

Methods and Reference Material

NISRA developed a methodological strategy to ensure the Northern Ireland Census 2011 results provide accurate population estimates.

The strategy encompassed the census coverage survey and comprehensive quality assurance. The objective was to identify and adjust for the number of people and households not counted in the Census 2011, counted twice in the census, or counted in the wrong location.

The following section of the prospectus covers:

- [Census 2011 Methodology](#)
- [Evaluation of Census 2011 operations](#)

Census 2011 Methodology

The following is an extract from the “2011 Census Security: Report of the Independent Review Team” which was published in January 2011 and outlines the planned census operations.

The Censuses

The United Kingdom censuses are ten yearly compulsory counts of population and housing. The information obtained in a census is used by government, local authorities, health providers, commercial businesses and other users to develop their policies and plan services effectively. As billions of pounds of public money is distributed using census figures it is vital that we reach and engage with every individual. If, for example, people are missed, there may not be enough funds allocated for health care or education in a particular area.

A full census has taken place in Great Britain every ten years since 1801, with the exception of 1941. In 2011 Census Day in the UK is 27 March 2011.

The Office for National Statistics (ONS) is responsible for carrying out the 2011 Census in England and Wales. A census for Scotland is being planned and managed by the National Records of Scotland (NRS) and for Northern Ireland by the Northern Ireland Statistics and Research Agency (NISRA).

The ONS is overseen by the UK Statistics Authority and produces independent information to improve the understanding of the UK’s economy and society. Reliable and impartial statistics are vital for planning proper allocation of resources, policy making and decision making to ensure a fair society. The UK Statistics Authority was established on 1 April 2008 by the Statistics and Registration Service Act 2007 as non-ministerial department, directly accountable to parliament.

The NRS is part of the devolved Scottish Administration. It is headed by the Registrar General for Scotland, who reports to Scottish Ministers.

The NISRA is an Executive Agency within the Department of Finance and Personnel (Northern Ireland). NISRA’s Chief Executive is also the Registrar General for Northern Ireland.

Uses of the Census Data

Governments, local authorities, the health sector, businesses and market researchers, academic researchers and the education sector, community groups, genealogists and the public at large rely heavily on census results for a countless range of purposes. The six main uses of census data are:

- Resource allocation – for resource allocation it is crucial that population counts (both total counts and key characteristics) are accurate, consistent and comparable between areas.
- Targeting investment – for many government funding uses, data must be consistent nationally to allow investment to be made in the areas where it is most needed.
- Planning – basic population counts by key characteristics such as age, sex, ethnic group, household type and size are important for planning. If the different characteristics of an area's population can be identified, plans can then be made for the sort of services necessary. Information on small areas and small groups of the population is crucial in local planning.
- Policy making and monitoring – there is a clear drive across government for policy initiatives to be evidence based. Since many initiatives are implemented and assessed at a local level, census data on population size, age, sex, migration etc. are of key importance.
- Academic and market research – the ability to produce statistics for small areas is vital for many research uses. Basic population counts and counts by characteristic are also required.
- Statistical benchmarking – more generally, census data are employed to improve the quality of many other statistics, which may also be used for the above.

The 2011 Censuses: How Do the Censuses Work?

The Address Register

The address register underpins the entire census operation in England and Wales. Addresses are printed on each household questionnaire for postal delivery. Questionnaires are hand delivered to communal establishments (e.g. hospitals and care homes, or caravan parks). These addresses also provide the spine of the questionnaire tracking system, which is used to target non-response follow-up activity.

There is no single authoritative source of national address information in England and Wales that fulfils the requirements of the census. Therefore the census has developed an address register that brings together unique addresses from other data sources that have either national coverage (e.g. Royal Mail Postal Address File (PAF) or National Land and Property Gazetteer) or that cover a particular type of establishment. This information has been supplemented by a separate address check of approximately 15% of the postcodes in England & Wales, where there was least certainty in the address register.

In Northern Ireland, a single address database (POINTER) for use throughout government has been developed through the integration of a number of administrative sources such as those relating to valuation, domestic rates and Ordnance Survey Northern Ireland. NISRA has worked with other parts of government and Royal Mail to produce a Census Address Register, based on POINTER, that meets Census requirements. The linkage to POINTER provides a grid-reference for all properties which will support both enumeration processes and, ultimately, the creation of outputs. In the period immediately prior to Census Day, when Census forms are being delivered, enumerators will perform an address check based on the Census Address Register.

NRS also require accurate address and postcode based products for the Census operation in Scotland. A definitive high quality national address register is not yet available for Scotland but NRS has carried out research on the quality of address information and has identified suitable products. Residential addresses, non-residential addresses and communal establishments have been identified using the PAF. This has been supplemented with appropriate material from other sources such as Local Authority planning offices and the Assessors Portal.

NRS has created postcode look-up files and address files from the address register to manage the census field operation, to personalise questionnaires and Enumerator Record Books (ERBs), to support warehouse and processing operations and support creation of outputs.

Questionnaire Delivery

All households in England and Wales will receive a census questionnaire pack through the post. Questionnaire packs contain a census questionnaire together with an information leaflet and a pre-paid envelope for return by post direct to the census Data Capture Centre. Communal establishments (i.e. managed accommodation, such as care homes, army bases, hostels, etc.), and special groups (such as rough sleepers and travellers), will be hand delivered a questionnaire pack. Questionnaire packs for communal establishments are similar to household packs. In Wales, questionnaire packs contain both an English language and Welsh language questionnaire.

The delivery of questionnaires in Northern Ireland will follow the England and Wales model, with postal delivery to households and enumerator delivery to communal establishments. The single exception to this is households in rural Fermanagh where addressing issues have led NISRA to use enumerator delivery.

In Scotland 94% of census questionnaire packs will be hand-delivered by enumerators. The remaining 6% will be delivered by Royal Mail in mainly rural areas. New addresses found during the field operation will be added to the ERB and a questionnaire pack will be delivered to the address. Information obtained for new addresses and any address changes will be captured and used for subsequent statistical analysis and output creation.

Return and Collection of Questionnaires

In England and Wales householders can complete their questionnaires and return them by post or are able to complete an on-line questionnaire. Each household questionnaire is pre-addressed, and contains a unique internet access code (IAC, required to access the online census) and bar-code linked to the address. For household questionnaires that are returned by post, the identifying bar-code (which is visible through the return window) will be scanned by Royal Mail for 'receipting' purposes and this information uploaded onto the questionnaire tracking systems. Submission of the completed online census also updates the QT. Knowing that a return has been received from a household either on paper or online means that it does not need to be followed up.

In communal establishments, each individual is given a questionnaire pack which contains the census questionnaire, an information leaflet, and a privacy envelope. Questionnaires are collected by the special enumerator and transferred to the census data capture centre at a later time (either through the post or by secure courier). Individuals within communal establishments also have the option of completing their questionnaire on-line in the same way as households.

The procedures in Northern Ireland for return and collection of questionnaires are exactly the same as in England and Wales.

Householders in Scotland can complete their questionnaires and return them by post to a local census field office or they can complete their questionnaire on-line. If a household is listed on the address register their questionnaire will have a pre-printed address and a unique internet access code (IAC) and the householder can use this IAC to access the on-line census. Enumeration of communal establishments is carried out by census team leaders. All questionnaires are completed on paper, collected by the census team leader, and included with the other completed paper questionnaires for their respective area.

It is likely that some households will require additional materials. Households with more than six people in England and Wales and Northern Ireland (or five people in Scotland) will require a continuation questionnaire; households may want to be sent assistance material, or may have lost or damaged their census questionnaire and need a replacement. Such materials can be ordered online or via requests to the census helpline – they will then be sent out by post (or hand-delivered in Scotland). Census field staff can also provide additional material on the doorstep.

The Questionnaire Tracking System

In England and Wales the Questionnaire Tracking (QT) system enables the tracking of every questionnaire from delivery until return to the data capture centre. The QT tracks each questionnaire by means of the unique ID number and barcode printed on each questionnaire, or by means of the IAC for returns submitted online. By scanning this unique barcode printed on each questionnaire the QT can be updated with any additional or replacement questionnaires delivered to households.

The QT will provide real time information on response rates, enabling census managers to direct field staff to areas where response is lowest. It also enables the ONS to know the response status of each address, both during and after the census.

The questionnaire tracking system in Northern Ireland is the same as that in England and Wales.

In Scotland, questionnaire tracking is carried out during enumeration and at the data capture centre. During enumeration tracking of questionnaires is the responsibility of field staff. Regular management reports are submitted by staff and collated by managers for their area. Summary reports are also provided to census HQ along with reports from Royal Mail. At the data capture centre questionnaires are tracked by unique questionnaire ID and daily progress information is supplied to NRS on internet questionnaires completed and paper questionnaires scanned.

Follow-up

In England and Wales census field staff will be employed to visit households that haven't returned a questionnaire and encourage and assist householders to respond. Each collector will be provided with a follow-up list, listing all non-responding households from the QT that require a visit. Census coordinators (team leaders) will be monitoring response across their area and will be deploying the collectors to the areas with the lowest response to ensure that the variation in response is reduced. The follow-up period lasts until 6 May.

The Northern Ireland follow-up process is very similar to that in England and Wales, except that each enumerator will be allocated to a fixed area. The enumerator will already have conducted the address check within that area, and will then carry out all follow-up within the same area.

In Scotland non-responding households and households that fail to provide an acceptable level of response will be identified by enumerators via their ERB. The enumerator will make attempts to contact the householder to obtain the missing information, and if appropriate contact is made, will try to get the householder to complete the questionnaire immediately, or arrange a suitable time for collection or provide a return envelope for the questionnaire to be posted back. The follow-up period lasts until 25 April. After the end of follow-up, enumerators will carry out a final tally of questionnaires received and reconcile it with the ERB. Questionnaires are sorted, boxed and passed to the local census team leader with the ERB and a reconciliation summary for further

checking by both the census team leader and the local census district manager. When these final checks have been completed, the boxed questionnaires and ERBs will be uplifted by the logistics contractor and delivered to the paper data capture centre.

Refusals

It is mandatory for members of the public to complete census questionnaires. Census field staff will encourage responses, and will provide assistance, but persistent refusals will be reported to the census coordinator for non-compliance procedures to be initiated. This may ultimately result in prosecution.

Assistance Completing the Questionnaire

Although the questionnaire has been designed and tested to be easy to complete, some households will need assistance completing their questionnaire due to language challenges, difficulty reading English, or a disability, for instance. A wide range of assistance is available, including: online help; online audio and British Sign Language clips; the online census is readable by commonly used screen readers used by the visually impaired; translation booklets of the questions in the most commonly used languages; etc. The census helpline can also provide help. Additional materials requested online or via the census helpline will be posted out to the household. Census collectors can provide help and additional materials, on the doorstep.

Census Coverage Survey

To ensure that the census produces the most accurate snapshot of the population, a Census Coverage Survey (CCS) is conducted immediately following the census follow-up period. The CCS is a short doorstep interview carried out in a one per cent sample of postcodes in England and Wales and a 1.5% percent sample in Northern Ireland and Scotland; the survey starts on 9 May in England and Wales and Northern Ireland and 7 May in Scotland. The CCS is used to estimate the number of people and households that didn't respond to the census; these households and people are then imputed into the final published results.

Data Capture and Coding

In England and Wales all paper census and CCS questionnaires are returned direct to the census data capture site in Manchester. Here the paper questionnaires are scanned and the data captured automatically using Optical Character Recognition (OCR) and Optical Mark Recognition (OMR) software. Any snippets of text that cannot be automatically captured will be keyed from an image of just the relevant word or phrase. The write-in responses (e.g. country of birth; occupation, etc.) are also coded (i.e. given a standard classification number) – the majority will be coded automatically, with the remainder manually coded. The census data centre (which stores both the information captured from paper, and the online census returns) is based at the same

site in Manchester. At the end of data capture, and only after ONS has given authority, the paper questionnaires are securely shredded and environmentally recycled.

Paper census forms and CCS questionnaires for Northern Ireland will be processed along with those for England and Wales at the same site in Manchester.

In Scotland all data capture and coding activities are carried out in geographical order at our data capture centre. Paper questionnaires are delivered in boxes by the logistics contractor from local field offices to the data capture centre. Boxes are receipted and reconciled with information from the field operation. Questionnaire images and data are captured using scanning and recognition technology and paper questionnaires receipted are reconciled with information from the field operation. Data that is not captured automatically is keyed by operators. Data from online questionnaires is amalgamated with captured data from paper questionnaires. Most textual responses are converted into coded values via classifications using automatic and computer assisted manual methods. Captured and coded data is validated using pre-defined rules. Finally, data outputs are generated in geographical order and delivered to NRS.

Downstream Processing

Once the census data is captured and coded the database is securely passed to the England and Wales census HQ in Hampshire, where the data undergoes further validation routines (e.g. to identify and correct incorrect responses – such as 3 year old dentists). The clean and corrected data then undergoes further quality assurance checks, for example checks against aggregate administrative data (e.g. are the number of children from the census in an area consistent with the number of children receiving child benefit in that area). The final stage of processing before publication is Statistical Data Control (SDC) – see below.

Data for Northern Ireland will also be delivered to the ONS site in Hampshire for downstream processing. While the data will held and processed at ONS, NISRA staff will analyse the Northern Ireland data.

Captured and coded data for Scotland is delivered to NRS in Edinburgh where cleaning, correction, quality assurance and SDC takes place.

Producing Outputs

The anonymised and Statistical Data Controlled census information is then passed to the census outputs statisticians, who aggregate the data into agreed table formats, and prepare the data for publication (primarily online, but also on other medium). The first census outputs are planned for release in July 2012, consisting of population estimates, as at census day, by age and sex for each local authority. More detailed statistics for the rest of the information on the questionnaire, and for smaller geographies, will be released during 2013.

The smallest areas for which results will be published are 'Output Areas' – which typically consist in England and Wales and Northern Ireland of 125 households and about 250 people (50 households and about 120 people in Scotland). No identifiable individual information is published. No census personal information is made available to marketing companies, local authorities or government departments.

Protecting the Confidentiality of Individual Information in Published Results

Publishing data in any format does carry a risk, to some degree, that an individual, household, or organisation may be identified in the published statistics and confidential information released, and the risk increases as the level of detail in the published statistics increases. The UK Census Offices therefore will take a number of approaches to make useful data available, whilst protecting against such risks. Statistical disclosure control is an attempt to balance the utility (or statistical value) of published statistics against the potential for disclosure of confidential information. In order to achieve this balance the Census Offices will adopt a range of techniques which modify or summarise the 2011 census data. As in previous censuses, precautions will be taken so that published tabulations of census data are in line with the Census Acts, the Statistics and Registration Service Act 2007 and the Code of Practice for Official Statistics.

Extensive research has been undertaken by the Census Offices to determine the most effective ways of protecting published census statistics, drawing on academic and international expertise. This research has resulted in the following suite of methods to protect aggregated 2011 Census outputs:

- Restricting the number of output categories into which a variable may be classified, such as aggregated age groups;
- Where the number of people or households in a geographic area falls below a minimum threshold, the statistical output - except for basic headcounts - will be amalgamated with that for a sufficiently large enough neighbouring area;
- modifying some of the data before the statistics are released through 'record swapping', where records with similar characteristics are swapped with a record from another geographic area.

For some more detailed tables, where the impact of disclosure control on the usefulness of the data is too great, special access arrangements will be put in place for approved researchers, as defined in the Statistics and Registration Service Act.

Anonymised Micro-data Samples, and Safe Settings

Microdata are samples of individual and household records drawn from the census data, which have been anonymised to protect confidentiality. The microdata samples have been used by

academics and researchers to develop more sophisticated analyses of population data than are available from the standard published census tables, for example in studies of the health and labour market status of specific groups within the population such as carers, the disabled and ethnic and religious minorities.

The availability of such samples was a major, and successful, innovation of the 1991 Census, and these were extended in 2001. Following the 2001 Census five samples of microdata were produced, each involving 5% or less of census records. Access to this data was controlled securely, with access to the samples containing a more detailed level of information being provided only under supervision in the safe setting of Census office premises.

Proposals for microdata samples for 2011 are at an early stage but will be developed in light of the disclosure control methodology applied to the underlying data, access arrangements and licensing issues.

Further information

For further information on the planning of the Northern Ireland Census 2011 please see the [Proposals document](#) published in March 2010.

Further information on the statistical methodology being used on the Census 2011 can be found [here](#).

[Back to the top](#)

Evaluation of Census 2011 operations

An extensive process of evaluation is taking place about the Northern Ireland Census 2011, examining its component parts and the way they worked together. Evaluation reports are being released when available.

The evaluation reports will include:

- Legislation
- Address register
- Marketing, advertising and media
- Community Liaison
- Online census
- Field operation
- Statistical Methodology
- Census coverage survey and quality survey
- Data capture
- Outputs
- Quality Assurance

A general report on the Northern Ireland Census 2011 was released in March 2015. This will review the entire census operation from early consultation and planning stages, through to output production and dissemination: <http://www.nisra.gov.uk/census/2011/evaluation.html>

Keeping informed

For general information about the Census 2011 statistics and developments visit the Census pages on the NISRA website: <http://www.nisra.gov.uk/census>

[Back to the top](#)