

THE US ONE NUMBER CENSUS AND A COMPARISON TO THE UK

EXECUTIVE SUMMARY

1. The attached paper is a review of US plans for their next Census in 2000 with particular reference to coverage issues and the One Number Census. A comparison between the US and the UK approaches is also a key purpose of this paper. The paper has seven sections labelled I-VII in the document:

- I Background to the US One Number Census
- II US Census 2000 Plans
- III Improving coverage in the US
- IV Coverage evaluation in the US (PES, demographic analyses and use of administrative records)
- V Past experience with coverage adjustment of US Census population counts
- VI A comparison between the US and the UK
- VII Summary

Background to the US One Number Census

2. In 1990, the US Census conducted a mailout/ mailback Census with follow up procedures for non-respondents to the mail Census. This follow up involved over 300,000 Census enumerators. The two strongest criticisms levelled against the 1990 Census were that unit costs increased significantly, continuing a trend that began with the 1970 Census, and that the problem of differential undercount by race persisted despite a large investment program that was intended to improve coverage. The 1990 US Census undercounted by around 1.6% overall. There was differential undercounting of Blacks (4.4%), Hispanics (5%) and Asian and Pacific islanders (2.3%). These criticisms have fuelled the need for change and led to the US plans for a One Number Census approach.

US Census 2000 Plans

3. The US One Number Census is part of a larger plan for Census 2000. Their stated key objectives of Census 2000 are to:

- make every effort to count every household using multiple mail contacts based on a greatly improved address list with simpler, user-friendly forms and better field operations

- implement an open process that diverse groups can understand and support
- eliminate the differential undercount of racial and ethnic groups
- produce a one number census that is right first time.

They have four strategies to achieve these aims, which are:

- to build partnerships at every stage (e.g. establish Customer Liaison Offices in regions, enlist help compiling and validating address lists, involve the private sector in those operational and processing activities in which the Census Bureau do not have particular expertise such as Optical Character Recognition).
- to keep it simple (e.g. well designed user friendly census questionnaires, multiple contacts and ways to respond, counting the homeless)
- to use technology wisely (e.g. by scanning Census questionnaires, in checking for duplicate enumerations and in the production of Census outputs)
- to use statistical methods (e.g. sampling for non-response, carrying out a post enumeration survey).

These strategies underly their planning and testing for all aspects of the Census in 2000.

4. The 'one number census' means the production of just one set of official Census results to include all people and housing units estimated to have been missed in the Census through the quality check procedure. In the past the Bureau has produced two population counts:

- the number of people actually counted
- the estimated number of people living in the country after adjustment for net undercoverage.

To eliminate confusion and controversy caused by having more than one count representing the same population, Census 2000 will be a 'one number census'.

5. The US approach to enumerating all residents will be mailout based on a high quality Master Address File with follow up of nonrespondents until a 90% response rate is achieved in the Census tract. Then a 10% sample of the final nonresponders will be followed up to provide a solid base for estimating the number and characteristics of the remaining nonresponders. Thereby all households will be accounted for in the enumeration exercise within the time available and at a reduced cost. There will be a large post enumeration survey (PES) to carry out quality check interviews and provide the information needed to account for people missed or counted more than once, including those estimated by the nonresponse follow up. It is hoped that savings in cost by sampling the most difficult to enumerate will allow resources to be diverted into this post enumeration survey.

6. The PES is the main part of the Integrated Coverage Measurement (ICM) programme. Administrative records will also be used to help improve completeness and the timeliness of the operation. Demographic analyses will be used to evaluate coverage adjusted Census counts.

Key Differences between the US and the UK

7. The main difference between the US and the UK is that in the US the Census counts are used to apportion the seats in the House of Representatives. This use of the Census is probably the reason for the litigation that occurred in the States after 1990. This use has no parallel in the UK although it is by no means certain that the other key use of the Census data, resource allocation, would not be enough of an issue to cause controversy, and even litigation, in either the US or the UK.

8. The US Bureau of the Census are planning to use sampling in their Census data collection operation. Apart from the practical difficulties this will present (e.g. in identifying when 90% enumeration has been achieved in a Census tract) they are also being challenged on the legality of the use of sampling. Their defence is:

- they are using a number of strategies to make every effort to count all residents of the US and will only use sampling for the hardest to enumerate
- the sampling method proposed is objective and scientifically defensible
- the alternative is to return to methods used previously which are costly (labour intensive and time consuming) and have been shown not to yield adequate results in the past
- the Department of Justice and a number of Federal Courts have clearly held that the Census Act permits the use of sampling.

9. The US propose to use multi-modes responses (by telephone, via the Internet or by completion of a Be Counted Form). Although some use of the telephone may be considered for the UK in 2001 it is unlikely that forms would be left in public places for individuals to complete. This could lead to overcounting and the US Bureau will need accurate and efficient methods for detecting duplicate enumerations in their next Census.

10. The US PES is a two sample survey to estimate overcoverage separately from undercoverage (and hence net undercoverage by combining the two). There is no separate survey to estimate overcoverage of people within households in the UK, although an assessment of possible double counting of addresses was done in the 1991 Census Validation Survey.

11. The method of construction of a high quality Master Address File in the US is different to our approach in that local contacts and companies are invited to validate the

lists and submit their own addresses. Census enumerators also validate the lists in the US as they do in the UK.

12. In the US the principal demographic analysis is a cohort analysis rather than the rolled forward analyses that have been carried out in the UK. The proposed use of administrative registers is different to that proposed in the UK as the US Bureau are not reporting any plans to use these in capture/recapture analyses. Instead the proposed use of administrative records in the US is to validate address lists and to impute information for nonrespondents.

13. The nature of the differential undercount has some similarities between the US and the UK but the US differential undercount of racial and ethnic populations is probably a reflection of differences between the two countries in the size and character of the ethnic population sub-groups.

14. Despite the differences between the US and the UK there are also similarities e.g. in tackling undercoverage in the Census at a reasonable cost and in a way that allows for the production of timely outputs. An exchange visit of US officials to the UK Census Division is planned for later this year.

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I Background to the US One Number Census

1. Historically, the US Census Bureau has recruited a large fieldforce for a labour intensive decennial Census which attempts to enumerate all US residents. Basic demographic and housing information are collected from all with most households receiving a short form Census questionnaire. Additional information is collected from a sample of households who receive a long form Census questionnaire. In 1990, the US Census conducted a mailout/ mailback Census with, in general, one in six people receiving the long form version of the questionnaire. There were follow up procedures for non-respondents to the mail Census. This follow up involved over 300,000 Census enumerators.

2. The two strongest criticisms levelled against the 1990 Census were that unit costs increased significantly, continuing a trend that began with the 1970 Census, and that the problem of differential undercount by race persisted despite a large investment program that was intended to improve coverage. The 1990 US Census undercounted by around 1.6% overall. There was differential undercounting of Blacks (4.4%), Hispanics (5%) and Asian and Pacific islanders (2.3%). These criticisms have fuelled the need for change and led to the US plans for a One Number Census approach.

II US Census 2000 Plans

3. The US One Number Census is part of a larger plan for Census 2000. Their stated key objectives of Census 2000 are to:

- make every effort to count every household using multiple mail contacts based on a greatly improved address list with simpler, user-friendly forms and better field operations
- implement an open process that diverse groups can understand and support

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- produce a one number census that is right first time.

They have four strategies to achieve these aims, which are:

- to build partnerships at every stage (e.g. establish Customer Liaison Offices in regions, enlist help compiling and validating address lists, involve the private sector in those operational and processing activities in which the Census Bureau do not have particular expertise such as Optical Character Recognition).
- to keep it simple (e.g. well designed user friendly census questionnaires, multiple contacts and ways to respond, counting the homeless)
- to use technology wisely (e.g. by scanning Census questionnaires, in checking for duplicate enumerations and in the production of Census outputs)
- to use statistical methods (e.g. sampling for non-response, carrying out a post enumeration survey).

These strategies underly their planning and testing for all aspects of the Census in 2000.

4. Sampling procedures along with improved quality checks are expected to provide a 'one number census' in which all counts are adjusted for coverage. It is hoped that savings in cost by sampling the most difficult to enumerate will allow resources to be diverted into the post enumeration survey.

5. The 'one number census' means the production of just one set of official Census results to include all people and housing units estimated to have been missed in the Census through the quality check procedure. In the past the Bureau has produced two population counts:

- the number of people actually counted
- the estimated number of people living in the country after adjustment for net undercoverage.

To eliminate confusion and controversy caused by having more than one count representing the same population, Census 2000 will be a 'one number census'.

6. Under the one number census, coverage is measured through implementation of an Integrated Coverage Measurement (ICM) program. This is a large post enumeration survey (PES) aimed at estimating the number of people and housing units missed or counted more than once. The survey will use technology, both by employing Computer Assisted Personal Interviewing (CAPI) and through the use of global positioning system technology. Administrative records will also be used to help improve completeness and the timeliness of the operation. Demographic analyses will be used to evaluate coverage adjusted Census counts.

III Improving Coverage in the US Census

7. The US Census 2000 Plan starts with activities aimed at improving coverage in the initial Census mail out/mail back enumeration. The object of these initiatives is to achieve as high a response as possible to the mail Census so that the need for follow up procedures is reduced and the final level of non-response, for which it is intended that sampling estimation procedures will be used, are kept to a minimum. Conducting a census with classic labour intensive procedures is becoming unrealistically expensive. A more affordable census is one that includes sampling to reduce the costs of enumerator follow-up. Non-respondents to the initial mailout will be followed up until a 90% response rate is achieved (the assessment of the 90% is based on the initial address list). Once this level is reached then a 10% sample of non-respondents will be followed up and used to estimate the characteristics of the remaining non-responders. The follow up of a sample of nonrespondents will require accurate identification when 90% enumeration has been achieved in a Census tract and a list of nonresponding addresses from which to select the sample.

8. The main coverage improvement strategies are:

- provision of a complete address listing
- publicity to promote awareness
- use of a multiple contact strategy at households - i.e. delivery of a notice letter, Census questionnaire, reminder and replacement questionnaire.
- allowing the public to have more than one mode for response
- use of a simplified Census questionnaire to encourage response.

These together with the sampling for non-response follow-up are discussed in more detail.

Address Listings

9. The next US Census will be a mailout operation, the compilation of an accurate address list is the first crucial task in terms of ensuring high coverage. The address list will be compiled from US Postal Service listings, commercially available listings, and Census Bureau listings, including results of previous coverage checks. In addition the help of 'state, local and tribal partners' will be enlisted to ensure as complete a frame as possible is created (designated representatives will be authorised to review and validate the list). Prior to the 1995 Test there was a recommendation that the Census Bureau should continue aggressive development of the TIGER(topologically integrated geographic encoding and referencing) system, the Master Address File (MAF), and integration of these two systems. The Census Bureau's plan is to create a permanent national address list that will be continually maintained for use by a variety of Census Bureau programs as well as the decennial Census.

10. Although correct for the majority of addresses, the address lists for the 1995 Census Test sites were not completely up to date. Some addresses needed to be added and some deleted, overall more addresses were deleted but this may be a reflection of the fact that the Test sites were low growth areas. Under the Census 2000 strategy, amendments to the address lists may come from local and tribal partnerships, the US Postal Service as well as Census enumerators. The Bureau report that further research is needed in the updating of address lists to determine whether there is any scope for targeting updating operations and to improve communications with local and tribal partners.

11. An additional task related to the address list is the checking of the classification of the vacancy status of addresses. In the 1995 Test this was done by US Postal Service workers. Census enumerators' vacancy classifications in the nonresponse follow-up were compared to the postmasters returns on the vacancy status of these addresses. This indicated that the US Postal Service did not classify vacant addresses reliably, some identified as vacant were occupied and some vacants were not identified.

Publicity

12. The purpose of the publicity campaign is to promote awareness that the Census is imminent and of the uses that are made of Census data, particularly where these are of benefit to communities. An aim is to target at risk of underenumeration groups. Private sector consultants will help design and implement the advertising campaign. In addition the Bureau are recommending that the month of March in Census year is made national 'Be Counted Month'. For 4 weeks after Census Day, Census forms will be easily accessible in public places; available in 32 languages as well as English and Spanish and some neighbourhoods will be targeted to receive Spanish forms. This should make it easier to be counted and will help to enumerate those with no usual address, those who did not receive a questionnaire in the mail and those who believe they were excluded from their household form. It is also hoped that Be Counted Month will help eliminate confusion about whether it's too late to respond, although it is recognised that care will need to be taken to avoid causing confusion over the reference date at which residency status is determined when completing the Census form. Be Counted Forms were used in the 1995 Census Test and the results are summarised in paragraph 14.

Multiple Contact Strategies

13. A notice letter prepares people for the Census questionnaire and also may prompt people to ask for a form if they do not get one delivered by Census Day. Reminder postcards and replacement questionnaires are also aimed at increasing response to the mailout/mailback phase of the Census.

Multi-mode responses

14. This involves giving people other ways to complete a form, e.g. by phoning a freephone number, by logging into an Internet address, by completing 'Be Counted Forms' (BCF) referred to at paragraph 12. In the Census Test, duplicate enumerations were removed and a sample of persons enumerated on BCFs were followed up. The reporting of the results claims that there were not too many duplicate enumerations and most people completing a BCF form were genuine Census residents who had not been delivered a questionnaire or who believed they were not included on a questionnaire. The conclusion of this study was that there was evidence that these forms increased response to the Test.

15. It is important that people understand the population bases. The US Census Bureau has conducted the Census on the basis of de jure rather than de facto residence i.e. people are essentially asked "What was your usual residence on Census Day?" rather than "Where did you actually stay on Census Day?" The consistent application, and explanation, of the residence rule throughout all stages of the Census operation, and the correct understanding of it by enumerators and the public, is essential to reducing the differential undercount - particularly for those who are more difficult to enumerate than others, such as those with no usual residence or with more than one residence.

Simplified Census questionnaires

16. The Census 2000 strategy is to use a simple, easy to complete questionnaire to collect basic data from all and a long form questionnaire to collect additional data items for a sample. The Census Tests have used questionnaires with housing items, person items and household rosters. The household roster is a listing grid of those resident on Census Day and its inclusion on the form is expected to improve coverage of persons within households. In the US Census Tests, short forms without a roster did no worse than short forms with a roster in terms of coverage and in 2000 there will be no household roster on the Census short form. Instead there will be a question to ask how many residents live at the address on Census Day. The household roster will be included on the Census long form.

17. Alternative orderings for the three sections of the long form were tested. It was found that when the household roster and the person items were separated by the housing items the flow was illogical but that when the household roster and person items were consecutive and the housing items came last, the housing items were often missed. An ordering which put the housing items first, followed by the household roster and then by the person items gave a logical flow but was judged to be an ill designed form because the housing items are not user friendly enough to be the first questions a respondent has to answer. The best ordering for the Census long form questionnaire was deemed to be the housing roster first, followed by the person items for person 1 together with the housing items and then the person items repeated for persons 2 through to 5.

Non-Response Follow-up

18. The sampling for the nonresponse follow up should not be confused with the sampling for the post enumeration survey. The purpose of the nonresponse follow up is to achieve a solid base of responses which will allow for the estimation of the number of people and their characteristics in the remaining non-responding households. Thereby, all households will be accounted for in the enumeration exercise within the time available and at a reduced cost. The nonresponse follow-up will account for all households but not all people because some households will not report everyone living there. The post enumeration survey quality check interviews will provide the information needed to account for every person missed or counted more than once, including those estimated by the nonresponse follow-up sample. Finishing the nonresponse follow-up on schedule will allow for the post enumeration survey interviews to be conducted in a timely fashion.

19. The strategies employed to ensure all residents are enumerated may actually lead to overenumeration (e.g. use of aggressive publicity stressing the benefits of being counted, multiple modes for making a response and the use of Be Counted Forms which are to be made available in public places). The US Bureau of the Census will need accurate and efficient methods for removing duplicate enumerations.

IV Coverage Evaluation in the US

A: Post Enumeration Survey (PES)

20. In the US, the post-enumeration survey (PES) is the primary source of coverage measurement. The first PES was carried out in 1950. The 1990 PES sampled about 166,000 dwellings (about 400,000 persons). Of this total 22,000 were vacant, 144,000 were identified as occupied and 142,000 were interviewed. There are two samples in the PES:

- P sample - a sample of the US Census target population
- E sample - a sample of Census enumerations off the Census database.

The P sample constitutes an independent reenumeration of the Census population for selected areas in order to provide an estimate of gross undercoverage. The P sample in 1990 was independent in the sense that permanent Census Bureau staff listed all housing units and group quarters (communal establishments) in the sampled blocks before Census day and, although the interviewing was carried out by people who had worked on the Census, these employees were not allowed to work in areas they had previously enumerated. The E sample provides an estimate of overcoverage. In 1990 the P and E sample estimates of under and overcoverage were combined to give a Dual System Estimate (DSE) of net undercoverage.

21. The US Bureau have reviewed sources of error in the PES (Ref. 4) which will still be the major coverage evaluation tool in 2000. Many of the components of error would be sources of error in the UK CCS as well. The components of error in summary include:

- correlation bias between Census and PES, that those missed by the Census are also likely to be missed by the PES and this will be measured by comparison of the PES estimates of population size to demographic analysis estimates.
- matching errors between the Census and the PES which will affect the reliability of the results of the capture/recapture analysis
- failure to identify those born after Census Day and those who died before Census Day, in the sample to estimate overcoverage.
- interview failures in the PES, including proxy interviews which are those not with the original form-filler
- sampling errors in the PES
- non-sampling errors in the PES.

22. After the 1990 Census the coverage adjustments recommended by the US Census Bureau were criticised on the grounds that there was heterogeneity within post strata across geographical areas. The post strata were formed by region, race, area type, housing tenure, age and sex. There were 1392 post strata in total. Capture/recapture analyses were carried out for each post strata, linking the P and E samples so as to estimate the number of people missed by both the Census and the PES. Hence coverage adjustments were estimated for each post strata. It was assumed that the estimated adjustments would apply equally in other geographical areas not covered by the PES, which had similar characteristics to those in the post strata. This was the assumption of constant undercount which was challenged by the assertion that there would be heterogeneity between geographical areas. This issue is being addressed by the US Census Bureau in the design of the Census 2000 PES. Work is in hand to determine the characteristics of hard to enumerate areas and so to help identify what levels of post stratification will be required in order to ensure that the assumption of constant undercount (by post strata and across geographical areas) is met.

23. The plan for Census 2000 is that there will be a large post enumeration survey of 750,000 households for the Integrated Coverage Measurement (ICM) operation. US Census Tests have investigated the ICM to compare CensusPlus to Dual System Estimation. The difference between these two approaches is explained in the US literature as follows:

- The CensusPlus approach is based on the assumption that 100% coverage will be achieved in the follow up study in sampled areas. The estimate of undercoverage is then obtained directly as a ratio of coverage in the follow up survey to coverage in the Census.
- The Dual System Estimation (DSE) approach is based on the assumption that the follow up survey provides an independent estimate of the population in an area and this does not necessarily have to be 100% coverage. This is combined

with the Census using a capture/recapture analysis to estimate the number missed by both the Census and the survey and hence the total population.

24. The criteria for the comparison of CensusPlus and DSE were:

- which method estimated the most people missed
- which method added people in the groups where there was a differential undercount in 1990.

It is also essential that the chosen method could be demonstrated to deliver results on time, that means producing state and national estimates by 31 December in Census year. In the 1995 Test, the timing of the production of estimates was acceptable by either method. CensusPlus estimates were produced faster (by August 17 as opposed to October 5 for DSE) but in other ways CensusPlus did not perform well. This is thought to be because the resolved roster, arrived at in the PES interviews, was not reliable. DSE passed the face validity checks by producing estimates within sampling errors of the postcensal estimates (these postcensal estimates are the 1990 PES estimates) for two of the Census Test sites - Paterson and Northwest Louisiana. However, DSE in a third Test site, Oakland, was significantly lower than postcensal estimates and this was thought to have been caused by a large non-interview rate. The results of the comparison of CensusPlus and the DSE are given in detail in references 2 and 12. In the evaluation of the 1995 Test, it was thought that there may have been operational factors affecting the validity of CensusPlus and further tests were planned. No improvement has been reported and it is expected that DSE will be used to provide coverage adjustment estimates for Census 2000.

B: Demographic Analyses

25. Demographic analyses were pioneered in the States by Coale in the 1950s. The early efforts suffered from the quality of vital statistics and registration data. The completeness of birth registration data is not known for years prior to 1940. Studies have indicated underregistration of the order of 7-8% of all births for 1940 and of 2-3% for 1950. By 1990 the demographic estimates were based on the national demographic accounting equation:

$$\text{Births} - \text{Deaths} + \text{Legal immigration} - \text{emigration} + \text{Armed Forces Overseas} + \text{Estimated undocumented immigration} + (\text{Medicare data for } 65+ \text{ with an allowance for the estimated unenrolled})$$

This gives estimates by age, sex and race at the National Level. The US have also explored the use of sex-ratio analyses.

26. Das Gupta at the US Bureau of the Census has developed an 'uncertainty model' of demographic analyses. J Gregory Robinson describes this as providing a statistically based measure of uncertainty. Interval estimates which are analogous to confidence intervals, but which also take into account the subjective assessments of Bureau experts, are attached to the demographic estimates.

27. The issue about demographic analyses which the Bureau are considering is whether, for 2000, these should be used as a coverage evaluation tool or should they be brought into the integrated coverage measurement program as an integral part of the one-number census. The pros and cons are:

Weaknesses of method: lack of geographical detail
 limited race/ethnic detail
 inconsistency in the race classification over time
 uncertainty in estimates

Strengths: low cost of producing estimates
 operational feasibility
 timeliness
 independence
 internal consistency in estimates which provides a
 historical benchmark for comparing demographic
 analyses over time.

C: Use of Administrative Records

28. It is planned that administrative records will be used to:

- improve the Census address list
- give indirect information about non-respondents to the mail Census so that less of the more costly telephone and personal call follow-up is required

as well as to

- improve coverage measurement.

29. For the 1995 test an administrative records database was formed and the more successful sources were the Drivers' License and the Voter Registration Files. For the successful use of administrative records in the Census in 2000, the issues that need to be addressed are:

- what is the quality of the records
- can the records be used to validate the census address list
- can the records be used to supplement census results in respect of non-responders
- can individual records be successfully matched to census database records as part of the census coverage measurement methodologies (should they be matched to census addresses instead).

V Past Experience with Coverage Adjustment of US Census Population Counts

30. The US Constitution requires that a census be conducted every ten years in order to apportion the House of Representatives. Apportionment is the primary use of the Census although there are other uses including resource allocation and planning purposes. The adjustment of Census counts is politically sensitive and the production of coverage adjustment estimates is subject to much attention. It was against this background that the Census Bureau parent department, the Department of Commerce, decided against adjustment of 1990 Census counts even though the Census Bureau recommended coverage adjustment should be applied. Following on from that decision, in 1992, the Director of the Census Bureau decided not to adjust the postcensal population estimates.

31. The coverage adjustment estimates were subject to close scrutiny and were the subject of various lawsuits filed by states to whom adjustment would be favourable. After years of litigation, a lower court (the Second Circuit Court of Appeals) overturned the Department of Commerce decision and ordered the Census counts to be adjusted. This led to other states filing a petition to the Supreme Court to overturn the lower court's ruling. The accuracy of the Census counts was not the issue in the case before the Supreme Court. The issue was to determine the proper standard of legal review the courts should adopt in cases involving the Census. The Supreme Court found that the Secretary of the Department of Commerce adjustment decision "need bear only a reasonable relationship to the accomplishment of an actual enumeration of the population" and upheld the original decision not to adjust.

32. Some adjusted counts are in use in the US however. In January 1994, the Bureau of Labour Statistics decided to implement adjustment. For the first time in the US, an official set of population estimates (the national and state controls for the Current Population Survey) were available after adjustment for net undercoverage.

VI Key differences between the US and UK One Number Census Projects

33. There are differences in approach between the US and the UK but there are also underlying similarities in the planning for the next decennial Census. Undercoverage is a key issue for both countries and the advantage of a One Number Census in producing Census counts adjusted for undercoverage which are right first time is that there would be less confusion for users. A crucial difference between the US and the UK however, is the need to avoid the judicial review that occurred after the 1990 Census in the US. This need is a driving force behind the US Census 2000 Plan including the One Number Census. The use of the Census to apportion seats in the US House of Representatives is probably the reason for the litigation that occurred in the States after 1990. This use has no parallel in the UK although it is by no means certain that the other key use of the Census data, resource allocation, would not be enough of an issue to cause controversy, and even litigation, in either the US or the UK.

34. The key differences between the US and the UK are:

- the US Census counts are used to apportion the seats in the House of Representatives,
- the US use mailout and mailback to deliver and collect census questionnaires in all areas for which they have a well developed address list, that is apart from (some) rural areas and to communal establishments,
- the US are providing multi-modes for response e.g. Census questionnaires (Be Counted Forms) in public places, allowing for a response via the Internet or by completing a telephone interview,
- The US are using sampling in the data collection exercise so, in this sense, they are not aiming for 100% enumeration although their claim is that by mailing a Census questionnaire to every household in the land they have officially attempted to enumerate the whole population,
- the US take a specific sample in the post enumeration survey (the E sample) to estimate overcoverage,
- the intended use of administrative records in the US is to validate address lists and to supplement the Census enumerations of non-responders to the mail survey rather than to use these as further sources to be used in the capture/recapture analyses.
- the nature of the differential undercount which is analysed in the US primarily by racial and ethnic groups rather than by age and sex as in the UK. Undercounting in areas with high multioccupancy is common to both countries.

35. The US are committed to enumerating the whole population which is achieved by an extensive mailout/mailback operation based on high quality address lists. Nonrespondents are followed up but once a 90% response level is achieved in a Census tract, further follow up is carried out only for a 10% sample. The Bureau of the Census are being challenged on the legality of this use of sampling in the enumeration exercise. Their defence is that:

- they are using a number of strategies to make every effort to count all residents of the US and will only use sampling for the hardest to enumerate
- the sampling method proposed is objective and scientifically defensible
- the alternative is to return to methods used previously which are costly (labour intensive and time consuming) and have been shown not to yield adequate results in the past
- the Department of Justice and a number of Federal Courts have clearly held that the Census Act (13 U.S.C. S141,195) permits the use of sampling.

36. During May, a vote is due to be taken on a bill which includes a provision which, if passed, would prohibit the use of sampling in the Census. This is aimed at the use of sampling in the enumeration exercise and is not meant to affect the use of a long form Census questionnaire. The Census Bureau are being asked to demonstrate that their proposed use of sampling is “scientifically acceptable” and that it would not be subject to political manipulation. An interim decision has allowed the Census Bureau to continue with their plans to use sampling in the 2000 Census for now. The Census Bureau have stressed that they do not believe it is possible to improve the differential undercount in 2000 without the use of sampling and that they have invested in their Census 2000 planning on the basis that there would be sampling of the most difficult to enumerate households. The litigation debate continues.

37. Other differences between the US and the UK are:

- the US have a Master Address File which is an address listing compiled from a number of sources and validated by those with local knowledge,
- the US have used their Postal Service workers to classify addresses as vacant or nonvacant, although tests have shown that the results using the postal workers are not reliable and census enumerators may be used in the future,
- the US have a short and a long form Census questionnaire which means that they have sampling in their Census even without the sampling for non-response. However, this relates to data items rather than households and so is not directly linked to coverage unless the length of the form affects the probability of nonresponse differentially.

38. The US have produced a one page summary of their One Number Census approach entitled 21 steps to a One Number Census. This is attached as Annex A. A similar product in draft for the UK, 17 steps to a One Number Census, is attached as Annex B. Comparison of these gives a high level view of the differences between the US and the UK although some of the procedures in the UK, such as for publicity, have not yet been fully considered for 2001. It seems unlikely that measures such as multiple response modes and the use of Be Counted Forms would be adopted in the UK and the use of sampling in the enumeration exercise is not being contemplated in the UK.

VII Summary

39. The US Bureau of the Census are facing similar challenges to the UK of tackling undercoverage in the Census at a reasonable cost and in a way that allows for timely outputs. Costs are a major issue in the US as unit costs increased significantly in the 1990 Census and, despite this, differential undercounting of Blacks, Hispanics and Asian and Pacific Islanders persisted. This has led to the US Census 2000 Plan which includes the objective to produce a ‘One Number Census which is right first time’.

40. The key difference between the US and the UK is that the population totals for each state and the nation have to be issued by December 31, 2000 for the apportionment of seats in the House of Representatives. There is no parallel use of the Census in the UK and, as discussed above, this is the reason why after the 1990 Census, the US

Bureau of the Census faced judicial review over the coverage adjustment of the US Census counts.

41. Despite the differences between the US and the UK there are also similarities and an exchange visit of US officials to the UK Census Division is planned for later this year.

Roma Chappell
May 1997

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ANNEX A

21 STEPS TO A ONE-NUMBER CENSUS IN THE US

1. Create the best possible address list-with the help of the U.S.Postal services and State, and tribal partners.
2. Create a “responsive” environment-use advertising, outreach, and promotion to ensure that everyone knows the census is coming and how it will benefit their community.
3. Use a questionnaire delivery strategy that contacts every address multiple times (notice letter, questionnaire, reminder postcard, and replacement questionnaire).
4. Make other response opportunities widely available (leave blank forms for people to pick up, set up toll-free telephone numbers and an Internet address, and provide forms in many languages.
5. Check responses against the address list.
6. Use new technology to convert responses from paper forms to computer files.
7. Remove duplicate responses.
8. Determine the list of nonresponding addresses.
9. Use the telephone to call as many nonresponding addresses as possible.
10. Make personal visits to remaining nonresponding addresses until reaching 90 percent completion by census tract.
11. Develop estimates for last 10 percent of nonresponding households.
12. Check all responses.
13. Fill in missing answers based on responses already received.
14. Select the sample of households for the quality check.
15. Load census responses for “quality check” sample addresses into laptop computers.
16. Conduct intensive interviews at quality check households.
17. Match quality check responses with census responses to determine differences.
18. Reconcile differences.
19. Bring together mail responses, telephone responses, field interviews, nonrespondent estimates, and quality check results to compute the one-number census total for each state and the Nation before issuing apportionment totals by December 31, 2000.
20. Develop totals for all population groups and all geographical levels before issuing redistricting totals by April 1, 2001.
21. Develop data files for users to do their own tabulations.

ANNEX B

FIRST DRAFT

28.2.97

SEVENTEEN STEPS TO A ONE NUMBER CENSUS IN THE UK

1. Prepare external validation sources (administrative records, demographic analyses)
2. Prepare pre-printed address lists for each enumeration district
3. Have coverage improvement measures in place for the enumeration exercise
e.g. modularised training programmes for enumerators particularly those in hard to enumerate areas; local area liaison officers; provision of interpreters;
4. Invoke publicity campaign to promote awareness of the purpose and value of the Census
5. Check address lists against actual situation in areas, deliver advance round information, deliver Census questionnaires.
6. Draw the sample for the Census Coverage Survey (CCS).
7. Collect forms through a combination of mail back and conventional collection, thereby allowing for effective allocation of resources to where they are most needed.
8. Target of enumeration exercise is 100% but there will be absent households, non-contacts for which no form is returned, and vacant properties all of which are potential non-respondents. Keep a record of these.
9. Carry out CCS
10. Edit and imputation programme for absent households and item non-response
11. Capture/Recapture analyses on Census, CCS and administrative source(s) to sub-national level.
12. Statistical modelling and estimation to Ward level, if necessary
13. Imputation of missing people into households and missing households.
14. Agree National counts from Census post edit, CCS and pre-prepared demographic analyses and evidence from administrative records (Spring 2002)
15. Produce population estimates (National level and LA District level) by August 2002
16. Produce One Number Census microdatabase by end 2002.
17. Tabulations and user guidance.