

Scotland's Census 2022

National Statistics Accreditation

Phase 2

Evidence Report

January 2022

Table of Contents

1. Introduction	5
2. Update on actionable findings	7
2.1 Finding 1: Accessibility of research and website design	7
2.2 Finding 2: Transparency of Census questions and guidance	8
2.3 Finding(s) 3: Focus on the needs of UK census data users	8
2.4 Finding 4: Strengths and limitations of administrative data	9
2.5 Finding 5: Methodology and quality assurance	10
2.6 Finding 6: Census key milestones	10
2.7 Finding 7: Census assurance mechanisms	11
3. Reasons for move to 2022	13
4. Rehearsals	14
4.1 Census Rehearsal 2019	14
4.2 Statistical methods and data processing rehearsal 2020	14
5. Question development and questionnaire design	16
5.1 Designing the questionnaire	16
5.2 Question development	16
5.3 Topic reports and supporting documents	16
5.4 Question help (online and paper)	18
5.5 Supporting people to complete the census	18
5.6 Ensuring inclusion	20
6. Legislation	21
6.1 Census (Amendment) (Scotland) Act 2019	21
6.2 Census (Scotland) Order 2020	21
6.3 Census (Scotland) Regulations 2020	21
6.4 Census (Scotland) Amendment Order 2020	21
6.5 Census (Scotland) Amendment Regulations 2020	21
6.6 Impact assessments	22
6.7 Privacy in Scotland's Census 2022	22
7. Achieving quality targets and maximising response	23
7.1 Quality targets	23
7.2 First contact	24
7.3 Supporting respondents	25
7.4 Census staff	25

7.5	Enumeration base _____	26
7.6	Publicising the census _____	26
7.7	Marketing and public relations campaign _____	26
7.8	Stakeholder and community engagement _____	27
7.9	Following up non-response _____	27
7.10	Address register _____	27
8.	Stakeholder engagement and feedback _____	28
8.1	Future stakeholder engagement _____	28
9.	Capture and coding _____	30
9.1	Coding specification _____	30
9.2	Online coding _____	30
9.3	Paper questionnaires capture and coding _____	31
9.4	Census rehearsal evaluation _____	31
9.5	Manual coding _____	31
9.6	Quality assurance of coding _____	32
10.	Data Processing _____	33
10.1	Approach _____	33
10.2	Methodology _____	33
10.3	External stakeholders _____	33
10.4	Data Processing Working Groups _____	34
11.	Statistical Quality Assurance _____	36
11.1	Census Quality Survey _____	36
11.2	Harmonisation of UK censuses _____	37
11.3	Assurance of processes (AoP) _____	39
11.4	Impact maps _____	40
11.5	Statistical methods papers _____	40
11.6	Dashboards _____	42
12.	Use of Administrative Data in the 2022 census _____	43
12.1	Validation of population estimates _____	43
12.2	Data governance _____	44
12.3	Data Protection Impact Assessment (DPIA) _____	44
12.4	Harmonisation _____	44
12.5	Use of administrative data for quality assurance _____	45
12.6	Stakeholder events _____	45

12.7	Administrative data based population estimates (ABPE)	45
13.	Outputs	46
13.1	Statistical Disclosure Control (SDC) and outputs stakeholder events 2019	46
13.2	Outputs website	46
13.3	SDC and outputs user engagement	47
13.4	SDC and outputs stakeholder events 2020	48
13.5	Consultation on standard tables	48
13.6	Quality assurance of derived variables	48
14.	Assurance mechanisms for the 2022 Census Programme	50
14.1	First level - weekly reporting	50
14.2	Second level - internal review	50
14.3	Third level - external review	50
14.4	Risk management	50
14.5	Quality improvement	51
15.	Next Steps	52

1. Introduction

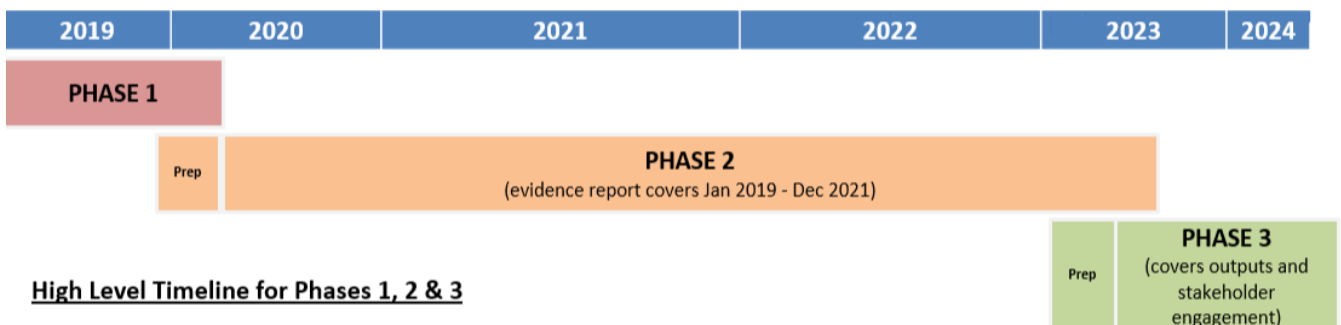
The [Office for Statistics Regulation](#) (OSR) is assessing the 2021 and 2022 Censuses in the UK. These are conducted by National Records of Scotland (NRS), the Office for National Statistics (ONS) and Northern Ireland Statistics and Research Agency (NISRA), in Scotland, England and Wales, and Northern Ireland respectively. The 2021 census in Scotland was moved to 2022 due to the impact of the COVID-19 pandemic. The Censuses in England, Wales and Northern Ireland will still be held in 2021.

The purpose of the OSR assessment is to inform their recommendation on whether Census 2021 and 2022 outputs should be designated as [National Statistics](#), in accordance with the requirements of the [Statistics and Registration Service Act 2007](#), when they are first released.

At National Records for Scotland (NRS) we have a responsibility to ensure the results of the 2022 Census in Scotland are correct, accurate and adhere to the [Code of Practice for Statistics](#) as determined by the [UK Statistics Authority](#).

The OSR assessment is split into three phases during which NRS will demonstrate how the Census 2022 statistics are trustworthy, of high quality and of value to users.

Scotland's Census 2022 programme will be assessed as a whole. This includes the initial planning stages that started in 2014, through to the production of the last standard outputs sometime in 2024.



Each phase of the assessment occurs as follows:



Compliance checks, which involve exploratory meetings between OSR and the census teams, also take place regularly throughout for all three phases of the assessment.

At the end of the Phase 2 assessment period in early 2023, OSR will consider whether Scotland's Census 2022 statistics should retain National Statistics Accreditation. If this is the case, OSR will confirm that we have retained the accreditation before the first census outputs are released in March 2023.

Our report "[How the National Records of Scotland is ensuring Census 2021 is trustworthy, high quality and of value to users](#)" published 12 June 2019, was our first step towards measuring our progress against the Code and will form part of the OSR assessment.

On 4 October 2019 OSR published their Phase 1 report [2021 Censuses in the UK – Preliminary findings](#)" which identifies a range of initial findings from the ongoing assessment, which require action on behalf of NRS, NISRA and ONS to strengthen our compliance with the Code of Practice for Statistics.

NRS responded to this report with the '[Response to Actionable Findings from Phase 1 of the National Statistics Accreditation](#)', published 15 June 2020, providing details of the NRS response to the OSR findings.

The OSR reviewed the actions NRS have taken to address their findings from Phase 1 and on 11 September 2020 published [a letter](#) noting actions taken by NRS that were particularly noteworthy and some areas where further action was needed.

This report is a follow on from the last report and addresses some of the actions that OSR identified.

Similar reports have also been produced by [NISRA](#) and [ONS](#).

2. Update on actionable findings

National Records of Scotland (NRS) is committed to addressing the Office for Statistics Regulation (OSR) findings from Phase 1, as detailed in the report '[Response to Actionable Findings from Phase 1 of the National Statistics Accreditation](#)', published 15 June 2020. This section looks at the developments and progress made between then and now.

User engagement and question development (actionable findings 1, 2 and 3)

2.1 Finding 1: Accessibility of research and website design

Census offices should consider the accessibility of research and other Census information on their websites and consider aligning website design and content where possible to provide a common user experience.

Actions

National Records of Scotland (NRS) have worked closely with the Office for National Statistics (ONS) and Northern Ireland Statistics and Research Agency (NISRA) on this. In September 2020 the three census offices attended a workshop with our digital transformation consultancy (Storm ID). This aim of this was to:

- gain a greater insight on the activities and plans around the Census website of each office
- identify opportunities for aligning website design and content to provide a common user experience, where possible and practical
- reinforce the commitment to improve signposting across the three websites on important topics of interest to users

The need for a new website for census outputs was identified after research identified that the current site was not meeting user's needs. The new website was created in collaboration with Storm ID and it went live in May 2021. The new website has a clearer layout and makes it easier for our users to find the information they are looking for. There are sections such as the [key milestones](#) section which keep users informed in what is happen in the programme. In order to help UK data users an effort has been made to clearly signpost to the relevant information on the ONS and NISRA websites.

More information on the new website can be found in the [outputs](#) section of this report.

Next Steps

NRS will continue to work closely with ONS and NISRA to identify UK data user's needs and ensure that appropriate supporting information is made available and clearly sign posted on each organisation's website. This work will be progressed through the Outputs & Dissemination Harmonised Working Group.

2.2 Finding 2. Transparency of Census questions and guidance

Census offices should be open and transparent on their decision-making processes and in their decisions on Census questions and guidance, particularly in relation to any areas of contention

Actions

The questions and the response options for Scotland's Census 2022 have been agreed as appropriate by the Scottish Parliament through the Census (Scotland) Order 2020 and the Census (Scotland) Regulations 2020 and these can no longer be changed.

We have published a number of topic reports and consultation summaries and these can all be found on [question development](#) section of our website. More information on this can also be found in the [question development and questionnaire design](#) section of this report.

Next steps

NRS will continue to be open and transparent on their decision-making processes and in their decisions on census guidance and ensure that additional information is accessible on the website when available.

2.3 Finding(s) 3: Focus on the needs of UK census data users

We consider that there should be more focus on the needs of census users at a UK level, in three areas:

2.3.1 Engagement with UK census data users

Census offices should consider how best to engage with users and stakeholders of UK census data and statistics users and coordinate activities as appropriate.

Actions

A new User Working Group for UK Census 2021 and 2022 Data has been set up to engage with users and ensure that NRS, ONS and NISRA all work together to ensure that we can continue to provide the UK wide population statistics needed. The group was set up to provide a forum for sharing information and feedback between the three UK census offices and UK census data users. Contact information for the group is found on the [UK Census Data](#) page of the website and UK census data users in Scotland are encouraged to join.

NRS, ONS and NISRA all take part and contribute to each other's stakeholder events where this is relevant and practical. This ensures that feedback can be provided on each census office's plans, including a focus on the needs of UK census data users.

[The UK census data](#) section of our new website keeps users informed of the ongoing collaborative work with ONS and NISRA as well as providing an easy to access area to find current UK census data, plans for ensuring harmonisation for 2022 and also provides information and encourages participation in the a new UK census data user working group that has been set up.

2.3.2 Decision-making and transparency

Census offices should be clear about the impact of country-specific decision making for UK census data and statistics and work together to provide greater transparency around their plans and decision making in meeting the needs of users interested in UK census outputs.

Actions

In July 2020, following the decision by Scottish Ministers, NRS announced that our Census will be moved to March 2022 while ONS and NISRA took the decision to keep theirs on the original 2021 date. The [statement of agreement](#) between the National Statistician and the Registrar Generals for Scotland and Northern Ireland has been revised to reflect this decision. The impact of the UK's decision to exit the European Union has also been reflected.

The [UK census data](#) page of the website keeps users up to date on general UK harmonisation as well as the impacts of COVID-19.

2.3.3 Harmonisation of Census questions

Census offices should provide users, stakeholders and decision makers with information on harmonisation of census questions and the impact on outputs at UK level to help inform users and support decision making.

Actions

Work is ongoing to produce a document that will provide detail on the harmonisation of the census questions across the UK; this will highlight where differences exist, the reasons for these differences and the impact on UK outputs. This work has been delayed due to the decision to move Scotland's Census to 2022 as it could not be completed until the Census Orders and Census Regulations for each part of the UK had become law. This work is expected to be published in early 2022 ahead of the first expected outputs by ONS and NISRA later in 2022.

Methods, data and quality management (actionable findings 4 and 5)

2.4 Finding 4: Strengths and limitations of administrative data

Census offices should build their awareness of the relative strengths and limitations of any administrative, commercial or other data sources used in the production of census

outputs, by regular engagement with suppliers. This should be undertaken on an ongoing basis and as part of a normal way of working.

Actions

NRS plan to use administrative data for quality assurance of the 2022 census unlike ONS and NISRA who maybe using it to augment part of their census data. It was used as part of the census rehearsal in 2019 in improving census methodologies. These [methodologies](#) were reviewed by an external peer review group and published on the [peer review and governance](#) section of the Scotland's Census website. The relating [quality assurance documents](#) for the administration data used in the rehearsal were also published on the statistical methodology rehearsal section of the website.

Administrative data is data held by local and national government or other public bodies. They use it to support their own day-to-day activities. NRS plans to use various administrative sources to support quality assure of the census at different unit levels. Quality Assurance of Administrative Data (QAAD) documents relating to administrative data being used to support the census will start being published in early 2022.

More information on the use of administrative data can be found in the [use of administrative data in the 2022 census](#) section of this report and also on the [administrative data](#) section of our website.

2.5 Finding 5: Methodology and quality assurance

Census offices should make information on the methodology and quality assurance arrangements available to users at the earliest opportunity.

Actions

Information about the statistical methodology for Census 2022 is available on the [statistical methodology rehearsal](#) section of our website. The methodology papers that were reviewed by our external assurance panel of experts for each part of our statistical methodology are also available on the [peer review and governance](#) section of our website.

An updated version of the NRS [Statistical Quality Assurance Strategy](#) was published in May 2021. This gives an overview of how we will assess and measure the level of quality being achieved throughout the collection and processing of census 2022 data and the production and dissemination of statistical outputs.

Planning, management and ways of working (actionable findings 6 and 7)

2.6 Finding 6: Census key milestones

Census offices should provide users with an indication of future census milestones – including future user engagement opportunities, publication of further research or reporting, and legislative milestones – to provide an added level of transparency and support trustworthiness and public confidence

Actions

The new website contains a [key milestones](#) section which keeps users updated on all the key milestones in the project including:

- information on legislation milestones
- rehearsals
- dates of consultations and user group meetings
- key publications
- other key milestones

The [get involved](#) section of the website provides users with information on:

- the latest census newsletters
- consultations
- procurement opportunities
- events and workshops that will be happening
- opportunities for people to apply to work on the census.

2.7 Finding 7: Census assurance mechanisms

Census offices should be clear to users what assurance mechanisms are in place and be open about identified areas for improvement in a way that is a proportionate and accessible to users

Actions

We have 3 levels of assurance within the census programme. We use these to measure how well we are progressing. These are weekly reporting, internal review and external review. More information is available in the [assurance mechanisms for the 2022 Census Programme](#) section of this report.

NRS also have three layers of review and governance to help us make sure our methodology is fit for purpose and robust. Our methodology goes through internal peer review, external peer review and will receive approval from the NRS census design authority before being adopted. This ensures that census outputs are high quality, trustworthy and of public value.

For external peer review, we asked a group of external experts to form an external methodology assurance panel to review our proposed methodologies. The panel met regularly and have peer-reviewed a different part of the proposed methodology at each session. After each panel session, they compiled a report, providing feedback on whether the methodology is fit for purpose.

The external experts are:

Katherine Keenan - University of St. Andrews (chair)

Chris Martin - Ipsos Mori (Deputy chair)

Genevieve Cezard - Centre for Population Change

Lisa Rutherford - ScotCen

Lee Williamson - Scottish Longitudinal Survey

Federico Andreis

Alan Marshall - University of Edinburgh (former chair)

More information on our assurance processes can be found on the [peer review and governance](#) section of our website.

3. Reasons for the move to 2022

On 17 July 2020 the Scottish Government announced the decision to move Scotland's Census to 2022 following the impact of the COVID-19 pandemic. This decision was not taken lightly. The census collection is a huge logistical operation involving the recruitment and deployment of thousands of staff, including a large field force team who engage with the public on their doorstep.

The twelve months leading up to a census are vital in planning and testing the effectiveness and safety and security of census systems and collection processes to ensure these are ready. COVID-19 restrictions prevented these key activities from progressing. These impacts occurred in a number of areas, for example progressing recruitment, being able to undertake comprehensive testing, contacting care homes and hospitals to establish their requirements for questionnaire delivery and engaging with third sector and community groups to encourage participation from everyone in Scotland.

National Records of Scotland (NRS) conducted a comprehensive [options assessment](#) on the risks of COVID-19 to the delivery of the census in March 2021. We considered a range of options including running a reduced scope census in 2021, cancelling the census and moving the census to 2022. The NRS conclusion was that the only option around which there was confidence of securing the high level of response rate required was moving the date of the census to March 2022. Following NRS's recommendation, Ministers decided to move Scotland's Census to March 2022 to ensure that a full and successful census is undertaken.

The census in March 2022 will follow the same model and question set as planned for March 2021. We will work closely with our stakeholders and partners to ensure that appropriate data is available to support work that was expecting to make use of Census 2021 data.

We will also continue to work closely with our colleagues in the Office for National Statistics (ONS) and Northern Ireland Statistics and Research Agency (NISRA) to ensure the needs of data users in Scotland and across the rest of the UK will be met.

4. Rehearsals

As part of the preparations for the census some rehearsals have taken place in order to test out our systems and processes.

4.1 Census Rehearsal 2019

The census rehearsal operation started on 7 October 2019 and closed for returns on 7 November 2019, with a reference date of 13 October 2019.

The rehearsal was conducted in three local authority areas, namely parts of Glasgow City, Dumfries and Galloway and Na h-Eileanan Siar, reaching 72,000 households.

National Records of Scotland (NRS) has evaluated the information gathered through the rehearsal and has now published an [evaluation report](#) on the Scotland's Census website. Scotland's Census rehearsal 2019 was a significant undertaking that tested some of the systems and services that will be used in Scotland's Census 2022. This report provides a summary of the key findings of the rehearsal, and outlines the next steps for us to undertake to ensure the successful delivery of next year's census.

4.2 Statistical methods and data processing rehearsal 2020

We used the data collected during [Scotland's Census rehearsal 2019](#) to test some of our statistical methodologies for Scotland's Census 2022.

From April to June 2020, we ran a rehearsal of several statistical methodologies for Scotland's Census 2022. Six data processing steps were tested. These were:

- Remove False Persons (RFP)
- Resolve Multiple Responses (RMR)
- Filter Rules
- Name Re-ordering – on paper questionnaires only
- Edit and Imputation (E&I)
- Estimation and Adjustment (E&A)

Rehearsing the use of administrative data was also carried out alongside the six main steps of the data processing rehearsal. The processes tested, which support the statistical methods and data processing steps, were:

- Remove False Persons (RFP) – to check the quality of this process
- Resolve Multiple Responses (RMR) – to check the quality of this process
- Date of Birth Checks (Missing and Different) – to support Edit and Imputation
- Census to Census Coverage Survey (CCS) Linking – to help check for those who may have been missed in the census
- Census De-duplication – linking the census to itself to identify duplicate entries

4.2.1 Results of the statistical methods and data processing rehearsal 2020

We have published two evaluation reports from this testing. You can read the [statistical methods and data processing rehearsal report](#) and the [household record swapping report](#) on the [statistical methodology rehearsal](#) page of our website.

The rehearsal showed that all the processes tested were able to run and complete successfully. In all of the processes tested it was found that using administrative data added value to the quality assurance process of the data and data processing steps.

Some changes to the software coding and to the format of the rehearsal data had to be made to allow the processes to be tested, however the rehearsal provided reassurance that the methodologies that have been developed worked well.

The rehearsal also allowed for a clerical review of the method for linking datasets, which is needed in each of the processes which use administrative data and census to census coverage survey linking. These links are marked for automatic acceptance or for manual checking. For rehearsal, all links were reviewed (both automatic and manual). This thorough approach validated the linking methods being used and found that almost all the 'automatic' links were correct. As part of this clerical review, spreadsheets were developed in Excel which were fully tested and evaluated as part of this rehearsal.

The rehearsal also highlighted some areas that need further development or improvement. These include:

- updates to the format of the data for live census to ensure it is suitable for data processing
- further development of quality assurance and clerical review processes
- further development of the sequencing of the data processes
- further updates to the coding software and finalisation of methodologies

5. Question development and questionnaire design

Our [Phase 1 report](#) highlights some of the early work that was done on question development and the design of the questionnaire. This section will look at the work that has been done in this area since that report was written.

5.1 Designing the questionnaire

We have built on the success of the online household questionnaire used in 2011. In 2022, respondents will primarily be asked to complete the questionnaire online, unlike in 2011 where it was primarily a paper based approach. The online questionnaire was designed to maximise online take up and the gains in the quality of the data. We have developed a questionnaire that is easy to use as well as being suitable for a range of digital devices (for example a PC, tablet or mobile phone). We undertook research to ensure that a robust design for an online capture system was developed which both improves data quality and reduces any unnecessary burden on respondents. The design of the online questionnaire took into account good practice standards and guidance.

As a result of conducting the census primarily online, the way respondents are introduced to their census questionnaire will change. International research suggests a postal first contact is the best and most cost-effective solution to ensure both coverage and address verification for the household. We are therefore planning to post-out a letter with an Internet Access Code (IAC) to every household in Scotland.

5.2 Question development

National Records of Scotland (NRS) have been working with relevant stakeholders to understand their data needs, and carrying out testing to ensure the data are collected accurately. Testing included cognitive style testing such as focus groups and quantitative testing. Both were done with the general public as well as with groups of interest where relevant.

Question testing techniques include cognitive feedback on participants' understanding. Additional questions are included to enhance the qualitative data collection to ensure participants answered the questions correctly to reflect their circumstances accurately.

We held [census stakeholder events](#) on questions development in November and December 2018 in Glasgow, Aberdeen and Edinburgh. These events updated census users on question and outputs development, and sought feedback.

5.3 Topic reports and supporting documents

To support our planned approach to delivering Scotland's Census 2022, we have published a number of topic reports and supporting documents. These reports are

a follow-up to the [Scotland's Census 2022 Topic Consultation](#) and describe our on-going programme of question development, testing and engagement with key stakeholders.

Links to the published detailed topic reports can be found on the [topic reports and supporting documents](#) section of the Scotland's Census website.

There are some new questions for 2022 and some questions that have undergone further development following engagement with data users and other stakeholders and they are discussed in a bit more detail below.

The question set was included in the [Census \(Scotland\) Regulations 2020](#) and was published on the Scotland's Census website.

5.3.1 Sex question

This question and the associated guidance was subject to scrutiny by the Culture, Tourism, Europe and External Affairs (CTEEA) Committee during their consideration of the census legislation. NRS officials and the Cabinet Secretary for Economy, Fair Work and Culture gave evidence to the CTEEA Committee on a number of occasions throughout this period of scrutiny.

The Committee appearances were public, and the dates for evidence sessions were published on the [news and events](#) section of the Scotland's Census website, as well as the Scottish Parliament website. All correspondence shared with members of the Committee was published on the [Committee pages](#) of the Scottish Parliament website.

The [Sex Question Recommendation Report](#) on further question testing was published in December 2019 on the Scotland's Census website. On 31 August 2021 NRS published the guidance to be provided for the sex question on the [sex question guidance](#) page of the Scotland's Census website. Following a legal challenge, the guidance was found to be lawful.

5.3.2 Ex-service question

Contact with stakeholders identified a strong user need for information about veterans. Alternative sources do not provide information that meets data user needs. Cognitive and quantitative testing was carried out with two possible questions being tested.

The question development for Scotland's Census was harmonised with the question testing carried out by the Office for National Statistics (ONS) and resulted in a harmonised question across the UK censuses.

5.3.3 Religion and ethnic group questions

A qualitative online survey was undertaken to test potential changes to the religion and ethnic group questions for inclusion in Scotland's Census 2022. The survey tested

potential changes to the religion and ethnic group questions for Muslim, African, Caribbean or Black, Roma, Jewish and Sikh, with people from these groups. Further question development included question testing and stakeholder engagement. Further discussion on this and more details can be found in the [ethnic group](#) and [religion](#) topic reports on the [question development](#) page of the Scotland's Census website.

5.3.4 Long-term conditions question

Changes to the existing question were proposed in order to meet a user need that is supported by the [Health \(Tobacco, Nicotine etc and Care \(Scotland\) Act 2016](#). The legislation specifies the duty to provide or secure communication equipment to any person who has lost their voice or has difficulty speaking.

NRS has included an additional response option – Full or partial loss of voice or difficulty speaking – to the question on long-term conditions. The testing of this ensured that the population of interest correctly identified themselves with that response option. Additional testing in February 2019 with the general public was carried out to ensure that people did not incorrectly choose the new response option, and it did not significantly increase the respondent burden. The results of the testing were summarised in an internal report, which formed the evidence basis for inclusion of an additional response option.

5.4 Question help (online and paper)

Help and guidance is available to assist users to complete the census. Working groups were set up to draft the question help and guidance, with follow-up testing with wider audiences. The results from testing were then fed back to the working groups. Content Development by Experts (CODEX) meetings and collaboration with the Office for National Statistics (ONS) and the Northern Ireland Statistics and Research Agency (NISRA) ensured that guidance across the UK was consistent where applicable.

All the question help documentation has been reviewed and updated following the 2019 rehearsal. Feedback on the questionnaire help tool from the 2019 rehearsal has also been analysed and improvements of the usability of this have been made.

5.5 Supporting people to complete the census

We engage in on-going research and development to find the best ways to help and support the public to complete their census in 2022. As with previous censuses, we will offer a full and comprehensive level of support.

5.5.1 Supporting Gaelic strategy, including online completion

To provide an option for people who use Gaelic as a first language, only language or who prefer to complete the census in Gaelic, NRS have engaged extensively with Gaelic users and stakeholders. Feedback from these groups has been incorporated into

preparations for the provision of the Scotland's Census 2022 in Gaelic. Users will be able to read and complete the questionnaire in Gaelic online and for those wish to complete the questionnaire on paper they will be provided with a Gaelic translation of the questionnaire but instructed to complete it in English.

5.5.2 British Sign Language (BSL) support for online and paper completion

To provide an option for people who use BSL as a first or only language, we have received input from BSL users and stakeholders. For example, meetings and discussions with the third sector organisation Deaf Action have resulted in optimisation of the way that Scotland's Census 2022 material will be presented in BSL.

5.5.3 Braille translated guidance

To provide an option for people who might not be able to complete online or paper questionnaires, Braille translated guidance has also been created. These respondents will then be able to complete in their census paper questionnaire with assistance from a family member or carer. This product will be printed using a specialised Braille printing service. Feedback on the most relevant way of presenting the script for household questionnaire for Braille printing has been incorporated into the design.

The approach to designing the specialised script was based on the input from the Royal National Institute of Blind People (RNIB) and the professional Braille printing service. The printing service is contracted to provide a translation, quality check and assurance of the translation, and final printing. We rely on the experience of both organisations for this highly specialised print product.

5.5.4 Community languages translated guidance

To assist respondents whose first language is not English to complete a paper questionnaire in English, guidance translated into several of the most common community languages has been created. The translated guidance also contains details of the privacy notice, extra help for household questions, and further information, as included in the household paper questionnaire pack. The format of the similar guidance produced for the 2011 census was updated for 2022. The translated guidance will be translated by the professional translating service. The census rehearsal in 2019 provided feedback on a more efficient way of presenting the documentation to the external translators and this has been applied for Scotland's Census 2022.

5.5.5 Large print

To provide an option to people who might need a large print format and prefer to complete the census using a paper questionnaire rather than online. The format of the large print document was designed based on the [accessibility standards](#) published on the UK Government website and with support from contacts in Royal National Institute of

Blind People (RNIB). The Census Public Assistance team engaged with relevant stakeholders, including Royal National Institute of Blind People for their feedback and confirmation of a suitable format. The privacy notice, extra help for household questions, and further information for the census will also be available in large print format.

5.6 Ensuring inclusion

Although we intend to carry out the census primarily online, we are aware that there will be households who cannot respond online or who do not wish to do so. We therefore need to ensure that services are in place to support these households. Understanding our respondents and how they wish to interact with the census collection exercise is key to achieving the maximum response rate and work is currently underway to do this.

We are working with Scottish Government Digital Directorate and key public and third sector organisations to gain a better understanding of the challenges and solutions available.

In addition, regardless of their digital capability, there will always be parts of the population who are hard to reach and are at risk of low levels of engagement or response. This includes those who may experience accessibility issues, for example, due to a health condition, language or literacy difficulties, as well as those who do not wish to provide their information to us. We are considering who these groups may be for the census in 2022 so we can engage with them to understand their needs, concerns and to explore appropriate ways to support their participation.

6. Legislation

Scotland's Census is underpinned by law. The Registrar General for Scotland takes a census in Scotland under the [Census Act 1920](#). The Act allows for a census to be taken not less than 5 years after the previous census.

Every census needs further legislation which details how it is to be run. This is the Census Order and Census Regulations.

6.1 Census (Amendment) (Scotland) Act 2019

[The Census \(Amendment\) \(Scotland\) Act 2019](#) allows the next census to ask voluntary questions about sexual orientation and transgender status and history.

The Act became law on 18 September 2019.

6.2 Census (Scotland) Order 2020

[The Census \(Scotland\) Order 2020](#) became law on 12 March 2020. It directs:

- the date of the next census
- who must make a census return
- the topics which will be asked about in the census

6.3 Census (Scotland) Regulations 2020

[The Census \(Scotland\) Regulations 2020](#) became law on 16 June 2020. They set out the arrangements for how Scotland's Census will be conducted, including the detail of the questions to be asked.

6.4 Census (Scotland) Amendment Order 2020

On 17 July 2020 it was announced that Scotland's Census would be moved to 2022, due to the impact of the COVID-19 pandemic.

The [Census \(Scotland\) Amendment Order 2020](#) came into force on 17 December 2020. This changed the date on which the next census is taken to 20 March 2022.

6.5 Census (Scotland) Amendment Regulations 2020

[The Census \(Scotland\) Amendment Regulations 2020](#) amend the Census (Scotland) Regulations 2020. The amended regulations reflect the change made by the Census (Scotland) Amendment Order 2020 to the date of the next census.

The updated regulations were laid in the Scottish Parliament on 21 December 2020 and came into force on 1 March 2021.

6.6 Impact assessments

Scotland's Census has undertaken a range of impact assessments to support the legislative process. You can view the latest versions of [impact assessments](#) on our website. The assessment of impacts is an ongoing process and will continue up to census day and beyond.

Please visit our [legislation](#) section of the Scotland's Census website to find out more.

6.7 Privacy in Scotland's Census 2022

There will be detailed information available to the public via the Scotland's Census and National Records of Scotland (NRS) websites around how their personal data will be used. In addition, a wide-ranging campaign of publicity and community engagement will be undertaken to encourage public participation which will further explain the uses and value of the census.

Details on how NRS will protect personal information and how it will be used can be found on the [your privacy](#) section of the Scotland's Census website. The [data protection impact assessment](#) for Scotland's Census 2022 can be found here as well as the [privacy policy](#). A paper copy of the privacy policy will also be sent out with all paper questionnaires.

7. Achieving quality targets and maximising response

The aims for 2022 include:

- maximising overall return rates
- minimising the variation in return rates across geographical areas

We've designed our approach to contacting and supporting respondents with these aims in mind.

7.1 Quality targets

Critical Success Factors (CSFs) describe what success will look like and are aligned to Scotland's Census 2022 objectives. While CSFs will evolve as the Statistical Quality Assurance Strategy develops, the overarching definitions of success for producing high quality results as at November 2019 are:

How will we achieve high quality results?	How will we measure success? (Key Performance Indicators (KPIs) and acceptance levels)
We will maximise our overall person response rate	Person response rate ¹ of at least 94%.
We will ensure a minimum level of response within every local authority in Scotland	Person response rate ¹ in every council area of at least 85%.
We will maximise the accuracy of our national population estimates	Variability ¹ : national estimates will achieve 95% Confidence Intervals (CI) +/- 0.4%; Bias: < 0.5%
We will maximise the accuracy of our local authority population estimates	Variability ¹ : Council Area estimates will achieve 95% CI +/- 3%
We will minimise the non-response to all mandatory questions	Achieve or exceed target non-response rates for all mandatory questions

We will assess all national and local authority level results for each main release by means of quality assurance panel	Undertake quality assurance panel and resolve any issues present
We will publish details of methods and full details of all our data quality indicators	Publish on our website
We will publish the results of an independent methodology review	Publish on our website
We will maintain our National Statistics Accreditation	Accreditation maintained throughout

Notes

1. The acceptance level for this Key Performance Indicator is under review.

7.2 First contact

For 2022, we're changing how we contact and introduce people to the census compared with previous censuses in Scotland.

Every household in Scotland will receive a letter in the post containing an internet access code. They can use this code to complete the census online.

This has proved to be the best and most cost-effective approach in other censuses around the world.

We'll send letters out using an address register we developed for the 2011 census. We've kept it updated, and plan to keep making improvements to it for 2022.

More information on how we plan to make [contact with households](#) can be found on the Scotland's Census website.

Not all addresses in Scotland are households. Places like hospitals, care homes, halls of residence or prisons are counted but in a slightly different way. We call these types of accommodation communal establishments.

The person in charge of the communal establishment must complete a communal establishment census questionnaire. Every resident of the establishment must also complete an individual questionnaire.

More information on how we plan to make [contact with communal establishments](#) can be found on the Scotland's Census website.

7.3 Supporting respondents

Not everyone will want or be able to complete the census online. This could be because:

- of their health
- of language barriers or low literacy
- they do not want to give their information online

We have investigated the barriers people face to completing online, and what we can do about it.

We'll offer a full range of support to help people complete the census, including:

- our website
- our helpline
- web chat
- interactive voice response
- social media
- providing local-based support
- a range of accessibility support:
 - questionnaire guidance in braille and 16 languages
 - brief messages translated into 24 languages telling people where to get support
 - BSL support
 - text relay service
 - accessible website pages that can be used by screen readers
 - Easy Read guidance
 - audio clips
 - large print questionnaire
- Where necessary, we will provide people with paper questionnaires.

More information on how we plan to support people complete their questionnaires can be found on the [questionnaire completion](#) section of the Scotland's Census website.

7.4 Census staff

We will need a large field force to help us follow up non-responding households. Our design includes targeted follow up and will take into account our focus on online completion. Therefore, we expect the number of people needed in the field force will be less than in 2011.

As part of our field operations for the 2022 census, we will divide Scotland into approximately: 170 field work areas and 8,900 planning areas. We will use these areas to help plan and operate field work. We will also use planning areas for census data processing. More information on this can be found in the [field work and planning areas](#) section of our website.

7.5 Enumeration base

Our enumeration base describes who to include in our count of the population. [A paper](#) setting out who should be counted and what the main population base should be for 2022 census outputs can be found on our website.

7.6 Publicising the census

An integrated communications and engagement strategy has been developed ahead of Scotland's Census covering marketing and advertising, media relations, social media, PR, stakeholder and community engagement.

Census will use a campaigns-based, multi-channel approach to raise awareness to people in Scotland about the 2022 Census and the value it will bring to the country.

Initial market research was conducted to understand more about public knowledge about the census, what their motivations would be to help them complete and what messages resonate best to help promote census. Further public research was then conducted in November 2020 to assess the impact of the coronavirus pandemic.

Eight key hard to reach groups have been identified and while the aim is to reach all of Scotland through our marketing and advertising campaigns, messaging will be tailored to key audiences using a range of platforms, including social media, PR, marketing and community and stakeholder engagement

All communications and engagement material will be aligned to the household letters and materials that the public will receive.

7.7 Marketing and public relations campaign

A three-phased approach to the campaign has been developed - awareness, persuasion and action- beginning in February 2022. Messaging will be targeted for each of the marginalised audiences, particularly in the persuasion and action phases. This will include television, radio, out of home posters and digital ads.

Marketing activity will be supported by a public relations campaign which will also incorporate the three phases and again focus on those hard to reach groups. This activity will include media relations and social media.

7.8 Stakeholder and community engagement

National Records of Scotland is engaging with key stakeholders, including Scottish Government and its Ministers, local authorities and Third Sector Interfaces, to ensure messaging about the census and its value reaches those at most risk of non-participation. This engagement will be supported by a 'field and partnerships' campaign to develop in-depth partnerships with stakeholders with reach to our key groups.

7.9 Following up non-response

We'll contact addresses that do not complete the census, and encourage people to take part. We'll do this by:

- publicity campaigns
- reminder letters
- visits from field staff

Our systems will help us identify areas with low response rates. We can use this information to target publicity or community engagements.

People will be reminded of the legal requirement to complete the census throughout. It is included in initial contact letter, reminder letters, letters responding to requests for Internet Access Codes (IACS).

7.10 Address register

Much of our work to maximise response is underpinned by holding a high quality address list (our 'Census Address Register'). This list draws from the best national sources is essential for delivering the necessary information to households and allow us to target follow-up for those households which do not initially respond.

In addition, the address register will underpin other processes that support the production of outputs following the census. We developed a high quality address register for the 2011 Census which has been maintained and we will continue to make improvements before its use in 2022.

More information on the [address register](#) and how we check it can be found on the Scotland's Census website.

8. Stakeholder engagement and feedback

Comprehensive evidence of stakeholder engagement prior to 2019 has been detailed in our previous reports. In addition to these there have been a number of further events taking place, with more planned.

The Covid-19 pandemic has had an impact on some of our stakeholder engagement and as a result we have had to make use of online technology to engage with stakeholders in the absence of face to face interaction.

The [news and events](#) section of our website has details of previous news items and events as well as providing users with details of forthcoming events.

Date	Title	Location
16 November 2021	Population and Migration Statistics (PAMS) meeting	online
October 2021 to January 2022	Awareness events	online
3 June 2021	Summer roadshow	online
1 June 2021	Summer roadshow	online
18 May 2021	Population and Migration Statistics (PAMS) meeting	online
January 2021	Feedback on the outputs website	online
1 March 2020	Outputs stakeholder events	
27 February 2020	Statistical Methodology Stakeholder events	Glasgow
26 February 2020	Statistical Methodology Stakeholder events	Online
25 February 2020	Statistical Methodology Stakeholder events	Edinburgh
14 August and 16 August 2019	Update on Scotland's Census 2022 events - sex question development	Edinburgh
June 2019	Outputs Stakeholder Events	Aberdeen , Dundee , Edinburgh , and Glasgow
27 Mar - 28 Mar 2019	2022 Ethnic Group and Religion Questions Update Events	Edinburgh and Glasgow
20 Feb - 21 Feb 2019	The Gathering 2019 (SCVO Third Sector Event)	Glasgow

8.1 Future stakeholder engagement

National Records of Scotland are planning a Statistical Disclosure Control (SDC) and Outputs consultation is part of our wider engagement plan and will build on our previous [consultation](#).

The SDC and Outputs consultation will seek user's views on a number of areas to better understand user needs and ensure that the outputs we produce maximise the value of the census.

This will be part of a number of stakeholder engagement activities we will hold as we plan outputs from the 2022 Census. These include:

- census stakeholder events – Webinars
- user working groups
- reviewing feedback received from website/mailboxes

The consultation will focus on Scottish census products though the feedback may also be used to inform decision making around UK Census products.

We are currently planning the consultation including when it will be run, once these plans are in place we will promote the consultation through our regular channels to build awareness through our user groups.

Alongside the consultation we will continue to engage with users through our regular stakeholder events where we update users on our work and plans. We will also provide updates to existing groups that we are members this includes our Population and Migration Statistics Committee (PAMS) and events organised by other UK census offices.

9. Capture and coding

Capture and coding is about how we collect and record census responses in a consistent way. Capture is how we collect census information through the questionnaire. Coding is how we give each answer a numerical value to help us with processing. In 2022, we'll collect census responses from both online and paper questionnaires and both formats will be coded in the same way.

Further detail on the [coding methodology](#) is available on the capture and coding section of the Scotland's Census website.

9.1 Coding specification

We have developed coding specification that tells us how to code questionnaire responses in a way that we can analyse. It was developed by the National Records of Scotland (NRS) coding team and ensures consistency between the coding of our online and paper contractors and is also a key reference document used by others for statistical processing and analysis. The coding specifications contain a number of elements including:

- instructions for IT systems to align to, known as **business rules**.
- **classification indexes**, which provide the listing we want responses to code to.
- **coding indexes**, which contain lists of alternative responses that code back to the classification indexes.

We liaised with Office for National Statistics (ONS) in constructing coding lists and indexes, which helped identify any gaps and inconsistencies and to promote harmonisation across countries.

9.2 Online coding

For responses collected online, the quality of data is expected to be high. In addition to complying with the coding specification there are a number of features that have been incorporated into the online questionnaire that ensure consistency. For example, if a question is not relevant to the person responding, the system will automatically route past it so unnecessary information is not captured.

Responses are also validated to only allow expected character types (e.g. numeric, date formats) and to give users pop up feedback for answers inconsistent with questions completed elsewhere on the questionnaire. Other functionality such as radio buttons for single tick responses and drop down lists for text answers were incorporated to improve the quality of the data.

External stakeholders were consulted on the presentation of relevant categories, which influenced the structure of, for example, questions on religion and sexual

orientation. Discussions at meetings with the Office for National Statistics (ONS) and the Northern Ireland Statistics and Research Agency (NISRA) ensured agreement on harmonisation (or divergence, e.g. in the case of differing marriage ages) and on issues such as question routing. We also collaborated with ONS on the construction of drop down lists by harmonising on the categories presented as far as was practical. There will be some differences, for example with how the Gaelic spelling options for UK countries will be presented. For some questions, however, it was not always possible to completely harmonise. This is due to differences in question wording, definitions, response categories or question structure and data user needs.

9.3 Paper questionnaires capture and coding

Census paper questionnaires are scanned and the responses captured digitally using character recognition software. Coding accuracy and completeness is lower for paper questionnaires than for online questionnaires because there are limits to interpreting handwriting. In addition, the completion of paper questionnaires does not benefit from the checks that the online validation and routing provide.

To address lower quality information coming in from paper questionnaires, additional “auto-coding” techniques to correct for things like spelling mistakes and word ordering are applied to code text based questions. Other techniques to identify commonality in words (e.g. teach, teacher, teaching to code to a single occupation code) and bespoke address matching were also developed to ensure higher match rate than in 2011.

Through liaising with ONS we have established that some of the auto-coding techniques are similar. However, because they have been developed separately they wouldn't necessarily produce exactly the same results. This would cover the techniques like distance matching to correct for spelling mistakes.

Census Coverage Survey (CCS) data is collected via a paper questionnaire and uses the techniques outlined in this section. There is no online collection for CCS but as the majority of CCS questionnaires will be filled in by a trained interviewer rather than a member of the public it is anticipated the quality of data will be higher than the other paper census forms. There is a separate coding specification for the CCS questions to inform the coding.

9.4 Census rehearsal evaluation

Analysis from the rehearsal informed improvements to the coding outputs. Examples include updating our lists of expected text responses as well as influencing the treatment of blank and partial census responses. These changes were detailed in our coding specification and formed the basis of subsequent development by our contractors. Analysis of the rehearsal data also informed changes to how questions answered online are validated and how some users are routed through to only see questions relevant to them.

9.5 Manual coding

Whilst new techniques have been developed to increase the coding rate and accuracy of 2022 census responses, there will still be a proportion of answers that will need to be manually inspected by a person to assign a code. When the census is running a “manual coding operation” will be stood up. This has the aim of filling in the gaps for un-coded data so we have as complete a dataset as possible.

The manual coding operation will be resourced by a number of coding operatives who will be adequately trained to understand the coding classifications. It is anticipated that manual coding will be required more so for responses collected on paper forms where the scanning software cannot interpret poor handwriting. Random quality assurance checks will be undertaken by NRS to ensure the information returned is of a satisfactory standard and will highlight any biases.

A manual coding rehearsal was undertaken in June/July 2020 with findings used to inform the training needs of staff and processes required for live operations.

9.6 Quality assurance of coding

Quality assurance processes have been developed to be used during live operations including:

- checking a sample of returns to understand the rate of error in coding;
- assessing the completeness of the coding lists (e.g. how many text answers can be automatically assigned to an existing code);
- checks for systematic errors (e.g. 'major' in job title being interpreted as military officer when not appropriate);
- distribution of responses to each question and variable will be monitored throughout the coding period.

More information on quality assurance of coding is available in our [statistical quality assurance strategy](#).

10. Data Processing

For data processing, our overall objective is to transform census questionnaire returns into a correct, complete and consistent dataset suitable for outputs. The statistical data processing of Scotland's Census 2022, and the methodology underpinning it, will seek to ensure that all characteristics captured by the census are processed appropriately and consistently to best meet the identified user needs. Statistical Disclosure Control (SDC) policies and processes protect individuals, particularly those who hold certain protected characteristics, from being identifiable from census outputs.

10.1 Approach

10.1.1 Lessons learned from 2011

The [2011 Scotland's Census General Report](#) contains details of lessons learnt from the data processing of the 2011 Census. These were used to inform 2022 methodology development. The 2011 process has been considered during development of all 2022 methodologies and improvements have been made where necessary.

10.2 Methodology

Methods for 2022 are thoroughly tested during the development and formal testing stages. Where changes from 2011 are being made, these processes are tested and the benefits of these changes are documented before seeking formal approval of the process. Methodology papers are shared internally at Internal Peer Review Group and with the Census Design Authority- and externally with the External Methodology Assurance Panels (EMAPs). Data processing papers presented to [EMAPs](#) are published on our website.

More information on the methodology for processing the data including steps such as [data cleansing](#), [edit and imputation](#) and [estimation and adjustment](#) processes are published on our website.

10.3 External stakeholders

10.3.1 Statistical methods external presentations

In order to provide as much information as possible for users we worked with other census teams to create an accessible yet comprehensive [presentation](#) on the data processing methodologies for census 2022 . The presentation was given to an audience of external data users and stakeholders and also made available online.

10.3.2 Office of Statistics Regulation (OSR) methodology workshops - 29th and 30th September 2020

We held workshops on 29 and 30 September 2020 with the Office of Statistics Regulation (OSR) in order to talk them through our statistical methods, what we still had to develop and the timelines for this work. Methodology papers and slides were shared

with OSR and discussed in detail. Follow-up questions were answered at the workshops and via email. Harmonisation with the Office of National Statistics (ONS) and the Northern Ireland Statistics and Research Agency (NISRA) on methodologies was also discussed as part of the workshops.

10.4 Data Processing Working Groups

10.4.1 UK Data Processing Harmonisation Working Group

The UK Data Processing Harmonisation Working Group was set up in order to share information and updates and get feedback on the data processing and coding projects across the different UK censuses. Meetings are held three times a year with representation from ONS, NISRA and NRS.

10.4.2 Remove Multiple Responses (RMR) Working Group

The Remove Multiple Responses (RMR) process finds and merges duplicate records. These could be records of:

- households
- people
- communal establishments

RMR involves matching census records to themselves based on answers like name and date of birth. This lets us spot any potential duplicates within a postcode.

True duplicate records are merged into one record. We'll keep both records if they look like different people.

The RMR Working Group was set up to share information and updates and get feedback on the RMR methodology across the different UK censuses. Meetings are held frequently throughout the year with representation from ONS, NISRA and NRS. ONS are responsible for sharing the UK harmonisation matrix which will explain how RMR is carried out by each UK office.

10.4.3 Census Edit and Imputation Working Group

Edit and imputation irons out inconsistencies and fills in gaps in census data.

We use editing and imputation where:

- people have not answered individual questions
- there are inconsistencies between answers

Editing is the process of finding and flagging missing, invalid and inconsistent answers to census questions. Imputation comes after editing. It involves replacing these missing, invalid or inconsistent values.

The Census Edit and Imputation Working Group was set up to share information and updates and get feedback on the Edit and Imputation methodology across the different UK censuses. Meetings are held frequently throughout the year with representation from ONS, NISRA and NRS. ONS are responsible for sharing the UK harmonisation matrix which will explain how Edit and Imputation is carried out by each UK office.

10.4.4 Edit Rules Working Group

An edit rule is a rule which determines an inconsistency or outlier. For example: A person under 16 cannot be, or have been, married, unless country of birth is outside the UK and similarly if the householders own their residence (outright or with a mortgage) then no response is required to the landlord question.

The Edit Rules working group was set up to share information and updates and get feedback on the edit rules methodology across the different UK censuses. Meetings are held frequently throughout the year with representation from ONS, NISRA and NRS. ONS are responsible for sharing the UK harmonisation matrix which will explain how edit rules are carried out by each UK office.

10.4.5 Estimation and Adjustment Working Group

Estimation and adjustment helps estimate how many households and people are missing. While the census aims to capture the whole of Scotland, we expect that some people and households will be missed. We use estimation and adjustment to find out how many households and people we collected information from in the census. If evidence suggests the census has missed some people, we add records so we have a census dataset that covers Scotland's entire population.

The Estimation and Adjustment Working Group was set up in order to share information, updates, and get feedback on the Estimation and Adjustment methodology across the different UK censuses. Meetings are held frequently throughout the year with representation from ONS, NISRA and NRS. Updates are shared internally with relevant colleagues. ONS are responsible for sharing the UK harmonisation matrix which will explain how Estimation and Adjustment is carried out by each UK office.

10.4.6 International Census Forum (ICF) Population Coverage and Adjustment Working Group

The ICF Population Coverage and Adjustment Working Group meets to share information and updates and get feedback on the population coverage and adjustment methodology across different international censuses. Meetings are three to four times a year with representation from Australia, New Zealand, Canada, USA, UK, and Ireland (ONS, NISRA, NRS).

11. Statistical Quality Assurance

The Government Statistical Service Statistical Policy and Standards Committee (GSS SPSC) define Quality Assurance (QA) as the anticipation and avoidance of problems. It is about having agreed systems that check and validate the work that we do so that our end product is robust and received well by the end user.

Statistical Quality Assurance:

- covers all procedures focused on providing confidence that quality requirements will be fulfilled;
- requires processes and systems in place that are planned and tested, and which should self-correct or flag problems under exceptions;
- aims to prevent, reduce or limit the occurrence of errors in a statistical product and therefore, to get it right first time.

The statistical quality assurance process will measure the level of quality being achieved throughout the collection and processing of census data and the production and dissemination of the results.

11.1 Census Quality Survey

Historically the Census Quality Survey (CQS) was a voluntary survey carried out across Scotland eight weeks after the census day. It aimed to capture the differences between responses in census compared to the CQS.

However, for Scotland's Census 2022 we have changed our approach and we will not carry out a CQS in the traditional way. Instead we will use alternative data quality measures which offer robust and extensive assurance that Scotland's Census 2022 produces high quality data and is of value to the people of Scotland. We have developed additional quality assurance processes that significantly improves our approach to ensure census data is high quality. The new approach we have adopted relies on the robustness, quality and value of existing statistical quality assurance processes.

Stakeholder engagement has been undertaken at the Population and Migration Statistics (PAMS) meeting in May 2021 and the census roadshow events in June 2021 to explain the reasons behind not conducting a CQS and increasing the awareness amongst users that this will not be taking place in 2022.

11.1.1 Statistical Quality Assurance (SQA) strategy

The [SQA strategy](#) gives an overview of how we will assess and measure the level of quality being achieved throughout the collection and processing of Census data and the production and dissemination of statistics. The strategy was written in order to be open and transparent with stakeholders on the proposed statistical quality assurance steps for live census 2022 and to get feedback on proposals.

The SQA strategy was collaboratively written by the collect and disseminate teams and then published in December 2021 on Scotland's Census website and was updated in May 2021. The document is designed to:

- outline what statistical quality assurance, quality control and quality management are and why they are important for Scotland's Census 2022;
- describe our proposed strategy for Statistical Quality Assurance for Census 2022;
- provide an overview of the methods we will use to quality assure the Census 2022 processes and results;
- describe and explain the Statistical Quality Assurance end-to-end journey built into Scotland's Census 2022; and
- explain how we have engaged with stakeholders and how we plan to continue doing so.

We worked closely with ONS and NISRA through the UK Statistical Quality working group and shared ideas and best practice for quality assurance methods throughout the development of this strategy. Prior to publication, it was shared with the PAMS committee in November 2019 for feedback and has been shared at an external stakeholder statistical methodology event on February 2020, PAMS committee meeting in May 2021, and at Census Roadshow events in June 2021. Comments from stakeholders, have been incorporated into the final version of our SQA strategy.

11.2 Harmonisation of UK censuses

We work closely with the other UK censuses to harmonise our efforts around quality assurance.

To support this, we have jointly set up the UK Statistical Quality Working Group. Through this group, we meet regularly with the Office for National Statistics and the Northern Ireland Statistics and Research Agency. The group meets four times a year to discuss:

- methodology
- best practice
- lessons learned
- opportunities for joint working

NRS are also a member of the following groups involved in harmonisation across UK censuses:

Board/Committee/Group	Purpose
UK Census Committee	Decision making body with responsibility for harmonisation of end to end Census activities across the UK.
UK Harmonisation Working Group	To manage relationships between Census programmes of work across the UK, identify potential areas of joint working and manage risks

	to harmonisation of UK outputs. Reports to UK Census Committee for decisions requiring sign-off.
Census 2021 Outputs and Dissemination Harmonisation Working Group	Working level group discussing outputs harmonisation which shares research, progress and resource relating to outputs products and statistical disclosure control.
Census 2021 Microdata Working group	Working level group discussing outputs harmonisation which shares research, progress and resource relating to Microdata products.
Census 2021 Origin Destination Working Group	Working level group discussing outputs harmonisation which shares research, progress and resource relating to Origin Destination products.
UK Data – User Group	To provide a forum for sharing information and feedback between the UK Census offices UK census data users to inform development of a dissemination approach that maximises the benefit that can be gained from providing UK census outputs.
Topic Groups	To consider requirements from census for the topic, input into output design and prepare for delivery of analysis of census data.
Ethnic Group Assurance Panel	To gather stakeholder's views on the development of the ethnic group question for the 2021/2022 Censuses.
Religion Assurance Panel	To gather stakeholder's input on the harmonisation of religion questions across the GSS and development of an integrated data approach to religion data, including support for the 2021 Census.
UK Data working group	Working level group taking forward OSR recommendations from the NS Accreditation process where the focus is at a UK level.
UK Statistical Quality Working Group	Working level group to maximise our harmonisation in approach to the statistical quality assurance of the 2021 and 2022 Censuses.
Data Processing Harmonisation working group	Working level group which identifies and documents potential areas of joint working and differences in the way the data is processed.
Edit and Imputation Working Group	Working level group discussing outputs harmonisation which shares research, progress and resource relating to Edit and Imputation.
UK Product Working Group	Working level group discussing the question development work/testing results/rehearsal findings etc to help develop harmonised questions and questionnaires.

UK Addressing Working Group	Working level group discussing and sharing best practice around the development of the address registers to support the 2021/2022 Census operation across the UK Census Offices.
UK and Ireland Geography Harmonisation working group	Working level group discussing geography information relating to initiatives, policies, standards and Census planning and dissemination.
International Census Forum	To share and discuss latest research and other international practices and how they tackle issues/potential issues including methods, communications and privacy.

11.3 Assurance of processes (AoP)

Census data undergoes a number of statistical processes that form the overall census data journey. AoP will review quality assurance procedures performed internally for each process within the census data journey, and will provide a secondary level of quality assurance for every individual process.

The approach to the assurance of the results of each process is to:

1. Understand each process and the nature of the errors which might be introduced:
 - define metrics to understand the nature of errors, measures and acceptance criteria
 - define interventions to resolve and sign-off for each process
2. Estimate the expected size and likelihood of the errors within each process
3. Prioritise the Quality Assurance work based on points 1 and 2:
 - define dependencies, risks, timeframes, and resources for the quality assurance of each process;

Scotland's Census 2022 Statistical Quality Assurance team will work closely with the owner of each process, drawing on their expertise to ensure that quality assurance checks are meaningful and can be easily produced, avoiding duplication of work, and ensuring methods of intervention are available where the results of a process are causing concern.

11.3.1 Detailed statistical specification

We have produced a Detailed Statistical Specification (DSS) in order to ensure that each process is running according to the pre-determined methodologies. The DSS is a document which describes each process in detail and maps out all of the individual tasks which make up the quality assurance checks for this process.

Task details are described in full, with details given on: the frequency of the task; type of reporting; issue logging details; time/resource required; and need for comparator data. Operator instructions provide a plain word description and explanation of the task and what it is checking, clear steps on how to complete each step of this task; and how to log the task once it has been completed.

11.4 Impact maps

We have pre-emptively mapped any concerns around errors, bias and issues that may occur during the end to end data journey and asked probing questions, recorded using 'impact maps'. Each process, or sub-process, is assessed in order to understand what can go wrong and what preventative measures are in place. We do this in advance of live census in order to be prepared for action if any of the issues mapped out occurs. If an event that has been pre-identified does occur, the impact on the data can be understood, and the appropriate actions can be taken.

Impact map questions include the following:

Why (the Process) = Which process or data step is being considered?

Where (the issue) = a list of all known issues, errors or biases that could occur during the aforementioned process or data step.

How (can errors be seen) = A description of what that error will look like and how we will identify if it has occurred.

What (are we going to do) = A description of the steps that will be taken to correct the error if it occurs.

11.5 Statistical methods papers

It's important that our methodology is fit for purpose and robust so that census outputs are:

- high quality
- trustworthy
- of public value

We have layers of review and governance to help us make sure our methodology is sound. Our methodology papers undertake the following approvals path:

- In-team review
- internal peer review group
- External Methodology Assurance Panel (EMAP) (where appropriate)
- Census Design Authority board approval (where appropriate).
- publication of paper and EMAP summary (where appropriate)

We publish methodology papers and summary reports as soon as possible following panel sessions. Before we publish, we work through the advice provided by peer review groups; update methodology as needed; and complete the internal

governance steps towards final approval of the statistical methods discussed in each paper. More information and links to the papers and reports published can be found in the [Peer review and governance](#) section of the website.

11.5.1 Internal Peer Review Group (IPRG) papers

Our Internal Peer Review Group (IPRG) is made up of around 15 statisticians from National Records of Scotland, from across the census programme and wider NRS. In these groups, statistical teams work closely together to understand and assess each process, and document methodological decisions. They review and provide feedback on proposed methodologies for each step of census processing. The group meets regularly and provides support to the teams who are designing the methodology for each step in the data journey. This helps us reduce or limit the occurrence of errors in a statistical product, and the final data outputs.

Fortnightly meetings are taken in order to evaluate, get feedback and agreement on the proposed process for Scotland's census 2022. This provides the first layer of peer review for statistical methodology for Scotland's Census 2022 before methodology papers go to External Methodology Assurance Panels (EMAPs) (where appropriate) and then to appropriate boards for sign-off.

11.5.2 External Methodology Assurance Panels (EMAPs) papers

External Methodology Assurance Panels (EMAPs) is a short-life advisory working group comprising subject matter experts and academics to support and facilitate the independent peer review of the proposed statistical methodology for Scotland's Census 2022.

When NRS receives the 2022 census data from our supplier, the data is passed through many processes which code, clean, adjust and quality assure the data. For each of these steps there is an in-depth statistical methodology designed to set out how each process will be completed. It is this statistical methodology which needs to be peer-reviewed by independent subject matter experts to ensure our approach is fit for purpose to produce high quality outputs at the end of the data journey.

EMAPs met monthly between May 2020 and April 2021 to review the proposed statistical methodology for Scotland's Census. The group is chaired by one of the external panel members ensuring a fully independent peer review process. Panel members review and explore each proposed methodology and reach a consensus on whether the proposed methodology is fit for purpose. A summary report, along with the methodology papers presented for review at EMAPs is published below following each panel session.

EMAPs papers are available from the [Peer review and governance](#) page on Scotland's Census website.

11.5.3 Board approval Census Design Authority (CDA)

The final stage of governance is National Records of Scotland's [Census Design Authority](#). This board is responsible for the overall census design. This is also where all aspects of our methodology are approved. The board uses the advice from the internal and external reviews to make their decision.

11.6 Dashboards

During the planning for the 2022 Census, Quality Assurance (QA) methods from 2011 were evaluated to help inform what QA would be needed for 2022 and what improvements could be made on the methods used in 2011. One such improvement was to speed up the process of QA by using interactive QA dashboards.

11.6.1 QA dashboard options paper

An options paper was written in order to explain the need for QA dashboards and assess the various software that could be used to develop QA dashboards. Software options were tested and a Scottish Government reproducible analytical pipelines developer was consulted to assess suitability of options. ONS shared their python dashboard ideas with NRS, which were included in the options paper and python was tested as an option for the NRS dashboards. The need for QA dashboards and the proposed software (R) was approved at the Census Design Authority.

11.6.2 Disseminate dashboard working group

The aim of this working group is to align the different QA dashboards being developed by different teams across Scotland's Census 2022 as much as possible. Discussion around the technical aspects of producing dashboards has also taken place. This has ensured a focus on the needs of dashboard users, and the working group has contributed to making sure they are easy to use by providing feedback to dashboard developers.

11.6.3 Definitions working group

The NRS definitions working group makes sure that all census terminology is recorded and documented for present and future reference. This ensures the accurate recording of definitions that are easy for the census programme to access and refer to when necessary. The group meets on a regular basis to discuss and agree documentation and sign off of definitions.

12. Use of Administrative Data in the 2022 census

As part of Scotland's Census 2022, NRS are planning on making best use of administrative data in its design. The primary use for administrative data being will be for quality assurance purposes rather than augmenting parts of the census.

12.1 Validation of population estimates

Scotland's Census 2022 will produce population data for Scotland at national and sub-national levels. This data will cover a range of topics for individuals and households. The Validation of Population Estimates (VoPE) process will compare these estimates with existing data, identifying any areas where census estimates differ significantly from prior data. At this point in the quality assurance process of the 2022 Census data are expected to be high quality and, therefore, VoPE is a final validation check.

By validating census population estimates, we will consider the likely accuracy of the census results for geographic areas, population groups and topics. We aim to ensure that the main demographic statistics are plausible for Scotland and its constituent Local Authorities, as well as other geographies and topic areas.

We will use a suite of tools and methods that will allow us to focus on geographic areas and population groups or topics where there are inconsistencies or need for further analysis. In 2022, we will aim to make best use of all sources available, including:

- 2011 Census;
- mid-year population estimates;
- administrative data;
- survey data;
- other sources.

The evidence to support our population estimates will be reviewed by internal and external quality assurance panels who will advise on whether estimates are fit for purpose or require further work or adjustment.

More information on our VoPE methodology is available in the [Statistical Quality Assurance - Validation of Population Estimates methodology paper](#).

12.1.1 Topic-based analysis

We will look at the results for each topic included in the census and compare with existing sources of data, including Scottish Survey Core Questions, the Scottish Household Survey and the Scottish House Condition Survey.

The owners of the comparator data sources have been consulted to ensure that they are being used in an appropriate way, with any limitations in the data being taken into account when comparing Census 2022 data.

12.1.2 Demographic analysis

We will also check the age and sex distribution of sub-populations, such as students and the prison population, against comparator sources. These checks will aim to use administrative data from sources including the Higher Education Statistics Agency, Further Education Statistics and the Defence Analytical Services Agency.

12.2 Data governance

In Scotland, one of the main suppliers of administrative and survey data to support the quality assurance of the census is Scottish Government (SG). They will provide approximately several of the sources we would like to use with most of them also already being used for official statistics. National Records of Scotland (NRS) has been working closely with the SG Statistical Public Benefit and Privacy Panel (SPBPP) on the data acquisition procedures for the data we wish to use for quality assuring Scotland's Census.

12.2.1 Quality Assurance of Administrative Data (QAAD)

For all existing data sources that we will use to quality assure the 2022 Census results, we have conducted an assessment of their quality, including the impact of the data collection processes on the statistics. These will be communicated to users through the publication of a QAAD document for each data source.

12.3 Data Protection Impact Assessment (DPIA)

Details of how we will use administrative data in Scotland's Census 2022 is covered in the [Data Protection Impact Assessment \(DPIA\)](#) which is available on the Scotland's Census website and will be refreshed and updated as plans develop. Any use of administrative data in the census would be subject to legal, ethical and privacy considerations. DPIA review will be done for each of the administrative data sources. Some data sources will require a fuller DPIA. These will sit underneath the main Census DPIA with links into it.

An example of how we used the NHS Central Register (NHSCR) data set to support some of the improved methodologies for the 2019 census rehearsal can be found in the [Data Protection Impact Assessment for the use of the NHSCR dataset](#). NRS expect to publish more DPIAs in the future.

12.4 Harmonisation

NRS will work with the Office for National Statistics (ONS) and the Northern Ireland Statistical Research Agency (NISRA) to ensure harmonised outputs (wherever possible) across the UK from the 2022 Censuses and in the development of statistical methodology. Where there are differences these will be highlighted and explanations provided to help UK census data users.

12.5 Use of administrative data for quality assurance

Administrative data will be used as part of the quality assurance of Census 2022 data. This will include use of individual data to quality assure the census, which is new to 2022. The data is only being used to quality assurance, not augment the census. These new methodologies were more successful at identifying duplicate entries, retaining genuine records and improving imputation for missing dates of birth. More information on the methodologies is available in the EMAPs papers for [Remove false persons – methodology](#), [Missing and Different Dates of Birth](#), [Resolve multiple responses - identify duplicates](#) and [Census to census linking and overcount correction](#).

12.6 Stakeholder events

In May 2021, a presentation was delivered to the Population and Migration Statistics Committee that included information on our plans for using administrative data to quality assure the Census 2022 results. Similar details were also presented to stakeholders at [Census roadshow events](#) in June 2021.

12.7 Administrative data based population estimates (ABPE)

NRS published the first set of [Administrative Data Based Population Estimates \(ABPE\) for Scotland, 2016](#) in November 2020. These were published as statistical research and [voluntary adopted the code of practice for official statistics](#). This is part of the evidence base that will allow a discussion with users about the use of administrative data within the field of demographic statistics (which includes census). Ongoing evaluation and assessment is required on this area of statistical research.

The Administrative Data team has undertaken stakeholder engagement to talk about this publication through 2021, hoping to address any concerns in its next iteration. The next publication will cover 2016 to 2018 data and be published in December 2021. There will be revisions to the initial methodology and explanation provided within the publication.

13. Outputs

Scotland's Census 2022 aims to generate outputs that meet the needs of our users and produce these in a timely manner to maximise the benefits of conducting a census.

13.1 Statistical Disclosure Control (SDC) and outputs stakeholder events 2019

The SDC and Outputs team coordinated four events in Aberdeen, Dundee, Edinburgh and Glasgow. These events comprised two broad sessions. Firstly, feedback was sought on current proposals for the specialist Microdata and Origin-Destination products, and our proposals for Census Output Geographies. During the second session Stakeholders were invited to provide feedback on the 2011 Census output website and give suggestions for the 2022 site via an interactive website workshop.

The June 2019 [Outputs Stakeholder Event Summary](#) can be found on the Outputs Stakeholder events page of the Scotland's Census website.

13.2 Outputs website

The need for a new website for census outputs was identified after research identified that the current site was not meeting user's needs.

A phased delivery approach, in line with the Government Digital Service (GDS) and Digital First models, was adopted to deliver Scotland's Census outputs website. A phased delivery approach, such as this, places particular emphasis on ensuring that digital services delivered in Scotland are continually improving and that users are always the primary focus.

The discovery phase focused on uncovering the service landscape from multiple perspectives. The goal was to understand the user needs that need to be met, the target business objectives and any problems that need to be solved.

Following on from the discovery phase was the alpha phase which built on the research and findings from the discovery phase. We continued user research, working to validate the findings from discovery, and engaged with users from a wider range of backgrounds. We developed a content strategy for the website, and completed the alpha version of the website based on results from discovery.

Next came the beta phase, where the team prepared the service to be publicly accessed by users. The Beta site was soft launched to sit alongside the previous version of the website, as this allowed the team to gather useful insight and feedback, without compromising access to the existing Scotland's Census outputs service.

The feedback gathered during the previous phases was incorporated into the final version of the new website, which went live in May 2021.

13.3 SDC and outputs user engagement

Members of the SDC and Outputs team have been attending various working groups in an effort to engage with users and provide harmonisation of census outputs across the UK where possible.

13.3.1 UK microdata working group

Coordinated by ONS and attended by NRS, NISRA and a number of Census Microdata users. The UK Census offices use these meetings to present proposals for the 2021 UK Census Microdata files and gather feedback and requirements from Microdata users.

13.3.2 UK origin destination workgroups

Coordinated by ONS and attended by NRS, NISRA and a number of Origin-Destination data users. The UK Census offices use these meetings to present proposals for the 2021 Origin-Destination products and gather feedback and requirements from data users.

13.3.3 Statistical disclosure control methodology

We have presented a number of papers on our Statistical Disclosure Control methodology for 2022 Census Outputs to the NRS Internal Peer Review Group and to our external methodology assurance panel. Feedback from the group has been used to refine and optimise our statistical methods.

The following papers have been approved by our external methodology assurance panel:

- [household record swapping methodology](#)
- [cell key perturbation](#)

In addition, our household composition algorithm methodology was approved by our Internal Peer Review Group.

13.3.4 Outputs dissemination system

The SDC and Outputs team tested a prototype version of the outputs dissemination system, SuperWEB2, to determine whether disclosure control functionality had been successfully implemented when generating output tables from a test census dataset.

NRS consulted internal and external stakeholders in order to capture descriptions of both the high level and detailed requirements for the outputs production and dissemination system in user story format. The results of these consultations can be have been recorded in a high level requirements spreadsheet and requirements catalogue respectively and they were used when procuring solutions to ensure that we were able to meet the needs of internal and external users.

13.4 SDC and outputs stakeholder events 2020

To gather feedback from external stakeholders on our proposals for census outputs and our plans for outputs dissemination.

These stakeholder events were carried out remotely (due to the COVID-19 situation). Materials were circulated via our census stakeholder mailing list and on the Scotland's Census 2011 website. These events covered our plans for content from new and changed census questions, our proposed outputs release schedule and updates on our plans for outputs dissemination (specifically around the [flexible table builder](#)). Feedback was collected from external stakeholders via an online survey

Slides from the [census outputs event March 2020](#) can be found on the [events](#) section of our website.

13.5 Consultation on standard tables

We are planning to produce fewer tables as standard in 2021 as users will be able to create their own. However, we plan to produce at least one output for each variable and will produce a reduced number of standard tables. We have and will continue to engage with stakeholders to identify what tables should be produced so that they are available to select from the [flexible table builder](#).

We have identified the tables which users require most through consultation. This has included consulting with Population and Migration Statistics (PAMS) committee members to confirm what their most used tables from the 2011 Census were. Web analytics from the 2011 census website were also used to identify what the most used/downloaded tables were.

13.6 Quality assurance of derived variables

A derived variable is a variable that can be created by calculating or categorising existing variables. Some example of these could be age which is calculated using date of birth and the date of the census and then you could then use the new age variables to group them together into age ranges.

The SDC and Outputs team have created specification documents for each of the Derived Variables which we intend to create in preparation for outputs from Scotland's Census 2022. The specification documents contain detailed information for each derived variable around the method used to create each one.

These derived Variable specifications have been reviewed by NRS statisticians and feedback has been used to correct errors and make improvements to the methods used to produce them.

13.7 Future stakeholder engagement

National Records of Scotland are planning a Statistical Disclosure Control (SDC) and outputs consultation is part of our wider engagement plan and will build on our previous [consultation](#).

The SDC and outputs consultation will seek users' views on a number of areas to better understand user needs and ensure that the outputs we produce maximise the value of the census.

This will be part of a number of stakeholder engagement activities we will hold as we plan outputs from the 2022 Census. These include:

- census stakeholder events – Webinars
- user working groups
- reviewing feedback received from website/mailboxes

The consultation will focus on Scottish Census products though the feedback may also be used to inform decision making around UK Census products.

We are currently planning the consultation including when it will be run, once these plans are in place we will promote the consultation through our regular channels to build awareness through our user groups.

Alongside the consultation we will continue to engage with users through our regular stakeholder events where we update users on our work and plans. We will also provide updates to existing groups that we are members this includes our Population and Migration Statistics Committee and events organised by other UK Censuses.

14. Assurance mechanisms for the 2022 Census Programme

It is important that we show our work to design, test and deliver the 2022 census meets a high standard. Programme assurance gives us, our suppliers, and our delivery partners confidence that we're on track to deliver a successful census. We have 3 levels of assurance within the census programme. We use these to measure how well we are progressing.

14.1 First level - weekly reporting

The first level focusses on the day-to-day activity within the census programme. We use weekly project reports to check what we've done and what's coming up next. This also helps us identify problems quickly and take action to resolve them.

14.2 Second level - internal review

The second level involves regular reviews of our progress. These 'stage gates' help us decide if the programme is ready to move from one stage to the next. For example, we'll check if we have completed all the work needed to build a system before we decide if we are ready to test it. Here we also review how well the programme is being managed and controlled so we can identify areas for improvement.

14.3 Third level - external review

The third level involves reviews by experts from outside the census programme. These review teams will tell us what we're doing well, and where we can make improvements. The reviews cover a range of topics. They focus on ensuring that:

- the census is open and accessible to everyone
- the quality of our work meets the expected standards
- we have good controls in place to manage and deliver the programme on time

Together, the reviews set out our Integrated Assurance Approvals Plan.

We work closely with the Scottish Government and Office for Statistics Regulation to plan these reviews and make improvements to the programme.

14.4 Risk management

It's important that we understand the risks involved in delivering the census. Understanding risks means we can reduce or remove them.

We use risk management to make sure we focus most of our effort on the biggest risks we face. Assurance activity is informed at all levels by risk management, to focus efforts on areas of highest-risk, and to support key decisions and approvals.

This is accomplished through the development of an Integration Assurance and Approvals Plan (IAAP) which is used to schedule all assurance activity across the three levels.

14.5 Quality improvement

Lastly, the census programme is taking a structured approach to improving the quality of our work prior to the census in 2022. A formal evaluation of the 2019 rehearsal was undertaken to identify areas for improvement. In addition to this, our teams record 'lessons learned' as they go, looking for opportunities for improvements which will ultimately help us achieve our census programme objectives.

15. Next Steps

The Office of Statistics Regulation (OSR) will use this report (as well as other evidence they have collected, that's available to the public) as evidence for their reporting on whether we have been successful in retaining National Statistics accreditation. We will continue to provide updates on our progress and consult both with OSR and with other UK Census offices. There will be a public consultation for OSR to directly gather views of users and stakeholders which will be available on their website. More information on the assessment process and how you can take part in consultations can be found on the [assessment of censuses in the UK](#) page of the [OSR website](#).

It is OSR's intention to publish their report on the UK Statistics Authority website in summer 2022. This report will look at the evidence we have provided so far and let us know what the requirements are that we will need to address. We will then publish an update in early 2023 detailing how we have responded to OSR's requirements. At the end of Phase 2 OSR will confirm whether Scotland's Census 2022 can retain the badge of National Statistics accreditation. If we are successful, then this will be confirmed ahead of the first outputs in 2023.