

# How are Population Estimates created?

## The Methodology



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1. 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.
2. The population statistics are produced for a number of geographical levels. Most notably at the Northern Ireland level – however statistics are also available for each Local Government District. The figures are broken down into statistics for single year of age and sex.
3. The population statistics refer to the *usually resident* population. The definition of usual residence is based on United Nations guidelines<sup>1</sup>; in the United Kingdom the population statistics are benchmarked to the results to the 2001 Census of Population.
4. Each year population estimates are updated using a standard technique known as the cohort component method. As a starting point the figures are based on updating the resident population from the Census 2001. 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 Her Majesty's Armed Forces)

Each of these steps is described below.

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<sup>1</sup> See "Recommendations on Statistics of International Migration. UN 1998" available at <http://unstats.un.org/unsd/demographic/sconcerns/migration/migmethods.htm#B>

## Ageing on the population

5. 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).

## Births

6. Birth figures by sex are obtained from registrations with the General Register Office and any births registered between the 1 July and 30 June are included. Births to non-resident mothers are not included. Within Northern Ireland births are distributed by mapping the mother's home address to Local Government Districts.

## Deaths

7. Death figures by sex and single year of age are obtained from registrations with the General Register Office and any deaths registered between the 1 July and 30 June are included. Deaths of non-residents are included. Within Northern Ireland deaths are distributed by mapping the deceased person's home address to Local Government Districts.

## Migration

8. 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 can be split into three different components:

- Internal Migration (within Northern Ireland migration);
- Inflows to Northern Ireland (in-migrants to Northern Ireland); and
- Outflows from Northern Ireland (out-migrants from Northern Ireland).

### *Internal Migration*

9. Internal or within Northern Ireland migration is defined as people moving their place of usual residence within the province. This does not have an impact on the Northern Ireland level annual population estimates, only the distribution of the population across areas within Northern Ireland. To estimate internal migration between one year and the next, changes in the list of patients registered with a family doctor are used. This data is available by age, gender and local area.

## *Migration into Northern Ireland*

10. Migration into Northern Ireland or *in-flows* is defined as persons who come to live in Northern Ireland from the rest of the United Kingdom, the Republic of Ireland or any other country for a period of at least a year. Inflows are estimated from the list of patients registered with a family doctor by counting the number of people who joined or rejoined the list within a one-year period (i.e. this will include people who previously resided here, but left and then returned). This data is available by age, gender and local area. It is recognised that the health card source 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 out of Northern Ireland*

11. Migration out of Northern Ireland or *outflows* is defined as persons who leave Northern Ireland to live in the rest of the UK, the Republic of Ireland or any other country for a period of at least a year. Outflows are estimated from the list of patients registered with a family doctor by counting the number of people who de-registered. This data is available by age, gender and local area. Data is also used from the Irish Quarterly National Household Survey (QNHS) to estimate migration to the Republic of Ireland. Previous research has shown that not all outflows are measured fully by the health card system<sup>2</sup> and therefore deregistrations are scaled up by an additional 50%. This scaling factor was determined through analysis of historic population change using results from Censuses of population. As with in-flows 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.

## *Armed Forces*

12. In population estimates Armed Forces are treated as special populations as they are not included on the GP registration system. Due to periods of service individual members of the forces move relatively frequently into and out of the coverage of population estimates. However the age structure of the armed forces groups remains stable. 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 in the armed forces after the ageing on is complete. The Defence Analytical Services Agency provides details on the number of forces stationed in Northern Ireland by age, sex and area on an annual basis.

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<sup>2</sup> NISRA has previously issued research papers on population migration, for example, see [http://www.nisra.gov.uk/archive/demography/population/migration/dev\\_est\\_mig.pdf](http://www.nisra.gov.uk/archive/demography/population/migration/dev_est_mig.pdf), [http://www.nisra.gov.uk/archive/demography/population/migration/UK\\_migration\\_paper\(2005\).pdf](http://www.nisra.gov.uk/archive/demography/population/migration/UK_migration_paper(2005).pdf) and <http://www.nisra.gov.uk/archive/demography/population/migration/Migration%20Report%202009.pdf>

## *Students*

13. A student adjustment has been applied since the 2003 mid-year population estimates. In Local Government Districts with a university campus - Belfast, Newtownabbey, Coleraine and Derry – it was found that expected flows to these areas at first enrolment into higher education (ages 18/19), and flows out of these areas after leaving higher education in their middle/late twenties, were not reflected in the changes to the Health Card Register. A large proportion of students appear to remain registered at their parents' address throughout their education; changes to their registration details on the Health Card Register were not made until they moved to a more permanent address.
14. The student adjustment works similarly to that of the armed forces, in that their population at the start of the period is removed before making adjustments for aging, migration and mortality, and then added again at the end of the period. However, a proportion of students did change their registration details on the Health Card Register. The student adjustment accounts for the shortfall in students to keep student populations in student areas constant. The adjustment is applied to aged 18 to 29 and has a net zero effect at the Northern Ireland level at each single year of age, and a net zero effect for each Local Government District for the 18-29 age group.

## *Other Changes*

15. In recent years, the quality and availability of other data sources such as the School Census, Child Benefit and Pension Benefits, has improved substantially. Although they are not used in the estimation of population estimates, their quality and coverage cannot be ignored, particularly with multiple data sources point in the same direction. For example, in the 2010 mid-year population estimates, 900 children (0.2% of all children) have been removed at the Northern Ireland level. Other minor adjustments in the population aged 65 and over were made to particular Local Government Districts. These adjustments were warranted by having multiple independent data sources; no adjustments were made to estimates for the population aged 16 to 64, as the sole data source for quality assurance was the Health Card Register.

## Quality Assurance

16. The resultant data is quality assured by checking the estimates against a number of sources:

### *Children*

- Pupil statistics from the Department of Education Annual School Census;
- Registrations of children with a family doctor and dentist;
- Information from the Social Security register of child benefit;

### *Older Persons*

- Registrations of pensioners with a family doctor;
- Information from the Social Security register of older people claiming retirement pension, pension credit, winter fuel payment, attendance allowance, disability living allowance and other related benefits;

### *Migration*

- Figures on the number of new National Insurance Numbers registered;
- Figures from the Home Office Worker Registration Scheme;
- Figures from the Home Office Points Based System;
- Figures from the Home Office on Asylum Claimants;

### *Overall population change*

- Figures on the number of domestic properties in Northern Ireland as recorded by the Rates Collection Agency; and
- Changes in overall registrations with a family doctor.

Changes over time and annual figures in the above sources are compared with the population statistics any significant differences found are examined further. A detailed paper on the quality of the 2010 mid-year population estimates is available [here](#).

17. Final results for the current population estimates for Northern Ireland, Local Government Districts, Health Areas, and Education & Library Boards by single year of age and sex can be found by clicking [here](#).