

Internal Migration Estimates

Cross-UK Methods Comparison

June 2015

1.0 Introduction

An internal migrant is defined as someone who moves home from one geographical area to another. This may be between local authorities, regions or countries within the UK. Internal migration is a major contributor to population change and is therefore an important component of both population estimates and projections.

However, there are no compulsory systems within the UK to record peoples' moves; instead they are estimated using various combinations of administrative data sources.

Estimates of internal migration affecting areas within England and Wales are produced by the Office for National Statistics (ONS). Those affecting Northern Ireland are produced by the Northern Ireland Statistics and Research Agency (NISRA), and those affecting Scotland are produced by National Records of Scotland (NRS).

Although there are similarities between the methods used by ONS, NISRA and NRS, there are also differences. This document compares the respective methods used for the estimates for the year ending June 2014.

2.0 Methods used across the UK

2.1 General

In all parts of the UK the main source of data is records of GP registrations. This is based on the premise that when people change their area of residence they will register with a new GP. However, the nature of the GP registration sources and other aspects of the methods vary across the UK.

2.2 England and Wales (ONS)

2.2.1 Summary of methods

ONS uses annual extracts from the Patient Register (PR), which lists all people registered with NHS GPs in England and Wales. These allow ONS to identify who has moved since the previous year; ONS also uses a separate PR extract for information on moves across the borders either to or from Northern Ireland and Scotland.

However, not everyone registers promptly with a new GP when they move – this is most common among young adults, especially males. ONS therefore links the PR data with data from the Higher Education Statistics Agency (HESA), which provides information on the location of all students attending higher education courses. The linking is at record level, providing high quality coverage of moves at the start of study. It also supports the estimation of moves at the end of study.

ONS also uses data from the NHS Central Register (NHSCR). The NHSCR is also derived from GP registrations but does not provide sufficient geographic detail to be the sole NHS source. However, it does cover moves throughout the year, which allows it to be used to scale

up the number of moves to take account of various groups that cannot be identified by the comparison of PR extracts:

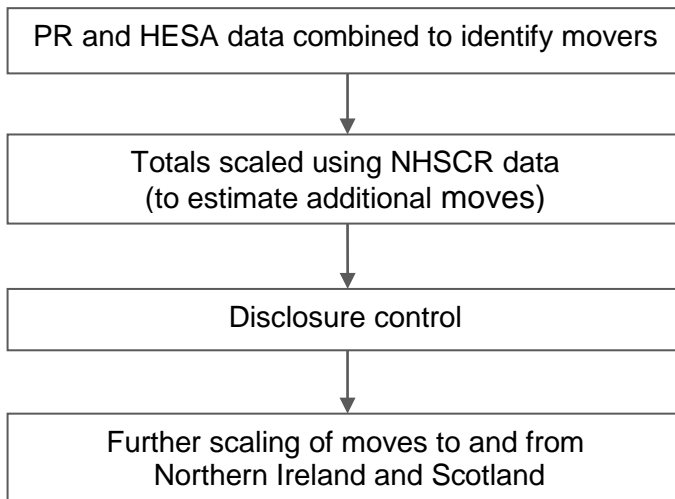
- moves of those not in the UK or not born at the start of the year
- moves of those who have left the UK or died by the end of the year
- interim moves of people who have moved more than once during the year

After the NHSCR scaling, ONS runs a disclosure control process. It then carries out further scaling to ensure that the number of moves to and from Northern Ireland and Scotland correspond with the respective totals used by NISRA and NRS. In summary:

- the number of moves from each of Northern Ireland and Scotland into England and Wales is derived from the NHSCR
- the number of moves from England and Wales into Scotland is derived by NRS from the separate Scottish NHSCR
- the number of moves into Northern Ireland is derived by NISRA from Northern Irish medical card data

ONS, NISRA and NRS all take this approach because, by mutual agreement, the GP registration sources in the country of destination take precedence over those in the country of origin.

In summary ONS's methods involve the following steps:



More detail on ONS's methods is available on their [internal migration methodology page](#).

2.2.2 Limitations (England and Wales)

The combination of PR, HESA and NHSCR data is the best method currently available but it does have limitations:

- except for those appearing in the HESA dataset, the estimates exclude people who have not re-registered with a new GP following a move
- moves either into or out of prison and the armed forces are also excluded (although ONS does take account of these separately in its annual population estimates)
- although the use of HESA data ensures high quality coverage of start of study moves, there is much less certainty about moves at the end of study
- the HESA data are only used for students who have both their home and study addresses in England and Wales – this means that estimates of moves of students to or from Northern Ireland or Scotland are entirely based on GP registration data sources which may mean that a small proportion of such moves are missed
- the NHSCR scaling is applied in the same way across the whole population so does not take account of likely differences between sexes and age groups; it is also liable to operate in an uneven way between local authorities

Another factor is the phenomenon known as “lagging”, whereby people do eventually re-register with a GP after they move but do not do so promptly. This means that their move may be estimated in a later year than when they actually moved. However, the impact on the internal migration estimates themselves may be limited: any moves missed because of lagging are likely to be offset (to a greater or lesser extent) by previous “lagger” now re-registering.

However, lagging can be very problematic when the internal migration estimates are fed into population estimates. This is because the population estimates are re-set every 10 years to the latest census figures, meaning they are liable to have already taken account of moves which do not appear in the internal migration statistics until a subsequent year, at which point they will be double-counted.

For example:

- imagine that back in 2009 Rachel was a resident of Birmingham, where she was also registered with a GP
- in 2010 she moved to Bradford but did not register with a new GP; this meant her move wasn't picked up in the internal migration estimates
- the 2011 Census recorded Rachel as living in Bradford, meaning she was now also counted in Bradford for subsequent population estimates
- in 2013 Rachel finally registered with a GP in Bradford, so appeared as a mover in that year's internal migration estimates

- however, this meant that her move from Birmingham to Bradford had now been counted twice in the population estimates, affecting their accuracy for both local authorities

2.3 Northern Ireland (NISRA)

2.3.1 Summary of methods

NISRA uses data from the Northern Irish medical card register (the equivalent of the NHS GP records in the rest of the UK). The data provide information on moves within Northern Ireland, as well as to and from the rest of the UK and other countries. As the data cover the whole year there is no need for a second health source to cover missed moves. However, NISRA also uses HESA data to improve estimation of moves at start and end of study.

At the start of study NISRA compares, for each pair of electoral wards, the number of moves between home and term-time address by age and sex on the medical card and HESA datasets. It then takes the higher of the two as the number of student moves. So, for example, if the medical cards show 8 moves of 19-year-old males between Ward A and Ward B, but the HESA data show 10 moves, NISRA uses the HESA total. At the end of study NISRA assumes that all students return to their home address.

When considering moves to or from the rest of the UK (England, Wales and Scotland) NISRA also takes steps to overcome biases caused by differing likelihoods of males and females to register or de-register with a GP when they move:

- for males aged 25 to 44, the number of registrations (representing moves to Northern Ireland from the rest of the UK) is scaled up or down so it is approximately the same as the number of female moves
- a similar process is applied to de-registrations (representing moves from Northern Ireland to the rest of the UK); however, this is only applied to males aged 21 to 29; the main student ages are excluded because it is known that more females than males leave Northern Ireland for study

The total number of de-registrations is then scaled to match the totals provided by ONS and NRS, based on their respective NHSCRs.

2.3.2 Limitations (Northern Ireland)

As with the methods in the rest of the UK, the main challenge is taking account of movers who have not re-registered with a new GP. Use of HESA data helps; however, because either HESA or medical card data are used dependent on which yields most moves at ward level (as opposed to ONS's approach of record-level linking), there is a risk of known movers being excluded. For example:

- suppose that, in reality, there are 12 moves of 19-year-old males between Ward A and Ward B
- 10 of these appear in the HESA data, reflecting moves to start higher education
- 8 of these appear in the medical card data – this includes 6 of those in the HESA data but also the 2 non-students, who are moving for work

- the HESA data take precedence because they have more moves than the medical card data; this means 10 moves are recorded
- however, this means that the 2 who moved for work, even though they had re-registered with a GP, are excluded from the statistics

It is also possible, if the medical card data yield more movers than the HESA data, for known HESA movers to be excluded.

Other limitations of the NISRA method include:

- the start of study moves process will exclude students moving from the rest of the UK to Northern Ireland, unless they register with a GP; therefore a small proportion may be missed
- because all students are moved back to their home address at the end of study, those who actually move directly elsewhere (assuming their moves are picked up on the medical card register) will incorrectly be considered to have moved twice – once from study to home and once from home to elsewhere
- moves of armed forces and prisoners are excluded (although NISRA does take account of armed forces separately in its mid-year population estimates)
- although the overall impact of the adjustments to balance the numbers of male and female cross-border movers for certain age groups is small, it does risk cancelling genuine differences between the sexes
- lagging (as described in the England and Wales section) will also have an impact

2.4 Scotland (NRS)

2.4.1 Summary of methods

NRS uses annual extracts from the Community Health Index (CHI), which lists all people who have registered with NHS GPs in Scotland. This allows NRS to identify who has moved since the previous year.

NRS also uses the Scottish NHSCR. This has similar properties to the NHSCR for England and Wales, in that it is also derived from GP registrations but does not provide sufficient geographic detail to be the sole NHS source. However, it does also cover moves throughout the year, which allows it to be used to scale up the number of moves to take account of various groups that cannot be identified by the comparison of CHI extracts. This includes:

- moves of those not in the UK or not born at the start of the year
- moves of those who have left the UK or died by the end of the year
- interim moves of people who have moved more than once during the year

The total number of moves to England and Wales is then scaled to match the totals provided by ONS, based on their NHSCR data. The total number of moves to Northern Ireland is scaled to match the total provided by NISRA, based on their medical card data.

2.4.2 Limitations (Scotland)

- NRS's current methods do not use HESA data so do not have any means of estimating any study-related moves that are missed from the health data sources
- as no other steps are taken to account for missed moves, the estimates only include people whose move has been recorded on the health data sources; therefore any mover who has not re-registered with a new GP will be excluded
- moves by armed forces or prisoners are also excluded (although NRS does take account of these separately in its annual population estimates)
- the NHSCR scaling is more detailed than the equivalent in England and Wales, as it takes account of both age and sex
- lagging (as described in the England and Wales section) will also have an impact

3.0 Comparison of methods

The following table summarises how each agency deals with specific challenges:

	ONS	NISRA	NRS
Geographic coverage	England and Wales	Northern Ireland	Scotland
Main sources	Patient Register (PR) NHS Central Register (NHSCR) – England and Wales Higher Education Statistics Agency (HESA)	Medical cards register Higher Education Statistics Agency (HESA)	Community Health Index (CHI) NHS Central Register (NHSCR) - Scotland
GP registrations not covered by annual health data extracts	NHSCR data used for scaling	No process needed – medical card register includes all GP moves	NHSCR data used for scaling

Study-related moves	HESA data combined with PR data at record level; done for both start and end of study	Start of study moves calculated at ward level, based on whichever of HESA and medical card data has most moves All students returned to home address on completion of study	No specific processes – moves are only covered if they appear in the CHI / NHSCR sources
For other moves, addressing differing GP registration patterns of men and women	No processes	For cross-border moves, those for certain age groups are scaled to ensure similar numbers of male and female moves	No processes
Lagging (delayed GP re-registrations)	No processes, other than those ladders whose moves were covered by the processes for start and end of study	No processes (the start of study process does not mitigate lagging as it is not done at record level)	No processes

The methods used in the different parts of the UK show similarities and differences. In all cases administrative data from the national health organisation have been selected as the main source of information, but there is always the challenge that this cannot pick up all moves, most notably those of young adult males.

However, ONS and NISRA have both introduced specific methods to counter this. Both agencies use HESA data for estimating moves of people as they start higher education courses, and ONS also uses HESA data to help estimate moves at the end of study. NISRA also adjusts its cross-border flows data for certain age groups so that the numbers of males and females moving to Northern Ireland are similar.

It is also worth noting that ONS, NISRA and NRS all scale their respective cross-border flow totals to those provided by the destination country, to ensure consistent totals.

Although the methods in each part of the UK differ, it is not possible to say that one is definitively better than the others in terms of overall accuracy. Although they have collaborated, ONS, NISRA and NRS have all developed their own solutions based on the differing data and resources they have available. Furthermore, although some methods are more complex than others, all of them have known limitations affecting different aspects of the estimates.

4.0 Future developments

The current methods are the best available sources of information on internal migration moves within the UK. However, over time data sources change and new data sources become available.

ONS is researching improvements to the current methods for England and Wales and intends to introduce them in June 2017. Areas of research include replacing the current NHSCR scaling with an improved process using the NHS's Personal Demographics Service, and developing improved estimates of study-related moves.

NRS is researching using more detailed geographic information from the Scottish NHSCR and depending on the outcome of this research the CHI may no longer be used directly. NRS is also researching the quality of the HESA data to improve the estimation of study-related moves in Scotland.

At present NISRA is not working on any changes to its methods.

ONS, NISRA and NRS meet regularly and share information on their publications, methods and research. This means that although the methods in each part of the UK will continue to differ, each agency has the opportunity to benefit from the others' knowledge.

5.0 Contacts

If you would like more information on internal migration methods, the contact details in each part of the UK are as follows:

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