



METHODOLOGY PAPER - MID-YEAR POPULATION ESTIMATES FOR NORTHERN IRELAND

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CONTENT

1	Introduction.....	2
2	Population Estimates for Northern Ireland.....	2
2.1	<i>Components of Change Method</i>	2
2.1.1	Census of population.....	2
2.1.2	Ageing of the population.....	3
2.1.3	Births	3
2.1.4	Deaths	3
2.1.5	Migration into Northern Ireland.....	3
2.1.6	Migration out of Northern Ireland.....	3
2.1.7	Armed Forces.....	4
3	Data Quality.....	4
4	Estimates of the population aged 90 and over.....	5
5	Quality Assurance	6

1 Introduction

In Northern Ireland, NISRA - the Northern Ireland Statistics and Research Agency - produce annual estimates of the resident population. The population estimates refer to the number of people in the population at 30 June each year, the statistics are therefore often referred to as the mid-year estimates.

The population statistics refer to the *usually resident* population. The definition of usual residence is based on United Nations guidelines¹; in the United Kingdom the population statistics are benchmarked to the [results of the 2021 Census of Population](#).

Final results for the current population estimates can be found on [NISRA Mid-year population estimates webpage](#).

2 Population Estimates for Northern Ireland

At the Northern Ireland level, population estimates are updated each year using the cohort component method.

2.1 *Components of Change Method*

In simple terms the previous year's population estimate is "aged on" by one year, with births added and deaths removed. Net migration is also accounted for. The following formula is thus applied to update the population:

Previous year's population estimate aged on

- + Births to mothers resident in Northern Ireland;
- Deaths;
- + Net migration (including movement of armed forces personnel)

The following sections describe how the different data sources are used in this calculation.

2.1.1 Census of population

The 2021 Census of population was the basis for the 2021 mid-year estimates.

¹ [Recommendations on Statistics of International Migration. UN 1998](#)

2.1.2 Ageing of the population

Each year the population by single year of age is aged on by one year (for example, all two-year-olds become three-year-olds one year later).

2.1.3 Births

Birth figures by sex are obtained from registrations with the General Register Office. They include all births that occurred between 1 July and 30 June the following year, registered up to 31 December the following year. Births to non-resident mothers are not included, as evidence from Great Britain and the Republic of Ireland suggests that there is an imbalance between the number of non-Northern Irish mothers giving birth in Northern Ireland on one side, and Northern Ireland mothers giving birth outside Northern Ireland on the other.

2.1.4 Deaths

The General Register Office provides details of registered deaths by sex and single year of age at mid-year. It includes deaths that occurred between the 1 July and 30 June the following year, registered up to 31 December the following year. Also included are a small number of deaths that occurred prior to 1 July but were registered in the following year. Deaths of non-residents are included, under the assumption that equal number of Northern Ireland residents die abroad as non-residents die in Northern Ireland.

2.1.5 Migration into Northern Ireland

Migration into Northern Ireland or *inflows* is defined as persons who come to live in Northern Ireland from the rest of the United Kingdom or any other country for a period of at least one year. Inflows are estimated from the Medical Card Register, which is a list of patients registered with a family doctor. From this, the number, sex and age at mid-year of people who joined or rejoined the register within a one-year period is determined (this will include people who previously resided here but left and then returned). It is recognised that the Medical Card Register is deficient in recording young adult males; therefore, the age distribution of young adult males is adjusted to be similar to the young adult female age distribution.

2.1.6 Migration out of Northern Ireland

Migration out of Northern Ireland or *outflows* is defined as persons who leave Northern Ireland to live in the rest of the UK or any other country for a period of at least one year. Outflows are estimated from transferred and deregistered medical cards for flows to Great Britain and countries outside the UK respectively. These estimates are available by sex and age at mid-year. Previous research has shown that not all outflows are measured

fully by the medical card register² and therefore de-registrations are scaled up by an additional 67 per cent (i.e. the assumption is that only 3 out of 5 persons who leave Northern Ireland to go abroad deregister from their family GP). This scaling factor was determined through analysis of historic population change using results from Censuses of population. As with inflows it is recognised that the administrative data is deficient in recording young adult males, therefore the age distribution of young adult males is adjusted to be similar to the young adult female age distribution. Migration flows to Great Britain are constrained to figures agreed by NISRA, the Office for National Statistics and National Records Scotland.

2.1.7 Armed Forces

Armed Forces are treated as a special population since i) they are not commonly on the Medical Card Register and ii) their age structure remains fairly stable each year. Due to periods of service, individual members of the forces move relatively frequently into and out of the coverage of population estimates. The adjustment procedure is to subtract Armed Forces based in Northern Ireland in the previous year's estimates before ageing on the (civilian) population and then adding the Armed Forces back in after the ageing on is complete. The Defence Analytical Services Agency of the [Ministry of Defence](#) provides details on the number of forces stationed in Northern Ireland by age and sex on a quarterly basis.

3 **Data Quality**

Population and Migration Estimates for Northern Ireland are based on data gathered from statistical censuses and surveys, and data extracted from administrative or management systems. A brief outline of the main sources used to develop population estimates is given below. A more comprehensive outline of these sources, including details of the quality management actions undertaken to ensure that the data is suitable for population estimates, is detailed within the [Administrative Data Quality Document](#).

Census

For information on the quality of Census data see the 2021 Census Quality Assurance section of the [NISRA website](#).

Births and Deaths

Information supplied at birth / death registration is generally believed to be correct since wilfully supplying false information may render the informant liable to prosecution for perjury. Birth and death figures by sex (and also by single year of age for deaths) are obtained from

² NISRA has previously issued research papers on population migration, for example, [Northern Ireland Migration Methodology Paper](#), [UK Migration Methodology Paper](#) and [Migration Report \(2009\)](#).

registrations with the General Register Office (GRO) and all that occurred between the 1 July and 30 June the following year are included in the mid-year population estimates.

Migration

Migration is the most difficult component of population change to measure, as unlike births and deaths, there is no complete system for registering migration. Migration is estimated using transfers observed in medical cards³, detailing the list of patients registered with a family doctor:

- inflows (persons who come to live in Northern Ireland for a period of at least one year) are estimated by counting the number of people who registered or re-registered with a family doctor; and
- outflows (persons who leave Northern Ireland for a period of at least one year) are estimated by counting the number of people who de-registered with a family doctor.

When the medical card data are processed to calculate migration estimates, figures for migration to / from Great Britain are agreed between the different UK administrations to provide as much accuracy and comparison between UK administrations as possible for users.

4 Estimates of the population aged 90 and over

To produce single year of age estimates of the population aged 90 and over, NISRA has adopted the Kannisto-Thatcher Survivor Ratio Method⁴, an internationally recognised method used to provide a more detailed breakdown of the older population by age. Using death registration data, an estimate is produced of the number of people at a given age alive in a particular year. For the most recent year, the Kannisto-Thatcher Survivor Ratio Method uses an average of the last five years death data to produce an estimate of the number of survivors. For earlier years, if someone died aged 100 in 2023, this means that they were alive in 2021 aged 99, and aged 98 in 2020 and so on. This is used to produce age distribution profiles. The number of people aged 99 alive in 2019 is recalibrated from the estimated number of people alive aged 100 in 2023, plus the number of registered deaths of people aged 100 in 2023. One outcome of this method is that each year the estimates for earlier years become more accurate as more death data become available to inform age profiles. It also assumes that migration for those aged 85 and over is negligible. Estimates are then controlled to agree with the NISRA mid-year population estimates for those aged 90 and over.

³ In previous reports, medical card data was referred as “health card” data.

⁴ The Survivor Ratio Method for Estimating Numbers at High Ages, Thatcher R, Kannisto V, Andreev K, 2002. Link to paper - <http://www.demographic-research.org/Volumes/Vol6/1/>. The Demography of Centenarians in England and Wales, Population Trends 96 pp5-12, Thatcher R, 1999.

5 Quality Assurance

Changes over time and annual population estimates are compared to several administrative data sources. These include those used in the estimation process, but can also include the active medical cards, the electoral roll, benefit claimants, and the number of domestic properties. Any significant differences found are examined further.

The improvements made are carried forward in population outputs going forward, with continued monitoring of the quality and availability of data sources and methodology. A close collaboration with colleagues in the Office for National Statistics and National Records of Scotland ensures continued improvement and comparability.

NISRA, September 2024