

ONE NUMBER CENSUS STEERING COMMITTEE**Census Coverage Survey Issues**

1. This note addresses the
 - issues of independence between the Census and Census Coverage Survey and
 - the treatment of people who move between the Census and CCS.
2. The Steering Committee are asked to note the approaches.

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CCS ISSUES

1. INTRODUCTION

The key element of the ONC methodology proposed in ONS(ONC((SC))00/11 is the Census Coverage Survey (CCS). To recap, the important features of the CCS are:

- For the first time there will be a full geographical coverage of underenumeration since the CCS will be an areal based survey.
- It is designed to enable census population counts to be adjusted for underenumeration both at the national, local authority and small area level.
- It will comprise an intensive enumeration of a large, nationally representative sample of postcodes. The sample of postcodes will be drawn from all Local Authority Districts (LADs) to enable population estimates to be made for all districts.
- It will consist of a short, paper-based interviewer-completed questionnaire (as opposed to the Census self-completion questionnaire) designed to minimise the burden on the public. This is vital since the CCS, unlike the Census, will be a voluntary survey.
- It will be independent of the Census.
- It will be undertaken shortly after Census Day.

This note addresses the issues of

- a) independence between the Census and Census Coverage Survey and
- b) the treatment of people who move between the Census and CCS.

2. INDEPENDENCE OF THE CENSUS AND CCS

There are two stages of estimation in the ONC. First, a Dual System Estimation (DSE) method is used to estimate the number of people in different age-sex groups accounting for individuals missed by both census and the CCS within each postcode in the CCS sample. Second, the postcode level population counts obtained from these DSEs are used in ratio estimates to obtain final counts for the Design Group as a whole.

DSE is a standard method for estimating underenumeration. This was the approach used by the US Census Bureau following both the 1980 and 1990 US Censuses. Shortly after the census a Post-Enumeration Survey (the CCS) is used to obtain an independent re-count of the population in a sample of areas. After matching it is possible, for those areas in the CCS sample, to produce Table 1.

TABLE 1
Classification of enumeration status

		CCS		
		Counted	Missed	
Census	Counted	n_{11}	n_{10}	n_{1+}
	Missed	n_{01}	n_{00}	n_{0+}
		n_{+1}	n_{+0}	n_{++}

Individuals can be assigned to the cells in Table 1, and the counts observed, except those missed by both the census and the CCS. In other words, n_{00} and any margins that depend on it, including the overall population total n_{++} , cannot be observed. However, dual system estimation combines the two counts, n_{1+} and n_{+1} , to estimate the true population, using the DSE defined by:

$$\hat{n}_{++} = \frac{n_{1+} \times n_{+1}}{n_{11}} \quad (1)$$

The method is theoretically straightforward, however unbiased estimation requires statistical **independence** between the census count and the PES count.

This is typically handled by procedures that ensure the operational independence of the census and the PES.

2.1 Operational Independence

A large number of steps have been taken in planning the Census and the CCS to ensure independence. The main safeguards are:

- Different geographical bases for the two operations;
- Separate research and development teams in the Census Offices to plan and carry out the two operations;
- Measures to ensure that the CCS sample will only be communicated to those who need to know and will exclude staff working on Census fieldwork;

- Measures to ensure that no CCS staff, whether in headquarters or in the field, know what information was collected during the Census enumeration;
- Separate field management structures for the two operations, with managers allowed to work either on the Census or on the CCS but not on both; and
- In as much as the CCS is mentioned in publicity, presenting it as a check on the Census Offices' procedures rather than as a check on the public in order to minimise the tendency of some people to seek to evade both operations.

2.2 People working both as Census Enumerators and CCS Interviewers

An issue raised at the Steering Committee meeting in February 2000 concerned the use as CCS interviewers of people who had been Census enumerators and the possible effects on the independence of the CCS.

People were allowed to do both jobs in the 1999 Rehearsal, and around half of the CCS Interviewers also worked as Enumerators on the Census Rehearsal. A few Enumerators who had accepted a post as an Interviewer resigned at the end of the Census but this was not a significant problem.

The issue has been re-examined and it has been decided that Enumerators will be allowed to be CCS Interviewers. However the advertising and recruitment processes for the two will be separate.

The reason for this is that to allow people to do only one job would introduce several large risks, namely that:

- We would have difficulty finding enough suitable people to mount both the Census and the CCS and thus weaken both exercises. Although the number of CCS Interviewers required is only 6% of the number of Census Enumerators, the CCS sample areas will be clustered. This is especially important in those difficult areas where we will find it hardest to recruit suitable field staff;
- Since the Census recruitment will precede the CCS recruitment the Census would be likely to cream off all of the better applicants, making it virtually impossible for the CCS to do better than the Census;
- It is felt that working as an Enumerator is a good preparation for tackling a job as an Interviewer for someone who is not a professional interviewer;
- There will be (despite our best efforts at quality control) some variation in individual performance amongst Enumerators and amongst Interviewers. Any tendency for an individual to perform particularly badly, or particularly well, in one area in the Census and in another area in the CCS is unlikely to have any discernible effect on the independence of the returns from the two operations; and
- Some people would probably accept both jobs anyway, which would give the CCS managers a difficult problem in finding replacements at short notice when they discovered this.

There is no evidence to date to suggest that the use of Enumerators as Interviewers has an impact on the independence of the Census and CCS.

2.3 Estimation under dependence

Despite our best efforts in the field the Census and CCS responses may still 'suffer' from dependence. The impact of estimation in the presence of dependence has been examined extensively in researching the estimation methodology for the ONC. Steering Committee paper ONS(ONC(SC))00/16, presented at this meeting, reports the latest work on examining the sensitivity of the estimation procedure to dependence. This work demonstrates that for even quite extreme levels of dependence, the impact is small provided both the Census and CCS have high response rates.

3. MOVERS

The issue of how the Census Coverage Survey will deal with people who move house between Census day and the CCS interview was also raised at the last Steering Committee.

The timing of the CCS fieldwork period is crucial. It cannot start until Census activities are complete but must not be left too long or a substantial number of people will have moved or will have forgotten who was present on Census day.

Based on results from Rehearsal, previous tests and practical considerations it is planned that the CCS will begin three and a half weeks after Census day and will last three and half weeks. That is, with Census day on 29th April 2001, CCS field work will extend from 24th May until 17th June.

The aim of the CCS is to identify all households and all people within households for the sampled postcodes.

Information is collected about the individuals and households by means of a short interview conducted on the doorstep. The questions refer back to Census day and are a subset of the Census questions.

There are check for movers at the household and individual level:

1. **A check on whether the whole household has moved in since Census day.** If so the interviewee is asked the CCS Household questions (type of accommodation, tenure etc) and for any proxy information they may be able to provide about the people who did live there on Census day.
2. **A check on whether any of the individual members of the household has moved in since Census day.** The interviewer should only include individuals on the form if they are sure they satisfy the residency conditions and were present on Census day. The exact wording and structure of this is currently being finalised by the CCS Strategy Group (a group comprising representatives of CCS, ONC, ONS Social Survey and Methods and Quality Divisions).