

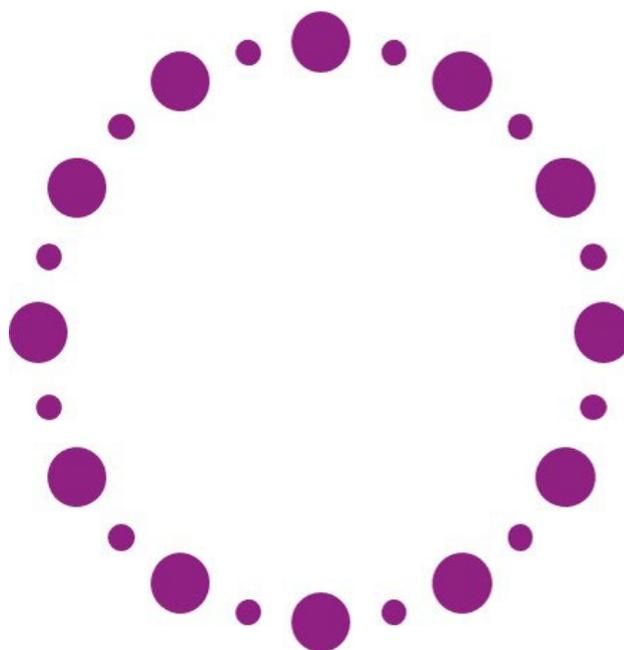
census
2021



Census 2021

Addressing information paper

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1. Introduction

A census usually takes place once every ten years and is the largest and most complex statistical exercise undertaken in Northern Ireland. Census statistics are a vital source of information and are widely used by government, public bodies, academia, commercial businesses and others to develop policies, allocate resources and help deliver services. The last census in Northern Ireland was taken on 21 March 2021.

The development of a complete Census Address Register (CAR) was essential to ensure that every household and communal establishment (CE) were included in Census 2021. A fit-for-purpose CAR was needed to:

- provide the basis for contacting the public to invite them to participate in the census;
- be the source for the system to monitor responses made to the census; and
- inform the field operation during the follow-up of non-responding addresses.

It also formed the basis of the back-end resources to allow for continual updating of addresses during the census operational phase, through information received from the public, census field staff or other data sources.

As was the case previously for the 2011 Census, the main source of addressing information for the 2021 CAR was the Land & Property Services (LPS) POINTER¹ database, supplemented with additional address level information available through government or within administrative/utilities data.

The development of the address register for Census 2021 built on lessons learned from the 2011 Census and tests/rehearsals undertaken in the interim period. The aim for any address register is to maximise coverage and accuracy. Having an accurate register minimises the risk of sending letters and/or questionnaires to addresses that don't exist, or sending them inadvertently to the wrong address – while having a register that has high coverage reduces the risk of people not being

¹ POINTER is the address database for Northern Ireland which is maintained by Land and Property Services with help from local councils and Royal Mail. Information on this dataset can be found on the [NI Direct](#) website.

invited to take part in the census. The overarching priority in creating the CAR was to limit undercoverage as much as possible. For example, where there was uncertainty over an address, the decision was generally made to include it.

This report details the stages of development and creation of the CAR, including its maintenance and continued development during the operational phase of Census 2021, and its finalisation during data processing.

2. Building on lessons learnt

2.1. Census 2011 experience

For the 2011 Census the main aim of the initial CAR was similar to Census 2021 in that it was required to provide the basis for contacting the public to invite them to take part in the census. However, for 2011 the field enumerators were responsible for completing a 100% address check of their areas just prior to delivery – so while accuracy was still a key factor, coverage was addressed in the field. The reason for this approach was that testing showed it was much more difficult for enumerators to search for addresses that didn't exist than it was to add addresses seen on the ground.

Results from the 2011 Census suggested that under this approach, 3% of addresses were found in the field that were previously not included in the initial CAR. In terms of accuracy, circa 4% of addresses in 2011 were not delivered by the postal service provider.

2.2. 2017 Address Check

In September 2017 NISRA performed an on-the-ground address check of approximately 16,000 addresses to test the address register at that time. The results showed that there were around 1.5% of addresses that were previously not known to NISRA. This sample showed that when compared to the experience in the 2011 Census, coverage in addressing seemed to be better – but it could still be improved.

2.3. 2019 Census Rehearsal

During the 2019 Census Rehearsal, NISRA carried out a full on-the-ground check of approximately 19,000 addresses. Overall, the coverage of addresses was excellent

and the address register was 97% accurate (an improvement from the overall level in 2011). As was the case for the 2017 Test, during the rehearsal field staff found some additional addresses that were previously not known to NISRA – but this was only around 0.6%.

In addition, a test was performed in which a number of addresses were deliberately left out of the address register prior to live operations – only half of those addresses were found by field enumerators, suggesting that enumerator led address checking had quality issues.

3. Development of the initial address register

The development of the Census 2021 CAR was split into two parts:

1. Development of a register of domestic habitable addresses (households);
and
2. Development of a register of collective living accommodation (CEs).

3.1. Development of the household register

As mentioned, the development of the 2021 Household CAR was based on the LPS POINTER product – as was the case for Census 2011. However it is important to note that while POINTER is the complete source of addressing for government, its primary purpose is not to enable 100% mail outs to domestic habitable addresses. Therefore for census purposes, the development of the CAR was supplemented using other available address centric information.

For example, NISRA completed work to link POINTER address information to administrative datasets to refine the classification of domestic properties and add indicators of activity –therefore improving the selection of appropriate addresses for a census enumeration. Furthermore, increased access to administrative datasets, coupled with the availability of robust GIS data and software, meant that NISRA could perform much more verification and validation of address records using a desk-based approach rather than having to rely on expensive on-the-ground operations.

Taking into consideration the improvements to data and systems outlined, and the experience gained in the 2019 Rehearsal regarding the accuracy of address checking, NISRA was already considering the merits of a 100% field address check for the 2021 Census. When the COVID-19 pandemic struck it became much more risky to plan for such an exercise so as a result, a decision was taken not to perform an on-the-ground address check in advance of the 2021 Census in favour of a fully desk-based approach.

The revised plans focussed on a deterministic rules-based approach to selecting addresses for the CAR from POINTER based on evidence of the validity of address records when linked to other sources. This was supplemented by thorough desk-based address checking using Geographic Information Systems (GIS) as a vehicle for providing checkers with both address and spatial information to determine the validity of addresses. Around 55,000 addresses were checked in this manner.

A cautious approach to desk-based checking was adopted, in recognition of the fact that the data and maps could potentially be out of date in some areas. As such, a decision was taken to maximise coverage over accuracy to ensure that, as far as possible, nobody was missed from the census. That meant that where there was uncertainty over an address, the decision was generally made to include these addresses – noting that these types of addresses could be “fixed” (e.g. invalidated if they were non-residential or derelict) by census field enumerators in the field during the planned follow-up phase of the census enumeration.

After initial address checking, there was still a risk that coverage had not been maximised and this related mostly to areas where development had been taking place or was planned to take place but the address datasets had not yet caught up. To mitigate against this NISRA adopted three approaches:

1. Every enumeration district in Northern Ireland was subjected to further desk-based checking to make sure that there were no significant pockets of buildings/properties where NISRA didn't have address records;
2. NISRA utilised the Census Area Managers (CAMs) to work with local representatives to determine the status of buildings based on information gleaned from building application data; and

3. Each of the 11 Northern Ireland Councils were also supplied with a list of addresses for their area and asked to review them and feedback any they thought should be excluded or any additional addresses they thought should be included.

Any information gleaned from these processes was fed through to the CAR in advance of finalising the dataset.

3.2. Development of the communal establishment register

The 2021 CE CAR was developed independently from the household CAR and unlike the household CAR, it wasn't driven primarily by POINTER because CEs are not explicitly identified within it. The CE CAR's creation began with identifying the main categories of CEs to be enumerated in the Census and sourcing address information for each of them. That information was gleaned from a number of sources – for example: CE websites, Tourist Board, direct contact with CEs, and the [RQIA Register](#).

Once compiled and verified, each CE address was matched to the household CAR to ensure no overlap. In addition, a further quality assurance exercise was undertaken to ensure that all known large CEs in Northern Ireland were included. This was facilitated using administrative data and a thorough desk based review.

3.3. Consolidating the household and communal establishment registers

Once the development work had concluded, both the household and CE registers were combined to create the final CAR, resulting in 843,100 household addresses and 1,510 CE addresses being identified for inclusion in the 2021 Census. The number of addresses by type is shown for each Local Government District (LGD) in Table 1.

Table 1: Census 2021 Address Register before the start of the census operational phase (by type and LGD)

Area	Household addresses*	CE addresses**	Total*
Antrim and Newtownabbey	63,200	90	63,300
Armagh City, Banbridge and Craigavon	91,100	100	91,200
Belfast	162,400	290	162,700
Causeway Coast and Glens	68,200	230	68,400
Derry City and Strabane	65,500	100	65,600
Fermanagh and Omagh	52,500	130	52,700
Lisburn and Castlereagh	63,700	70	63,800
Mid and East Antrim	63,100	90	63,200
Mid Ulster	60,200	80	60,300
Newry, Mourne and Down	76,500	190	76,700
Ards and North Down	76,500	130	76,700
Northern Ireland	843,100	1,510	844,600

* Figures have been rounded to the nearest 100

** Figures have been rounded to the nearest 10

4. Updates during the operational phase

During the census live operations, inevitably there were alterations required to the address register. This information came from a number of channels, for example:

- members of the public contacting NISRA to say they didn't get a form (and therefore an address needed added);
- members of the public changing their address (either on the system or by phone);
- census field staff confirming addresses no longer exist; or
- census office field staff finding new addresses.

A Response Management (RM) system operated to track such fulfilment requests and as part of this, any address additions, deletions or changes that were notified were reflected on the register, if deemed valid.

The decision on validity was made through a central Address Resolution service which operated to ensure that each change was managed appropriately and that the CAR was maintained to a high standard throughout the operational phase.

During this phase approx. 8,400 addresses were added to the register and 31,100 were deactivated (e.g. houses under construction that were not occupiable by Census Day).

At the end of the census operational phase, the maintained CAR had 820,300 household addresses and 1,420 CE addresses. The number of addresses by type at the end of the census operational phase is shown for each LGD in Table 2.

Table 2: Census 2021 Address Register at the end of the census operational phase (by type and LGD)

Area	Household addresses*	CE addresses**	Total*
Antrim and Newtownabbey	61,800	90	61,900
Armagh City, Banbridge and Craigavon	88,300	100	88,400
Belfast	160,000	260	160,200
Causeway Coast and Glens	66,500	220	66,700
Derry City and Strabane	64,600	100	64,700
Fermanagh and Omagh	49,700	120	49,800
Lisburn and Castlereagh	62,500	80	62,600
Mid and East Antrim	61,700	90	61,800
Mid Ulster	57,100	80	57,200
Newry, Mourne and Down	73,400	180	73,500
Ards and North Down	74,800	120	74,900
Northern Ireland	820,300	1,420	821,800

* Figures have been rounded to the nearest 100

** Figures have been rounded to the nearest 10

5. Updates during data processing

Once the operational phase of the census closed and data processing began, a number of consolidation activities and refinements took place which affected the overall count of distinct addresses in the CAR. These included:

1. Linking of unlinked questionnaires: A small number of paper questionnaires were returned without being linked to an address, so additional work was undertaken to link these returns to the relevant address. If an address wasn't available on the system, one was created;
2. Reconciling placeholder returns: The purpose of this process was to create a record for every non-responding, valid address so that the census dataset included records for all domestic addresses in Northern Ireland;

3. Deduplication: On occasion it was necessary to consolidate addresses where duplicate responses had been received from the same household with slightly different addresses. This usually happened where addresses shared official and vanity strings (e.g. '1 Broad Street' versus 'The Cottage, Broad Street');
4. Location information: During processing all addresses were reviewed for locational accuracy. On occasion this required addresses close to the boundary of Local Government Districts to be reclassified into the neighbouring District.

At the end of data processing the census database consisted of 821,100 household addresses and 1,420 CE addresses. The number of addresses in the final census database is shown by LGD in Table 3.

Table 3: Census 2021 addresses in the final census database (by type and LGD)

Area	Household addresses*	CE addresses**	Total*
Antrim and Newtownabbey	61,900	90	62,000
Armagh City, Banbridge and Craigavon	88,400	100	88,500
Belfast	160,200	260	160,400
Causeway Coast and Glens	66,500	220	66,800
Derry City and Strabane	64,600	100	64,700
Fermanagh and Omagh	49,700	120	49,800
Lisburn and Castlereagh	62,600	80	62,700
Mid and East Antrim	61,700	90	61,800
Mid Ulster	57,200	80	57,300
Newry, Mourne and Down	73,500	180	73,600
Ards and North Down	74,800	120	75,000
Northern Ireland	821,100	1,420	822,500

* Figures have been rounded to the nearest 100

** Figures have been rounded to the nearest 10

6. Conclusion

The Census 2021 addressing project met its main objective of providing a comprehensive and accurate list of addresses. This was used to facilitate contact with the public, inviting them to complete their census return.

The approaches taken to achieve high coverage and accuracy worked well with coverage measured at the end of the operational phase at around 99% (1-8,400/821,800) and accuracy measured at around 96% (1-31,100/844,600).