

METHODOLOGY PAPER - POPULATION PROJECTIONS FOR AREAS WITHIN NORTHERN IRELAND: 2014-BASED



May 2016

Introduction

The Northern Ireland Statistics and Research Agency (NISRA) produces population projections for areas within Northern Ireland. These areas include Local Government Districts (LGD), Health and Social Care Trusts (HSCT), Education and Library Boards (ELB), and Nomenclature of Units for Territorial Statistics (NUTS) Areas. The latest set of local area population projections available are based on the 2014 mid-year population estimates, which are projected forward until 2039.

Historical 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.

In December 2003, the 2002-based projections for Northern Ireland were jointly published by the Government Actuary's Department and NISRA and in August 2004 NISRA produced the subsequent 2002-based local area projections.

Northern Ireland level population projections are updated every second year and the next set of population projections, the 2004-based set, was produced in October 2005. Following the publication of the Northern Ireland level projections, 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 from the Government Actuary's Department. Following this NISRA produced 2006-based local area population projections in February 2008. Similarly, 2008-based projections were published in October 2009 and May 2010 for Northern Ireland as a whole and areas within Northern Ireland respectively.

The 2010-based Northern Ireland level Population Projections were published in November 2011. However, 2010-based projections for areas within Northern Ireland were not produced due to the impending results from the 2011 Census. The release of new Census results provides an opportunity to revise population estimates for inter-censal years, including those for mid-2010, the base year of the population projections. The impact of such a revision can be considerable for smaller areas. In addition, the revision of population estimates would impact on historical fertility and mortality rates, and also estimates of migration, which together form the assumptions for population projections. This added uncertainty led to the decision to postpone the projections for areas within Northern Ireland.

2012-based projections were published in November 2013 and October 2014 for Northern Ireland as a whole and areas within Northern Ireland respectively.

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:

$$\begin{aligned} & 2014 \text{ mid-year population estimates, aged on} \\ & \quad + \text{ projected births to mothers resident in Northern Ireland} \\ & \quad - \text{ projected deaths} \\ & \quad + \text{ projected net migration (including changes to HM Armed Forces)} \\ & = 2014 \text{ based population projection for mid-2015} \end{aligned}$$

This process is repeated, so that the first year of projections (mid-2015) becomes the starting point to create the following year's projection (mid-2016), and so forth. The projections are based on a top-down approach which means they are constrained to the Northern Ireland level population projections.

Population projections are based on demographic trends only. Therefore they do not take into account issues such as future planned housing or policy changes which may influence the size of the population. Projections are therefore strictly not forecasts of what Government expect to happen.

The 2014-based sub-national population projections used the [POPGROUP](#) software, which is managed by the Cathie Marsh Centre for Census and Survey Research at the University of Manchester. The software is used widely throughout the UK.

Assumptions

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 discussed with NISRA before being sent for consultation to the Census Advisory Group for ratification.

The assumptions for population projections for areas within Northern Ireland were created by NISRA and were based on the most recent 5 years of demographic data. The Demographic Statistics Advisory Group (formerly the Census Advisory Group) also reviewed these assumptions; the consensus was that of general agreement and work progressed on that basis. The consultation paper containing full details of the assumptions is available at the [NISRA website](#).

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 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.

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. This 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.

The assumptions on migration are set in terms of number of people rather than rates of migration. However, for migration within and out of Northern Ireland, age-sex specific migration rates were applied to the population to create initial projections for migration, which 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

HM 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 remains stable over time. The HM 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.

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:

<http://www.nisra.gov.uk/demography/default.asp20.htm>

Data available

The projections have been produced for the 11 new Local Government Districts, Health and Social Care Trusts, Education and Library Boards and NUTS-III areas by sex and single year of age up to age 90 and over, and from 2014 to 2039. Also available are projections for the current 26 Local Government Districts by single year of age and sex. Detailed data is available at:

<http://www.nisra.gov.uk/demography/default.asp47.htm>

Variant Projections

There are several [variant projections](#) 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 realistic, assumptions of future fertility, mortality and migration. There are no variant population projections produced for areas within Northern Ireland.

It is difficult to create variants for areas within Northern Ireland, as Local Government Districts could be differently affected. For example, the number of children that the hypothetical “average woman” in Northern Ireland will have in her lifetime equals 2.00 children under the principal projections and 1.80 children under the low fertility variant. These assumptions correspond broadly to estimated fertility rates in the three-year periods 2012-2014 and 2003-2005 respectively. For each Local Government District, fertility rates in 2003-2005 were lower than those in 2008-2010, but they were not uniformly different, ranging from 0.08 to 0.31 children. There is no clear evidence that Districts with high fertility rates were more affected, and it would be uncertain whether a low fertility projection would manifest itself in the same way as in 2003-2005.

A variant for migration within Northern Ireland would be particularly challenging, as assumptions would already identify ‘winners and losers’. This is in contrast to most other variants, where each area is affected in the same way at equal or differing rates. Also, estimates of population change between mid-2012 and mid-2014 provide a more accurate picture than the 2012-based projected changes for this period.

Comparison with 2012-based projections

The previously published population projections for areas within Northern Ireland used mid-2012 as a base year. The 2014 population estimates and estimates of recent births, deaths and migration, have lead to a different set of assumptions; see the most recent assumptions paper:

http://www.nisra.gov.uk/archive/demography/population/projections/lgd/SNPP14_Assumptions.pdf

Looking at the projected change in population between mid-2014 and mid-2024 will remove to some extent the effect of the change in population estimates and demographic trends between mid-2012 and mid-2014 (see Annex A). The differences are then largely affected by differences in the assumptions¹. The assumptions on fertility and mortality at

¹ A minor effect could relate to differences in the age-sex distribution of the starting population, for example, the proportion of females of child bearing age (fertility) and the older population (mortality) as a share of the total population.

the Northern Ireland level remained largely unchanged. However, the assumption on net migration was increased from a zero net migration in the 2012-based projections to account for the new 2014-based assumption that net international migration will reduce linearly from 3,000 inflows in mid-year ending 2015 to the long-term assumption of 1,000 inflows at the Northern Ireland level from mid-year ending 2020 onwards.

The impact of different assumptions on net migration for Local Government Districts was the main reason for differences in population growth in the decade from mid-2014 to mid-2024 (even though they were proportionately small). For example, it was found that all Local Government Districts where the 2014-based projected growth in the number of people for mid-2014 to mid-2024 was larger than that of equivalent 2012-based projections, had higher assumed net migration in the 2014-based projections.

Looking at the difference between the two sets of projections for mid-2024 (i.e. ten years into the 2014-based projections), Annex B shows that the 2014-based projections for all LGDs are within 1.1 per cent of the equivalent 2012-based projections. For example, in the largest LGD (i.e. Belfast), the difference between the 2014 and the 2012 based projections for mid-2024 equates to 2,300 people. By way of contrast, in the smallest LGD (i.e. Fermanagh and Omagh), the difference between the 2014 and the 2012 based projections for mid-2024 equates to 900 people.

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. 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.

Further statistical information can be obtained from NISRA Customer Services:

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Responsible Statistician:	Brian Green

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Annex A: Comparison of projected population change (mid-2014 to mid-2024) between the 2012-based and 2014-based population projections, by Local Government District

Local Government District	Projected population change mid-2014 to mid-2024				Difference	
	2012-based		2014-based			
	People	%	People	%	People	%
Antrim & Newtownabbey	5,500	3.9	4,300	3.1	-1,200	-0.8
Ards & North Down	4,700	3.0	4,300	2.7	-400	-0.3
Armagh City, Banbridge & Craigavon	20,400	9.9	21,400	10.4	1,000	0.5
Belfast	8,800	2.6	11,300	3.3	2,500	0.7
Causeway, Coast & Glens	3,000	2.1	4,000	2.8	1,000	0.7
Derry City & Strabane	1,500	1.0	2,200	1.5	700	0.5
Fermanagh & Omagh	4,700	4.1	5,600	4.8	900	0.7
Lisburn & Castlereagh	12,400	8.9	13,300	9.6	900	0.7
Mid & East Antrim	3,400	2.5	4,300	3.1	900	0.6
Mid Ulster	14,500	10.1	14,600	10.2	100	0.1
Newry, Mourne & Down	14,300	8.1	13,100	7.4	-1,200	-0.7
Northern Ireland	93,100	5.1	98,200	5.3	5,100	0.2

Figures may not add due to rounding

Annex B: Comparison of projected population in mid-2024 (i.e 10 years into the 2014-based projections) between the 2012-based and 2014-based population projections, by Local Government District

Local Government District	2012-based Population Projections (mid-2024)	2014-based Population Projections (mid-2024)	Difference	% Difference
Antrim & Newtownabbey	145,800	144,200	-1,500	-1.0
North Down & Ards	162,700	162,200	-500	-0.3
Armagh, Banbridge & Craigavon	226,300	227,100	800	0.4
Belfast	345,800	348,100	2,300	0.7
Causeway Coast & Glens	145,300	146,300	1,000	0.7
Derry & Strabane	150,500	151,400	900	0.6
Fermanagh & Omagh	119,600	120,600	900	0.8
Lisburn & Castlereagh	151,100	151,900	800	0.6
Mid & East Antrim	140,000	140,900	900	0.7
Mid Ulster	157,400	157,500	100	0.1
Newry, Mourne & Down	190,500	188,500	-2,100	-1.1
Northern Ireland	1,935,100	1,938,700	3,700	0.2

Figures may not add due to rounding