

METHODOLOGY PAPER - POPULATION PROJECTIONS FOR AREAS WITHIN NORTHERN IRELAND: 2018-BASED



April 2020

Introduction

Every two years, NISRA produces population projections for areas within Northern Ireland which are based on the Northern Ireland population projections produced by the Office for National Statistics (ONS) on behalf of the Registrar General of Northern Ireland.

These projections cover areas such as Local Government Districts (LGD), Health and Social Care Trusts (HSCT) and former Education and Library Boards (ELB). The latest set of local area population projections available are based on the 2018 mid-year population estimates, which are projected forward 25 years until 2043.

The population projections are based on current levels of and trends in fertility, mortality and migration. These projections are **not** forecasts and do **not** attempt to predict the impact of future government policies, changing economic circumstances or other factors that might impact on future demographic behaviour. **In particular the impact of any increased mortality due to the current coronavirus (Covid-19) pandemic is not included.**

Historical Projections

Historically Northern Ireland level population projections have been updated every second year. Following the release of these national level projections, NISRA has generally followed on by producing population projections for local areas which are constrained to the national projections.

In July 2002, NISRA produced the first set of local area population projections which were based on the mid-2000 population estimates and also constrained to the Northern Ireland level 2000-based population projections jointly published by the Government Actuary's Department and NISRA in November 2001. The 2002-based local area projections were published by NISRA in August 2004, following the publication of the Northern Ireland level projections in December 2003.

Following the publication of the Northern Ireland level projections in October 2005, NISRA took the decision not to produce 2004-based local area population projections given the level of local migration from the new Eastern European accession countries.

In October 2007 the 2006-based Northern Ireland level population projections were published by the Office for National Statistics (ONS) after responsibility was transferred to them from the Government Actuary's Department. Following this NISRA produced 2006-based local area population projections in February 2008.

Since then, with the exception of 2010-based local area projections¹, every two years the local area projections have been published in the Spring following the publication of Northern Ireland population projections in October.

Details of previous population projections for areas within Northern Ireland (referred to as sub-national projections) are available from the [NISRA website](#).

Methodology

The population projections methodology is similar to that used for the mid-year population estimates: it projects the number of people usually resident in each area at the 30 June each year. The projections are updated using a standard technique known as the cohort component method.

The starting point is the mid-year population estimate. The previous year's population is "aged on" by one year, births are added, deaths are removed and finally changes in migration included. The following formula is thus applied to update the projections:

$$\begin{aligned} & 2018 \text{ mid-year population estimates, aged on} \\ & \quad + \text{ projected births to mothers resident in Northern Ireland} \\ & \quad - \text{ projected deaths} \\ & \quad + \text{ projected net migration} \\ & = 2018 \text{ based population projection for mid-2019} \end{aligned}$$

This process is repeated, so that the first year of projections (mid-2019) becomes the starting point to create the following year's projection (mid-2020), and so forth. The projections are

¹ 2010-based local area projections were not produced due to the impending results of the 2011 Census and the impact that these results would have on historical fertility, mortality and migration data due to the population estimates census rebasing exercise.

based on a top-down approach which means they are constrained to the Northern Ireland level population projections.

The 2018-based sub-national population projections have utilised the [POPGROUP](#) software in their development. This software is managed by the Cathie Marsh Centre for Census and Survey Research at the University of Manchester and is used widely throughout the UK.

Assumptions Setting Process

As part of development of the National Population projections, Northern Ireland level assumptions on fertility, mortality and migration were created based on detailed analysis of historic trends by the Office for National Statistics. These assumptions were then discussed with NISRA before being sent for consultation to relevant expert groups including the Northern Ireland Demographic Statistics Advisory Group (DSAG).

The assumptions for population projections for areas within Northern Ireland were developed and proposed by NISRA and are based on the most recent demographic data available at the local level. The DSAG also reviewed these assumptions as part of the production process. The most recent consultation paper containing full details of the assumptions is available on the [NISRA website](#).

For the 2018-based sub-national population projections the most recent 5 years of births and deaths data at the local level were used, while 7 years of net migration data was used. Domestic and international migration flows are demonstrating increasing volatility over the last number of years. As this volatility is relatively recent and is uncertain to continue in the long term, a seven year average will dampen the effect of this volatility on future projections. For consistency a seven year average has been used for all three elements of migration (international, within UK and domestic). This represents a change from the methodology used in previous sets of sub-national population projections where a five year average of net migration was used to inform the assumptions.

Applying the Assumptions

At the Northern Ireland level, mortality rates are projected by single year of age and sex. In order to calculate projections for areas within Northern Ireland, scaling factors for each area were derived based on the area's standardised mortality rate. Six scaling factors for different age-sex groups were calculated for each area. These area-specific scaling factors formed the mortality assumptions for local areas and were applied to the projected Northern Ireland

age-sex-specific mortality rates and the population in each area to project the number of deaths by age and sex within the projection model.

Similarly, Northern Ireland fertility rates are projected by single year of age for the female population of childbearing age. For each area within Northern Ireland, a scaling factor was derived based on its total period fertility rate relative to that for Northern Ireland as a whole (i.e. the local area fertility assumption). Each single area-specific scaling factor was then applied to each age-specific fertility rate at the Northern Ireland level and the female population in each area to project the number of births within the projection model.

The assumptions on migration are set in terms of number of people rather than rates of migration. However within the projection model, for migration within and out of Northern Ireland, age-sex specific migration rates were applied to the population to create initial projections for migration. These in turn were constrained to the assumed total number given in the Northern Ireland projections. For migration into Northern Ireland, a constant age-sex distribution of the assumed total flow was used.

Special Populations

Armed Forces are treated as a special population in both the mid-year population estimates and projections. This group is treated separately to the rest of the population as the age structure of these groups is assumed to remain stable over time. The Armed Forces population is removed prior to ageing on and adjusting for mortality and migration, and then added back in at the end of the calculation. Therefore, their age-structure remains fixed over the projection period.

Students have not been treated as a special population in the projections since the availability of data from the Higher Education Statistics Agency. This data has led to an improvement in the internal migration estimates when combined with changes in Medical Card Register – the main source for migration estimates. As such, they are included within the migration element of the projection model.

Constraints on sub-national population projections

Even though there are assumptions made about fertility, mortality and migration for each area in Northern Ireland, the sum of the individual local area projections are constrained to the overall Northern Ireland projections. The sum of the local area projections by single year of age and sex are constrained to add up to the Northern Ireland projected population each

year. Also, the total births, deaths and migrants are constrained each year to the Northern Ireland figures. The Northern Ireland figures can be found at: <https://www.nisra.gov.uk/publications/2018-based-population-projections-northern-ireland>.

Data available

The projections have been produced for the 11 Local Government Districts, Health and Social Care Trusts and former Education and Library Boards by sex and single year of age up to age 90 and over, and from 2018 to 2043. Also available are projections for the current 26 Local Government Districts by single year of age and sex.

Variant Projections

Variant population projections are not produced for areas within Northern Ireland. However, [several variant projections](#) are produced for Northern Ireland as a whole, each with alternative assumptions on fertility, mortality and migration. These variants are intended to provide an indication of the uncertainty surrounding projections based on alternative, but still plausible, assumptions of future fertility, mortality and migration.

Limitations of population projections for areas within Northern Ireland

Northern Ireland and local area projections are the result of applying long-term demographic assumptions only. They are solely based on historical trends in fertility, mortality and migration; they do not take into account any planned policy changes which may influence population distribution. Additionally, the impact of the current coronavirus (Covid-19) pandemic has not been taken into account in the production of the sub-national population projections. Local area figures tend to be less reliable than Northern Ireland figures as smaller areas will be more affected by changes in migration. Also the reliability of projections decreases over time.

Contact

Further statistical information can be obtained from NISRA Customer Services:

Telephone: 028 9025 5156

E-mail: census@nisra.gov.uk

Responsible Statistician: Jonathan Harvey

NISRA

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