ONS(ONC(SC))00/18

ONE NUMBER CENSUS STEERING COMMITTEE

Taking Forward the ONC Quality Assurance and Contingency Strategy

1. This paper outlines the work that has been conducted to date on taking forward the QA and Contingency strategy for the One Number Census, and gives proposals for how the strategy should be implemented for 2001.

2. Although the paper mainly focuses on England & Wales, discussions are ongoing with GROS and NISRA to ensure that all three Census Offices use similar QA and Contingency procedures.

3. The Steering Committee are asked to:

a) note the paper;

b) comment on the proposals made for taking forward the QA and Contingency strategy; and

c) comment on what consultation activities should follow.

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TAKING FORWARD THE ONE NUMBER CENSUS QUALITY ASSURANCE AND CONTINGENCY STRATEGY

1. INTRODUCTION

The One Number Census (ONC) Quality Assurance and Contingency Strategy was agreed at the last meeting of the ONC Steering Committee in February 2000. The key points of this strategy are:

- ONC population estimates should be quality assured to ensure they are plausible for all areas of the country. This quality assurance process will involve demographic analyses and include broad comparisons with both demographic estimates and administrative sources;

- ONC estimates for each Design Group (and its constituent local authorities) will systematically be quality assured as they are produced. Once estimates for all Design Groups/local authorities have been generated and quality assured, the resulting national ONC population estimate will also be subject to quality assurance; and

- If the quality assurance procedures should clearly indicate that it is necessary to adjust one or more ONC estimates at either a sub-national or national level, a Contingency Strategy will be invoked involving either borrowing strength (at a sub-national level) or using empirical Bayes estimation based upon ancillary demographic information (at a national level).

For further details of the agreed strategy see ONS(ONC(SC))00/04.

The purpose of this paper is to propose how the ONC Quality Assurance and Contingency Strategy should be implemented for 2001. It begins with an overview of how it is proposed the strategy should be implemented (section 2), and then goes on to address each of the following issues in greater detail:

- The choice of comparators to quality assure the ONC estimates. (QA Comparators - Section 3)

- The choice of comparisons and demographic analyses to be conducted, and the circumstances in which a decision would be made to adjust an ONC estimate. (QA Analyses and Assessment - Section 4)

- The strategies to adjust an ONC estimate. (Contingency Strategy - Section 5)

Although the paper focuses on England and Wales, discussions are ongoing between all three Census Offices to ensure that QA and contingency procedures for 2001 are similar across the UK. It should be noted that there will also be ongoing liaison with the Data Quality project as the QA processes are developed.

2. OVERVIEW OF QUALITY ASSURANCE AND CONTINGENCY PROCEDURES

2.1 Sub-national Quality Assurance & Contingency Procedures

2.11 Quantitative Quality Assurance

It is proposed that ONC estimates for each individual Design Group (and its constituent local authorities) be compared against a range of comparators, including both demographic estimates (i.e. rolled-forward mid-year population estimates - MYEs) and data derived from administrative

sources (health registers, benefit registers, etc.) This portfolio of different comparators will vary by age group (for example, Child Benefit data can only be used as a comparator for those aged under 16), but for all age groups the different comparators will be used to indicate a plausibility range for the ONC estimate.

The portfolio of comparators for each age group within each Design Group/local authority would be input into an automated quality assurance program prior to ONC estimation. Using the range of comparators, the program would calculate plausibility ranges within which one would reasonably expect the ONC estimates to lie, as well as a variety of demographic analyses such as sex, age and dependency ratios together with their associated plausibility ranges. The ONC estimates would then be fed into this quality assurance program as they were generated and a series of pre-determined comparisons conducted. If the ONC estimates for a Design Group/local authority fell within the plausibility ranges on all comparisons, these would automatically be accepted. However, if one or more of the ONC estimates should fall outside the plausibility ranges on any comparison, they would be subject to further qualitative quality assurance procedures as described below.

2.12 Qualitative Quality Assurance

This second stage of quality assurance would involve a systematic assessment of the output from the first stage QA (graphs, tables, etc) and the ONC estimation system itself (error bounds, model parameters, etc.). Other information would also be examined such as field reports and feedback that the Population Estimates Unit has received from local authorities on their demographic estimates. If this assessment of all the available evidence indicates that the ONC estimates for the Design Group/local authority are indeed plausible (despite one or more estimates falling outside the pre-determined plausibility bounds), they would be accepted. However, if the evidence indicates that one or more ONC estimates require adjustment, a decision would be made to invoke the Contingency Strategy.

2.13 Contingency Strategy

If a decision is made to adjust the ONC estimates for a particular Design Group or unitary/local authority, information from socio-economically and demographically similar Design Groups or local authorities would be used to model the likely underenumeration in the problem sub-national area and hence make alternative estimates of underenumeration (the *ONS Classification of Local Authorities* being used to define socio-economic and demographic similar areas – see Section 5).

2.2 National Quality Assurance & Contingency Procedures

2.21 Quality Assurance

Once the ONC estimates for every Design Group have been generated, quality assured and adjusted (where necessary), they will be summed to produce the national ONC population estimate. This will be compared against a national demographic estimate for which plausibility bounds have already been estimated (see ONS(ONC(SC))99/05 and ONC(PB)00/06). The national ONC population estimate would be accepted if it fell within the plausibility bounds of the rolled forward estimate. If it did not, however, the sub-national quality assurance results would be re-examined, for example, for systematic patterns of the ONC estimates falling above or below the corresponding demographic estimates. (If the ONC estimates for some or all Design Groups fell within their plausibility ranges but consistently fell below (or above) their corresponding demographic estimates, then it is possible that when summed the resulting national ONC estimate would fall outside the national plausibility range.) There would also be a series of demographic and other sensitivity analyses to assess whether there was a need to make an adjustment at the national level.

2.22 Contingency Strategy

If a decision is made to adjust the national figures then this would be undertaken using empirical Bayes estimation based on expected sex ratios and other demographic ratios together with comparisons, at particular ages, with administrative records whose accuracy is credible for those ages.

3. QUALITY ASSURANCE COMPARATORS

The ONC estimation procedure will output ONC estimates by sex and quinary age group (except for the 0-4 age group which will be split between 0 and 1-4 year olds) for each Design Group and unitary/local authority. For each of the age groups in each Design Group/local authority, there will be a set of comparators as shown in the Table 1 below.

Table 1: Portfolio of Comparators by Age Group for Quality Assurance of ONC Estimates

Age Group	Comparators
0	1. Demographic Estimates (MYEs) 2. Birth registration data adjusted for infant mortality & migration 3. DSS Child Benefit data 4. FHSA data
1 – 4	1. Demographic Estimates (MYEs) 2. DSS Child Benefit data 3. FHSA data
5 – 9 10 – 14	1. Demographic Estimates (MYEs) 2. DSS Child Benefit data 3. FHSA data 4. DfEE Schools Census data
15 – 19 20 – 24 25 – 29 30 – 34 35 – 39 40 – 44 45 – 49 50 – 54 55 – 59 60 – 64	1. Demographic Estimates (MYEs) 2. FHSA data and for working age population sub-groups prone to underenumeration: 3. HESA data (Students) 4. DASA data (HM Armed Forces) 5. DSS Income Support/Family Credit data (Lone parents)?
65 – 69 70 – 74 75 – 79 80 – 84 85 +	1. Demographic Estimates (MYEs) 2. DSS Retirement Pension data 3. FHSA data

3.1 Demographic Estimates (Rolled-forward Mid-Year Population Estimates – MYEs)

Rolled-forward mid-year population estimates (MYEs) are produced every year by the Population Estimates Unit (PEU) of Population & Vital Statistics Division (PVSD) within ONS. The MYEs are produced by age and sex for each unitary/local authority in England & Wales, and these demographic estimates will be used as one of the main comparators for all age groups in the ONC QA procedures both nationally and sub-nationally. However, because the estimates have been rolled-forward from the 1981 Census (using births, deaths, estimates of migration, and estimated underenumeration for the 1991 Census), they are subject to a degree of error. Plausibility bounds have therefore been estimated for the demographic estimates at a national level (see Chappell and Charlton 1999/ 2000), and it is proposed that plausibility at a sub-national level is assessed in two ways: (i) by assuming that for similar types of areas, errors will broadly be constant between 1991 and 2001, and (ii) by using the differences between the demographic estimate and the other administratively-based comparators for a particular age-sex group as an indication of error.

The rolled-forward MYEs for 2001 will not be available to feed into the ONC QA process (due to many of the constituent components that make up the estimates not being available in time) – see rough ONC timetable, Annex A. Alternative demographic estimates will therefore be required for use in ONC quality assurance procedures at both sub-national (Design Group and Unitary/local authority) and national levels:

Sub-national level

ONC estimates for the first England and Wales Design Group should be quality assured around September 2001. PEU have agreed to supply population estimates by age, sex and unitary/local authority to feed into the start of this QA process, and these could be either published 2000 MYEs or 2000 MYEs extrapolated forward to mid-2001 to allow for average annual population change between mid-1991 and mid-2000. Although the latter would be closer in terms of timing to Census Day, the small size of the timing difference once plausibility bounds are considered might mean that it would be more transparent to use published 2000 MYEs as the sub-national demographic comparators.

National level

At a national level, better quality demographic estimates for 2001 should be available from PEU by the end of February 2002, well in time to quality assure ONC estimates for England and Wales as a whole. These estimates, however, will still differ from the final rolled-forward estimates PEU will use in their published comparison of rolled-forward and re-based population estimates for 2001. It might, therefore, be preferable to use the Government Actuary's Department (GAD) 2000-based population projections for 2001 as the provisional national demographic comparators (although confirmation needs to be obtained from GAD that they will indeed be producing 2000-based projections), and then use the final 2001 rolled-forward MYEs when they become available in early July 2002.

3.2 Birth Registration Data

The civil registration system records all new births in the population, and this will therefore be a key source of data when quality assuring ONC estimates for children aged under one year (a group of the population which censuses worldwide seem to undercount to a greater extent). PEU are currently developing a method for adjusting the registration data on births at both national and sub-national levels for infant deaths and migration to produce a high quality comparator for use in the ONC QA procedures.

3.3 DSS Child Benefit Data

The Benefits Agency administer the Child Benefit Claimant Register which holds information on all persons claiming child benefit in the UK ("customers") and the children for whom the benefit is claimed ("non-customers"). As Child Benefit is almost universally taken up for children in the UK, this administrative register is potentially a good source of information on those aged under 16 (the benefit can only be claimed for those children aged 16 and over who remain in full-time 'school-type' education). However, there are problems that need to be overcome and issues that need to be borne in mind if the records are to be aggregated and used as a comparator in ONC quality assurance procedures:

i) Many of the postcodes on the customer records are either missing, contain errors, or are out of date. It is therefore necessary to validate the postcodes against address details using some form of postcoding software before any data is aggregated geographically.

ii) Newborn children can take up to three months to appear on the Child Benefit register, due to delays in claims being made and the information subsequently being added to the register. It is therefore necessary to obtain an additional extract from the register approximately three months after the reference date required (to obtain information on children born on or before the reference date for whom benefit has subsequently been claimed) and to add these records to the extract relating to the reference date.

DSS have recently commissioned work to overcome both i) and ii) for a full 100% extract from the Child Benefit Register relating to August 1999, and current indications are that this work will be repeated for a 100% extract relating to mid 2000.

iii) Approximately 0.5% of children listed on the register are linked to customers with overseas addresses (mainly BFPO addresses). It is not known how many of these children are educated (and therefore resident) in the UK, and how many are resident overseas.

iv) Some customer address information may be out of date due to claimants moving but not informing the Benefits Agency. This is only likely to be a problem for those customers who have their benefits paid directly into a bank account.

Census Division will be liaising with DSS to obtain “clean” child benefit data for both 1999 (for use in developing and assessing prototype QA programs and procedures) and 2000 (for use as a comparator in 2001).

3.4 DSS Retirement Pensions Data

The Benefits Agency administers the Retirement Pension Register which holds information on all persons claiming a state retirement pension in the UK. Almost all persons aged 65 or over are entitled to claim some form of state retirement pension, be it as a recipient of a full contributory pension, a partner of such a recipient, a recipient of a non-contributory pension, or a combination of these options. This administrative register is potentially a good source of information on those aged 65 and over but once again there are problems that need to be overcome and issues that need to be borne in mind if the records are to be aggregated and used as a comparator in ONC quality assurance procedures:

i) In common with the Child Benefit Register, many of the postcodes are either missing, contain errors, or out of date and it is therefore necessary to validate these before any data are aggregated geographically.

ii) To ensure maximum coverage of the population aged 65 and over without duplication, records relating to each of the different types of pension (as well as benefits such as Severe Disability Allowance and Incapacity Benefit) need to be extracted and linked by

National Insurance number.

iii) As well as men aged 65+ and women aged 60+ living in the UK, some expatriates resident overseas are also eligible to claim a state pension.

iv) Again, some address information may be out of date due to pension claimants moving but not informing the Benefits Agency. This is only likely to be a problem for those customers who have their pensions paid directly into a bank account.

DSS plan to commission work over the next few months to overcome both i) and ii) for a full 100% extract from the Retirement Pension Register, and current indications are that this work will be repeated for a 100% extract relating to mid 2000. In the meantime Census Division have already obtained a 100% scan of Retirement Pension recipients in March 1999 aggregated by age group and ward for assessment and system development purposes.

3.5 FHSA Data

Patient registers administered by individual Health Authorities provide the most comprehensive administrative source in terms of coverage of the whole population. Previous work conducted by ONS, however, concluded that data derived from these registers were unsuitable for producing population estimates due to (i) coverage differences with the resident population (certain groups such as Armed Forces personnel are excluded from patient registers), and (ii) list inflation (caused by delays in people who have died or moved out of a health authority being removed from the register, duplicate entries, and people having more than one NHS number). It should be noted that the degree of list inflation is extremely variable geographically. Following on from work by individual Health Authorities to "clean" their registers, Census Division are liaising with both PVSD and the NHS Executive to obtain suitable data to feed into work developing and assessing prototype QA programs and procedures.

3.6 Schools Census Data

The Schools Census is a count of all children attending educational establishments, including schools which are privately funded. In England, information relating to the 1 January is collected from local authorities by DfEE each year, whilst in Wales, Scotland and Northern Ireland this role is carried out by the appropriate devolved Government authority. PEU and Census Division are currently liaising with DfEE to establish how Schools Census data might be used in the quality assurance procedures for 5-14 year olds in 2001, and in particular how the problem of children living in one local authority/Design Group/country and attending a school in another might be overcome.

3.7 Data Sources relating to specific sub-groups

As well as comparators that cover one or more specific age groups within the population, other administrative data sources that relate to specific sub-groups known to be prone to underenumeration are also being considered for use as comparators in the ONC quality assurance procedures. The main sources of data that have been identified are the Higher Education Statistics Authority (HESA – these data on students are currently being assessed by Census Division) and the Defence Analytical Services Agency (DASA – once they have been validated by local authorities, these data on the Armed Forces are judged by PEU to be of acceptable quality to feed into the construction of MYEs). One further possibility might be to use DSS Income Support and Family Credit data as a comparator for lone parents, but this suggestion would need to be explored further with DSS.

It should be noted that quality assurance for specific sub-groups will only be possible once ONC imputation has been completed for a Design Group, and it is therefore proposed that this secondary analysis is conducted as part of the qualitative quality assurance procedures outlined in 2.12 above and described in more detail in 4.14 below.

4. QUALITY ASSURANCE ANALYSES AND ASSESSMENT

4.1 Sub-national QA Analyses

4.11 Plausibility ranges

At sub-national levels, the portfolio of comparators for each age group (as outlined in Section 3 above) will be used to estimate a plausibility range within which it is thought the ONC estimates should fall. It is proposed that these plausibility ranges be calculated by considering the variance of the demographic estimates and the other comparators for each age group. However, the fact that FHSA data are prone to list inflation (the extent of which varies considerably between Health Authorities) will mean that this comparator will in most cases prove to be higher than the corresponding demographic estimate for any given age group, with the size of this difference to some extent being directly related to the quality of the FHSA data.

It is therefore proposed that rather than considering the variability of FHSA data and demographic estimates at an individual local authority level, local authorities be grouped (for example using the ONS classification of local authorities – see Section 5) and a mean percentage difference between the two comparators calculated for each age group within each group of local authorities. In developing the quality assurance programs and procedures for 2001, it will be necessary to assess whether any of the other administratively-based comparators have a general tendency to be greater or less than the corresponding demographic estimates.

4.12 Comparing ONC estimates against a portfolio of comparators

For each Design Group/local authority, the ONC and raw Census estimates for each age group will be automatically compared against the pre-prepared portfolio of comparators and the resulting plausibility range. The results of these comparisons will be presented graphically (see Annex B for an example of comparisons with demographic estimates for a single Design Group) and any ONC estimates that fall outside the plausibility ranges will be automatically flagged for further quality assurance.

4.13 Demographic analyses

In addition to a simple comparison of the ONC estimates with the different comparators and the plausibility range for each age group, demographic analyses examining the plausibility of sex ratios, age ratios and dependency ratios will be conducted (again, see Annex B for an illustrative example). The results of these analyses will again be presented graphically and in tables and any ratios that fall outside the pre-determined plausibility ranges will be automatically flagged for further quality assurance.

4.14 Qualitative quality assurance

If all the ONC estimates for a Design Group/local authority fall within the plausibility ranges for the comparisons and demographic analyses outlined above, the estimates will be accepted and the quality assurance will move on to the next Design Group/local authority. However, if one or more ONC estimates falls outside the plausibility ranges, a comprehensive assessment of the following information will be required in order to assess whether the ONC estimates are indeed acceptable or whether it is recommended that further adjustment of one or more estimates is required:

- Information from the quantative QA procedures described in 4.12 and 4.13 above (graphs, tables of differences, extent to which plausibility ranges are exceeded, etc.);

- Information from the ONC estimation procedures (error bounds for the estimates, model parameters, off-diagonal components of the Dual System Estimators, etc.);
- Comparators for specific sub-groups prone to underenumeration (e.g. DASA data on armed forces, HESA data on students – see 3.7 above);
- Feedback received by PEU from local authorities on the rolled-forward demographic estimates;
- Information from the field – both Census (Census Management Information System) and CCS (Team Reporting and Communication System – TRACS); and
- Details of the adjustments made to the 1991 Census estimates.

4.15 Quality assurance schedule

The quality assurance of ONC estimates for each age-sex group will progress sequentially through the Design Groups and their constituent local authorities as follows:

1. If the ONC estimates for Design Group A are plausible, then consider the constituent local authorities (a_1 to a_X):
   - 1.1. if the ONC estimates for local authorities (a_1 to a_X) are plausible, accept and move on to Design Group B;
   - 1.2. if the ONC estimates for local authorities (a_1 to a_X) are not plausible, make adjustments and repeat the quality assurance of Design Group A.

2. If the ONC estimates for Design Group A are not plausible, consider the constituent local authorities (a_1 to a_X):
   - 2.1. if the ONC estimates for local authorities (a_1 to a_X) are not plausible, make adjustments and repeat the quality assurance of Design Group A;
   - 2.2. if the ONC estimates for local authorities (a_1 to a_X) are plausible, adjust the ONC estimates for Design Group A and then repeat the quality assurance of Design Group A and its constituent local authorities.

4.2 National QA Analyses

Once all the ONC estimates for each Design Group (and their constituent local authorities) have been quality assured and agreed, these will be summed to produce the national ONC population estimate for each age-sex group. These will be compared with the national demographic estimates and their plausibility bounds. If all the ONC estimates fall within these plausibility bounds, they will be accepted and no further adjustments will be made. However, should the ONC national estimates for one or more age-sex groups fall outside the plausibility bounds then a series of demographic and qualitative analyses such as those described above will be undertaken with the aim of making a judgement as to whether a further adjustment should be made.

5. CONTINGENCY STRATEGY – ADJUSTMENT OF ONC ESTIMATES

5.1 Borrowing Strength

The basic strategy to be used will be to impute the degree of underenumeration in a particular local authority or Design Group from the levels of underenumeration estimated in socio-economically and demographically similar areas in the same broad geographical region. For local authorities the most obvious, and in some cases, suitable areas to borrow strength from will be other local authorities within the same Design Group. However, this will not be the case for Design Groups

that are single local authorities or those whose constituent local authorities are likely to have quite different patterns of underenumeration.

It is proposed that the choice of local authorities from which to borrow strength will be made using the *ONS classification of Local Authorities* developed by Methods and Quality Division. This classification combines 37 variables from the 1991 Census to calculate a "distance" between each and every other local authority in Great Britain. An example for the SW Hampshire Design Group is given in Annex C – this shows the "distance" between Southampton Unitary Authority and other local authorities within the same Design Group, local authorities in contiguous Design Groups, and the "closest" and "furthest" local authorities in England and Wales as a whole. This indicates, for example, that Weymouth & Portland Local Authority and Portsmouth Unitary Authority may be more suitable areas to borrow strength from than the local authorities in the same Design Group as Southampton. The regression methodology by which borrowing strength will be operationalised was described in ONS (ONC (SC)00/04)

5.2 National Adjustment: Bayes Estimation based upon Demographic Information

In the case where the evidence suggests that the national estimates, formed by summing the agreed sub-national estimates, still require adjustment then this is likely to be because, across the nation, the degree of dependence between the Census and CCS collection procedures will have been too high (or low). A diagnostic would be that all estimates were a little low (or high). In this case it is proposed that adjustments be made to the sub-national dual system estimates and a new national estimate calculated. Elliott and Little (1999) show how, in the situation described above, empirical Bayes estimation can be used to make such adjustments as long as one has ancillary information such as expected sex ratios, dependency ratios or other demographic or administrative data. It is proposed that this strategy will be used.

6. REFERENCES

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Cruddas, M. & Diamond I (2000), *'A Quality Assurance and Contingency Strategy for the One Number Census',* ONS(ONC(SC))00/04.

Elliott, M.R. & Little, R.J.A. (1999). *'On Combining Information from a Census, a Coverage Measurement Survey and Demographic Analysis'* submitted to J.A.S.A.

Annex A – Rough ONC Timetable

2001

Start August	First data due from Lockheed Martin
Mid-late August	Census & CCS data for first Design Group matched
Start September	*Final 2000 (and/or extrapolated 2001) Mid-Year Population Estimates supplied by Population Estimates Unit*
Early-mid September	ONC estimates for first Design Group produced
Mid-late September	(i) QA of estimates for first Design Group; and (ii) Imputation of households/persons for first Design Group (Note: These two processes will run in parallel, with estimation and imputation being re-run if found to be necessary by QA)

Matching, Estimation and QA/Imputation will continue for each Design Group in turn, with all processes running in parallel (i.e. whilst Design Group A is going through the QA and imputation processes, Design Group B will be going through the estimation process and Design Group C will be being matched). This continues until….

2002

End February	*Preliminary rolled-forward 2001 Mid-Year Population Estimates at national level supplied by Population Estimates Unit; 2000-based 2001 population projections obtained from Government Actuary's Department?*
Early May	Matching of Census & CCS for final Design Group completed
Early-mid June	Estimation for final Design Group completed
Mid June to early July	QA and Imputation for final Design Group completed
Early July	*Final rolled-forward 2001 Mid-Year Population Estimates at national level supplied by Population Estimates Unit*
Mid July to early August	QA of national level ONC estimates, revising estimation and re-running imputation if necessary
Mid August	Supply Population Estimates Unit (PEU) with final (Census Day) ONC estimates by local authority, sex and age. *PEU to adjust ONC estimates to mid-year 2001 and deliver to DETR by 31 August at the latest (SSA Priority 1 Statistics).*

Annex B – Example of Quality Assurance Analyses for SW Hampshire Design Group

Example comparisons of ONC estimates and raw Census counts against demographic estimates for the SW Hampshire Design Group (comprising Southampton Unitary Authority and Eastleigh and Test Valley Local Authorities) are illustrated below. These examples use simulated Census and ONC estimates, and due to the fact that these simulations have used 1991 Census data as a starting point, the results represent a situation where the ONC appears to have failed to adjust fully for Census underenumeration. The ONC estimates illustrated therefore do not represent the level of adjustment one would expect in 2001 - the analyses presented here are intended to be purely illustrative of the QA procedures that might be used, rather than a realistic representation of likely results for SW Hampshire.

Comparisons

The first stage will be to compare ONC (and raw Census) estimates for a Design Group with the corresponding portfolio of comparators for each age group. Charts 1 & 2 below show an example comparison against demographic estimates and indicate that whilst the ONC and demographic estimates are in reasonably close correspondence, differences clearly exist for certain age-sex groups. (In particular, further examination of the data shows the rolled-forward demographic estimates are 9% higher than the corresponding ONC estimates for men aged 15 to 29 and 16% higher for women aged over 75). Comparisons with the other comparators and the plausibility range for each age group would also be presented graphically, with all differences output to a table for further analysis.

Chart 1 – Comparison of ONC and Demographic Estimates, Males, SW Hampshire

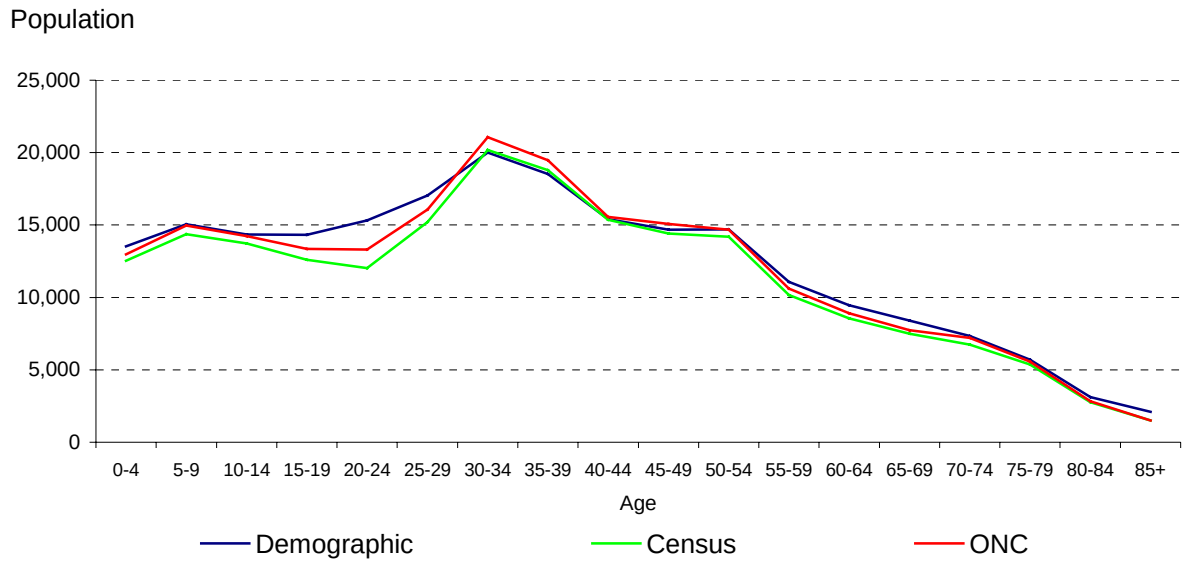
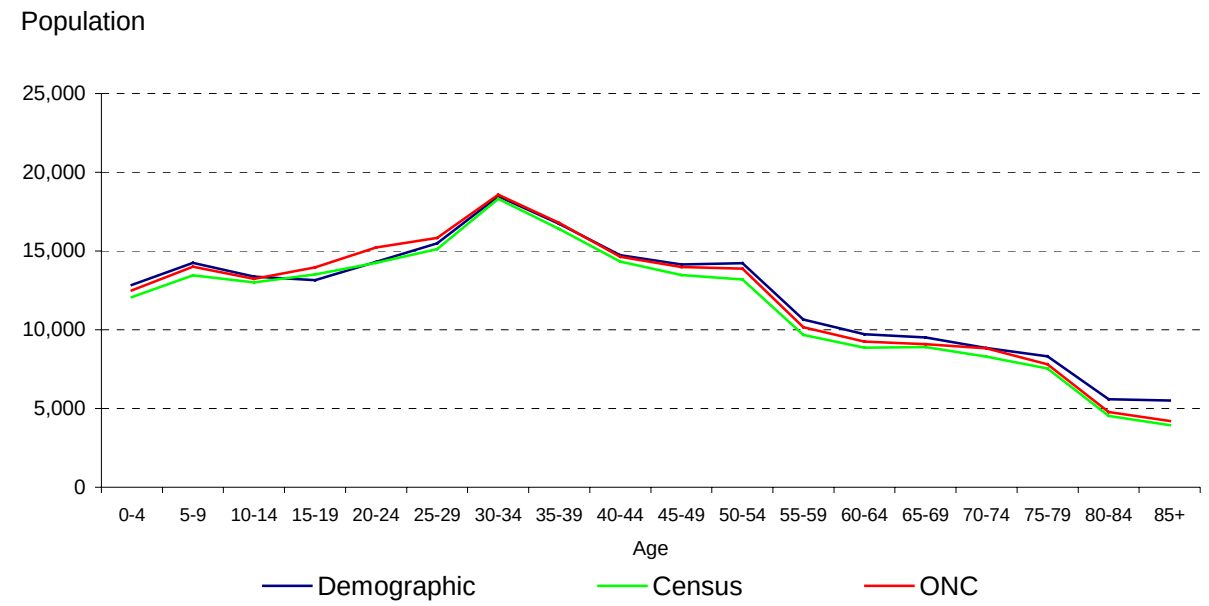


Chart 2 – Comparison of ONC and Demographic Estimates, Females, SW Hampshire



Demographic analyses

As well as a straight comparison of the ONC estimates with the different comparators for each age group, demographic analyses derived from the ONC estimates and the comparators such as sex ratios, age ratios and dependency ratios will also be compared, together with their corresponding plausibility ranges. A comparison of sex ratios derived from the ONC (and raw Census) estimates with sex ratios derived from the demographic estimates is illustrated in Chart 3 below, and a comparison of dependency ratios is shown in Table 2.

Chart 3 – Comparison of Sex Ratios for SW Hampshire

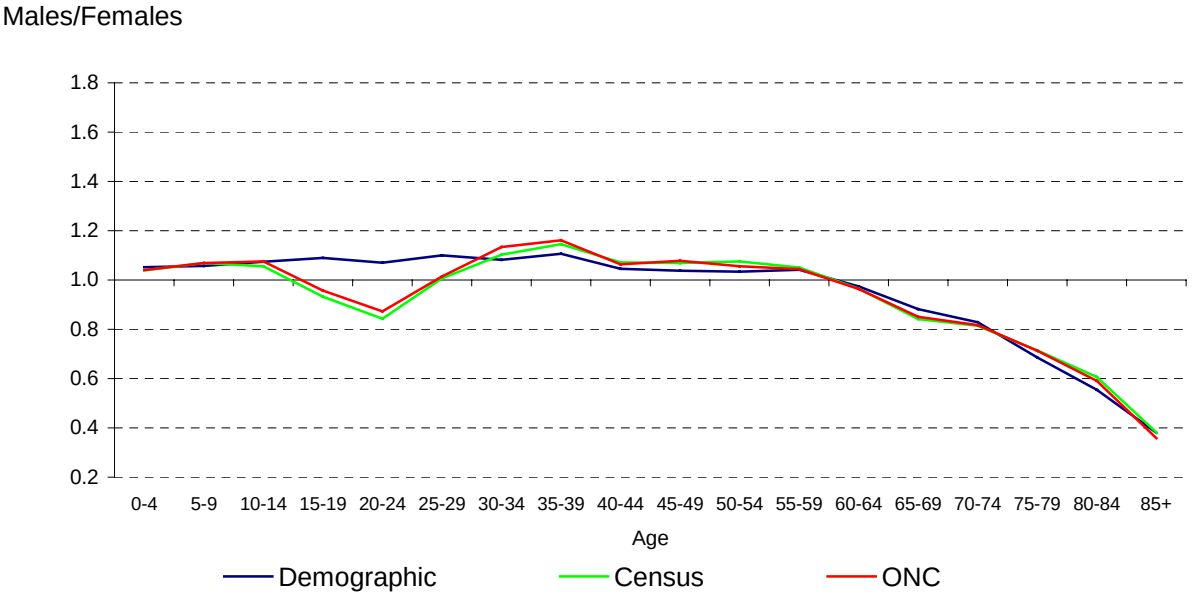


Chart 3 shows that whilst there is a marked dip in the ONC-based sex ratio for ages 15-29, this is not present in the sex ratios derived from the demographic estimates. This is consistent with the difference between the ONC and demographic estimates observed for men aged 15-29 in Chart 1, but does not necessarily indicate that the ONC has under-estimated for this group of the population. Further comparison with sex ratios for the other comparators and the estimated plausibility range for the ONC sex ratios would also be required, as well as comparison with sex ratios for previous Census years.

Table 2 – Comparison of Dependency Ratios for SW Hampshire

	Rolled Forward		Census		ONC	
	Males	*Females*	*Males*	*Females*	*Males*	*Females*
Young (0-14 / 15-64)	0.29	0.29	0.29	0.28	0.28	0.28
Elderly (65+ / 15-64)	0.18	0.27	0.17	0.24	0.17	0.24

Table 2 shows that whilst the ratio of children to working age adults is similar for both the ONC and the demographic estimates, there is a marked difference between the elderly dependency ratios, with the ratio derived from the ONC estimates being markedly lower. Again, whilst this alone does not necessarily indicate that the ONC has underestimated the population aged 65 and over, comparison with the other comparators and the plausibility ranges for each age group would further indicate whether the ONC estimates for this age group were plausible.

Note: As this is purely an illustrative example based on simulated data, no consideration has been given here as to the possible reasons why differences exist between the ONC estimates and the demographic estimates – however, were this a real life situation, the estimates would be carefully put into context to ensure that the results of the analyses made sense.

Annex C - Where to borrow strength from?

Example for SW Hampshire Design Group - Southampton Unitary Authority

Category	Design Group	Unitary/Local Authority	"Distances" between Southampton and Unitary/Local Authority
Own Design Group		Eastleigh	1.53
		Test Valley	1.76
Contiguous Design Groups	SE Hampshire	Fareham	1.95
		Gosport	0.67
		Havant	0.64
		Portsmouth	0.49
	N & E Hampshire	Basingstoke & Deane	1.86
		E Hampshire	2.12
		Hart	3.91
		Rushmoor	1.58
		Winchester	2.44
	Wiltshire	Kennet	1.54
		N Wiltshire	1.47
		Salisbury	1.13
		W Wiltshire	1.14
	Wessex	E Dorset	2.52
		New Forest	1.45
		N Dorset	1.43
		Purbeck	1.17
		W Dorset	1.67
		Weymouth & Portland	0.45
	SE Dorset & Isle of Wight	Bournemouth	1.04
		Isle of Wight	1.05
		Christchurch	2.25
		Poole	0.82
"Closest" LADs		City of Bristol	0.25
		Plymouth	0.26
		Ipswich	0.28
		Leeds	0.28
		Lincoln	0.29
"Furthest" LADs		Westminster/City of London	4.34
		Kensington & Chelsea	5.38
		Tower Hamlets	5.57

Distances calculated as part of methodology used to produce
The ONS Classification of Local & Health Authorities of Great Britain