

**Advisory Groups Paper (97)13**

**TOWARDS A ONE NUMBER CENSUS**

This paper describes the current strategy for developing and implementing a methodology for a One Number Census in 2001. The key elements of the research are described, and the plans for consultation are outlined.

**Members of the Advisory Groups are invited to note:**

- the paper; and in particular,
- the plans for a consultation paper to be widely circulated early in 1998.

## ONE NUMBER CENSUS - A STRATEGIC OVERVIEW

### Background

- 0 It is widely accepted that the greatest source of error in the 1991 Census was the high level of underenumeration, and in particular its differential nature. The Census Offices had not anticipated the difficulties caused by underenumeration in 1991 and the consequent confusion amongst customers about how census counts and the population estimates (which were adjusted for the undercount) should be interpreted.
- 1 Accordingly, the Census Offices have put underenumeration at the top of the agenda in the research programme towards the 2001 Census. The methodology for carrying out the Census is being re-thought with the aim of using resources to their best effect to minimise the level of differential underenumeration in the 2001 Census. The 1997 Census Test provided an opportunity to try out new ideas such as:
- 0 the use of postal methods of delivering and collecting Census forms to allow enumerator resources to be redirected to areas where they are most needed; and,
  - 1 new designs of the Census form with the aim of making it easier to complete for those households most susceptible to underenumeration.
- 2 While it is too early to draw conclusions from the Test, the Census Offices are already identifying a number of lessons to be learnt. These include the need to keep the enumerator's job as simple as possible, the importance of establishing links with community groups who have contact with those population groups most susceptible to being missed and a confirmation that flexibility needs to be built into the operation on the ground so further enabling resources to be used where they are most needed.
- 3 Despite these efforts, there will be some people who are not counted in the Census. The One Number Census (ONC) is concerned with measuring the level of underenumeration in the 2001 Census.
- 4 The ultimate aim of the ONC project is to integrate the Census, the estimated undercount and the rebased population estimates to produce "one number". In essence, to adjust the Census for underenumeration. The methodological work for the ONC is currently being undertaken by a joint ONS/Academic team, under the direction of Ian Diamond at the University of Southampton. A Steering Committee, including representatives of the academic community and the local authority community, oversees the work.

### Consultation

- 5 Consultation will play a key part in the development and acceptance of the methodology. A consultation paper will be issued **early in 1998** to all interested parties (including all Advisory Group members). This will explain the ONC methodology as envisaged, in the context of the timing of the output and the marketing strategy for Census products as far as will be known at that stage. Comments will be invited through the Advisory Groups by the end of April 1998.
- 6 Future consultation will take place as required through the Census Advisory Groups.

### Methodological approach as currently envisaged

- 7 The process outlined below represents current thinking on the possible ONC methodology. However, this is still under development and therefore liable to change.
- 8 The first two stages in the ONC will be to produce the best estimate of the population by age and sex at national and county levels. The third stage will produce estimates for lower levels of geography (described as "Ward level" at Annex A and below but it could be any geographical level) and for other characteristics of people and households. The final stage is to impute records for households that are estimated to have been missed and people estimated to have

been missed from households. This last stage would allow all statistics based on the 2001 Census to aggregate to "One Number".

9 These stages are illustrated at Annex A, and described in somewhat more detail below.

#### **Stages 1 and 2 - National and County level estimates**

- 10 To estimate the population by age and sex at the county level in 2001, counts from the 2001 Census will be adjusted for estimated net underenumeration from a *Census Coverage Survey (CCS)* and administrative records using *capture/recapture analysis* techniques (see paragraphs 14 and 15). These will then be aggregated to produce a *national Census-based estimate* and compared with *the national demographic estimate* of the population (the estimate of the population rolled forward from the previous Census). The proposed strategy is that if the Census-based estimates come within an agreed range of plausible values based on demographic analysis, then the Census count should be accepted. If not the demographic estimate will be believed.
- 11 If the national demographic estimate is decided to be the most accurate, then the county level (Census based) estimates would need to be scaled to ensure that everything adds up. Methods for doing this will be agreed in advance.
- 12 A design for a *Census Coverage Survey* based on the re-enumeration of a sample of whole postcode units, stratified by county and an index based on difficulty to enumerate, was successfully piloted in Brent following the 1997 Census Test. This used a short questionnaire to collect information on characteristics believed to be associated with underenumeration. The simplicity of the questionnaire and the fact that sampling whole postcodes makes efficient use of interviewer time, makes a much larger sample size possible than was the case for the 1991 Census Validation Survey.
- 13 It is however, unlikely that the CCS will itself be perfectly accurate. Therefore we are looking at ways to link data from administrative sources (such as the Family Health Service Authority (FHSA) registers and Council Tax Registers) to the Census and CCS records at the individual level. The project team is investigating the possibility of using three or four way *capture/recapture analysis* techniques to estimate those missing from all sources and to reduce the error attached to the county level estimates.

#### **Stages 3 and 4 - Small area estimation and imputation**

- 14 The production of adjusted census counts for small areas (and ultimately to adjust the Census database) represent the final goals of the ONC process. Models developed on the sampled postcodes in the CCS linking the observed Census characteristics and the estimated missing population will be used to predict the number missed in non-sampled postcodes. These models will estimate the number of people missed in enumerated households and those in wholly missed households for each postcode. The precise method for creating individual records and allocating them to household units has not yet been developed.

Andy Teague and David Thorogood  
ONS Census Division  
Room 4200W  
Segensworth Road,  
Titchfield  
Fareham  
Hants. PO15 5RR

Tel 01329 813 404  
Fax 01329 813 525  
Email andy.teague@ons.gov.uk

September 1997

**Annex A - The Stages of a One Number Census**



