

# Census 2001

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## One Number Census Quality Assurance information: 38UC Oxford

### Introduction

The following information is available at Local Authority level

- The Quality Assurance charts and theme commentaries
- The Administrative data (comparator data) used in the One Number Census Quality Assurance process
- A map showing the location of postcodes sampled by the Census Coverage Survey.

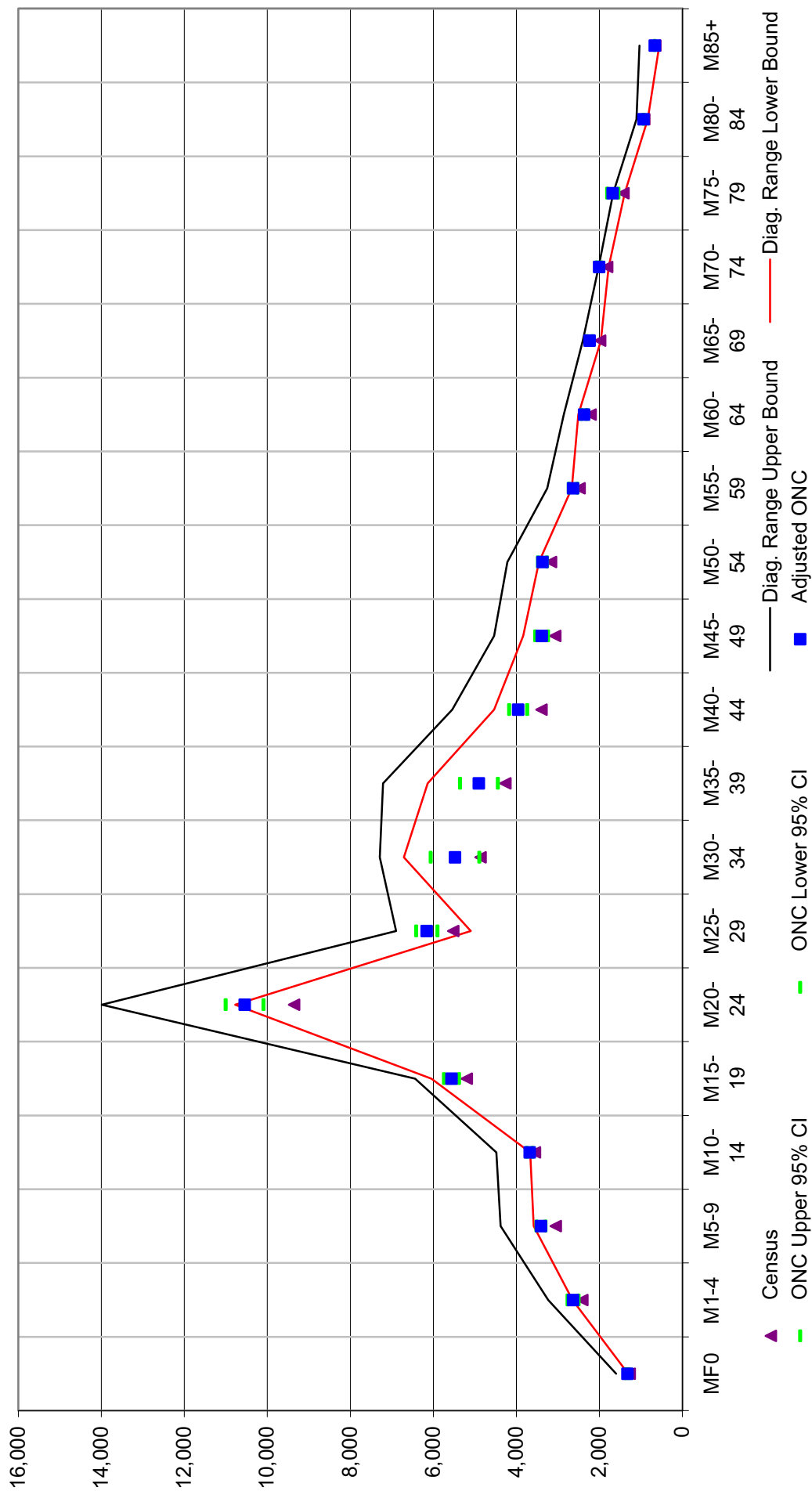
It is important to note that the Quality Assurance process found that in about 75% of Local authorities, the One Number Census estimates were lower than the diagnostic ranges for the males aged between 25 and 39. Commentary on this feature was published with the first release of Census results at

[www.statistics.gov.uk/census2001/methodology.asp](http://www.statistics.gov.uk/census2001/methodology.asp)

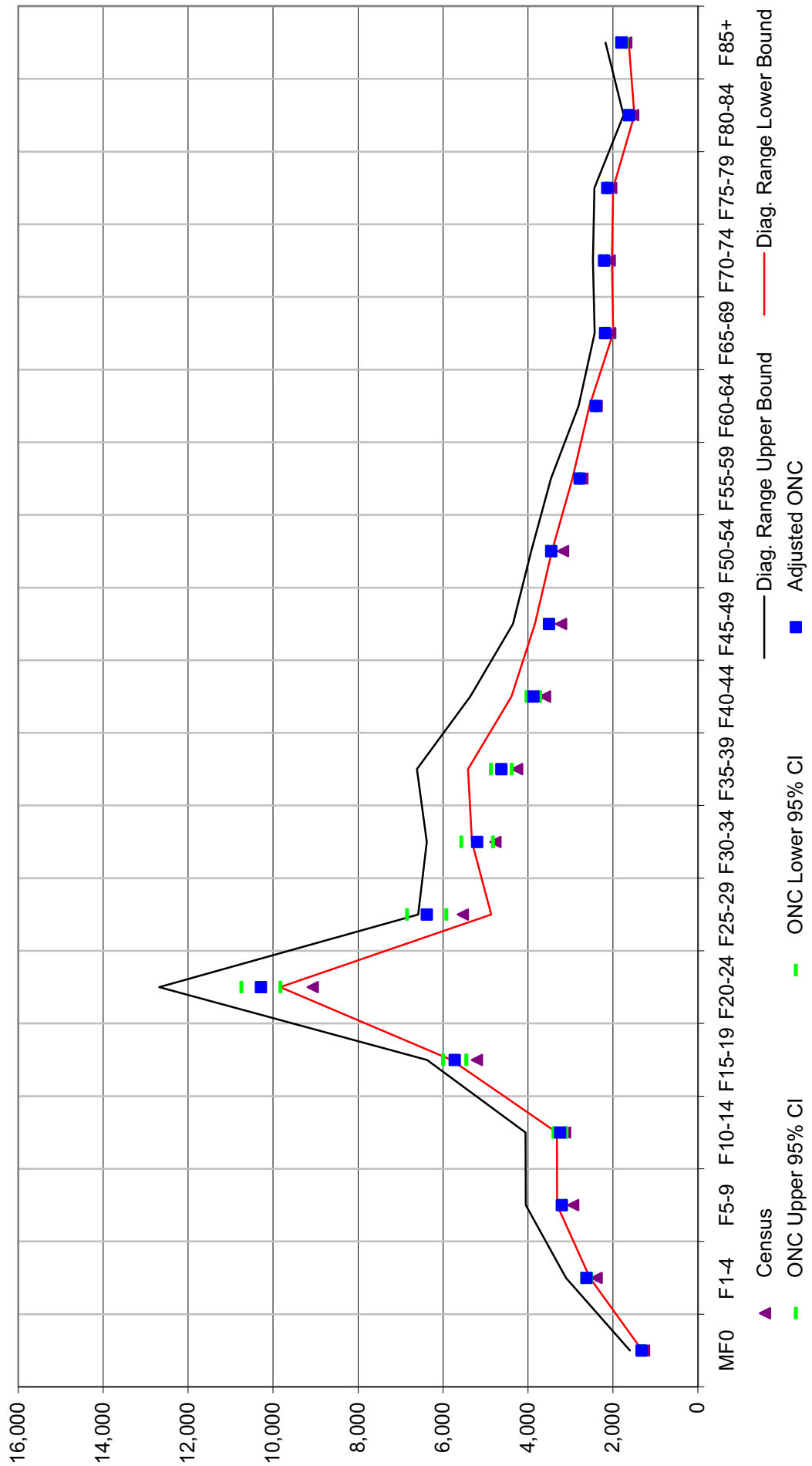
### Quality Assurance charts

The charts on pages 2 and 3 are those that were used during the Quality Assurance (QA) part of the One Number Census (ONC) process. Each chart compares the original 2001 Census count with the One Number Census estimates by age-sex group for one Local Authority District. They also show the upper and lower boundaries of the corresponding 95% Confidence Interval for the estimate, as well as the upper and lower boundaries of the diagnostic range that the estimate was compared against. The diagnostic ranges were calculated using the 2000 mid-year population estimates, patient records, pension data, child benefit data, school census information and approximate 2001 mid-year population estimates. They were used to give an idea of the range within which we could expect the population to be given the alternative data sources. They were not used as control totals or an indication that the Census results were in error. Full details of how the diagnostic ranges were calculated can be found in the ONC Quality Assurance strategy paper at [www.statistics.gov.uk/census2001/pdfs/oncinfopaper.pdf](http://www.statistics.gov.uk/census2001/pdfs/oncinfopaper.pdf)

38UC Oxford - ONC Estimates - Males



38UC Oxford - ONC Estimates - Females



## Students

### Problems

The ONC quality assurance strategy included a comparison of the full time student population enumerated in the Census against administrative sources, including Higher Education Statistics Agency (HESA) and Learning Skills Council (LSC) data. Generally the counts of full time students compared well with the comparator data. However, there were areas where the QA panel expressed concerns over the enumeration of full time students. Often when the ONC population estimates of persons aged 20-24 looked low in comparison to the diagnostic ranges a specific note was made to pay particular attention to the student charts (produced as standard) that compared the 2001 Census counts, adjusted for underenumeration, with the comparator data for full time students. An example of these charts can be seen in the illustrative ONC Quality Assurance pack at [www.statistics.gov.uk/census2001/pdfs/onc\\_qa\\_pack.pdf](http://www.statistics.gov.uk/census2001/pdfs/onc_qa_pack.pdf)

If the QA panel believed that the ONC estimates for students looked inconsistent with expectations then several actions were undertaken to look at students in more detail.

### Actions

#### 1) Enumeration of halls of residence

One area of further work undertaken was to look at the enumeration of students in halls of residences. The Census Coverage Survey did not cover large communal establishments such as halls of residences and hence attention was focused at QA meetings on areas with a large number of students.

Analysis to supplement the Census Coverage Survey was carried out for each individual area, identifying students enumerated at halls of residences, and adjusting their numbers if there was evidence of under-enumeration. Evidence was gathered from university websites and by e-mail/telephone contact with university accommodation officers to obtain detailed information on the accommodation and likely population on Census day of students at halls of residences. Reference was also made to Census enumerator field material to see how many forms for a particular hall of residence may have been issued. In addition, Communal Establishment individual forms were examined to confirm address details.

The evidence provided from individual university establishments was used to calculate a threshold that was used to decide whether a student adjustment was required or not. It was agreed by the QA panel that student adjustments should be considered where the number of "missing" students was 100 or more for a particular hall of residence and the notional response rate (calculated by comparing recorded students with indicative numbers of students) was below 75%.

Following the student halls of residence analysis, 40 of the 376 LADs had student adjustments made. For each of these 40 LADs, adjustments were made to the communal establishment population, in 10 of these LADs adjustments

were also made to the private household population. This was because some of the halls of residence had been classified, not necessarily incorrectly, as households by the Census enumerators rather than as Communal Establishments. These households collectively formed the halls of residence.

A list of the LADs that received student adjustments as a result of the halls of residence analysis is outlined on the next page:

LAD code	LAD	EA code	Establishment(s)
00GF	Telford and Wrekin	KC	Harper Adams University College
41UG	Stafford	KF	Staffordshire University
00FK	Derby	KI	Derby University
00FN	Leicester	KL	Leicester University
31UC	Charnwood	KL	Loughborough University
00CQ	Coventry	KO	Coventry University
00CN	Birmingham	KP	Birmingham University, Central England University & Birmingham College of Food
00KA	Luton	KV	Luton University
09UC	Mid Bedfordshire	KV	Cranfield University
00BK	Westminster	LA	Westminster University
00AM	Hackney	LB	Westminster University
00AU	Islington	LB	North London University
00BG	Tower Hamlets	LB	London University, London Guildhall University
00BJ	Wandsworth	LD	London Institute, Surrey University
00AL	Greenwich	LI	Greenwich University
00AK	Enfield	LL	Middlesex University
00AQ	Harrow	LM	Brunel University, Harrow School
00CJ	Newcastle-upon-Tyne	NC	Newcastle-upon-Tyne University, Northumbria University
00CM	Sunderland	ND	Sunderland University
20UE	Durham	NE	Durham University
30UQ	Wyre	NH	Myerscough College
30UK	Preston	NI	Central Lancashire University
00CX	Bradford	NK	Bradford College
00DA	Leeds	NL	Leeds Metropolitan University
00FF	York	NM	College of Ripon & York St Johns
00FA	Kingston upon Hull	NN	Hull University, Humberside University
00BY	Liverpool	NU	John Moores University, Liverpool University, Liverpool Hope University
00BR	Salford	NW	Salford University
00BN	Manchester	NX	Manchester University, Manchester Metropolitan University, UMIST
00HG	Plymouth	SC	Plymouth University
18UH	Teignbridge	SC	College of St Mark & St John
00MS	Southampton	SJ	Southampton Institute, Southampton University
00MR	Portsmouth	SK	Portsmouth University
43UG	Runnymede	SO	London University
43UD	Guildford	SP	Surrey University
00ML	Brighton	SR	Brighton University, Sussex University
00PT	Cardiff	WC	Cardiff University
00NX	Swansea	WD	Swansea Institute
00NQ	Ceredigion	WE	University of Wales Aberystwyth
00NL	Wrexham	WF	North East Wales Institute

All areas with higher education establishments were subjected to a halls of residence analysis.

2) Patient record inflation due to students

Further work to look at the apparent differences between the ONC estimates and the diagnostic ranges in some Local Authorities involved looking into the possibility that students (both home and international) do not de-register from the GP patient records when they leave university. This would inflate the patient record figures (one of the administrative comparator data sources used in the QA process) which may potentially inflate the diagnostic ranges. In order to try and address this issue the Department of Health was contacted to discuss the patient record data.

On contact with the Department of Health, it was confirmed that list inflation for patient record data is very likely to occur in university towns and cities. The QA panel judged that based on this evidence, this will explain a great deal of the difference between the ONC and the diagnostic ranges in the following LADs:

LAD code	LAD	EA code	EA
29UC	Canterbury	SV	Eastern Kent
38UC	Oxford	KS	Oxon
12UB	Cambridge	EB	Cambridgeshire
18UC	Exeter	SB	North Devon
00HG	Plymouth	SC	South Devon & Teignbridge
00HA	Bath and North East Somerset	SE	Avon
00AR	Havering	LN	Bexley & Havering
00BY	Liverpool	NU	Liverpool

3) Regional student analysis

The HESA and LSC data used as comparators in the QA process give counts of full time students at place of study rather than home address. However, the 2001 Census enumerated students at their term-time address. HESA data also assigns students to the administrative centre of the university rather than where the students are actually studying. In some cases a university campus is located in a different Local Authority to the administrative centre (for instance the University of Bath has a campus in Swindon) but the HESA data will include the students in the Local Authority where the administrative centre is. Initial comparisons of full time students were conducted at the Estimation Area (EA) level. Some areas reviewed in the QA meeting appeared to show a lower number of students enumerated by the Census than the comparator data.

Many students reside in a different Local Authority to the one in which they study and it was therefore questioned whether the apparent difference seen in some areas was because students were travelling across the borders to study. Also, some of the difference between the Census and the HESA data could be accounted for by the definitions imposed by the comparator data as to where students are counted. It

was agreed therefore that a larger geographical comparison would need to be done to try and capture cross border flows of students.

**Actions**

Seven regional charts of full time students were produced that compared the HESA and LSC data to the ONC estimates. These captured all 101 EAs and hence all 376 LADs. These regional charts did not replace the EA level student charts but were used in conjunction with them and were made available to the QA panel.

**Results**

The regional charts produced provided a more reliable comparison between the HESA and LSC data and the ONC estimates to look at cross boarder flows when used in conjunction with the EA level full time student charts. No adjustments were deemed to be necessary following review of these regional charts but the panel agreed that this analysis was a key part of the QA process for students. These regional student analyses may be published if permission is given by the agencies providing the data.

**Armed forces**

**Problem**

Home armed forces are one of the subgroups that are difficult to enumerate. They are subject to frequent changes in location, often at short notice. Many also live in large communal accommodation blocks which can lead to problems which are common with other similar establishments such as student halls of residence. Armed forces personnel living in barracks who owned a property elsewhere were asked to fill in a form for the place they spent the most time and this will have reduced the number of people enumerated as living in bases.

The Quality Assurance strategy included a comparison of the 2001 Census count of home armed forces against both the Defence Analytical Services Agency (DASA) data and the 2000 mid-year estimate (MYE) of home armed forces. The DASA data places people where they are stationed, whereas the MYEs applies a residence matrix to the DASA data to estimate the home armed forces on a residence base.

The QA panel noted that the ONC estimates were lower than than 2000 MYEs in a number of areas containing high concentrations of Home Armed Forces. There was also some disparity between the number of Armed Forces recorded by DASA and the number captured by the Census. Conversely, in other areas there were noticeably more home armed forces than in either the 2001 MYEs or the 2001 DASA data.

The QA panel concluded that the differences could be a result of a number of causes, such as: definitional differences; error in the base to residence matrix used by the PEU; form completion errors; coding errors; and undercount in the Census.

## Actions

### Further work:

- identified areas with expected high concentrations of home armed forces, and examined the geographical location of the bases within them. This highlighted that some of the armed forces bases were close to area boundaries, which meant personnel could be living in the surrounding areas and travelling to the bases.
- looked at the workplace postcode of a 10% sample of armed forces personnel enumerated for selected areas where the Census counts were larger than the comparator data.
- assessed the accuracy of DASA data in relation to the definitions used to place armed forces at a particular base.
- assessed the quality of coding and form completion.
- reviewed alternative sources of information regarding the numbers of armed forces living in communal accommodation.

## Results

This further work led to improvements in the information provided in the QA process, including additional charts for aggregated areas to reflect cross border flows.

The analysis of workplace postcodes did highlight members of the home armed forces that worked a significant distance from their usual residence.

There was evidence that some armed forces personnel had been coded as civilians, reflecting form completion difficulties rather than errors in the coding system. The Census Quality report will include more information on the quality of the statistics for this subgroup, but it is clear that this explains most of the large differences. The information was fed into the QA process so that the armed forces comparisons could take account of this. ONS will release more detailed analysis on Armed Forces in due course to help with the interpretation and use of Armed Forces information.

Adjustments for undercount among the armed forces were distributed between the areas with the largest differences between the comparator data and these were made to the populations of communal establishments. Following further discussions with officials at DASA, extra information was provided detailing the number of people paying to live in communal accommodation, by establishment, for each of the services. This allowed us to distribute the adjustment for an area between the communal establishments within that EA. A total of 35 adjustments to defence communal establishments were made. The total adjustment made was based on a national comparison between the ONC estimates adjusted for the completion difficulties and the DASA total of home armed forces.

## Administrative data (comparator data) used in the One Number Census quality assurance process

### Introduction

The One Number Census (ONC) population estimates were quality assured using a range of comparator data. These sources were combined to produce the diagnostic ranges shown on the quality assurance charts for each Local Authority. Estimates falling outside this range were looked at in more detail. More information on the process used to produce the diagnostic ranges, and the QA process generally, can be found in the paper "A Quality Assurance and Contingency Strategy for the One Number Census"

[www.statistics.gov.uk/census2001/pdfs/oncinfopaper.pdf](http://www.statistics.gov.uk/census2001/pdfs/oncinfopaper.pdf)

The comparator data included demographic estimates from ONS's Population Estimates Unit and a number of administrative data sources. These sources are described below.

### Demographic estimates

Rolled-forward mid-year population estimates (MYEs) are produced every year by the Population Estimates Unit (PEU) of Population & Demography (P&D) Division of ONS. The rolled-forward MYEs for 2001 were not available to feed into the sub-national ONC Quality Assurance process. This was because many of the constituent components that make up the estimates were not available in time. Instead, MYEs from 2000 were used and extrapolated forward to mid-2001 to allow for average annual population change between mid-1991 and mid-2000.

### Health authority patient register

Patient registers administered by individual health authorities provide the most comprehensive administrative source in terms of coverage of the whole population. However, these records do not cover the whole population (foreign armed forces are excluded), and are known to be prone to "list inflation" - that is, they include more people than actually live in the area. This is due mainly to two factors:

- the way in which the patient register is managed (e.g. delays in removing patients who have moved or died from the register)
- certain types of people being more or less likely to register with a new GP when they move (e.g. young males tend to be less likely to re-register than young females).

The error is not uniform and varies by both age and geography, with some groups (e.g. 25-29 year old males) generally having a lower patient register count than the Mid Year Estimate.

To allow for these variations, an adjusted patient register count for April 2001 was used in the ONC quality assurance. First of all, foreign armed forces data was added to the patient register numbers. An adjustment was then made to compensate for the variations in list inflation. This involved



comparing the difference between the patient register and the Mid Year Estimate across the most similar local authorities.

### Department of Works and Pensions (DWP) child benefit data

The Benefits Agency administer the Child Benefit Claimant Register which holds information on all persons claiming child benefit in the UK and the children for whom the benefit is claimed. Child benefit is almost universally taken up for children under 16 in the UK. However, there are certain problems:

- Many of the postcodes on the records are either missing, contain errors or are out of date.
- New-born 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.
- Children of foreign armed forces are not eligible.
- There can often be a lag in updating records when a claimant moves, particularly now that payments are made directly into bank accounts.
- There are also some issues regarding benefit fraud, although this is difficult to quantify.

To allow for the first two points, ONS liaised with DWP and Oxford University to obtain “clean” child benefit data relating to August 2000. To allow for the third, foreign armed forces data was added to the child benefit information before using it as a comparator. Some inaccuracies may however remain, and these and the last two points should be borne in mind when making comparisons. It must also be remembered that the data relates to a date several months before Census day.

### Department of Works and Pensions (DWP) retirement pensions data

The Benefits Agency administers the Retirement Pension Register that holds information on all persons claiming a state pension in the UK. Almost all persons aged 65 or over are entitled to claim some form of state retirement pension. However, pension data suffers from many of the same problems as child benefit data, including the problems with postcodes and the lag in updating records when a claimant moves. In addition, there are several different forms of state pension which can lead to duplication. Once again ONS liaised with DWP and with a data cleaning expert at Oxford University to obtain “clean” retirement pension data from May 2000, but the same caution must be taken in making comparisons as with the child benefit data.

### School Census data

The School Census is an annual count of all children attending educational establishments, including schools which are privately funded. In England, information relating to January is collected from local authorities by DfES each year, while in Wales, Scotland and Northern Ireland this role is carried out by the appropriate devolved government

authority and has a different reference date. The data used in ONC quality assurance relate to place of study in January 2001, although the ages are as at 31st August 2000.

The main problem with this data is that it relates to place of study, which may be in a different local authority to where the child lives. For this reason, less weight was given to these figures in the quality assurance procedure.

### Birth registration data

The civil registration system records all new births in the population, and this was therefore a key source of data when quality assuring ONC estimates for children aged under one year - a group which Censuses worldwide generally undercount to a greater extent. Infant mortality and migration before the age of one will clearly cause differences between the registration data and the actual number of babies living in an area. ONS's methods were used 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 quality assurance procedures. The figures relate to 30th April 2001.

### Comparator data

#### Population estimates

The Population Estimates table shows the ONC estimate along with all the administrative data that was used to quality assure the estimates for each age group. These data were used to calculate the ranges into which we would have expected the estimates to fall (the diagnostic ranges). Babies were examined as a single group and so the data has not been split into the two sexes. Therefore, the line for males and females aged less than 1 (labelled MF0) appears twice in the table, at the top of the male age groups and the female age groups.



## Population estimates

Age Group	ONC Estimate	2000 MYE	Adjusted Patient Records	"Pension/ Child Benefit"	"Pop'tion Est.<1/ School Census"	2001 Extrap'ns	Diag. Range Upper Bound	Diag. Range Lower Bound
MF0	1325	1,438	1,353	1,350	1,505	1,563	1,597	1,306
M1-4	2634	3,027	2,949	2,700		3,202	3,233	2,645
M5-9	3407	4,515	4,218	3,450	3,809	4,317	4,380	3,583
M10-14	3679	4,649	4,394	3,500	4,171	4,543	4,484	3,668
M15-19	5564	6,234	6,341			6,146	6,438	6,049
M20-24	10561	12,188	13,185			11,579	13,988	10,776
M25-29	6165	5,302	6,764			5,231	6,897	5,098
M30-34	5482	6,854	7,147			6,957	7,293	6,708
M35-39	4906	6,406	6,590			6,942	7,210	6,138
M40-44	3957	4,770	5,174			5,312	5,545	4,537
M45-49	3392	4,012	4,361			4,122	4,536	3,837
M50-54	3379	3,646	4,026			3,829	4,215	3,456
M55-59	2636	2,798	3,120			2,919	3,255	2,663
M60-64	2373	2,601	2,767			2,592	2,854	2,505
M65-69	2233	2,221	2,351	2,000		2,296	2,397	1,961
M70-74	2007	1,907	1,958	1,850		1,937	2,019	1,775
M75-79	1678	1,552	1,597	1,450		1,574	1,667	1,390
M80-84	935	952	1,016	900		1,035	1,103	831
M85+	664	825	769	650		913	1,031	555
MF0	1325	1,438	1,353	1,350	1,505	1,563	1,597	1,306
F1-4	2621	2,938	2,888	2,700		2,962	3,101	2,537
F5-9	3205	4,018	3,762	3,350	3,708	3,901	4,050	3,313
F10-14	3246	4,158	3,956	3,200	3,979	4,107	4,058	3,321
F15-19	5724	6,007	6,232			5,943	6,377	5,798
F20-24	10289	10,812	11,968			10,544	12,679	9,832
F25-29	6386	4,764	6,849			4,603	6,585	4,867
F30-34	5202	5,582	6,115			5,704	6,382	5,315
F35-39	4628	6,100	5,647			6,375	6,612	5,410
F40-44	3873	4,775	4,567			5,180	5,361	4,386
F45-49	3507	4,049	3,966			4,224	4,353	3,837
F50-54	3451	3,645	3,555			3,801	3,924	3,432
F55-59	2785	3,126	3,078			3,332	3,459	2,951
F60-64	2407	2,700	2,616			2,745	2,809	2,552
F65-69	2184	2,297	2,221	2,100		2,320	2,429	1,995
F70-74	2211	2,316	2,227	2,100		2,376	2,470	2,021
F75-79	2135	2,347	2,223	2,100		2,313	2,435	1,992
F80-84	1624	1,556	1,625	1,550		1,685	1,750	1,492
F85+	1793	1,989	1,764	1,800		2,036	2,172	1,628
Male	<b>66,306</b>	<b>75,190</b>	<b>79,413</b>			<b>76,270</b>		
Female	<b>67,942</b>	<b>73,886</b>	<b>75,926</b>			<b>74,890</b>		
TOTAL	<b>134,248</b>	<b>149,076</b>	<b>155,339</b>			<b>151,160</b>		

## Sex ratios

The Sex Ratios table shows the ratio of males to females for the ONC estimate and all the administrative data by age group. They are calculated as follows:

$$\text{Sex Ratio} = \frac{\text{Number of Males}}{\text{Number of Females}} \times 100$$

Age Group	ONC Estimate	2000 MYE	Patient Records	Adjusted Patient Records	"Pension/ Child Benefit"	"Pop'tion Est.<1/ School Census"	2001 Extrap'ns	Diag. Range Upper Bound	Diag. Range Lower Bound
0	97.5	103.4	103.6	103.0	104.9	107.6	111.5	115.8	98.7
1-4	100.5	103.0	102.0	102.1	100.0		108.1	112.2	95.9
5-9	106.3	112.4	102.5	112.1	103.1	102.7	110.7	117.3	97.5
10-14	113.3	111.8	112.8	111.1	108.8	104.8	110.6	116.7	100.9
15-19	97.2	103.8	99.3	101.7			103.4	106.0	97.1
20-24	102.6	112.7	110.1	110.2			109.8	114.2	108.4
25-29	96.5	111.3	128.9	98.8			113.6	143.9	83.7
30-34	105.4	122.8	140.7	116.9			122.0	152.7	104.9
35-39	106.0	105.0	142.6	116.7			108.9	161.4	86.2
40-44	102.2	99.9	139.3	113.3			102.5	158.9	80.2
45-49	96.7	99.1	129.6	110.0			97.6	145.6	81.6
50-54	97.9	100.0	125.5	113.2			100.7	138.2	87.3
55-59	94.6	89.5	113.7	101.4			87.6	126.8	74.5
60-64	98.6	96.3	112.9	105.8			94.4	122.2	85.2
65-69	102.2	96.7	110.4	105.9	95.4		99.0	117.9	87.9
70-74	90.8	82.3	95.7	87.9	86.8		81.5	102.7	74.5
75-79	78.6	66.1	72.7	71.8	70.1		68.1	76.0	62.8
80-84	57.6	61.2	62.7	62.5	57.4		61.4	65.3	54.7
85+	37.0	41.5	42.9	43.6	37.1		44.8	48.7	33.2

## Dependency ratios

The Dependency Ratios table shows ratios for the two main groups of economically inactive people to economically active people for the ONC estimate and all the administrative data. They are calculated as follows:

$$\text{Young Dependency Ratio} = \frac{\text{Population Aged 0-14}}{\text{Population Aged 15-64}} \times 100$$

$$\text{Old Dependency Ratio} = \frac{\text{Population Aged 65+}}{\text{Population Aged 15-64}} \times 100$$

	ONC Estimate	2000 MYE	Patient Records	Adjusted Patient Records	2001 Extrap'ns	Diag. Range Upper Bound	Diag. Range Lower Bound
Young	20.8	23.3	18.4	20.6	22.8	25.7	16.0
Old	18.1	16.9	14.4	15.6	17.1	18.4	13.1

## Census Coverage Survey maps

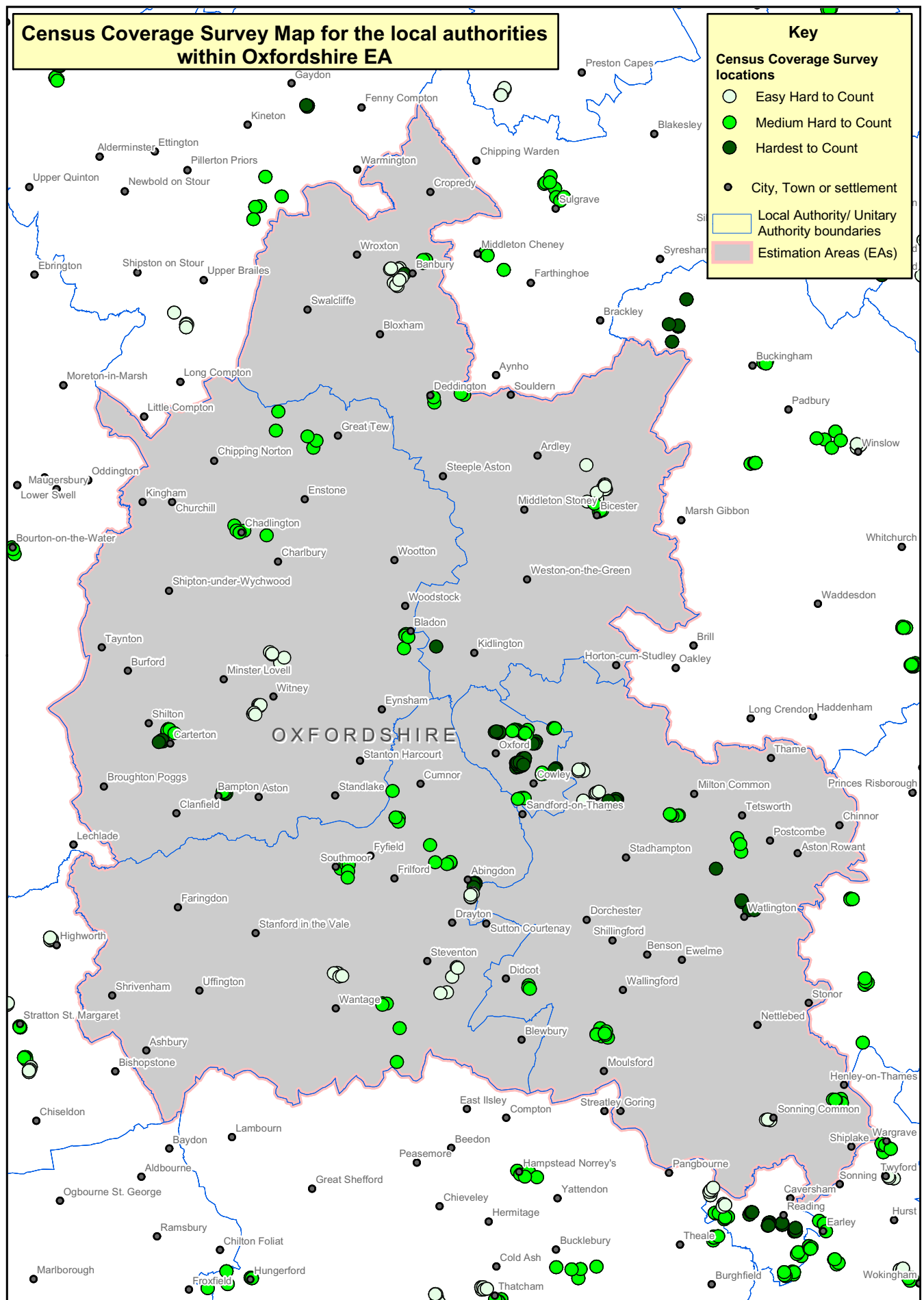
It is standard ONS practice not to release sample details which allow the identification of individual households or people sampled in the Office's surveys. In addition, Census data for areas consisting of a small number of postcodes will be released at a later date. By releasing the details of the individual postcodes sampled in the CCS, we would effectively be releasing information about some individual households and persons sampled, since some postcodes may contain only one household and it may be possible to identify these from the small area data. This would be contrary to the confidentiality assurances given by the Registrar General. The specific postcodes sampled in the CCS will not, therefore, be published.

The map below shows the location of the CCS Postcodes within the Local Authority. Please note that these maps were created as working documents. We plan to replace them with higher quality maps in the near future.

The local authorities covered by this map are:

- Cherwell
- Oxford
- South Oxfordshire
- Vale of White Horse
- West Oxfordshire

White circles show postcodes with a Hard to Count (HtC) index of 1 (the easiest areas to enumerate), light green circles have a HtC index of 2 and dark green circles have a HtC index of 3 (the hardest areas to enumerate). Local Authority boundaries are marked in blue and the Estimation Area boundary in red.



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