

Statistical bulletin

## Provisional statistics Winter Mortality, 2023/2024

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The number of deaths can vary depending on the season and, in particular, tend to increase in the winter. This paper presents estimated additional winter deaths by comparing the months of December to March 2023/24 with the average of the four-month periods before and after this period. Analysis includes data by sex, age, region, and cause of death.

#### **Key Points**

- In the 2023/24 winter period (December to March) there were 6,152 deaths in Northern Ireland, 325 fewer than the 6,477 deaths occurring in winter 2022/23. Comparing this with the average number of deaths for the two adjacent, 'non-winter' four-month periods (August to November 2023 and April to July 2024), the seasonal increase in mortality (i.e., Winter Mortality (WM)) for winter 2023/24 was estimated to be 740. This was 230 fewer than the corresponding estimate for the previous winter (970 in 2022/23)<sup>1</sup>.
- The Covid-19 pandemic impacted WM estimates for 2019/20, 2020/21 and 2021,22 due to the unexpectedly high number of deaths in the non-winter months of 2020 and 2021 as well as increased Covid-19 related deaths in winter 2020/21. This makes direct annual comparisons with subsequent years difficult, which have had minimal impact from Covid-19 related deaths. Annex 1 details how removing deaths due to Covid-19 impacts WM.
- WM is usually higher in females compared with males, and this was the case in winter 2023/24 with females accounting for 55.9 per cent and males counting for 44.1 per cent of the additional 740 winter deaths that occurred in 20223/24.
- Two causes of death, circulatory disease, and respiratory disease, together accounted for over half of the additional WM in 2023/24, at 24.5 and 28.0 per cent respectively. Dementia and Alzheimer's accounted for 16.5 per cent of the additional WM. This is largely consistent with the 2022/23 additional WM where circulatory and respiratory deaths also accounted for more than half of the additional winter mortality.
- In Northern Ireland, deaths in the winter months were 13.6 per cent higher than in the adjacent non-winter months (WM) this proportion is referred to as the Winter Mortality Index (WMI). The Health & Social Care Trust with the highest WMI in 2023/24 was the Southern Trust, with 26.6 per cent more deaths occurring in the winter months. In comparison, the

<sup>&</sup>lt;sup>1</sup> This will differ from the previously published total for 2022/23. as it is based on death occurrences. The current figure takes account of further occurrences registered for the period since the last publication on 7 December 2023.

lowest WMI was in the South-Eastern Trust where 8.9 per cent more deaths occurred in the winter months, than in the non-winter months.

• The highest regional WMI in 2023/24 was in the Mid Ulster Local Government District, where 29.6 per cent more deaths occurred in the winter months than in the non-winter months. Derry City and Strabane had the lowest WMI, with 4.3 per cent fewer deaths occurring in the winter months.

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#### Summary

Winter Mortality 2023/24





The 6,152 deaths in Northern Ireland in the four months of winter 2023/24 (December to March) is a fall from the 6,477 deaths in Winter 2022/23. Comparing this with the average for the two adjacent, 'non-winter' 4-month periods (5,414), the seasonal increase in mortality (i.e., the WM) for winter 2022/23 was approximately 740. This is lower than the previous winter (2022/23) when 970 'additional' winter deaths occurred. Direct comparisons with the pandemic period (2019/20 to 2021/22) should be treated with caution as WM during this period was impacted by unusual trends in deaths outside the winter periods in 2020 and 2021. Deaths related to Covid-19 were not found to have a notable impact on WM in 2023/24.

See Annex 1 for more information on the impact of Covid-19 deaths on WM in 2023/24.

## What You Need to Know

This statistical bulletin presents provisional figures for Winter Mortality (**WM**) and the Winter Mortality Index (**WMI**) in Northern Ireland for the winter period 2023/2024.

Historical trends from 1980/1981 onwards are also provided in the accompanying <u>spreadsheet</u> 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 due to 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 they are occurrence-based and include deaths that happened up to and including 31<sup>st</sup> July 2023 based on deaths registered up to 30<sup>th</sup> September 2024.

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

The following outlines the calculations used to create WM. WM 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).



The WMI is calculated as the number of deaths taking place in the winter months (WM) divided by the average non-winter deaths expressed as a percentage. The WMI is calculated separately for

each population subgroup to enable comparisons between sexes, age groups and areas. The WMI shows the percentage of additional or fewer deaths that occurred in the winter and is reported to one decimal place.



Please note that winter mortality estimates in this bulletin are rounded to the nearest 10, but percentages are calculated based on the unrounded numbers.

## The Future of Winter Mortality

In November 2024 the results of the consultation commissioned by the Health and Social Care Statistics Leadership Forum on health and social care statistical outputs were published on gov.uk. One of the outputs consulted on was the Winter Mortality in England and Wales', produced by the Office for National Statistics. A proposal had been made in the consultation to review this output with particular focus on the methodology. The results of the consultation are that the England and Wales report on Winter Mortality will be paused to allow a review to take place by a cross-government technical working group. A proposal on the future of these statistics will be published when the review is completed.

NISRA will take part in the technical working group to ensure that Northern Ireland outputs remain consistent with the rest of the UK to allow comparisons to be made.

## Differences Between Winter Mortality and Excess Mortality Estimates

NISRA also publishes estimates of general excess deaths (weekly, quarterly and annual). These estimates are based on a statistical model to calculate 'expected deaths', that is the number of deaths you would expect to see in the reference period during 'usual' circumstances while accounting for population size and age profile and recent trends in mortality. This measure is distinctly different from WM, which is a simple measure of seasonality within a 12-month period.

Excess Mortality is currently defined as:

Actual total deaths from all causes

# Expected number of deaths for the same period

A UK-wide technical working group was set up in early 2023 to look at the method of calculating excess mortality. The previous method was relatively easy to understand as it was based on a simple 5-year average of previous periods to obtain an 'expected' number of deaths. However, that did not account for a number of factors that put excess mortality into context, such as:

- the size of the population deaths presented as a number do not give an indication of population size. A rate gives a clearer steer as to the level of mortality, making it easier to make comparisons across countries;
- the age structure of the population age is the biggest factor in predicting mortality therefore the age structure of the population should be taken into consideration when comparing deaths and excess deaths across different countries, or different regions; and
- trends in mortality the current method can be skewed by years of high and/or low mortality.

A common UK-wide approach to producing national estimates of excess mortality was developed and agreed across government and the devolved administrations. A <u>blog</u> giving background information to this development work was published by ONS on Thursday 15 February 2024. A <u>methodology paper and data tables</u>, including breakdowns for the constituent administrations in the UK, was released by ONS on 20 February 2024.

To supplement this, NISRA published an initial short explainer paper in February 2024 followed by a more detailed information paper in January 2025, that demonstrates, through evidence, the benefits of the new approach. Both papers and the data are available at the link below.

Northern Ireland information paper on excess deaths, change in methodology

## Winter Mortality (WM) in Northern Ireland - Trends Over Time

It is often the case that more people die in the winter than in the summer. In the winter period (December to March) of 2023/24, there were an estimated 740 additional winter deaths in Northern Ireland (Figure 2), compared with the average for the non-winter periods (previous August to November and the following April to July). The corresponding figure for 2022/23 was 970<sup>2</sup>.

The seasonal increase in mortality has been calculated since 1980/81. The 2021/22 WM figure of 180 was the lowest over that period and was a result of a higher number of deaths occurring in nonwinter months linked to the Covid-19 pandemic. The series peak (1,900) in 1989/90 corresponded with a major influenza outbreak. (Chart 2 and table 1 in the accompanying <u>spreadsheet</u>).

The long-term trend in WM has been generally downward, but it can fluctuate greatly from year to year. A five-year moving average is included in Figure 2, to smooth out short-term fluctuations and make the trend over time clearer. There have been unusually high numbers of additional winter deaths in some years, including 1,610 for 2017/18, which was the largest number of additional winter deaths since 1999/2000, both coinciding with influenza outbreaks. Also, in 2020/21 there were an additional 1,020 winter deaths observed, above the observed average from non-winter months, which coincided with a peak in the Covid-19 pandemic.





The WM moving average as shown in figure 2 is calculated using 5 years of data and plotted against the central year. You can see that the impact of the peaks during the flu outbreaks are smoothed by the surrounding years that generally observed relatively low levels of winter mortality.

<sup>&</sup>lt;sup>2</sup> This will differ from the previously published total for 2022/23 and it is based on death occurrences. The current figure includes any deaths registered since the last publication on 7 December 2023.

All through the 1980s and into the early 1990s the moving average WM was consistently somewhere between 900 and 1,100, even up as high as 1,190 in 1983/84 (based on the average for the years 1981/82 to 1985/86). After that, aside from the flu outbreaks pulling WM up temporarily, additional winter deaths have usually remained between 600 and 800, with a series low of 510 in 2002/03 and 2003/04.

In 2021/22 the moving average was 690 (based on years 2019/20 to 2023/24). Although higher than the previous year (650), it is still at a level that hasn't been as low since 2005/06.

#### Influenza

Influenza outbreaks do not necessarily result in many deaths directly attributed to this cause (there have been no more than 70 deaths registered in a calendar year in Northern Ireland with influenza recorded as the underlying cause in the last decade<sup>3</sup>), but looking at deaths over time, as shown in Figures 2 and 3, the impact of influenza can be clearly seen on WM and the Winter Mortality Index (WMI). This is particularly evident in the additional winter deaths observed in 1989/90, 1999/2000 and 2017/18 when the last major influenza outbreaks happened in Northern Ireland.

The number of influenza deaths may also be indirectly linked to additional 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.

<sup>&</sup>lt;sup>3</sup> Registrar General Annual Report, Northern Ireland, 2023 <u>Registrar General Annual Report</u> | <u>Northern Ireland Statistics and</u> <u>Research Agency (nisra.gov.uk)</u>

## Winter Mortality Index (WMI) in Northern Ireland

A WMI is calculated for each sub-population group separately, to allow comparisons across key demographics such as sexes, age groups and regions. WMI is the number of winter deaths (unrounded) divided by the average non-winter deaths, expressed as a percentage (for that sub-group). Figure 3 shows the WMI for Northern Ireland for 1983/84 to 2023/24.





The WMI for Northern Ireland in 2023/24 was 13.6 per cent, which means that 13.6 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 32.8 per cent. The 2021/22 index of 3.0 per cent was the lowest WMI over the 44-year period which, as already mentioned, was due to an increased number of deaths in the non-winter periods linked with the pandemic.

## Winter Mortality by Sex and Age

Of the estimated additional 740 winter deaths in 2023/24, 44.1 per cent were males and 55.9 per cent females (Figure 4). 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.

Looking at the WMI, as with most years the WMI for females was higher than males. In 2023/24 the WMI was 12.1 per cent in males and 15.1 per cent in females i.e. 15.1 per cent more female deaths in winter months compared with non-winter months. (see table 3 in the accompanying spreadsheet for time series data).



#### Figure 4: Composition of additional winter deaths by sex, Northern Ireland, 2023/24

In 2023/24, 80.2 per cent of the estimated 740 additional winter deaths involved people aged 75 and over, with 49.1 per cent being in the 85 and over age group.

Using the WMI to compare with previous winters, for those aged 85 and over, figure 5 shows how the index was impacted in the first 3 of the 5 years plotted by the pandemic. The WMIs in 2019/20 (6.9 per cent) and 2021/22 (10.0 per cent) were impacted by an increase in non-winter deaths coinciding with waves 1 and 3 of the pandemic in non-winter months. Conversely, there is a peak, at 24.7 per cent, in 2020/21 which coincides with wave 2 of the pandemic that winter. More recently the index has shown less volatility between 2022/23 and 2023/24 where, for those aged 85 and over, it fell from 22.3 per cent to 17.8 per cent.



#### Figure 5: WMI by age group, 2019-2020 to 2023/24

## Winter Mortality by Underlying Cause of Death

Figures 6 and 7 shows the composition of the 2023/24 WM in numbers and the WMI for the three leading underlying causes of additional winter deaths: respiratory diseases (defined as International Classification of Diseases, 10th Revision (ICD-10) codes J00 to J99), circulatory diseases (defined as ICD-10 codes I00 to I99), and dementia/Alzheimer's disease (F01, F03 and G30), along with the WMI for all remaining causes (grouped into the category 'All Other Causes of Death').

Figure 6 shows how the number of additional winter deaths in 2023/24 are comprised by cause, compared with the average number observed in the non-winter months.

#### Figure 6: Approximate Change in Winter Deaths by Cause of Death, Northern Ireland, 2023/24



Similar to 2022/23, respiratory disease and circulatory disease contributed to just over half of the additional winter deaths in 2023/24. There was a reduction in additional winter deaths across all main causes, but the biggest fall in numbers between winter and non-winter months, was in deaths due to circulatory diseases where the WM fell from an estimated 280 additional winter deaths in 2022/23, to 180 in 2023/24.

Covid-19 accounted for 40 (or 4.9 per cent) of all additional winter deaths in winter 2023/24 and was therefore not a leading cause. For this reason, it has been included within the 'All Other Causes' category above. This is in stark contrast to the three winters impacted by the pandemic (2019/20 to 2021/22) when deaths due to Covid-19 were the primary driver of the direction and scale of WM.

#### Figure 7: WMI by Cause of Death, Northern Ireland, 2023/24



Based on the numbers of deaths, respiratory disease and circulatory disease were the two joint leading causes of additional winter deaths in 2023/24. These causes accounted for 210 and 180 deaths respectively (see Figure 6), or 52.6 per cent (when taken together) of the additional winter deaths in Northern Ireland in 2023/24.

When looking at the WMI, respiratory disease was also the highest of the three leading causes of additional winter deaths, at 31.0 per cent. This means that there were 31.0 per cent more deaths due to respiratory disease occurring in the 2023/24 winter period compared with the non-winter 4-month periods to either side of the winter.

This compares to a WMI of 18.4 per cent for dementia/Alzheimer's disease, and 15.1 per cent for circulatory disease in 2023/24.

## Winter Mortality by Area

## Health and Social Care Trust

In 2023/24, the Trust with the highest WMI was the Southern Trust with 26.6 per cent more deaths having occurred there in the winter months, compared with the non-winter months. The next highest WMI was in the Northern Trust with a WMI of 13.2 per cent. The South-Eastern Trust experienced the lowest WMI of all the Trusts in 2023/24 where 8.9 per cent more deaths occurred in the winter months, than in the non-winter months. For reference, the Northern Ireland index was 13.6 per cent.



#### Figure 8: WMI by Health & Social Care Trust, Northern Ireland, 2023/24

## Local Government District (LGD)

The range of the WMIs across the LGDs in 2023/24 is much wider than the previous year. Figure 9 shows that Derry City and Strabane LGD had the lowest regional WMI in 2023/24 (at 4.3 per cent). In contrast, Mid-Ulster district had the highest WMI in 2023/24 (at 29.6 per cent). The Fermanagh and Omagh district WMI (12.9 per cent) was closest to the Northern Ireland WMI of 13.6 per cent. Overall, five LGDs were below the average and six were above it. The indices also show notable fluctuation over time across all of the districts (see Table 6 in accompanying spreadsheet).



#### Figure 9: WMI by Local Government District, Northern Ireland, 2023/24

## Annex 1: Estimating the Impact of Covid-19 on Winter Mortality

In the 2019/20 and 2021/22 publications, the inflationary effect of Covid-19 on deaths occurring in the non-winter months reduced winter mortality and WMI relative to the high level of non-winter deaths. However, for 2020/21 the majority of deaths due to Covid-19 occurred in winter months so instead inflated the additional winter deaths and WMI. WM in 2023/24 was not impacted by Covid-19 in the same way as that observed in previous winters as the number of deaths due to Covid-19 were relatively stable throughout the year.

As in previous publications, we can estimate this impact on WM in 2023/24 by removing all deaths where Covid-19 was the underlying cause of death and re-calculating WM.

Between December 2023 and March 2024, 120 deaths occurred where Covid-19 was determined to be the underlying cause of death, then 105 from August to November 2023, and 63 from April to July 2024. Removing these from the calculation leads to an estimated additional WM of approximately 700 (compared with 740 when including deaths due to Covid-19). In this scenario, the Northern Ireland WMI decreases from 13.6 to 13.2 per cent.



#### Figure 10: Deaths (excluding Covid-19 deaths) before, during and after winter 2023/24

#### Links to Relevant Publications

Excess Mortality and Covid-19 Related Deaths in Northern Ireland- March 2020 to December 2022 Statistical bulletin | Released March 2023

Winter mortality in Scotland 2023/24

Statistical bulletin | Released 30 October 2024

Seasonal increase in mortality in Scotland for winter 2023/24 and earlier years, broken down by age-group, sex, cause of death, Scottish Index of Multiple Deprivation quintile, NHS Board and Local Authority area. Winter mortality in England and Wales 2021 to 2022 provisional 2020 to 2021 final

Data tables | Released 19 January 2023

Winter mortality in England and Wales for 2021 to 2022 (provisional) and earlier years (final), broken down by sex, age, cause of death, region and place of death. Updates to report on hold pending a review of methodology.

Deaths registered weekly in Northern Ireland, provisional

Statistical Bulletin | Updated weekly

Summary information and sub-national analysis on number of deaths registered each week in Northern Ireland. Includes data in excess deaths and cause of death. Data are provisional and subject to change, however, there is final weekly historical data available, at the same link, up to and including 2023. **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.

## **Tables and Charts**

Data tables and charts are available from the Winter Mortality web page in Excel and ODS format:

#### **Contact Details**

We welcome feedback from users, please contact: NISRA Vital Statistics Unit, Northern Ireland Statistics and Research Agency, Colby House, Stranmillis Court, Belfast BT9 5RR E-mail: <u>demography@nisra.gov.uk</u> Telephone: +44 (0)300 200 7836

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NISRA Births, deaths and marriages statistics Next publication: **Winter 2025/26**