Death

Figure 9 shows the composition of the 2019/20 excess winter deaths (EWM) by the leading underlying causes of death: circulatory diseases (defined as International Classification of Diseases, 10th Revision (ICD-10) codes I00 to I99), respiratory diseases (defined as ICD-10 codes J00 to J99) dementia and Alzheimer’s disease (F01, F03 and G30) and Covid-19 (U07).

Figure 9: Excess Winter Mortality by Cause of Death, Northern Ireland, 2019/20



Respiratory diseases (310 deaths of the 600 total excess winter deaths) remained the leading cause of EWM in 2019/20 accounting for 51.7 per cent of all excess winter deaths in Northern Ireland. This proportion is, however, much higher than previous years (between 20 and 40% over the last 15 years) due to the large negative impact of Covid-19 on the EWM estimate ([Table 4](#)). Of

these 310 respiratory deaths, pneumonia (defined as ICD-10 codes J12 to J18) comprised the largest proportion (29.0 per cent; 90 deaths).

According to the EWMI, there were 63.4 per cent more respiratory deaths in the 2019/20 winter period compared with the non-winter months. The equivalent proportion in 2018/19 was 35.4 per cent while the EWMI for this group peaked in 2017/18 at 96.4 per cent (coinciding with an influenza outbreak), see [Table 4](#).

Circulatory diseases and dementia/Alzheimer’s disease were the second and third biggest contributors to 2019/20 Northern Ireland EWM respectively, accounting for 35.0 per cent (210) and 31.7 per cent (190) of total excess winter deaths in Northern Ireland.

The EWMI indicates that in 2019/20 there were 18.6 per cent more circulatory deaths and 30.1 per cent dementia/Alzheimer’s disease deaths occurring in the winter months than the non-winter months.

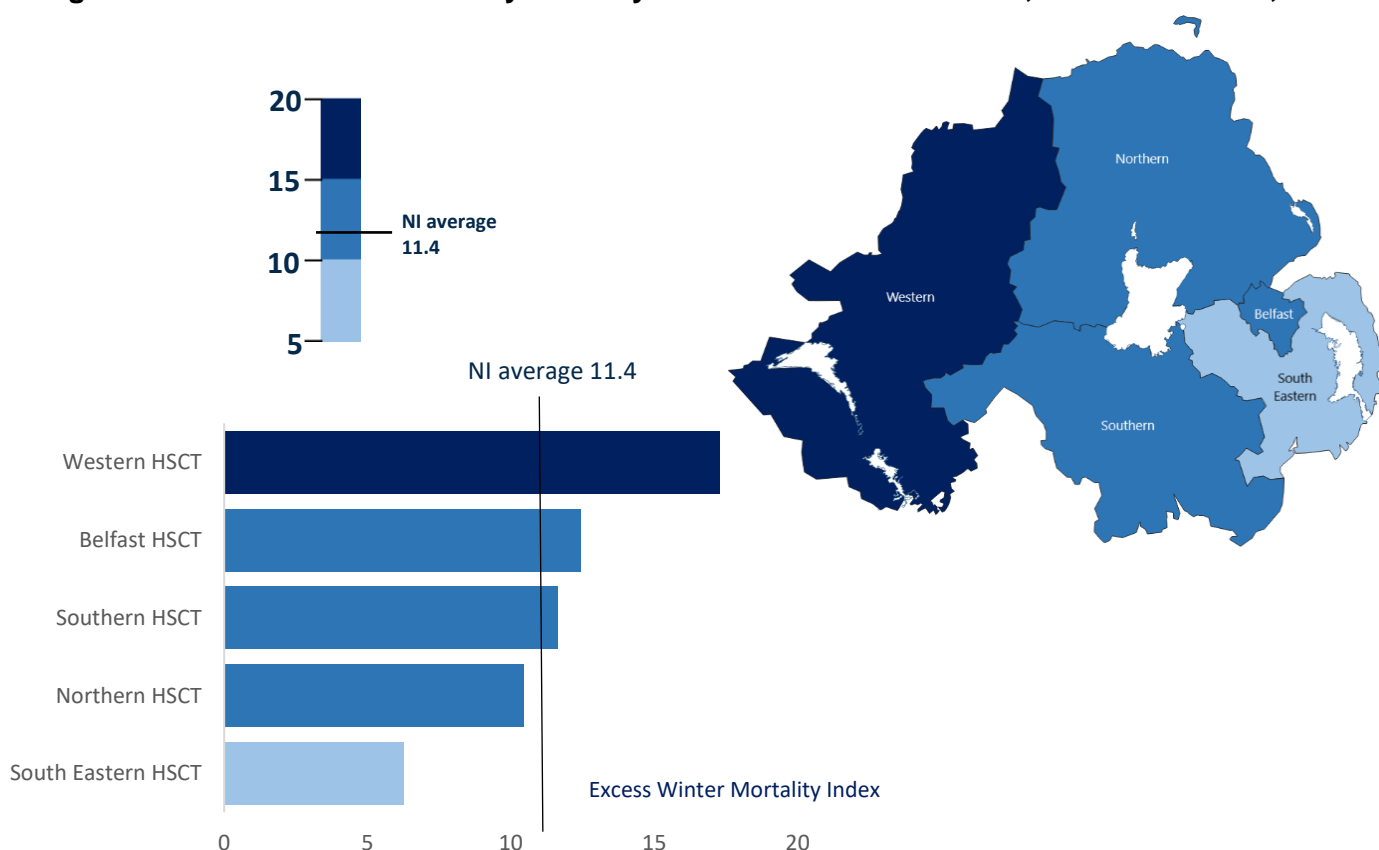
Covid-19 had a huge negative impact on the estimate of excess winter deaths as shown in Figure 9. This is because relatively few deaths (47) for which Covid-19 was the underlying cause occurred in winter (December 2019 to March 2020) compared with the number occurring in the following four months (April to July 2020).

Excess Winter Mortality by Area

Health and Social Care Trust

In 2019/2020, the Trust with the highest EWMI was the Western Trust with 18.6 per cent more deaths occurring in the winter months, compared with the non-winter months, followed by Belfast Trust (EWM Index 12.4 per cent). In comparison, 6.3 per cent more deaths occurred in the winter months, than the non-winter months in the South Eastern Trust. The Northern Ireland figure was 11.4 per cent.

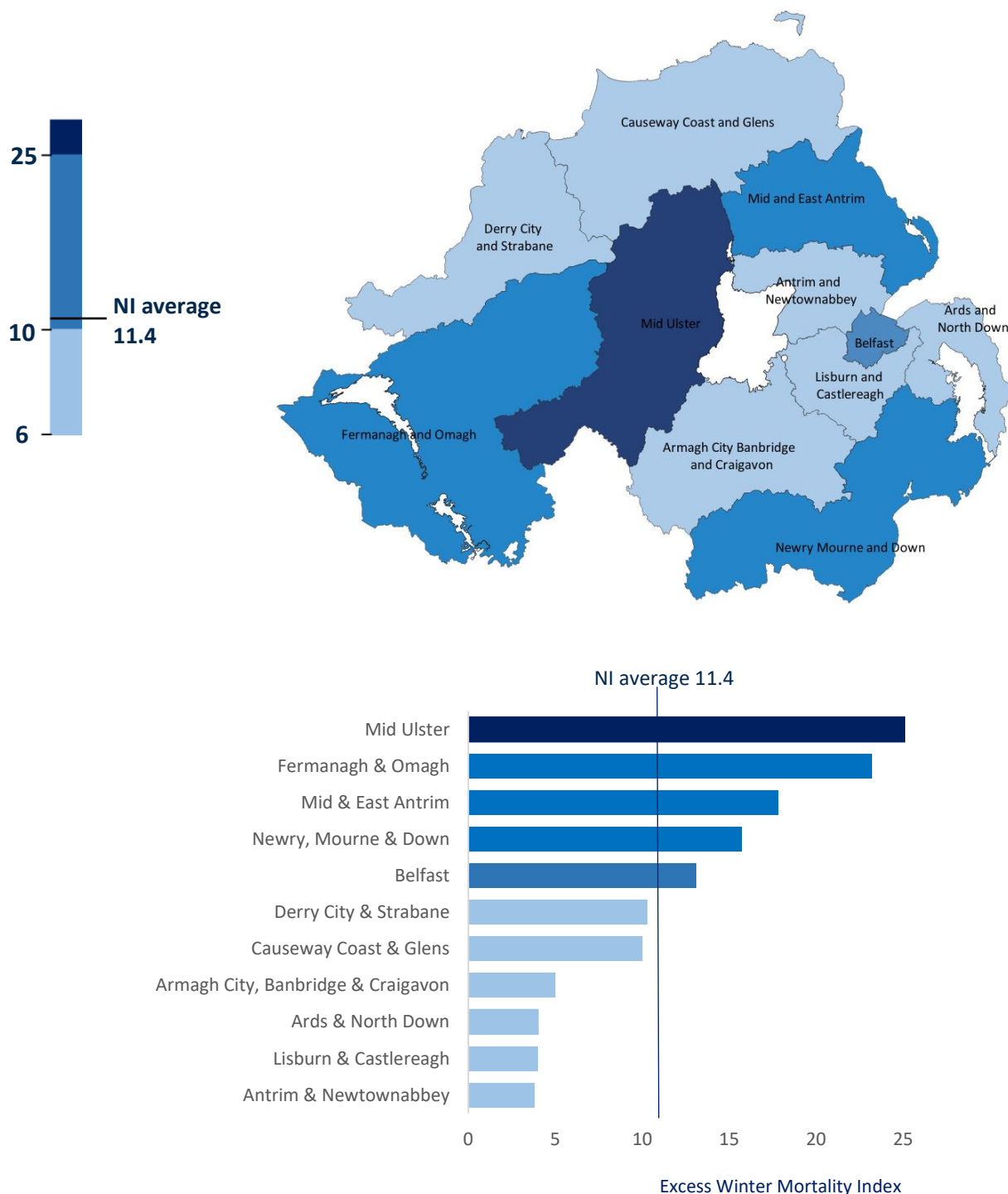
Figure 10: Excess Winter Mortality Index by Health & Social Care Trust, Northern Ireland, 2019/20



Local Government District (LGD)

In 2019/20, the highest regional EWMI was in Mid Ulster LGD, where 25.9 per cent more deaths occurred in the winter months (Figure 11). This was followed by Fermanagh & Omagh (23.2 per cent). Antrim & Newtownabbey (3.8 per cent) had the lowest proportion of excess winter deaths in 2019/20 followed by Ards & North Down and Lisburn and Castlereagh (4.0 per cent). Looking at the regional EWMI over time there is no one LGD which consistently has a higher proportion of excess winter deaths each year; rather the indices show notable fluctuation over time across the Districts ([Table 6](#)).

Figure 11: Excess Winter Mortality Index by Local Government District, Northern Ireland, 2019/20



Links to relevant publications

[Excess Mortality and Covid-19 Related Deaths in Northern Ireland](#)

Statistical bulletin | Periodically

[Winter mortality in Scotland 2019/20](#)

Statistical bulletin | Released 13 October 2020

Figures for the seasonal increase in mortality in Scotland for winter 2019 to 2020 and earlier years.

[Excess winter mortality in England and Wales 2018/19](#)

Data tables | Released 27 November 2019

Figures for excess winter mortality in England and Wales for winter 2018 to 2019 and earlier years.

[Deaths registered weekly in Northern Ireland, provisional](#)

Statistical Bulletin | Updated weekly

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

[Registrar General Quarterly Report](#)

Tables | Updated Quarterly

Provisional statistics on births, deaths, stillbirths, marriages and civil partnerships for each 3-month period in Northern Ireland.

List of Tables and Charts

Data accompanying this bulletin are available from the [Excess Winter Mortality page \(opens in a new window\)](#) in Excel format. The spreadsheet includes the following tables and charts

Table 1: *Number of Deaths Occurring, Number of Excess Winter Deaths and Excess Winter Mortality Index, Northern Ireland*

Table 2: *Excess Winter Deaths and Excess Winter Mortality Index by age group, Northern Ireland*

Table 3: *Excess Winter Deaths and Excess Winter Mortality Index by sex, Northern Ireland*

Table 4: *Excess Winter Deaths and Excess Winter Mortality Index by Cause of Death, Northern Ireland*

Table 5: *Excess Winter Deaths and Excess Winter Mortality Index by Health and Social Care Trust, Northern Ireland*

Table 6a: *Excess Winter Deaths by Local Government District, Northern Ireland*

Table 6b: *Excess Winter Mortality Index by Local Government District, Northern Ireland*

Chart 1 *Deaths before, during and after winter 2019/20*

Chart 2 *Deaths (excluding deaths from Covid-19) before, during and after winter 2019/20*

Chart 3 *Excess Winter Mortality and 5-Year Central Moving Average, NI, 1980/81 to 2019/20*

Chart 4 *Excess Winter Mortality by Cause of Death, Northern Ireland, 2019/20*

Chart 5 *Excess Winter Mortality Index, Northern Ireland, 1980/81 to 2019/20*

Chart 6 *Excess Winter Mortality by Sex, Northern Ireland, 2019/20*

Chart 7 *Excess Winter Mortality and 5-Year Average by Age Group, Northern Ireland, 2015/16 to 2019/20*

Chart 8 *Excess Winter Mortality Index by Health & Social Care Trust, Northern Ireland, 2019/20*

Chart 9 *Excess Winter Mortality Index by Local Government District, Northern Ireland, 2019/20*

Contact Details

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[NISRA Statistics \(opens in a new window\)](#)

Next publication: **Winter 2021**