

The Future Provision of Demographic Statistics  
in Northern Ireland (Towards the 2011 Census)

Information Paper

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## 1. Introduction

Demographic statistics underpin most of the information systems used by government and wider society. Knowledge about the number and characteristics of the population and how it is likely to change influence important areas such as resource allocation, policy development and service planning. Given that the results of the 2001 Census have been released and are now integrated within the population statistics system, it is timely that the future provision of demographic statistics in Northern Ireland is considered and reviewed.

The Census of Population remains the benchmark upon which population estimates and many other statistical series are based. The one-off decennial nature of the Census makes it critical that preparations for each Census are as comprehensive as possible. One of the key lessons from the 2001 Census of Population in Northern Ireland was that preparations and planning should begin earlier. Accordingly, while the remaining final specialised products from the 2001 Census are still being produced, the Northern Ireland Statistics and Research Agency (NISRA) is turning its thoughts to the next Census (planned for 2011) and is seeking the views of users on the proposed way forward as outlined in this paper.

### 1.1 Overview of Paper

This paper begins by discussing the need for demographic statistics. It then outlines the key role that the Census plays in the provision of such statistics and sets out the high level strategic aims that will underpin the development of the 2011 Census strategy. Importantly, it signals those aspects of the 2001 Census operation that were judged to be successful and accordingly are candidates for inclusion in the development of the 2011 strategy. Equally, it highlights known shortcomings that would need to be addressed in any future Census operation and reflects on alternative approaches adopted by other leading Census organisations in Europe and beyond.

### 1.2 Purpose of Paper

The primary purpose of this paper is to stimulate thought and initiate a continuous consultation process that will form an integral part of the 2011 Census development programme. On considering the content of the paper, users are invited to share their thoughts on a number of issues, which, from a strategic perspective, are regarded as fundamental to the developmental process at this stage. These include:

- the general provision of demographic statistics, including where improvements should be pursued and how these might be achieved;
- the high level operational implications associated with enhancing the population base for the 2011 Census; and
- 2011 question content.

### 1.3 Consultation

The feedback provided by users through the consultation document that accompanies this paper will play an important role in shaping the development of the 2011 Census strategy. NISRA actively encourages users to participate in the consultation in order to ensure that their requirements are considered in the development of future provisions. Details of how to participate in the consultation are set out in the consultation document, (see reference 1 on page 14).

## 2. The need for Demographic Statistics

Demographic statistics, narrowly defined for the purpose of this paper as the number and condition of the population, are a basic information requirement for the governance of society. The planning of maternity and school-age education services is fundamentally based on the number of births that occur and the resulting number of school children. Demographic statistics thus underpin the development of robust policies and the efficient delivery of services. A recent report by the Office for National Statistics (ONS), "A demographic service for the 21st century" (July 2003) (see reference 2 on page 14) identified ten major uses of population statistics by government, namely,

- Resource allocation and targeting resources;
- Understanding the long-term context and the demographic consequences of public policy;
- Assessing the implications for public programmes of demographic and social change;
- Policy development and service planning;
- Understanding the labour market;
- Supporting effective local government;
- Supporting operations;
- Democratic accountability;
- Meeting international obligations; and
- Informing the public and customers.

Further detail on these uses can be found in the ONS report (see reference 2 on page 14). In the context of this report however, it is noted that wider society will make both similar and further different uses of population and wider demographic statistics.

The ONS report suggests that, ideally, population statistics must be:

- Accurate, and that their accuracy should be both accepted by users' and capable of being measured;
- Consistent over time and space;
- Available for small areas;
- Timely; and
- Capable of identifying new trends.

The production of high quality demographic statistics that meet the criteria outlined above has always been a major target for NISRA.

Through the accompanying consultation questionnaire, NISRA is asking users' to: -

- Comment on the extent to which Northern Ireland demographic statistics meet the above criteria; and
- Outline where improvements should be pursued and how these might be achieved.

### 2.1 Frequency and Timeliness of Demographic Statistics

Mid-year population estimates are produced and published by NISRA annually, typically about one year after the reference date (i.e. 2004 based mid-year population estimates will be published around the middle of 2005).

Through the accompanying consultation questionnaire, NISRA is seeking users' views on:

- how frequently population estimates are required; and
- what time-lag is acceptable, bearing in mind that reducing the interval may lead to the introduction of routine revisions of the estimates.

### 2.2 The Geography of Demographic Statistics

At present, the annual mid-year estimates series is presented down to Local Government District and Parliamentary Constituency levels. Statistics for smaller geographic units, such as Electoral Wards, are produced on an occasional basis, for example to act as denominators for spatial measures of deprivation.

Through the accompanying consultation questionnaire, NISRA is seeking users' views on the extent to which this current practice meets their needs for demographic statistics for geographical areas.

### 3. Administrative Data as a Source for Demographic Statistics

NISRA has recently launched and is continuing to develop the Northern Ireland Neighbourhood Information Service (NINIS) ([www.ninis.nisra.gov.uk](http://www.ninis.nisra.gov.uk)). This provides access to statistical information about geographic areas throughout Northern Ireland. While the 2001 Census provides a large amount of the statistical information within NINIS, an increasing proportion of the information comes from administrative sources. The facility to access and analyse large-scale administrative datasets is a recent development, but it is reasonable to assume that over the next few years the range of available statistics will continue to increase.

#### 3.1 Benefits

Statistics from administrative sources are attractive for a number of reasons. They usually provide complete population coverage (in some instances for subsets of the population), as opposed to samples, and the administrative system usually has a stake in their accuracy. Accordingly, statistics offices throughout the world are exploring and expanding their use of such data. The data are generally up to date and can be used to extract useful, meaningful statistical information relatively quickly and cheaply. In Northern Ireland, they are a key driving force behind the Neighbourhood Statistics initiative.

The use and linkage of administrative data has the potential to contribute much to the 2011 Census exercise in terms of:

- supporting a targeted enumeration strategy through the linkage of data with address lists;
- informing the need for non-response follow-up, in some cases, by using other sources of information about second homes;
- replacing or adding to census topics;
- improving the accuracy of the imputation of missing or inconsistent census responses;
- improving our understanding of undercoverage and overcoverage; and
- enhancing the quality assurance of census results.

#### 3.2 Limitations

There are a number of shortcomings associated with administrative data. While they count what the administrative system is required to count, this may not match what

users require. They are thus usually a proxy, of varying quality and appropriateness, for some underlying population. Further, changes in the administrative count are susceptible to changes in administrative procedures, making interpretation difficult. The claimant unemployment count is a frequently quoted example. The administrative system produces accurate, timely statistics on the claimant count, but the link between the numbers on the claimant count and the numbers experiencing labour market disadvantage is not necessarily straightforward, and it is in the latter that most users are primarily interested. It is well-known that the numbers depend critically on the eligibility criteria for such benefits, and this makes changes over time difficult to interpret, and makes international comparisons practically impossible.

Some distinctions about administrative data are more subtle. For example, the Central Health Index (CHI) in Northern Ireland is composed of people registered for health services. In principle, this is broadly similar to a population register and therefore should, ideally, yield an accurate count of the population. However, issues such as cross-border workers and armed forces personnel mean that the two are not exactly synonymous. This is even before issues of data quality are considered; there may be instances where some people elect not to register with a GP while others may not inform their GP when they move house. There are related issues around migration, for example, in terms of how the health system becomes aware that a young male adult has migrated from Northern Ireland.

Other administrative sources may provide regular data on a sub-set of the population which cannot readily be converted into population based statistics. For example, the education system can readily provide statistics on the qualifications of each year's school-leavers and this plays an important role in terms of monitoring education standards. However, the educational administrative system is not designed to provide person-based statistics on the highest level of educational qualifications achieved by the adult population.

The ability of administrative systems to produce robust statistics is of course related to the quality of the administrative source. One of the strengths of the Census is its ability to produce estimates for small geographic areas. The ability of administrative systems to do likewise is based on the quality of geographic identifiers such as postcodes. It is quite feasible to have an administrative system that has quality built into it for aspects that are relevant to the host body, and thus produces robust national counts, but where the postcode is of little value to the administrative system and is accordingly of poor quality leading to poor statistics for small areas.

A further drawback of administrative data, compared to the Census of Population, is the lack of cross-tabulated information. Thus, data from administrative sources might provide information on the numbers of people who are unemployed (through being eligible for a relevant benefit) but it cannot be linked at person level, and thus correlated, with that person's educational qualifications or ethnic group, unless the relevant authority collects such information. Such cross-tabulation would be possible if administrative data sources could be brought together and matched at person level, but current legislation within the UK greatly restricts the extent to which this approach can be followed.

### **3.3 Conclusion Regarding Administrative Data**

There can be no doubt that the potential uses of administrative data are likely to increase over time as IT advances enable ever larger databases to be manipulated and exploited. However, it is by no means certain that, by 2011, the demographic information typically provided through a Census could be obtained from administrative data sources. Accordingly, NISRA believes that a 'traditional' Census process of some type will be required in 2011 and indeed this is a major consideration in current planning. In arriving at this position, alternative Census designs such as those employed in France and the United States of America were considered but ruled out at this stage (see Appendix 1 for more detail). It is possible, indeed likely, that one function of a 2011 Census might be to validate the use of an administrative source to produce baseline demographic statistics.

## 4. The Census of Population as a Source for Demographic Statistics

### 4.1 The Role of the Census

It is widely acknowledged that the Census plays a fundamental and unique role in the provision of comprehensive and robust population statistics on a comparable and consistent basis for both small areas and small population groups. The information from the Census is extensively used across the public, private and voluntary sectors and has many important applications. These include, for example,

- acting as a benchmark for demographic statistics, providing the base count of the population, that are used widely within Government and beyond;
- informing the efficient allocation of significant resources across all parts of Government spanning, housing, education, health care, social welfare and transport;
- providing an authoritative base for population and housing projections which are pivotal to planning and decision making in respect of front line service provision throughout the inter-censal period;
- supporting development, targeting, delivery and evaluation work in key policy areas such as New Targeting Social Need (TSN) and Equality Monitoring through the provision of information detailing the demographic characteristics of geographical areas and population groups;
- identifying and targeting areas of need and disadvantage, and then assessing the effectiveness of policies to address such need;
- benchmarking and improving the quality of information collected from other data sources such as administrative systems, address registers and sample surveys;
- providing information on small population subgroups, such as ethnic minority populations, for which sample surveys cannot provide robust statistics; and
- informing and supporting research.

### 4.2 The Need for Planning

The Census is an extremely large-scale exercise, which is traditionally conducted every ten years in Northern Ireland and requires significant funding on the part of Government. As highlighted above, the information from the Census has many important applications and, as such, failure to

deliver would have considerable implications, carry heavy costs and serve to severely undermine both user and public confidence. To mitigate against the risks, detailed planning is required to ensure that clearly identified strategic aims and objectives are met and that the investment is fully realised through the provision of official statistics that are fit for purpose.

In accordance with best practice, the strategy that will be developed for the 2011 Census in Northern Ireland will seek to reflect the important lessons learnt from the review and evaluation of key processes that underpinned the 2001 Census and take cognisance of the development work that is ongoing in the rest of the UK and further a field. In addition, it will seek to exploit both the efficiencies and experience that can be secured through joint working, where it is appropriate and in Northern Ireland's best interest to do so.

### 4.3 High-level Strategic Aims

The following high-level strategic aims will underpin the development of the 2011 strategy:

- to provide high quality, value for money statistics that are fit for purpose and meet the needs of users;
- to maximise response rates by actively encouraging public participation in the Census and raising awareness of its important role;
- to protect, and be seen to protect, the confidential personal information collected through the Census; and
- to secure public and user confidence in the final results and deliver them in a timely manner.

### 4.4 2011 Census Topics and Questions

It is widely acknowledged that the length of the Census form, which is largely governed by the number of topics and questions included, has the potential to impact on both the quality and cost of the Census. The development of the 2011 Census question set is important not only in this context but also in terms of ensuring that the needs of users are rigorously established and met wherever possible and practical, hence justifying the expenditure.

Through the accompanying consultation questionnaire, NISRA is seeking to establish :

- the type of information that users require;
- what the information is used for; and
- the level of geography required.

The consultation document creates a framework for discussion by setting out the questions asked in the 2001 Census along with sample output where appropriate and asks users whether the question should be retained in its current format, amended in some way or excluded. Where users feel a question should be retained or amended in some way they are asked to indicate what the information is used for and the level of geography required. The consultation document also seeks users' views on any additional information requirements over and above those covered by the 2001 Census topics and questions.

Respondents should consider the appropriateness of the Census for their requirements before suggesting additional questions for the Census and be mindful that questions on the Census form must be:

- succinct, as only a very limited number of questions can be asked; and
- unambiguous and easily understood by everybody.

In addition, there must be a requirement for statistics at small area level, otherwise a sample survey is likely to provide sufficient information.

## 5. The Context for the 2011 Census

The environment for the next Census will of course differ from that in 2001, just as it operated in different circumstances to the 1991 Census. This short section discusses the likely context for the next Census.

### 5.1 The Legal Context

The Census is conducted under the Census Act (Northern Ireland) 1969, which gives the Registrar General, an official of NISRA, the authority to conduct a Census and places an obligation on householders to respond. The Census Act states that at least 5 years must pass before a further Census can be held; thus a Census could be held at any time from 2006 onwards. However, in recent decades a pattern of 10-yearly Censuses, in years ending in '1', has emerged and NISRA is planning on the assumption that the next Census will be held in 2011.

As outlined in section 1.2, this paper and the accompanying consultation document mark the start of a continuous programme of consultation about the 2011 Census. In the previous Census cycle, a Census White Paper (Cm 4253,1999) was produced in 1999. The need for a White Paper will be considered in the light of the consultation process, probably around 2008 or 2009.

There are two further legal aspects that will contribute to the process.

- The Census Act requires a Census Order and subsequent Regulations; these set out the exact nature of the Census, detailing for example the questionnaire. The Order and Regulations are subject to Parliamentary scrutiny and are likely to be taken forward in 2010.
- The European Union has an interest in obtaining consistent information about the size and characteristics of the populations of member states. For the 2000 round of Censuses, the EU issued a recommendation on the content of the Census, and a similar approach is expected to be taken for the 2010 round. The UK is represented on a working group developing the recommendation.

### 5.2 The Societal Context

Society is constantly changing and the Census must adapt in order to collect meaningful and relevant information. For example, the 1926 Census asked for the name of the 'Head of Household' and then the name of his 'wife', while

the 2001 Census asked people living in the same household if they were married or living as partners. Given current developments, the 2011 Census may need to take account of civil partnerships.

The changing structure of society will also affect how the Census is conducted. In 2001, the Census anticipated, and experienced, enumeration difficulties such as gaining access to apartment blocks, and making contact with households where all the adults are absent during working hours. If the Census continues to use enumerators to deliver Census forms to individual households, these problems will probably be more acute in 2011.

The response to the 2001 Census was very positive in Northern Ireland with the main reason for calls to the helpline relating to households that, while keen to participate in the Census, had not yet received a form. NISRA aims to maintain this level of support for the Census but recognise that people face ever-increasing demands upon their time.

### 5.3 The Statistical Context

It is likely that by 2011 the circumstances around access to administrative data and advances in record linkage techniques will provide opportunities for supplementing or replacing at least part of the Census process. The Office for National Statistics has published a statistical framework for the 2011 Census (October 2004) (see reference 3 on page 14) from the perspective of England and Wales. The paper notes however that there is a clear requirement for census outputs that are consistent and comparable across the UK. NISRA shares the aims expressed in the ONS paper, and invites views on the paper from the Northern Ireland perspective.

## 6. The Population Base

Demographic statistics in Northern Ireland, as in most European countries, are based on the concept of the usually resident population. This places each person in one fixed location, reflecting where he or she spends the majority of their residential time. While the usually resident population is a very useful concept, it is based on the assumption that there is a one-to-one relationship between people and places. However, more flexible and mobile lifestyles increasingly question the assumption that each person should be associated with just one place. A number of alternative population bases are possible, including:

- population present at a given point in time (the de facto population);
- term-time / out-of-term population;
- seasonal populations;
- weekend / weekday populations (either de facto or usual residence); and
- daytime population (either de facto or usual place of work).

There are also groups of the population whose treatment will differ under different bases. These include:

- temporarily resident population;
- 'legal' population (perhaps with voting rights);
- UK 'residents' living abroad; and
- non-UK 'residents' living in the UK.

In an ideal system population estimates could be derived using any of the above bases and include or exclude the groups above as required. In practice, obtaining estimates on alternative bases will inevitably involve asking further questions in the Census and / or developing additional sample survey resources and administrative systems.

Historical population statistics were mostly based on the de facto population present basis. While this is still the prevailing choice in some countries, including the Republic of Ireland, users generally prefer the usually resident population base as it is more stable and provides superior statistics on household structures. This was the approach adopted in the 2001 Census which also provided estimates of the day-time population through counting people in employment at their place of work and amalgamating them with the corresponding non-working residents.

Whatever the approach, there can be no doubt that the issue of the population base is of fundamental importance and has the potential to impact on every aspect of the whole Census process. In recognition of this, the Census Offices throughout the UK have been working in partnership to develop a detailed paper, "Population base for the 2011 census enumeration" (see reference 4 on page 14) which outlines the various options for the enumeration base for the 2011 Census.

The paper notes at the outset that there is insufficient information available at this stage to support a conclusive recommendation. However the issues it describes tend towards an acceptance that information will need to be collected on both usual residents and any visitors present at an address on Census night.

Through the accompanying consultation questionnaire, NISRA is asking users to:

- describe the extent to which the usually resident-based population statistics meet their needs; and
- where user needs are not met in this way, describe what further population bases should be developed.

Respondents should be aware that the measurement of the population using alternative bases would probably require additional questions on the Census form. Any additional questions on population base will reduce the space for questions on other population characteristics and may lead to some questions being dropped.

## 7. Experience from the 2001 Census

NISRA are formally reviewing the 2001 Census through a series of topic-based evaluations. While the majority of these have been completed and can be accessed through the Agency website (see reference 5 on page 14) NISRA plans to collate the various evaluations into a summary general report.

In advance of this being published, the following section describes some of the key aspects of the 2001 Census and discusses both those that were judged to have been successful and hence should be considered for inclusion in the 2011 Census strategy and those that had shortcomings which would need to be addressed before being included in any future Census operation.

### 7.1 The Census Test and Census Rehearsal

In preparation for the 2001 Census, a test was held in 1997 and a rehearsal in 1999. The test in 1997 was used primarily to test different types of Census form, different methods of fieldwork (essentially enumerator collection and postback) and different questions. Details can be found in NISRA Occasional Paper number 13 (see reference 6 on page 14) The Test in itself was judged successful, and the lessons learned from it were incorporated into both the Rehearsal and the full Census. The Rehearsal was held in 1999 and was intended, as its name suggests, to be a 'dry-run' of the 2001 process. This approach worked for some of the more traditional aspects of the Census process, such as field procedures, but other more innovative procedures such as data capture were only seriously tested for the first time in the Rehearsal. Subsequently many lessons from the Rehearsal were not evaluated in time to permit fine-tuning of processes for the 2001 Census.

The key lesson is that more work needs to be done, and more decisions taken, earlier in the cycle, with the aim of making the Rehearsal into an authentic 'dry-run' of the census operation.

### 7.2 Enumeration Methodology

In previous Censuses prior to 2001, enumerators both distributed the Census forms and returned to collect them when completed. In 2001, return envelopes were supplied with the Census forms and respondents were asked to return the completed form by post. NISRA view the use of postback as a general success, but some areas of concern remain. NISRA requested the public to return their forms immediately after Census Day. There was an excellent response to this, and indeed the Royal Mail had problems dealing with the surge of forms immediately following Census Day. This will need to be addressed if post-back is retained in the future.

After Census Day enumerators followed up on non-response by visiting the relevant addresses. On a number of occasions the household had already returned the form but that information had not reached the enumerator. Again, the issue of form tracking will require further consideration and development.

One issue associated with postback is the completeness of the Census returns. Enumerator collection allows for a check, perhaps cursory, that the respondent has answered all questions. With post-back, although there is the option of going back to households who return incomplete forms, the cost of doing so is likely to undermine the cost savings that post-back is designed to achieve. Initial analyses by NISRA suggest the form completion levels in 2001 using post-back were satisfactory but this cannot be assumed to carry through to 2011. Achieving higher levels of form completeness is of course desirable.

The Office for National Statistics has proposed to use a mail-out, mail-back procedure as their primary enumeration method for the 2011 Census in England and Wales. The use of mail-out requires both prior comprehensive knowledge of all addresses and a system of identifying households not in receipt of a Census form.

NISRA plan to undertake a detailed assessment of the relative merits of the different approaches to the delivery and return of Census forms and will examine each of the options in the context of quality, cost, timeliness and respondent burden. The findings from the assessment will play a pivotal role in the development of the planned 2007 Census Test, a major component of which will be an evaluation of the implications of using the NI POINTER address database (see 7.3).

### 7.3 The Requirement for an Authoritative Address List

A key objective of the Census is the enumeration of the population in all households throughout Northern Ireland. One of the first tasks of a Census enumerator is to physically assess their enumeration area and prepare a listing of all properties within the boundary of their enumeration district. NISRA used information from Ordnance Survey Northern Ireland (OSNI) to guide enumerators, but there were inevitable differences between the OSNI database and the situation on the ground, for example, because of new builds or properties being demolished.

As mentioned above, the Office for National Statistics is considering using a mail-out option to pre-prepared address lists as their primary method for getting forms into the field in 2011. The quality, coverage and timeliness of such an address list is obviously critical to the success of this approach and that of hand delivery, albeit to a lesser extent. Much work will be required over the next few years

in assessing address lists in Northern Ireland and, as mentioned above, this will be a key objective of the 2007 Census Test.

#### 7.4 Processing the Forms

In the 1991 Census the data were converted to electronic format through manual keying of the responses. For 2001 the data were captured through scanning and imaging. In addition to converting the data to electronic format for subsequent statistical analysis, Census Office staff had electronic access to images of the completed forms; this contributed greatly to the validation and quality assurance of the Census database. Subsequent analyses confirm the quality of the data capture process met the prescribed standards; this will be reported further in specific evaluations.

The scanning and imaging yielded many benefits to the Census process, but one significant shortcoming was the delay in delivery of electronic datasets. As discussed above, the first serious testing of the scanning and imaging was in the 1999 Rehearsal. Difficulties that were encountered were still being worked upon as the schedule moved into processing of the actual Census thereby causing delays. The lesson is that while the technology has been shown to be capable of delivery, it is vital that adequate time is allowed to ensure that the system is fully ready when required.

NISRA believes that a self-completion form will remain the mainstay of the 2011 Census in Northern Ireland. NISRA also believe that, from a technical perspective, scanning and imaging was a success in 2001 and should be retained for 2011 accompanied by an appropriate retrieval and edit system that at least emulates the 2001 system. NISRA will discuss with ONS and General Register Office - Scotland (GROS) the scope for joint processing along the broad lines followed in 2001.

#### 7.5 Enumerator Computer Assisted form Capture

The fieldwork for the majority of NISRA's household surveys are conducted by computer assisted methodologies and NISRA are well aware of the advantages of computer assisted data capture in the field. NISRA has considered the possibility of using its experience of this technology for 2011 fieldwork, but has concluded that the logistics of training sufficient numbers of staff, costs of acquiring the hardware and the cost of requiring enumerators to conduct face-to-face interviews make this approach, while methodologically attractive, unlikely to be practical in the field.

#### 7.6 Internet Capture

Experience of those countries who have taken this facility forward is that that set-up costs are high and usage rates are low. For example, an internet reply option was provided

by the Swiss Federal Statistical Office in their 2000 Census, but less than 5 per cent of the population who had the option used it (see reference 7 on page 14). Having said that, NISRA is aware of the increasing interest and capacity for internet capture and is of the view that internet responses as a means of returning Census forms should be thoroughly explored. However, we recognise that given Northern Ireland's relatively small population size, the cost of developing a system for Northern Ireland would have high per capita costs and accordingly have signalled our intent to work closely with the Office for National Statistics towards the development of a possible UK solution.

#### 7.7 Downstream Processing - the use of Item Imputation

Although full completion of the Census form is a statutory requirement, it is recognised that some Census forms will not be fully completed for all questions, and it is impractical to return to each household to insist upon full completion. Further, the completion rate for most questions exceeded 90 per cent. The Census White Paper (Cm 4253, 1999) announced that a system would be developed to impute responses to omitted questions in otherwise complete Census forms. This was developed and applied to all questions, with the exception of religion although it was applied to the derived variable of community background.

The purpose of the Census is to produce a statistical portrait of the population, and the sole purpose of item imputation is to ensure that the portrait of the population is as complete and accurate as possible. One major benefit of the use of item imputation is that there is no longer a residual category in Census outputs labelled 'Not stated'. Users generally appear to find this beneficial and seem to be content with the application of item imputation.

Accordingly, the use of item imputation is likely to be incorporated in the 2011 methodology.

#### 7.8 Downstream Processing - Adjusting the Census Database for Underenumeration

As no Census succeeds in collecting information from all residents, a methodology was developed to take account of any undercount, and thus provide an accurate estimate of the total population and its characteristics. In Northern Ireland, this process seems to have worked well and the resulting population estimates appear to have been acceptable to users. However, the features that prompted NISRA, and the other UK Census organisations, to develop these adjustments remain, and are likely to become more pronounced in the future. It seems reasonable to conclude that the underenumeration adjustment strategy developed by the UK Census organisations worked well provided the Census operation itself achieved an adequate response rate.

NISRA views the adjustment of the 2001 raw Census returns for under-enumeration as a success that has improved the Census outputs. Accordingly, NISRA intends to retain the principle that 2011 counts should be adjusted. At present a method based on a Census Coverage Survey from which returns are matched at individual level with the Census is envisaged. However, there is potential for administrative data to play a greater role, for example, through enabling the use of a more accurate triple-estimator system than the dual-estimator system used in 2001. This does not detract from an underlying principle that a prime Census objective is complete population enumeration, leading ideally to the adjustment for underenumeration being a validation of the Census count.

#### 7.9 Quality Assurance of Results - Use of Administrative Data

It is proposed that the primary use of administrative data in 2011 will again be to act as a quality assurance tool for the counts from the Census. For example, NISRA used counts from sources such as Child Benefit to check that the Census counts of children for geographic areas looked plausible and to ensure that software coding had not introduced errors into outputs.

#### 7.10 Disclosure Control

The purpose of disclosure control is to ensure that the statistical output does not unknowingly disclose information about individual Census respondents. The methodology employed in 1991 involved slightly perturbing cells in output tables. This was not popular with users since it affected the additivity of Census output and accordingly an aim in the 2001 Census was to introduce a method whereby additivity was preserved. The resulting approach, namely small cell adjustment, partially achieved this objective in that individual Census tables were internally additive and hence consistent. However, as the method was applied independently to each table, marginally different counts sometimes emerged across tables for the same variable and information produced for nested geographies did not always sum to the totals for the higher-level geography (e.g. summing output for Electoral Wards did not always equate to the Local Government District totals). While NISRA fully recognises that a fully additive disclosure control method is desirable, the demand for ever more detailed output may preclude this unless other criteria are weakened. Given the importance of disclosure control from the user's perspective NISRA will, at an appropriate point in the developmental process, seek user's views on the issue.

#### 7.11 Census Outputs

Prior to the 2001 Census a detailed user consultation exercise was conducted to ascertain the information that users required from the Census. The exercise represented a considerable investment on the part of both Census Offices and users throughout the UK and resulted in detailed specifications for tables that were consistent across the UK wherever possible.

In Northern Ireland, over one million tables were released from the 2001 Census between September 2002 and April 2004, a period of one and half years. During this period considerable resources were devoted to the development of the NISRA website ([www.nisra.gov.uk](http://www.nisra.gov.uk)) and the Northern Ireland Census Access system (NICA - [www.nicensus2001.gov.uk](http://www.nicensus2001.gov.uk)) to ensure that the full range of Census tables were widely, and freely, available electronically. These initiatives, which included the provision of detailed supporting metadata to help users understand the data and make best use of it, marked a major innovation over the 1991 Census when outputs were largely only accessible in paper format.

While NISRA is acutely aware that users of Census information want results as quickly as possible after the Census is taken, this needs to be balanced against the requirements to ensure that the confidentiality of the data is preserved and that the results are robustly quality-assured prior to release. In taking forward the development work for the 2011 Census, NISRA will be actively looking at innovative ways in which the output production processes might be streamlined. At an appropriate point in the process, NISRA will engage users in a specific output consultation exercise that will seek to establish, amongst other things,

- exactly what outputs are required and what they are used for;
- the order in which users would prefer the outputs produced;
- the preferred format, timescales and method of dissemination; and, as mentioned earlier,
- disclosure control issues.

Section 7 has described some of the issues around the 2001 Census and given a broad indication of NISRA's plans for 2011. By necessity, these plans are not yet clearly formed. Many of the issues are about internal process management of which users are unlikely to be aware. However, **through the accompanying consultation questionnaire, NISRA invite users' comments on any of the issues raised in section 7, or indeed on issues that have not been explicitly stated.**

## 8. Conclusions

### 8.1 A Strategy for Taking Forward Development Work on the 2011 Census

As discussed in this paper, NISRA's view is that alternative data sources are unlikely to be sufficiently developed by 2011 and accordingly that a 'traditional' Census of some sort will be required in 2011. NISRA's development of Census procedures will be based on a Census Test in 2007 and a Census Rehearsal in 2009. The 2007 Test will focus on the respective roles of enumerators and the postal system, and will include an assessment of the contribution that the NI POINTER address database could make to the Census process. This will lead to a full-scale Census Rehearsal in 2009 involving all Census processes.

NISRA envisage the Census process, after the collection of forms, broadly following that of 2001, with both an item imputation system and adjustment for underenumeration through a Census Coverage Survey.

### 8.2 2011 Priority Work Packages

In order to advance and inform more detailed planning for a census in 2011 a number of priority work packages have been identified which will be the main focus of our work over the next 12-18 months. These will include:-

A data needs exercise involving:

- a comprehensive programme of consultation;
- a review of the 2001 data needs experience; and
- an audit of potential alternative data sources for census type data.

A data collection exercise involving:

- an assessment of the available modes of enumeration which examines the relative merits of each (in particular, the likely implications for quality and cost); and
- research into the difficult to enumerate groups and areas using, where possible, intelligence gathered during 2001 and taking into account similar work being conducted by the other Census Offices both within and outside the UK.

An evaluation of the NI POINTER address database including:

- the development and implementation of a quality assurance strategy and an assessment of its fitness for purpose, which will be robustly tested in the planned Census Test in 2007.

### 8.3 Joint Working Across the UK

As outlined in section 4.2, NISRA recognises both the efficiencies and experience that can be secured through joint working where it is appropriate and in Northern Ireland's best interest to do so.

In keeping with this, the work described above is broadly similar in scope and nature to that being carried out in England & Wales and Scotland and the offices have agreed to share the outcomes of their various pieces of research.

Another important area for joint working is in the development of a strategy for outsourcing a number of the major components of the census design. This work is being led by ONS and is commencing with a "concept viability workshop" with the aim of engaging with potential suppliers early in the planning process to test the feasibility of the 2011 census design and tease out any new technologies or methods which will help with the delivery of quality outputs. NISRA will be actively involved in this event, which is scheduled to take place in December 2004.

In the European context, NISRA also works closely with colleagues in the Central Statistics Office (CSO) in the Republic of Ireland (ROI) and will be seeking to learn from their experiences in the ROI census planned for 2006. In the past NISRA has collaborated with CSO on the harmonisation of a common day for the taking of the Census and will seek to do so again for 2011.

Finally, as mentioned earlier, the Census Offices throughout the UK recognise the importance of a consistent approach on the issue of the population base that is used for enumeration and are working to harmonise consultation activities in this important area.

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## Appendix 1

### Alternative Census Designs

#### **Within the Context of a 'Traditional' Census, a Number of Designs or Design Variants could be Considered.**

The most radical is the idea of a Rolling Census that has been adopted by France. In simple terms, the French Statistical Office will be placing their communes into a number of strata and conducting a Census in a sample of communes each year. The Census process itself will become continuous, but the residents of any given commune will typically be subject to a Census every 5 years. Different Census cycles will apply in large and small communes, but the key point is that, at any given point in time, the Census statistics for a number of communes will refer to different time points, although a population estimates system will produce annual population estimates. NISRA believes that Northern Ireland is too small for this to be considered appropriate or beneficial locally.

A second alternative is to consider the American system of long and short forms. In 2000, most American households received a 'short' form that asked about key demographic variables only. A minority of households, roughly one in six, received a 'long' form that asked a series of additional questions. It was argued that sufficient information would be received from this sample to achieve the Census's objectives. Since 2000, the US Census Bureau has decided to move away from this approach partly because some of the negative reaction to the 'long' form is judged to have adversely affected public perception of the whole Census process. Accordingly, the US Census Bureau is moving to a 'short' form only in 2010. The information previously obtained from the 'long' form will now be obtained from continuous sample surveys; the long form process was essentially a large sample survey conducted at the same time as the Census. The attraction of the approach is that it allows information to be collected for a sufficient number of the population without unnecessarily increasing the burden on all respondents. It is however essentially a sample survey approach and Northern Ireland has a well-developed survey capability. Accordingly NISRA's view is that the Census should retain a single Census form common to all respondents. Given the statutory nature of the Census, a business case is required before questions are added to the Census questionnaire and this will continue. Information requirements that can be met through sample surveys should continue to be met using this method.

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