

DEVELOPMENT OF METHODS/SOURCES TO ESTIMATE POPULATION MIGRATION IN NORTHERN IRELAND



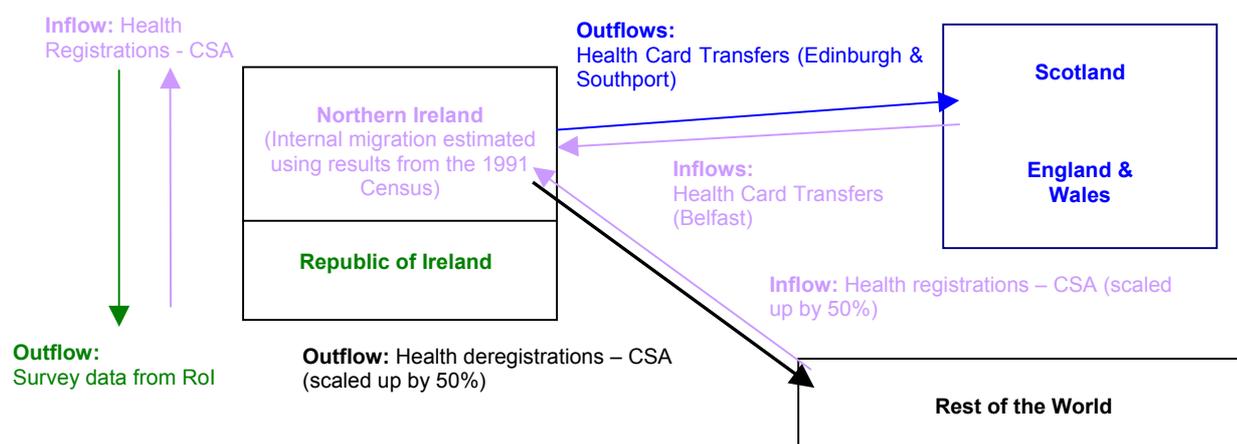
Introduction

1. Within Northern Ireland (internal) and between Northern Ireland and GB, RoI and Rest of World population migration flows are difficult components of population change to measure. Therefore historically statistical estimates of migration have been derived using proxy indicators such as the electoral register, housing build, GP registration, etc.
2. Preceding the publication of the 2001 Census results, the Office for National Statistics (ONS) set up a National Statistics Quality Review of International Migration statistics. At the same time NISRA have undertaken detailed research into understanding the reasons behind differences between the rolled forward 1991 Census based population estimate and the population estimate based on the Northern Ireland 2001 Census count.
3. This paper describes the related NISRA review of migration estimation methods and sources for NI population estimates. The NISRA review assessed the sources that could be used to effectively estimate migration in the inter-Censal period. New methods for estimating migration were assessed and any improvements found included into the 2001-2004 population estimate series.

Methods used historically to estimate migration

4. The diagram below illustrates the methods used in the 1990s to estimate levels of migration for the NI mid-year estimates.

Figure 1: Method used to estimate migration (NI population estimate series in 1990s)



5. During the 1990s the age-sex profile of non-internal migrants (i.e. flows to and from GB, Republic of Ireland and the Rest of the World) was estimated by applying the age-sex profile (obtained from the NHSCR and SNHSCR) of the flows of persons who moved between Great Britain and Northern Ireland to the overall flows. To allocate figures to LGDs, to which the migrants entered or left, net differences in electoral register counts between one year and the next were used as a proxy indicator.

Migration within Northern Ireland (Internal migration)

6. Internal or within NI migration is defined as people moving their place of usual residence within Northern Ireland. For example someone moves into a Nursing Home in Bangor from their home in Belfast. This effect does not have an impact on the Northern Ireland level annual population estimates, only the distribution of the population across areas within Northern Ireland.
7. During the 1990s internal migration was estimated at Local Government District and Parliamentary Constituency levels using the 1991 Census question on address one year ago, and the same data was used for each year in the 1990s.
8. The Electoral Register, Child Benefit, and Retirement Pension data are other possible sources that could be used for estimating internal migration. However these sources only cover sub-sections of the population (persons aged 18 years and over, children and those of pensionable age respectively). In addition pension deferment, child benefit rules for those aged 16-18 and the recent change in the law regarding electoral registration procedures creates further difficulty in using these as universal sources for migration estimation.
9. However one further administrative source remains namely the Central Health Index (CHI). The CHI data have undergone enhancement in the late 1990s, through more complete postcoding and data are now available at Local Government District and Parliamentary Constituency levels. Therefore the CHI could be used to estimate migration levels by using statistics on people changing their GP registration. A quality assurance exercise was carried out using the 2001 Census results as a benchmark to assess the CHI method. The key results are:
 - the 2001 Census¹ results of the address one year ago question showed that 128,000 people moved within Northern Ireland between Census day (29th April 2001) and one year previously (29th April 2000). Of these moves, 37,100 people moved from one LGD to another within Northern Ireland. People aged in their twenties had the highest number of internal moves between LGDs;
 - the CHI results showed that 118,000 people changed address on the CHI system between 18 May 2000 and 4 May 2001. Of these moves, 35,500 people moved from one LGD to another in Northern Ireland. Again people aged in their twenties had the highest number of internal moves between LGDs; and
 - although not detailed here the 2001 Census and CHI internal migration data by age and gender show similar patterns. Census figures for males were 5.0 per cent higher than the CHI estimates but there was less difference for females (3.5 per cent). This is consistent with females in age groups with high absolute migration (i.e. women in early adulthood) being more likely to utilise GP services;
10. Table 1 below shows the estimated levels of internal migration flows (across LGDs). The 1991 Census internal migration statistics shows very different patterns to the 2001 Census. This is explained by the different population bases used in the 1991 and 2001 Censuses. In particular, rules for defining the place of usual residence for students also changed between the 1991 and 2001 Censuses. In addition although the analysis demonstrates that there is a small difference between the 2001 Census and CHI for similar time-points, the further one moves away from the 2001 Census the more dated the 2001 Census data may become. Therefore CHI data will form one part of the process in estimating internal migration for the annual population estimate series.

¹ The NI 2001 Census address one year ago question recorded 10,400 people with 'no usual address' one year ago. Only 200 of these were infant children aged 0. Of the remaining respondents 1,700 were born outside Northern Ireland and may have answered this question inaccurately. In this analysis these 1,700 respondents are included in GB, ROI or Rest of World migration totals based on their country of birth.

Table 1: Within NI migration estimates (across LGD boundaries)

Year	Flows across LGD boundaries within NI
1991 Census² (address one year ago)	13,400
2001 Census (address one year ago)	37,100
2000-2001	35,500
2001-2002	38,300
2002-2003	37,700
2003-2004	41,600
	CHI Based

Adjustments for HM Forces and students

11. In population estimates students and Armed Forces are treated as special populations.
12. Armed forces personnel are not captured by the GP registration system. In addition, due to periods of service individual members of the armed forces move relatively frequently into and out of the coverage of national 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 last year before ageing on the civilian population and then adding in the armed forces after the ageing on is complete.
13. In the 1991 Census students were recorded at their 'home' address, whereas MYE definitions place students at their term-time address. The general effect of moving from the 1991 Census to the 1991 MYE was to remove a number of people of student-age from most LGDs and add them to a small number of LGDs with centres of third-level education. Each year following the 1991 estimates this 'movement to term-time address' was repeated in the MYE process. The implicit assumption is that the extent of 'movement to term-time address' is constant from one year to the next.
14. The 2001 Census recorded students at their term-time address thus no change had to be made between the 2001 Census and 2001 MYE. For subsequent MYEs a student adjustment was made that is similar to that used in the 1990s MYE series. A number of students are removed from certain LGDs and added to other LGDs to maintain a similar LGD age-sex structure for those of student age. Where possible additional administrative data sources such as student enrolment data are examined to inform this process.

² Different population bases used in the 1991 and 2001 Censuses make these migration statistics not directly comparable.

Within UK migration

15. Within UK migration is defined as persons who enter or leave Northern Ireland from or to other UK destinations. As noted in figure 1, within UK migration statistics have been derived from Health Card transfers. The flows from NI to GB are based on figures from the National Health Service Central Register (NHSCR) in Southport and the Scottish National Health Service Central Register (SNHSCR) in Edinburgh. The Central Services Agency collects information on the CHI on the number of people entering Northern Ireland from GB and registering with a doctor. This includes data on the area in GB that they left. This has been used as the inflow to Northern Ireland from GB in the population estimate series. The UK statistical offices have agreed that the receiving country only should measure flows – so figures for moving from NI to GB are taken from the NHSCR and SNHSCR.
16. Throughout the 1990s, the total flows derived from CHI/NHSCR/SNHSCR were distributed across NI using changes in the electoral register as a proxy. Recent changes in the law regarding electoral registration procedures, and the ensuing changes in the levels of registration, have made this use of electoral data no longer feasible. Accordingly, since 2001 detailed CHI data has been used to estimate age-sex and LGD profiles of these figures. Table 2 below shows estimates of the levels of flows between NI and the rest of the UK. A quality assurance exercise was carried out using the 2001 Census results (with all HM Forces personnel removed) as a benchmark to assess this method. The key results are:
- the 2001 Census results of the address one year ago question showed that 10,600 people moved from Great Britain into Northern Ireland and 11,600 people moved from Northern Ireland to GB between Census day (29 April 2001) and one year previously. This gives a Census net migration level of -1,000 people;
 - the CHI results show 11,600 people entered NI from Great Britain between May 2000 and May 2001. The NHSCR/SNHSCR showed that 11,700 people left NI to move to GB between 2000 and 2001. This gives a 'Health Service' zero net GB migration level; and
 - in broad terms the out-migration figures show similar patterns for the Census and Health Service datasets. The in-migration figures show slightly different patterns between the Census and CHI data. This difference may in part be explained by comments made in footnote 1.

Table 2: Migration flow estimates NI/ GB

Year	Inflow to NI from GB	Outflow from NI to GB	Net
1991-2000	112,300	115,100	-2,800
2001 Census (Address one year ago)*	10,600	11,600	-1,000
2000-2001	11,600	11,700	0
2001-2002	12,500	11,600	900
2002-2003	11,100	11,000	100
2003-2004	12,200	11,800	400
	CHI based	NHSCR / SNHSCR based	

* See footnote 1

Figures may not add due to rounding

17. The Office for National Statistics (ONS) have also looked at internal UK migration and their research confirmed that there is evidence that the current data sources under-record the migration of males aged between 16 and 36, both on the inflows and outflows and therefore compensating errors are likely to occur. However, ONS noted that there are no independent data sources available that could be used to either revise past data or adjust future data. ONS have concluded that they will continue using NHSCR data to measure within UK migration.
18. The Northern Ireland analysis acknowledges that there is a difference between the Census and CHI for similar points in time. However since there are no detailed alternative data sources available, it is concluded that the CHI is the best estimate of within UK migration each year. CHI data has been used to create the 2001-2004 mid year estimates.

Migration to and from Republic of Ireland

19. In the 1990s the Central Health Index coupled with the Irish Quarterly National Household Survey (QNHS) was used to estimate migration from and to the Republic of Ireland. All inflows to Northern Ireland were obtained from the CHI. Outflows to the Republic of Ireland were estimated by the Quarterly National Household Survey in Ireland (a survey of 40,000 households per annum in Ireland).
20. Table 3 below shows estimates of the levels of flows between NI and the Republic of Ireland. The key results are:
- the 2001 Census results from the address one year ago question showed 2,600 people moved into Northern Ireland from the Republic of Ireland and the CHI total inflows for a similar period was 2,300 people; and
 - the 2002 RoI Census recorded 3,500 people moving from Northern Ireland to the Republic of Ireland. Irish QNHS results for 2001-2002 estimated that 2,200 people had moved from Northern Ireland to the Republic of Ireland³.

Table 3: Migration flow estimates NI/RoI

Year	Inflow to NI from RoI	Outflow from NI to RoI	Net
1991-2000	23,200	20,300	2,900
2001/2 Census (Address one year ago)	2,600(2001*)	3,500(2002)	
2000-2001	2,300	2,000	200
2001-2002	1,900	2,200	-300
2002-2003	1,800	2,200	-400
2003-2004	2,100	1,900	300
	CHI based	QNHS Based	

* See footnote 1

Figures may not add due to rounding

21. Throughout the 1990s, the total flows derived from CHI/QNHS were distributed across NI using changes in the electoral register as a proxy. The recent changes in the law regarding electoral registration procedures, and the ensuing changes in the levels of registration, have made this use of electoral data no longer feasible. Accordingly, since 2001 detailed CHI data has been used to estimate age-sex and LGD profiles of these figures.
22. The analysis outlines a small difference between the RoI 2002 Census and QNHS for similar points in time – this may be in part due to the different population bases used in social surveys and the Census. However since there are no alternative universal data sources available, it is concluded that the QNHS continues to be the best estimate of migration from NI to the Republic of Ireland each year. QNHS data has been used to create the 2001-2004 mid year estimates.

³ This difference may be due to the population base used in the 2002 Census in RoI and/or the scale up factors used in the QNHS in the Republic of Ireland.

Migration to and from the Rest of the World

23. Migration from the rest of the world is defined as persons who come into Northern Ireland from places outside the UK or Ireland. The Office for National Statistics impose a minimum twelve month residency restriction; such that someone must expect to be resident in the UK for twelve months or more to be counted as an international migrant, this is different to the Health Service approach where residency for a minimum period of 3 months is required.
24. In the 1990s the Central Health Index was used to estimate Rest of World migration for Northern Ireland. All inflows from the rest of the world to Northern Ireland were obtained from the CHI. Outflows to the rest of the world were calculated using the CHI, which stores information on removals of patients from GP lists.
25. For migration estimates it was believed that not all flows to and from the Rest of the World were measured fully by the health card system. Thus CHI estimates of persons who came into or left Northern Ireland from outside the UK and Ireland as measured by registration/deregistration with a doctor were scaled up by a factor of one half.
26. A quality assurance exercise was carried out using the 2001 Census results (with all HM forces personnel removed) as a benchmark to assess this method. Details of the analysis are given in table 4 below. The key results are:
- the 2001 Census results from the address one year ago question 5,300 people moved from outside UK and Ireland to Northern Ireland;
 - the 2000-2001 CHI total inflows from Rest of World was 4,500 persons – using the methods noted above the Rest of World figure would have been amended for population estimation purposes to 6,700 (scaled up as above); and
 - the 2000-2001 CHI total outflow to the Rest of World was 4,600 persons – using the methods noted above the Rest of World figure would have been amended for population estimation purposes to 6,600 (scaled up as above).
27. The 2001 Census shows that 5,300 people entered NI from outside the UK and Ireland – this is broadly in line with actual CHI count (4,500 people) – the application of the scale up would increase this to 6,700. If one removes the scale up from Rest of World in-migrants – then the migration difference between the data sources (Census and CHI) would be relatively small (5,300 against 4,500). This change (lowering the RoW inflow to Northern Ireland) would also explain over 80% of the difference between the 1991 Census rolled forward and 2001 Census based population estimates.

Table 4: Migration flow estimates NI/Rest of World

Year	Inflow to NI from RoW	Outflow from NI to RoW	Net
1991-2000	25,200*	27,400	-2,200
2001 Census (Address one year ago)#	5,300		
2000-2001	4,500*	6,600	-2,100
2001-2002	4,600*	5,100	-500
2002-2003	5,400*	6,100	-700
2003-2004	5,900*	5,800	100
	CHI based	CHI based	

See footnote 1

* With scale up removed

Figures may not add due to rounding

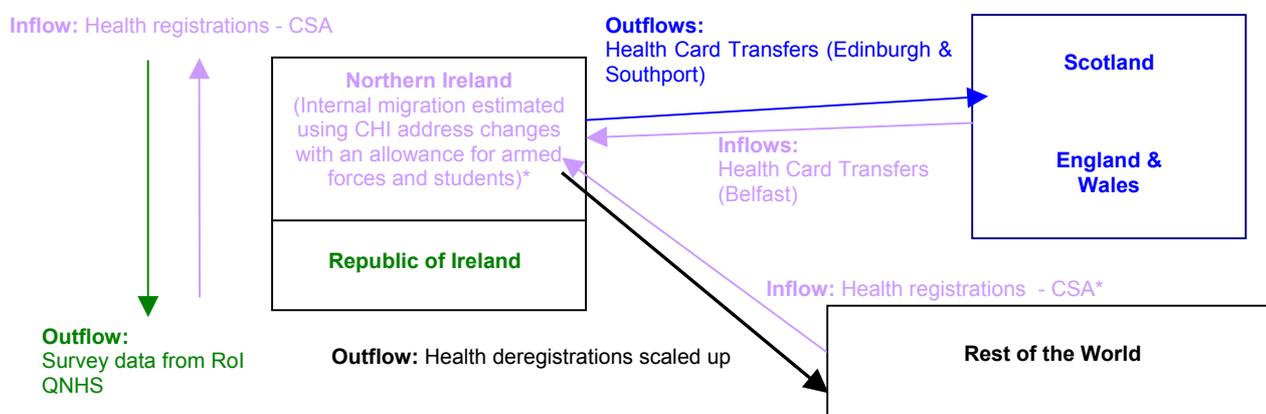
28. If one adopts the change noted above a further issue is the distribution of these migrants in Northern Ireland. Historically, the age-sex profile of Rest of World migrants was estimated by applying the age-sex profile of persons who moved from England and Wales to Northern Ireland onto the overall flows. To allocate figures to LGDs, to which the migrants entered or left, differences in electoral register counts between one year and the next were used as a proxy. Given the recent changes to the electoral register procedures this method was no longer a viable option.

29. With recent IT advancements, the number of people who have joined the CHI from outside the UK between any two-time periods can be obtained from the CSA. This also allows an age-sex and area profile to be derived for these migrants and CHI data has been used to estimate this part of the 2001-2004 mid year estimates.
30. In conclusion NISRA will continue to use CHI data to estimate levels of Rest of World flows to Northern Ireland. However the application of a scale up factor on Rest of World inflows will be removed. CHI data will also be used to distribute Rest of World migration flows into Northern Ireland and out-migration changes on the CHI will be used to distribute migration flows to the rest of the World.

Method used to estimate migration 2001-2004 population estimate series

31. The diagram below illustrates how the new method proposed in this paper will be used to estimate levels on migration for the NI mid-year estimates.

Figure 2: Methods used to estimate migration in 2001-2004 population estimates



Amendments from the 1991-2001 series methods are marked with an asterisk

Further research proposed

32. Population migration is difficult to measure. NISRA therefore plan to continue to develop new sources and analysis in testing migration estimates. This research documented above assessed a number of other sources – these are listed below:
- the **International Passenger Survey (IPS)**, is used by the Office for National Statistics to estimate international migration. Various ad-hoc adjustments to the IPS are used to allow for the limitations with the survey approach. The IPS surveys around 0.2% of all travellers (0.5% of migrants due to the immigration filter shifts) c250k people as they enter or leave the UK. However, captured responses for people entering and leaving NI are very small;
 - the **Continuous Population Survey (CPS)**, at present the questions asked in the Continuous Household Survey and Labour Force Surveys cannot easily be compared for population estimation purposes. However the proposed CPS will standardise these surveys so that a common core of questions will be asked. It is proposed that during the inter-Censal period further work will be undertaken to assess whether the Continuous Population Survey could be used to improve migration estimates;
 - the **Northern Ireland Longitudinal Study (NILS)**, this will give information on the type of people who are out migrants (from the 2001 Census) and could be used to model future out-flows;
 - the **Social Security System (SSA)**, this system could provide information from the child benefit and retirement pension systems to add weight to information from the Central Health Index – this could be used to further validate CHI data and support the estimation of migration (of all types);
 - information from the **NS quality review of international migration** – NISRA are receiving papers from the NS implementation board and will adopt methods and sources from this review as are applicable in Northern Ireland;
 - information from other travel and social surveys – NISRA are aware of the Northern Ireland Tourist Board survey that could help monitor population migration – this will be evaluated as part of the further research programme; and
 - information from the **Home Office Workers Registration Scheme** - NISRA are receiving data from the Home Office on the number of migrant workers registering in Northern Ireland and are using this to quality assure Rest of World inflows to Northern Ireland.
38. NISRA will continue to examine all available data sources with a view to further improving migration estimates.

NISRA
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