

Report on internal migration for Scotland, quality assurance of administrative data used in population and migration statistics: January 2018

Quality assurance undertaken on administrative data for internal migration for Scotland data used within Population Statistics Division (PSD) and Migration Statistics Division (MSD) publications.

Contact:
Pete Large
pop.info@ons.gsi.gov.uk
+44 (0)1329 444661

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Table of contents

1. [Introduction](#)
2. [Operation context and administrative data collection](#)
3. [Communication with data supply partners](#)
4. [Quality assurance principles, standards and checks applied by data suppliers](#)
5. [Producer's quality assurance investigations and documentation](#)

1 . Introduction

A [summary of this quality assurance of administrative data report](#) covering the use of internal migration for Scotland used in publications by PSD and MSD is also available.

What is internal migration for Scotland?

Tables for internal migration between Scottish council areas (equivalent to local authorities in England and Wales) are produced and published by the National Records of Scotland (NRS). Office for National Statistics (ONS) uses these tables in the production of population estimates and migration outputs.

The NHS Central Register (NHSCR) for Scotland records the movement of patients between NHS Board areas within Scotland. The Community Health Index (CHI) is a register of patients registered with a doctor in Scotland and records changes in patient addresses. The NRS use the NHSCR for Scotland to estimate moves between NHS Board areas in Scotland, which are considered the best estimates of internal migration within Scotland.

The NHSCR for Scotland is used with the CHI to estimate moves below NHS Board level, including moves between Scottish council areas. The CHI contains postcode information, which allows geographical information to be assigned to patient records. Estimates below NHS Board level are constrained to the NHS Board level figures, so that they are consistent with moves across NHS Board areas.

Moves to Scotland from other constituent countries of the UK (sometimes referred to as cross-border flows) are also included in this report as they are determined from the same data sources by the same supplier.

How is it used by ONS in population and migration statistics?

Within ONS, internal migration for Scotland data are used by the Population Estimates Unit (PEU) and the Migration Statistics Unit (MSU). The data are used to estimate the movement of people between Scottish council areas and to determine the movement of people to Scotland from the other constituent countries of the UK.

In the components of population change tables for UK local authorities in the UK mid-year population estimates, the data are used as measures of internal migration inflows and outflows in the UK for Scottish council areas, as well as the inflows of people to Scotland from the other constituent countries of the UK. They are defined as residential moves between different local authorities in the UK.

In internal migration, the moves to Scotland are used to determine the number of people moving to Scotland from England and Wales during statistical production, where we use the flow data to adjust our estimates.

In the migration flows table within the local area migration indicators suite (LAMIS) for the UK, the data are also used as measures of internal migration inflows and outflows within the UK for Scottish council areas and to determine the movement of people to Scotland from the other constituent countries of the UK.

This report covers the processes, from data collection through to publications produced by ONS, and focuses on quality assurance. It has been published in a bid to help you understand data processing and provide reassurance that the subsequent statistics, produced by ONS using internal migration for Scotland data, are suitably robust.

This report is intended to supplement existing documentation, such as:

[Local area migration indicators metadata](#)

[Local area migration indicators suite \(LAMIS\) Quality and Methodology Information \(QMI\)](#)

[Annual mid-year population estimates QMI](#)

[Methodology guide for mid-2016 UK population estimates \(England and Wales\): June 2017](#)

[Internal migration methodology](#)

[Internal migration estimates QMI](#)

Strengths and limitations

There is no direct source for estimating internal migration in the UK. It is, therefore, necessary to use surveys or proxy data to produce estimates of internal migration. [Research suggests](#) that the NHSCR for Scotland data and CHI data as sources are the best proxy sources of internal migration estimates for Scotland. Recent improvements in the data have included making the lag for registration with a doctor in the CHI consistent with that in the NHSCR for Scotland. Previously, it had been three months instead of two months. There are also strong links between the NHSCR for Scotland team and the CHI data providers.

For moves between the constituent countries of the UK, the receiving country is deemed to have the best data and as such determines the flows from the other constituent countries. This is due to a known issue where people do not de-register with their GP surgery when moving (so can be seen as passive) and registration requesting access to services is an active event. The other UK countries then agree to the totals to ensure consistency.

Migration within Scotland is estimated based on General Practitioner (GP) registration and so will only pick up migrants who register with a GP at their new address. A known weakness of patient registers, NHSCR for Scotland data and CHI data, is the underestimation of young people. Young men are less likely to register with a doctor and young people (particularly men) are less likely to tell their doctor if they have moved, including moving abroad. Students may choose to keep registered with the GP at their parental address and not notify the GP of their term time address. Patient registers will also not contain people who only access private healthcare. For further consideration of the impact of such issues, see the [Patient Register quality assurance of administrative data \(QAAD\) report](#), where the issues are discussed in detail, which will be updated in 2018.

What is QAAD?

Within the UK Statistics Authority's [QAAD - Setting the Standard \(298.77KB\)](#) documentation it states, "The need for investigation and documentation increases at each level of assurance."

The [QAAD Toolkit](#) sets out the four levels for the quality assurance that will be required of a dataset:

- A0 – no assurance
- A1 – basic assurance
- A2 – enhanced assurance
- A3 – comprehensive assurance

The UK Statistics Authority states that the A0 level is not compliant with the [Code of Practice for Official Statistics](#). The assessment of the assurance level is in turn based on a combination of assessments of data quality risk and public interest. The toolkit sets out the level of assurances required as follows:

- A1: Basic assurance – the statistical producer has reviewed and published a summary of the administrative data QA arrangements
- A2: Enhanced assurance – the statistical producer has evaluated the administrative data QA arrangements and published a fuller description of the assurance
- A3: Comprehensive assurance – the statistical producer has investigated the administrative data QA arrangements, identified the results of independent audit, and published detailed documentation about the assurance and audit

Within the UK Statistics Authority [QAAD – Setting the standard](#) documentation it states:

“Quality assurance of administrative data is more than simply checking that the figures add up. It is an ongoing, iterative process to assess the data’s fitness to serve their purpose. It covers the entire statistical production process and involves monitoring data quality over time and reporting on variations in that quality. Post collection quality assurance process, but can be of limited value if the underlying data are of poor quality. The Authority encourages the application of critical judgment of the underlying data from administrative systems before the data are extracted for supply into the statistical production process. As with survey data, producers need to: investigate the administrative data to identify errors, uncertainty and potential bias in the data; make efforts to understand why these errors occur and to manage or, if possible, eliminate them; and communicate to users how these could affect the statistics and their use.”

The toolkit outlines four areas of assurance; the rest of this report can be split into these areas. The areas for assurance are:

- operational context and administrative data collection
- communication with data supply partners
- quality assurance principles, standards and checks applied by data suppliers
- producer’s quality assurance investigations and documentation

Assessment of quality assurance level

Our assessment was carried out using the [QAAD Toolkit](#). This assesses an administrative data source in terms of the risk to data quality and its onward use in statistics as well as the profile of the statistics produced from the source. The matrix approach to assessment advised by the UK Statistics Authority has two components: separate assessments of public interest in our statistics (low, medium, high) and input data quality concerns about our statistics (low, medium, high). The outcome of our assessment then determines the level of assurance and documentation required to keep our users informed about the quality assurance arrangements in place for the administrative systems from which our statistics are sourced. The results of those assessments are an A1 rating.

The A1 rating means that a basic level of assurance is required for these sources and this report will provide information to meet this level of assurance.

Table 1: Summary of quality assurance level for internal migration for Scotland

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Use	Risk of quality concern	Public interest	Assurance level
Overall assessment			A1 - basic
Population Estimates Unit (PEU)			
Mid-year estimates	Low	High	A1 - basic
Internal migration	Low	High	A1 - basic
	Low	Medium	A1 - basic
Migration Statistics Unit (MSU)	Low	High	A1 basic

Source: Office for National Statistics

Internal migration for Scotland data used within ONS outputs have been given an A1 rating based on risk profile scoring. This is a basic level of assurance. Internal migration for Scotland data are considered a low concern in terms of quality (risk) and of high public interest (profile).

The level of risk of data quality concerns is low because:

- these administrative data sources are considered to be a good proxy as internal migration estimates
- the CHI and NHSCR for Scotland are combined to produce estimates at Scottish council area level
- the data are accredited National Statistics and fully quality assured at the time of supply

The public interest profile of the statistics is high because:

- they are part of the UK mid-year population estimates, which are National Statistics used as a basis to make decisions on resource allocation by central and local government and as a component in other national statistics
- LAMIS is published annually and the data are of interest to local authorities and health services, in particular, for the purposes of planning resource allocations

If you feel this report does not adequately provide this assurance then please contact pop.info@ons.gsi.gov.uk with your concerns.

2 . Operation context and administrative data collection

Migration is an important component of estimating population change. Internal migration measures those moving within a country. For the UK, internal migration includes moves within a country (for example, Angus to Falkirk) and moves from one constituent country to another. This second type of move is also referred to as a cross-border flow.

Administrative sources are used to estimate internal migration because there is no comprehensive system to measure internal migration in the UK.

National Records of Scotland (NRS) uses the following sources of data to produce internal migration for Scotland estimates between Scottish council areas:

- National Health Service Central Register (NHSCR) for Scotland, run by NRS
- Community Health Index (CHI), controlled and run by NHS Scotland's Information Services Division (NHS ISD)

NHS Central Register for Scotland

The NHSCR for Scotland records the movements of patients between NHS Board areas in Scotland. NHS Scotland consists of 14 regional NHS Boards, responsible for the health of the population in each area. Each time a patient transfers to a new NHS doctor in a different NHS Board area, the NHSCR for Scotland is notified and then the patient is considered to have made a migrant move.

The NHSCR for Scotland contains basic demographic information of everyone who was born, or has died, in Scotland, plus anyone else who is or has been registered with a General Practitioner (GP) in Scotland. The Register exists mainly to permit easy transfers of patients across Scottish NHS Board areas or to other parts of the UK. The NHSCR for Scotland receives a nightly update via CHI. New records are visually checked against existing records and if the record is believed to be a new entry record, it is added to the NHSCR for Scotland.

The NHSCR for Scotland does not contain postcode information for each record. To produce estimates below NHS Board level, it is necessary to combine the NHSCR for Scotland data and the CHI data, which does contain the patient's postcode.

Community Health Index

The CHI is a complete register of Scottish GP practice patients. When a patient registers at a GP practice, their details are matched to the CHI. Every new patient who registers with a Scottish NHS doctor is allocated a CHI number. When a person dies, the date of death is added, but the record is not removed. The CHI contains data on patient demographics and some clinical information on aspects of healthcare screening and surveillance. The CHI records contain the postcode of the patient's address. Postcode data are shared by NHS National Services Scotland (NHS NSS) with NHSCR for Scotland.

NRS consider the best quality estimates of internal migration for Scotland to be at the NHS Board level of geography, based on data from the NHSCR for Scotland. To provide estimates at lower levels of geography, such as Scottish council areas, the NHSCR for Scotland is used with the CHI. The estimates at these lower levels of geography are constrained to the NHS Board estimates, so that estimates derived from the NHSCR for Scotland and the CHI will equal the NHS Board estimates.

How internal migration estimates are produced

NHS Board area level moves are produced using data from the NHSCR for Scotland; when a patient is transferred between NHS Board areas, a posting record is created for the change. These postings are used to produce the internal migration estimates at NHS Board area level.

The CHI is then used to estimate moves within NHS Board areas by using postcode information on the CHI. Two CHI extracts, one year apart, are compared and any differences in postcode between the two extracts are recorded as being a move.

3 . Communication with data supply partners

Within Office for National Statistics (ONS), the Population Estimates Unit (PEU) and the Migration Statistics Unit (MSU) use the internal migration for Scotland data produced by National Records for Scotland (NRS).

Population Estimates Unit

PEU has no formal agreement with NRS for the supply of these data. Regular contact is maintained between colleagues from both organisations throughout the year regarding the publishing of the UK population estimates and internal migration estimates.

NRS publish migration within Scotland tables on an annual basis in April. PEU uses the table available on the NRS website. There is no formal sign-off of the data from the data supplier. If the NRS tables are not published in time for the information to be included in the PEU outputs, PEU publishes figures as provisional figures and final figures are published when the tables are published by NRS.

Cross-border flows to Scotland are agreed between ONS, NRS and the Northern Ireland Statistics and Research Agency during an annual meeting. Data are then shared so that cross-border flows are consistent between countries with the receiving countries determining the flows to them.

Migration Statistics Unit

There is no formal agreement between MSU and NRS for these data. A formal request is made by MSU when the data are required. MSU provides a template as part of their formal request for the data. NRS supplies internal migration data for Scotland based on the years requested in the template. Any issues relating to the supply of the data are fed back to the NRS and resolved, using appropriate channels. There is no formal sign-off of the data from the data supplier.

Engagement with users

ONS continually engages with users, through a variety of means, to understand how our outputs are meeting their requirements. Feedback provided tends to relate to the overall statistical methodology and the impact on the final statistics, rather than to any individual data source. To date, no specific feedback on the use of these data sources have been provided.

4 . Quality assurance principles, standards and checks applied by data suppliers

Checks and quality assurance carried out by National Records of Scotland

Estimates for internal migration from NHS Central Register (NHSCR) for Scotland are used for migration between Scottish NHS Board areas. But migration between Scottish council areas are produced using the Community Health Index (CHI). The estimates for Scottish council area level migration are constrained to the NHS Board area estimates.

Community Health Index

National Records of Scotland (NRS) receives an annual CHI extract from the NHS National Services Scotland (NHS NSS). It is checked by running frequency and cross checks on the data received, comparing with previous years and also comparing with the NHSCR for Scotland data. Any queries are then followed up with NHS Scotland's Information Services Division (NHS ISD), as are any known changes in the system or issues that they are aware of.

As well as carrying out basic checks and speaking to NHS ISD, who run the CHI, NRS have also carried out various comparisons with other data sources. These include linking the CHI to the 2011 Census to learn more about the differences between the sources, to give insights into the quality of the data and its suitability for use in producing population and migration estimates.

Certain records are removed, such as:

- records with an invalid age
- records without a General Practitioner (GP) practice
- patients thought to be resident outside Scotland but registered with a Scottish GP
- other invalid records

NRS also validates the postcodes of the CHI records on each extract against the NRS postcode index. Mapping both extracts to the same version of the postcode index avoids creating false migrants due to postcodes being introduced or deleted between the dates of the two extracts.

For the CHI, data quality exercises are carried out to keep patient demographic details and registration statuses up-to-date. For some exercises, patients are contacted directly; for other exercises, input from GP practices is required. These may be for individual patients or groups of patients. Up-to-date information is shared throughout NHS Scotland to ensure patients can be positively identified and records kept accurate.

Checks carried out by NRS on the data used by ONS

For population estimates for Scotland produced by NRS, which feed into ONS population figures, the NRS's Population and Migration Statistics (PMS) team receive an anonymised extract of the NHSCR for Scotland every month. When the data are received, various basic checks are carried out, including checking the frequencies of the variables, number of records, comparing the migration flows with previous months and years by area, and so on. NHSCR for Scotland migration flows are also compared with the migration flows derived separately from the CHI.

The PMS team also have regular meetings with the NHSCR for Scotland team as well as other statisticians in NRS using other extracts of the NHSCR for Scotland, to find out about any system or data flow changes that might affect how NRS use the NHSCR for Scotland data to produce population and migration estimates.

As well as carrying out basic checks, NRS speak to NHS NSS to learn more about the differences between the sources and to give insights into the quality of the data and its suitability to be used to produce population and migration estimates. NRS also compare the final population and migration figures to previous years and other available sources, for example, school census, new house completion, data before supplying NRS's data to the users.

Data quality arrangements for NHSCR for Scotland and CHI

Regular meetings between the PMS team, the Head of NHSCR for Scotland in NRS and other NHSCR for Scotland staff take place to discuss current data quality and future data quality and system changes. The PMS also meet with colleagues in NHS ISD to discuss the quality of the CHI extract they supply. Over the years various quality assurance work has been carried out to compare the CHI data with the NHSCR for Scotland data, both for statistical and operational purposes.

There is also a CHI Data Quality Group, which includes analysts from NHS ISD as members. As the NHSCR for Scotland systems and the CHI systems update each other overnight and as operational and statistical linkages have been carried out in the past, the quality of the systems is fairly well understood. Research papers on the quality of the CHI can be found on the NRS website in the [2021 Census research section](#).

The governance of the NHSCR for Scotland data lies within NRS and the head of NRS Data Resources, sits on the NHSCR for Scotland governance board along with the head of NHSCR for Scotland, the CHI Advisory Group Chair, representatives from NHS ISD and a Caldicott Guardian (a senior person responsible for protecting the confidentiality of people's health and care information and making sure it is used properly within an organisation).

As well as the governance board, NRS statistical teams also have strong links with the NHSCR for Scotland team and correspond regularly about data quality. NRS also visit the NHSCR for Scotland team in Dumfries to find out more about how the NHSCR for Scotland system works in practice and how data are recorded and managed. NRS also have regular meetings with the NHSCR for Scotland, NRS's Caldicott guardian and other important stakeholders to discuss use of the NHSCR for Scotland data, including appropriate use and any data quality issues NRS should be aware of.

Quality assurance checks carried out by NRS on tables supplied to ONS

Basic checks are carried out on the data. Migration flows are compared with previous months and years by area. NHSCR migration flows are also compared with the migration flows derived separately from the CHI. Final migration and population figures are compared with previous years and with other sources.

For the tables supplied to MSU, the NRS statistician collates the requested data and then another NRS statistician independently quality assures the data and the resulting tables are compared for consistency. If the resultant tables are identical, the data are supplied to MSU. If there are differences between the two tables, the cause of the differences will be investigated by NRS statisticians.

Information on the methodology and data quality of population estimates is produced by the NRS, such as:

[Mid-year population estimates for Scotland: methodology guide 2016](#)

[Information on the quality assurance arrangements for administrative data used in population estimates](#)

5 . Producer's quality assurance investigations and documentation

Population Estimates Unit

The Population Estimates Unit (PEU) uses the internal migration for Scotland data at the Scottish council area level in the production of the UK mid-year population estimates.

The PEU team carry out basic checks on the data, such as:

- check that the data are complete and appear valid
- confirm that the figures have been copied into the processing files correctly
- compare the figures for the current year to the previous year's figures
- verify that no errors have occurred during the data processing
- check that the totals after processing are the same as those in the original data

If the checks yield any issues with the data, PEU will contact the data supplier to discuss and resolve the issues.

Migration Statistics Unit

The Migration Statistics Unit (MSU) uses the internal migration for Scotland data at the Scottish council area level in the production of the local area migration indicators suite of tables.

The MSU team carry out basic checks on the data, such as:

- check that the data are complete and appear valid
- confirm that the figures have been copied into the master LAMIS spreadsheet correctly
- compare the figures for the current year to the previous year's figures
- check that the correct figures are recorded against the appropriate Scottish council area code

If the checks yield any issues with the data, MSU will contact the data supplier to discuss and resolve the issues.