

# PLANNING FOR THE 2001 CENSUS COVERAGE SURVEY IN ENGLAND AND WALES

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## Abstract

This paper describes the development and research of the field methodology for the 2001 Census Coverage Survey. The Census Coverage Survey will intensively re-enumerate a sample of approximately 20,000 postcodes (equivalent to approximately 300,000 households) as part of the One Number Census process (the companion paper by Abbot *et al.*, 1999 describes this). In order to develop the methodology for 2001 three trial surveys have been undertaken; a brief outline of each is given in this paper.

## Background – Coverage in the 1991 Census

Traditionally the level of under-coverage in the Census has been measured from data collected in a post-enumeration survey (PES). The objectives of the PES (known as the Census Validation Survey (CVS)) in the 1991 Census of Great Britain) were two-fold: (1) to measure the quality of responses to Census questions; and (2) to measure coverage (the number of households and persons counted). The 1991 CVS was carried out on a sample of 20,000 private households. Interviewers was given the Census returns from the households in their workloads and instructed to identify and interview all household members, to re-ask all the Census questions, and to discuss any discrepancies in responses between the Census the Survey.

From the results of the CVS it was estimated that 162,000 persons had been missed by the Census (Heady *et al.*, 1994). However, the CVS estimates and Census counts were then compared with the existing series of population estimates based on the 1981 Census and it was further estimated that 1.2 million persons (2.2 per cent of the resident population) had been missed. This meant that the CVS had failed to find many of the people missed by the Census. This latter comparison found that the population sub-groups that suffered most from under-coverage were:

- Young adults aged 20 - 29 (6% nationally, 11% in inner cities and as high as 23% for young males in some inner cities);
- Those in converted or shared accommodation (11% net under-coverage);
- Infants under one year old (estimated at 3% nationally);
- Armed forces personnel and their dependants;
- Elderly women (around 6% for 85s and over); and
- Ethnic minorities in inner city areas.

Although the Census methodology has been changed in an attempt to maximise coverage for the 2001 Census (and in particular to address the differential nature of under-enumeration in 1991), there is every reason to expect there will be some degree of under-coverage again. The One Number Census (ONC) programme to adjust for this has been accordingly developed (Abbot *et al.*, 1999).

The objective of the One Number Census Programme is to estimate the level of under-enumeration and to integrate this with the census counts so that all census outputs sum to one number – the national estimate of the population on Census Day. The approach is to use a post-enumeration survey which concentrates solely on coverage and which is much bigger to give the resilience that was not there in the 1991 survey. The sample will be designed to produce direct estimates for some 100 ‘design groups’ – average population size 500,000 people. The information from the survey will be combined with that from the census and estimates of under-enumeration made at the design group level using a combination of dual system and regression-based estimators. These will then be cascaded using synthetic estimation techniques to the local/unitary authority level (average size 120,000 population) to provide the new base of local population estimates by age and sex.

The final step of the ONC process is to estimate the probabilities of households and people being missed at the local level by type of household and person. Imputation of households and people according to these probabilities will follow to produce a fully adjusted census database. This final process will be constrained to the estimates produced at local/unitary authority level.

The quality of the census data will be measured in a separate Census Quality Survey.

### **Objective of the 2001 Census Coverage Survey**

The objective of the CCS is to find in a selected sample of postcodes those households, and persons within households, that have been missed by the Census. The CCS will, unlike the 1991 CVS, be completely independent from the Census. No prior information will be given to interviewers about the census returns, and the identity of the selected postcodes will be restricted to those working on the CCS and the ONC projects. The CCS will intensively re-enumerate the sample of postcodes (a postcode contains, on average, 15 households). The interviewer-based CCS will collect data on a small number of key variables central to detecting and measuring under-coverage. In order to make the ONC adjustments with the required precision the size of the CCS will be considerably larger than the 1991 CVS. The working assumption is that the sample size in England and Wales will be 20,000 postcodes, which equates to approximately 300,000 households.

## CCS Sample Design and Interviewer Workloads

A two-stage sampling procedure will be used to select the 2001 CCS sample: firstly the 1991 Census Enumeration Districts<sup>1</sup> (EDs) will be stratified by a “hard to count” index based on 1991 Census data (see Abbott *et al.*, 1999), and a sample of EDs drawn, and secondly, 5 postcodes will be sampled from each ED. CCS headquarters staff will then divide the sample of postcodes up into interviewer workloads.

The current strategy for deriving interviewer workloads is by:

- using the five postcode clusters selected in each 1991 Enumeration District as the basic unit of allocation;
- using the ONC Hard to Count score for each postcode cluster, to indicate the likely difficulty of achieving 100% coverage;
- using address counts from the Royal Mail as a proxy for the number of households; and
- constraining, wherever possible, workloads to contain clusters of postcodes with the same Hard to Count Index.

The precise aspects of the design for the 2001 CCS could be adjusted somewhat in the light of the results from the Rehearsal in 1999 but the broad approach will remain as discussed in Abbott *et al.*, (1999).

To ensure independence, Census field staff will not know which areas have been selected for the CCS and so will not be able to give special attention to these areas in the Census.

## Operational Strategy for the 2001 CCS

The Survey will take the form of an independent intensive re-enumeration of the sample of postcodes by means of short doorstep interviews (as opposed to using a self-completion questionnaire as in the Census) with all households that can be contacted.

The maintenance of field staff morale throughout the Survey period will be crucial to the CCS meeting its objective and this will be based on teamwork. Approaches to team-building that were used very successfully in the 1998 CCS Test and the 1999 Rehearsal included: personal contact between CCS HQ staff and field managers, interviewers working in pairs, and motivation meetings for all levels of field staff. Similar arrangements will be implemented in the 2001 CCS.

Interviewers will be given maps with their approximate boundaries<sup>2</sup> outlined on them, and will independently list the addresses and households in their assigned workload area<sup>3</sup>. The

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<sup>1</sup> Areas derived for Census enumeration purposes and containing approximately 200 households

<sup>2</sup> A postcode is defined by the Royal Mail as a list of postal delivery points rather than as an area on the ground. Thus a postcode does not have an official boundary.

interviewers will then repeatedly revisit each address over a three and a half week period and attempt to interview every household. At the end of the period they will leave a short self-completion postback questionnaire at any address where they have not succeeded in making contact with a resident.

A card informing residents about the survey will be left at each address during the initial round in each area. In addition, interviewers will have an official letter from ONS to give to residents seeking further reassurance about the official nature of the survey. Unlike the Census, the 2001 CCS will be voluntary.

The survey questionnaire will be as compact and manageable in the field as possible. A matrix format will be used to enable the Interviewers to see the response spaces for as many members of the household as possible on one page. A double A4 page spread will cover 3 people. The questionnaire will be designed for capture by scanning and automatic recognition.

The Survey will collect data on a small number of key variables central to measuring under-enumeration. The selected survey questions used will be identical to the Census questions and the responses categories will use pre-coded classifications compatible with those in the Census.

The Interviewers will check carefully how many households there are at each address and who is in each household to ensure, as far as possible, that no households or residents are missed. They will ask probing questions (helped by a prompt card) about those groups likely to be under-reported, such as babies, students, young people, and the elderly. Interviewers will also enquire about visitors (defined as those people temporarily staying at the address) in the course of identifying all residents in a household but, as in the census, no information about visitors will be recorded. Both the Census and the CCS will be based on recording everyone at their “usual residence”.

## **The CCS Field Staff**

### ***Field Managers***

The key level of CCS field manager will be the Team Manager. The Team Managers will allocate the interviewer-workloads prepared by CCS headquarters staff to the Interviewers in their area. They will monitor progress and workloads during the fieldwork, and if necessary change the allocation to balance workloads and ensure high and even coverage. They will visit each Interviewer in the field early in the fieldwork period to observe performance and provide guidance. They will also convene two Interviewers’ meetings during the fieldwork, designed to maintain commitment and enhance performance. It is planned to employ around 260 Team Managers for the CCS in 2001.

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<sup>3</sup> In the Census, enumerators are given a list of all the addresses in their area recorded in Address-Point™, a product supplied by the Ordnance Survey.

One in every 6 or so Team Managers will be a Co-ordinating Team Manager, and will have the additional duties of keeping in touch with the other Team Managers in the area, co-ordinating any mutual help that may be required, and channelling management information back to CCS headquarters. All Team Managers will be trained in these additional co-ordination duties so any one could be selected to step up to the co-ordinating role if required.

One further option being considered for 2001 is to make the role of the Co-ordinators entirely concerned with managing the Team Managers and remove from them the duties of recruiting and managing a team of Interviewers, but we are keen to avoid introducing unnecessary bureaucracy.

To give resilience, Stand-by Team Managers will be appointed in each part of the country and trained with the Team Managers so that they are ready to step in to make good any losses. They may also be appointed as Interviewers; this is desirable both to give them experience of the survey in case they should be called in to manage, and for the survey to benefit from their interviewing skills.

The possibility of Census field staff carrying out the duties of the Team Managers has been considered but this is not practicable because the duties would clash. Also, it is important to have a fresh and independent management team for the Survey.

Any publicity for the CCS will be low key. The message will be that we are checking on how well we carried out the Census, not on individual members of the public.

### ***Interviewers***

It is expected that around 3,600 CCS Interviewers will be needed. The exact number will be decided in the light of the 1999 Rehearsal. In addition, to provide resilience, Stand-by Interviewers will be appointed and trained together with the Interviewers so they are ready to step in to cover any losses. It is expected that around 360 (10%) Stand-bys will be needed.

It is expected that some of the Interviewers will have been Enumerators in the 2001 Census. This is because the same type of person is likely to be attracted to, and suitable for, both the Census and the CCS. However, to capitalise on people who may be prepared to interview but not to enumerate, some people will be recruited just to be Interviewers. Those Interviewers who have been Enumerators will be assigned to a different area for the CCS.

### **Recruitment**

The decision on how to advertise most effectively for Census and CCS field staff has still to be finalised. The traditional Census methods of advertising within the government Employment Service JobCentres, Local Authorities and Health Authorities will certainly be used. In addition, advertising in survey journals, via the academic network and directly in local newspapers will be considered.

For the 1999 Rehearsal the Co-ordinating Team Managers and Team Managers were all recruited at the same time by the headquarters staff. For 2001, given the larger scale of the operation, it will be necessary to recruit and train the Co-ordinating Team Managers earlier and involve them in helping Survey headquarters staff recruit the Team Managers. By this means, even in the larger survey in 2001, headquarters staff will continue to be involved in recruiting the Team Managers and be able to exert maximum control over quality. For the 1999 Rehearsal recruitment started immediately after the Christmas break, but in 2001 an earlier start will be necessary because of the larger numbers involved.

The newly recruited Team Managers will be trained in their recruitment duties and will then recruit their Interviewers. People who apply for posts both as an enumerator and an interviewer will be required to make separate applications. Applicants will be interviewed by the Census Officer and the Team Manager, respectively. The interviews will be held independently in most areas because to organise joint interviews would not be practicable. The reasons for making the jobs entirely separate are: firstly, because the pool of potential staff may be somewhat different, secondly, because it would not be practicable to select the Interviewers from the Enumerators based on their performance on the Census and thirdly, because applicants will want to know as soon as possible for what work they have been accepted.

## **Training**

Training the field staff is a key aspect of the CCS. ONS' Social Survey Division (SSD) and Human Resources Development Division (HRD) have already been involved along with the CCS team in planning and delivering the training to field staff for the 1998 Test CCS, and the 1999 Rehearsal. Due to the size of the Survey in 2001, it is unlikely that SSD and HRD will be able to provide all of the assistance required and the best way to bring in extra resources is being considered.

In 2001 the Team Managers will be trained by CCS HQ staff in order to exert tight control over quality. Because of the numbers involved the HQ team will need to be supplemented by people with good survey experience such as some of the Co-ordinating Team Managers, or possibly survey specialists. Training will be in two parts; the first part will cover the background to the Survey and their recruitment duties, and the second part will cover interviewing techniques and how to train the Interviewers.

The current expectation is that people will be able to apply to be both an Enumerator in the Census and an Interviewer in the CCS. On this assumption Interviewer training must take place simultaneously throughout the country immediately after the Enumerators have completed their Census follow-up collection duties. All of the Team Managers will have to run their course simultaneously so some 260 courses will be held in parallel. Consequently it will not be possible for professional survey and CCS staff to be directly involved in this training. However, even if no Interviewers worked on the Census as Enumerators, their period of training would need to be scheduled immediately before the start of the fieldwork in order to ensure that it will be fresh in their minds when they begin their duties.

Interviewer training will begin with a self-study pack on the basics, and continue with two three to four-hour training sessions. A video will be used to illustrate the required interviewing techniques, both to ensure that a consistent message is delivered in all areas, and to help reduce the burden of training on the Team Managers. Time will be allowed in the programme for consolidation and practice at home between the two sessions so that all Interviewers are well prepared before they begin the fieldwork.

### **Timing and Processing**

The survey will be carried out as soon as practicable after the Census in order to minimise the effect of population migration and the burden on respondents of recalling the position on Census Day. The earliest possible start date is not less than three weeks after Census Day as the Survey cannot go into the field until the Census follow-up has finished.

The length of the fieldwork will be around 3½ weeks, to allow for residents being away for up to three weeks during the fieldwork period and yet still to be contactable. The fieldwork period will probably begin on a Thursday and finish on a Sunday in order to incorporate four weekends.

The data from the Survey will be captured by a similar means to the Census data, that is by the contractor appointed to provide scanning and automatic recognition processing for the Census.

### **Testing for the 2001 CCS**

#### ***1997 Brent Pilot<sup>4</sup>***

A Pilot CCS using four Interviewers was carried out after the 1997 Census Test, in one of the more difficult areas, the London Borough of Brent. The pilot was carried out over a period of five days. The interviewers listed 450 households and achieved 43% of interviews. Overall there was little difference between the number of properties found by the interviewers and those located by the enumerators in the Census Test. However, there were significant differences in the number of households located, with the interviewers finding fewer households than those found in the Census Test. The matching procedure must therefore be robust against differences in the way the residents are grouped into households. The research into matching the Census and Survey returns showed that successful matching depends not only on the formulation of a logical strategy, but more importantly on recording accurate and complete information about individuals. One implication of this is that the CCS must be carried out as soon as possible after Census Day to reduce discrepancies due to migration.

The pilot established the general feasibility of undertaking a postcode based CCS, and using the collected data for record linkage with Census data.

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<sup>4</sup> The material quoted about the Brent Pilot draws on the unpublished work of Faith Holland, Dr. Lisa Buckner, and Professor Ian Diamond.

### *The 1998 Southampton Test<sup>5</sup>*

Following on from the Brent Pilot, a Test Census Coverage Survey was carried out in parts of Southampton in October 1998 using 24 Interviewers plus two reserves managed by two Team Managers. The city of Southampton was selected because it has various types of residential neighbourhoods, including areas with a high percentage of ethnic minorities and students. A sample of postcodes was drawn which included just over 2,000 households. There was good co-operation from the public with few refusals, and an encouraging contact rate. Interviews were achieved at over 85% of addresses.

The forms used in the field during the test CCS in Southampton were found to be cumbersome to handle on the doorstep. Accordingly improved designs were tested in fresh areas of Southampton during a weekend in November. These were found to be satisfactory and were adopted for the 1999 Rehearsal.

### *The 1999 Rehearsal*

The Rehearsal Census Coverage Survey in 1999 has as far as possible used the methods and procedures proposed for 2001. It will enable us to evaluate the effects of scaling up the size of the Survey.

The Rehearsal CCS was carried out in all Census Rehearsal areas (Leeds, Lincoln and Bournemouth in England, and Aberystwyth and Caernarfon in Wales) and covered 818 postcodes, equivalent to around 18,000 households. This is considerably larger in proportion to the size of the Census Rehearsal than the Survey in 2001 will be in relation to the Census, in order to provide a test of methods and procedures on a sufficiently large scale. In total the Rehearsal CCS had a field force of 16 Team Managers and around 250 Interviewers.

In the light of the evaluation of the Rehearsal the ONC project will confirm the sample size required for the full survey after the 2001 Census. Also, the final details of all the field methods and procedures will be decided.

Based on the experience gained in the Southampton Test, and in previous internal and external research (Barton, 1999; Campanelli et al. 1997) more specific instructions were given to the Interviewers about their calling strategy in order to maximise their chances of making contact with every household. Interviewers were instructed to call on at least two week-day evenings every week, and also to call every weekend. They were also instructed to call at different times of the day and different days of the week throughout the fieldwork. Many Interviewers called more frequently than this. In addition, they were asked to use any local knowledge they may have had in establishing the best times to try to make contact.

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<sup>5</sup> The material quoted about the 1998 CCS Test draws on the unpublished work of Jennie Dyer, Jacqueline Jones, Jan Thomas, Sarah Walker and Jennet Woolford.



The interviews in the 1999 Rehearsal CCS collected:

- the address including the postcode,
- basic information about the accommodation, and
- for each person, name, relationship within household, date of birth, sex, marital status, whether a student and if so whether at term-time address, ethnic group, whether the person had a different address one year ago, and economic status.

Information about ethnic group, migration and economic activities of students in full-time education was not collected at their vacation address, and information about economic activities was not collected from those under 16. The need for each item of information will be evaluated from the results of the 1999 Rehearsal and a decision will be made on what will be collected and captured in 2001.

Where no contact was made with a resident, interviewers were instructed not only to leave a self-completion post-back form, but also to complete a CCS questionnaire with any proxy information that they could observe or collect (for example from neighbours).

The only quantitative results currently available are from the progress reports sent in by the Team Managers at the end of the fieldwork. The provisional figures for private household response rates in each of the Rehearsal areas are in table 1 below.

**Table 1: Provisional results from the 1999 Rehearsal, based on progress reports**

Area (England and Wales)	Addresses listed	Vacant + Non-residential	Private households	Interviews achieved	Refusals	% of Maximum possible
<b>Bournemouth</b>	3560	512	3048	2573	345	84
<b>Leeds</b>	6808	913	5895	4794	513	81
<b>Lincoln</b>	6025	500	5525	4734	488	86
<b>Aberystwyth</b>	1230	171	1059	1023	30	97
<b>Caernarfon</b>	1038	169	869	832	38	96
<b>All Areas</b>	18661	2265	16396	13956	1414	85

The preliminary figures are most encouraging. They reflect the difference between the various Rehearsal areas. The parts of Leeds chosen for the Rehearsal were mainly inner-city, with substantial populations of students and ethnic minorities. The part of Bournemouth chosen also included students, but also more elderly residents and the commercial centre. Most of the city of Lincoln was included in the Rehearsal and the survey covered a full range of neighbourhood types except inner-city as Lincoln is relatively small. The two Welsh areas, around Aberystwyth and Caernarfon, were predominantly rural and were the easiest areas in which to carry out the survey.

The evaluation of the 1999 Rehearsal is now being undertaken and the final evaluation report is planned for the beginning of 2000. This will then allow for the final decisions to be made on the field methodology for the 2001 CCS and the operational period to begin.

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