

Change in Methodology: Excess Deaths in Northern Ireland

Information Paper

February 2024

This short information paper outlines the change about to be introduced in how excess deaths are estimated. The change will be UK-wide, and this note summarises why it was necessary, how the new estimate has improved on the previous approach and also contains links to more useful information.

What are excess deaths?

'Excess deaths' is the term used to describe how the number of deaths observed (registered) during a certain period differs from the number of deaths that might be expected (also known as the baseline) during that period in 'usual' circumstances. Although it is named 'excess' the difference can be in either direction, that is, there could be more deaths than would be expected, or fewer when the number of deaths registered is less than the number expected.

Excess deaths = Observed deaths - Expected deaths

What might impact the number of deaths?

The number of deaths can be impacted by a number of factors, some can be expected but some are difficult to anticipate. Expected factors include the size and age profile of the population and general trends in mortality rates. For instance, a growing population should also expect an increase in the number of deaths, just as a population that is increasingly made up of people in older age groups can expect a related increase in deaths too.

Some of the more difficult things to anticipate include epidemics, pandemics, wars, medical/treatment improvements etc.

It makes sense to control for the factors we can anticipate to achieve the most accurate estimate of the expected number of deaths during a certain period.

What is the current method?

The current method for estimating 'excess deaths' involves comparing the average number of deaths from a recent 5-year period with the number of deaths observed for the current period. This method is based on counts of deaths only so does not take into account changes in the size and age structure of the population over the same time, nor the general mortality trends.

As mentioned, it is reasonable to anticipate a general rise in the number of deaths within a population that is both growing and aging (i.e. the proportion of the population in higher age groups is increasing); not accounting for such changes when estimating the number of deaths you would expect to see, means that there will almost certainly always be a positive number of excess deaths.

For example, looking pre-pandemic in Northern Ireland, the number of deaths rose from 14,678 registered in 2014, to 15,758 deaths registered in 2019. The 5-year average number of deaths registered between 2014 and 2018 was 15,523, meaning that using the previous methodology for excess deaths there would be 235 more registered deaths than would be expected in 2019. However, when put into the context of the population and accounting for age structure using age standardised mortality rates (ASMRs¹) the corresponding ASMRs for the same years actually fell from 1004.8 deaths per 100,000 population in 2014 to 971.7 dates per 100,000 population in 2019.

Increased interest in the number of deaths and excess deaths over the course of the pandemic highlighted the need to review the current methodology and replace it with a more robust measure.

¹ Age-standardised mortality rates adjust for differences in the age structure of populations and therefore allow valid comparisons to be made between geographical areas, the sexes and over time. Age-standardised mortality rates have been presented per 100,000 people and standardised to the 2013 European Standard Population.

What is the new method and what are its advantages?

The new method involves looking at age-specific death rates² (that is the number of deaths in a particular age group relative to the number of people in that age group in the population) from the previous five years and using a statistical model to project an estimated number of deaths that we could expect to see in the current year. This also applies to weeks by looking at weekly death rates in the previous five years to estimate what could be expected for the same week in the current year.

The new method has moved from being based on counts of deaths to being based on age-specific rates which means trends in population size and age structure are taken into account; and also adjusts for historical population mortality rates.

The impact of the pandemic in the context of estimating the number of deaths one would expect in a 'usual' time has been accounted for by excluding individual weeks or months from analysis where the impact from covid-related deaths was felt most – for the purposes of this methodology that has been defined as periods where Covid-19 deaths comprised 15% or more of the total deaths.

Other advantages linked to the new method include consistency across the UK, meaning results can be directly compared and summed. In addition, uncertainty (confidence intervals) around the estimated expected number of deaths can be calculated

The statistical model estimates the number of deaths for the current period by taking into account information on age, sex, trend, season and population size.

The recently published [National Statistical blog post](#) gives further contextual background information around the work that has taken place within the UK-wide technical working group exploring possible new methodologies and the decision-making process.

² Age-specific death rates are the number of deaths in a particular age group relative to the number of people in that age group in the population. Calculating expected deaths by age group and then summing accounts for differing mortality rates experienced at different ages, much like ASMRs. The difference between age-specific death rates and ASMRs, however, is the use of the European Standard Population in ASMRs to facilitate comparisons internationally.

More technical information on the method itself, data used and the resulting expected deaths is available from the [methodology paper](#) released by ONS on 20 February 2024.

Main impacts from the new methodology for Northern Ireland

The number of deaths registered in Northern Ireland has not changed; more recent death registrations from 2023 onwards remain provisional and subject to change until the data is finalised via the Annual Report of the Registrar General, as per standard practice. The change announced today relates solely to how 'excess deaths' are estimated focusing on the methodology to estimate the number of deaths you might expect to see in a given reference period, to the exclusion of any extraordinary mortality events. This in turn will lead to a more accurate estimation of excess deaths in the reference period. It should be noted that 'excess deaths' is a statistical concept: it is not possible to identify if an individual death is an 'excess death'.

The ONS Methodology paper shows the impact at UK level and is accompanied by data tables for each country including new method-based expected deaths and excess deaths. For Northern Ireland, the new method has, as expected, decreased the estimated number of excess deaths in recent years compared with the former methodology based on a basic 5-year average. Longer-term, the new methodology (when compared with the previous, basic 5 year-average based method) has had the impact of decreasing the number of expected deaths in 2012 and 2013 and, therefore, increasing the estimated excess deaths for those years. However, every year since then has seen an increase in the number of expected deaths to varying degrees, thus leading to decreases in excess deaths. This is particularly evident in 2019 and 2023.

Charts 1 and 2, below, illustrate this by plotting the number of expected deaths and excess deaths per year respectively, by summing from reporting weeks, using both the former methodology based on the count-based 5-year average, and the new, model-based methodology which still uses 5 years of data but accounts for known factors such as population size, age and mortality trends. The ONS methodology

paper contains more information on the components that have impacted change in expected deaths estimates.

Chart 1: Comparison of expected deaths based on the former and new estimation methods 2011 to 2023 (non-zero axis)

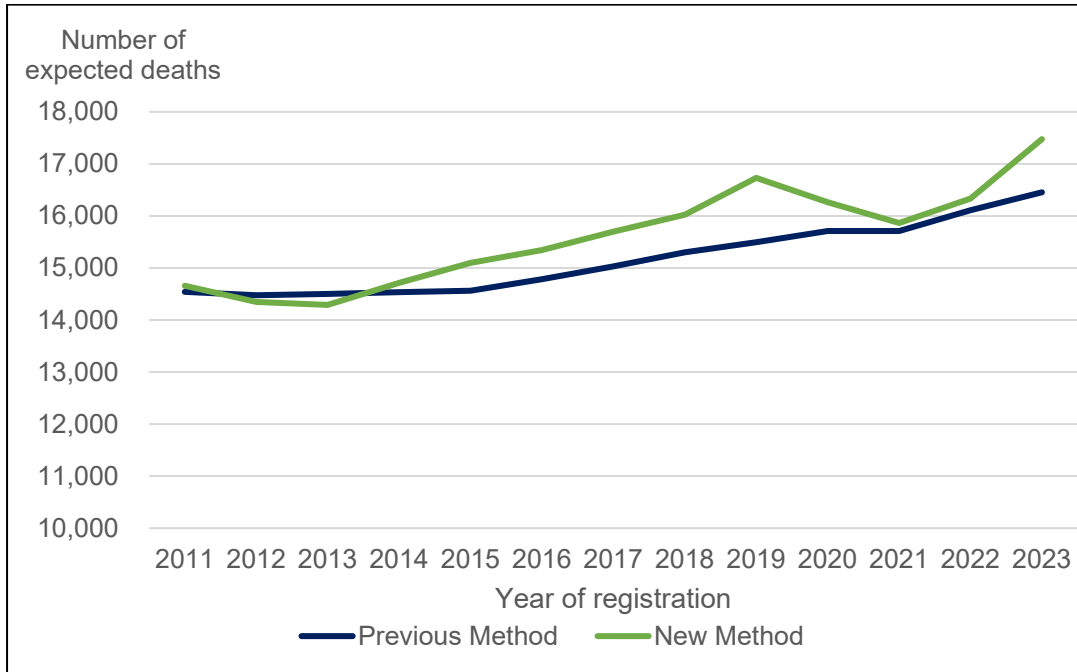
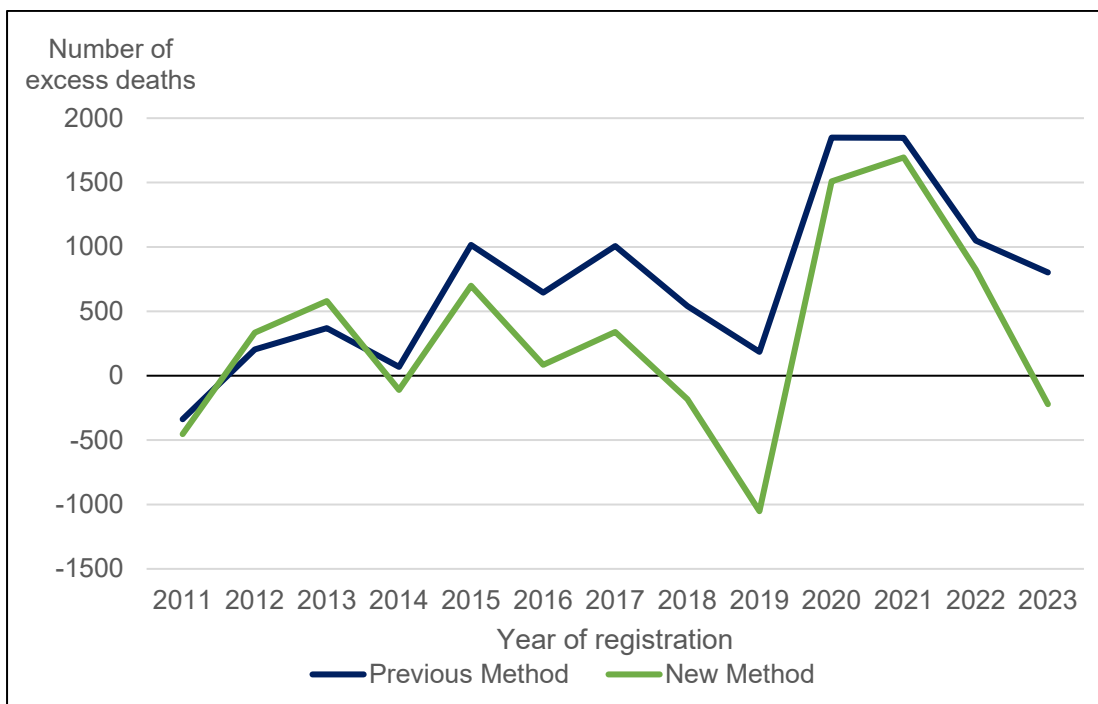


Chart 2: Comparison of excess deaths (summed from reporting weeks) based on the former and new methods for estimating expected deaths, 2011 to 2023



Where will Northern Ireland excess deaths data be available from?

Excess deaths up to end of 2023 using the new methodology were published for each UK country alongside the [ONS Methodology paper](#). Additionally, NISRA has published a [Northern Ireland specific back series](#), extracted from the ONS tables, for the convenience of users showing the excess deaths data using the model-based methodology. NISRA will also expand the [historical weekly deaths](#) dataset to include the new methodology-based expected and excess deaths estimate, in addition to the 5 year averages which would have been used previously, for comparison and transparency purposes. These will cease to be produced in due course (see below).

Ongoing, provisional weekly estimates for Northern Ireland will be available in the [weekly death registration tables](#) released each Friday, from Friday 23 February.

Additionally, there will be new annual data on excess deaths featured in the [Annual Report of the Registrar General](#) from this year onwards.

What to expect from coming weekly tables?

We will continue to include both 5-year averages (including and excluding 2020) as the previous estimate of expected deaths, in addition to the new baseline for calculating excess deaths, for the next 8 weeks to allow users time to understand the new method and quantify the difference.

Useful Links

[Weekly death registrations in Northern Ireland | Northern Ireland Statistics and Research Agency \(nisra.gov.uk\)](#)

Data Tables released weekly

Contains provisional information on the number of deaths registered each week and excess deaths, as well as deaths occurring each week. Also contains breakdowns of deaths registered for age, sex, geography and place of death.

[Deaths registered weekly in England and Wales, provisional - Office for National Statistics \(ons.gov.uk\)](#)

Data tables published weekly

Provisional counts of the number of deaths registered in England and Wales (including excess deaths estimates), by age, sex and region.

[Deaths registered weekly in Scotland | National Records of Scotland \(nrscotland.gov.uk\)](#)

Data tables published weekly

Provisional counts of the number of deaths registered in Scotland (including excess deaths estimates), by age, sex and key causes.

Contact Details

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