



## General Household Survey 2007

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# Sample Design and Response

## Appendix B

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## Sample design and response

In 2007, 12,765 addresses were sampled. The GHS aims to interview all adults aged 16 or over at every household at the sampled address<sup>1</sup>. It uses a probability, stratified two-stage sample design. The Primary Sampling Units (PSUs) are postcode sectors, which are similar in size to wards and the secondary sampling units are addresses within those sectors.

### Sample design

The revised 2000 survey design introduced new stratifiers<sup>2</sup>. Stratification involves the division of the population into sub-groups, or strata, from which independent samples are taken. This ensures that a representative sample will be drawn with respect to the stratifiers (i.e. the proportion of units sampled from any particular stratum will equal the proportion in the population with that characteristic). Stratification of a sample can lead to substantial improvements in the precision of survey estimates. Optimal precision is achieved where the factors used as strata are those that correlate most highly with the survey variables. From 2000, the stratification factors were based on an area classifier and selected indicators from the 1991 census. Details of how these were selected were reported in the January 2000 edition of the ONS Survey Methodology bulletin<sup>3</sup>.

Initially, postcode sectors were allocated to 30 major strata. These were based on the 10 Government Office Regions in England, 5 subdivisions in Scotland and 2 in Wales. The English regions were divided between the former Metropolitan and non-Metropolitan counties. In addition London was subdivided into quadrants (Northwest, Northeast, Southwest and Southeast) with each quadrant being divided into inner and outer areas<sup>4</sup>. Using a finer division of London in the regional stratifier had a large effect on the increase in precision.

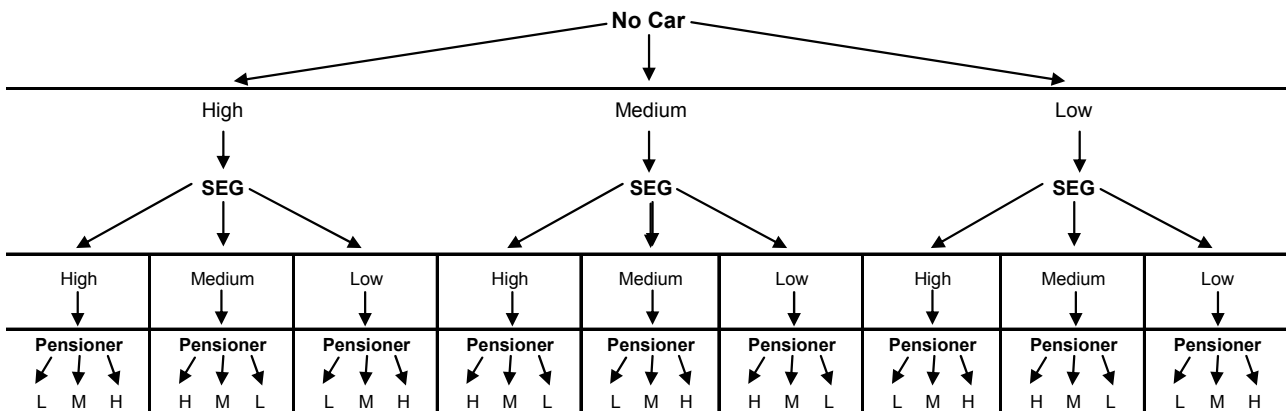
Within each major stratum, postcode sectors were then stratified according to the selected indicators taken from the 1991 Census. Sectors were initially ranked according to the proportion of households with no car, then divided into three bands containing approximately the same number of households. Within each band, sectors were re-ranked according to the proportion of households with household reference person in socio-economic groups 1 to 5 and 13, and these bands were then sub-divided into three further bands of approximately equal size. Finally, within each of these bands, sectors were re-ranked according to the proportion of people who were pensioners. In order to minimise the difference between one band and the next, the ranking by the pensioners and socio-economic group criteria were in the reverse order in consecutive bands, as shown in Figure B.A.

#### **Figure B.A**

Major strata were then divided into minor strata with equal numbers of addresses, the number of minor strata per major strata being proportionate to the size of the major stratum. Since 1984, the frame has been divided into 576 minor strata and one PSU has been selected from each per year. Of the 576 PSUs selected, 48 are randomly allocated to each month of the year. Each PSU forms a quota of work for an interviewer. Within each PSU, 23 addresses are randomly selected.

In 2005 the frame was divided into 720 strata. In 2006, 588 of these were rolled forward to the next wave in the longitudinal design. There were 132 pseudo wave 4 strata which were replaced and an additional 96 strata added, giving 816 for 2006. The expansion to the number of strata is in preparation for the launch of the Integrated Household Survey (IHS). More information on the IHS can be found on the National Statistics website at: <http://www.statistics.gov.uk/CCI/nugget.asp?ID=936&Pos=&ColRank=1&Rank=112>

Figure B.A



### Sample design on the longitudinal General Household Survey

In 2005, the GHS adopted a new sample design in line with European requirements, changing from a cross-sectional to a longitudinal format.

The GHS sample design follows a four-year sample rotation in which households remain in the sample for four years (waves) with one quarter of the sample being replaced each year. Each quarter of the sample is known as a replication, and each replication is representative of the target population. Figure B.B illustrates how the design operates. Once the system is fully established (from year 4 onwards) the sample for any one year consists of four replications which have been in the survey for 1, 2, 3 or 4 years. Each year one of the four replications is dropped and a new one added, giving an overlap of 75 per cent between successive years. This has been implemented to avoid high attrition rates due to repeated interviewing. Because 2007 is the third year of this longitudinal design, this sample contains approximately 25 per cent wave 2 interviews and approximately 50 per cent wave 3 interviews.

In the longitudinal survey, we asked the wave 1, wave 2 and wave 3 respondents for their agreement to be recalled next year for a re-interview at the end of the current interview. Table B.1a shows the percentages of the agreement status for the next year interviews. Agree to recall rate for wave 1, 2 and 3 adults in 2007 was 88 %. Only 3% (377) didn't agree to recall for the next wave interview. Out of these 377 respondents, 245 were wave 1, 81 wave 2 and 51 wave 3 interviews. Nine per cent (1250) were coded as don't know (including refusals & proxies). Out of these 1250 don't know, only 7 were full interviews 1013 proxy interviews and 230 no interviews.

**Table B.1a**

**Table B1a Agree to recall rate for the next wave interview**

*All persons*

*Great Britain 2007*

Agree to recall for the next wave interview	Recall status	
	%	
Yes	88	12276
No	3	377
Don't know (Code for non contacts, refusals and proxies)	9	1250
<i>Unweighted sample</i>		<i>13903</i>

A major advantage of the longitudinal component of the design is that it is more efficient at detecting statistically significant estimates of change over time than is a design utilising independently selected cross-sections. This is because peoples' responses to the same question at different points in time tend to be positively correlated and this has the effect of reducing the estimated standard errors of change. Consequently, year on year comparisons will give the most efficient method of detecting changes over time, i.e. when overlap between the two time points is at its highest. This approach was adopted on the Labour Force Survey to give more efficient measures of un/employment.

The longitudinal design (as illustrated in figure B.B) means that GHS datasets from 2006 are not independent, with approximately three quarters of the sample from the previous year being re-interviewed during the current year.

**Figure B.B**

**Figure B.B**

Sample replication	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
1	1st						
2	1st	2nd					
3	1st	2nd	3rd				
4	1st	2nd	3rd	4th			
5		1st	2nd	3rd	4th		
6			1st	2nd	3rd	4th	
7				1st	2nd	3rd	etc.
8					1st	2nd	etc.
9						1st	etc.

	New sample
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## Follow-up sample

## Conversion of multi-occupancy addresses to households

Most addresses contain just one private household, a few - such as institutions and purely business addresses<sup>5</sup> - contain no private households, while others contain more than one private household. For addresses containing more than one household, set procedures are laid down in order to give each household one and only one chance of selection.

As the Postcode Address File (PAF) does not give names of occupants of addresses, it is not possible to use the number of different surnames at an address as an indicator of the number of households living there. A rough guide to the number of households at an address is provided on the PAF by the multi-occupancy (MO) count. The MO count is a fairly accurate indicator in Scotland but is less accurate in England and Wales, so it is used only when sampling at addresses in Scotland.

All addresses in England and Wales, and those in Scotland with an MO count of two or less, are given only one chance of selection for the sample. At such addresses, interviewers interview all the households they find up to a maximum of three. If there are more than three households at the address, the interviewer selects the households for interview by listing all households at the address systematically then making a random choice by referring to a household selection table.

Addresses in Scotland with an MO count of three or more, where the probability that there is more than one household is fairly high, are given as many chances of selection as the value of the MO count. When the interviewer arrives at such an address, he or she checks the actual number of households and interviews a proportion of them according to instructions. The proportion is set originally by the MO count and adjusted according to the number of households actually found, with a maximum of three households being interviewed at any address. The interviewer selects the households for interview by listing all households at the address systematically and making a random choice, as above, by means of a table.

No addresses are deleted from the sample to compensate for the extra interviews that may result from these multi-household addresses, but a maximum of four extra interviews per quota of addresses is allowed. Once four extra interviews have been carried out in an interviewer's quota, only the first household selected at each multi-occupancy address is included. As a result of the limits on additional interviews, households in concealed multi-occupied addresses may be slightly under-represented in the GHS sample.

## Data collection

Information for the GHS is collected week by week throughout the year<sup>6</sup> by personal interview. From 2006 onwards, interviews took place from January to December each year. In 2005, the field period changed from financial year to calendar year. As the 2004/5 survey finished in March 2005, interviewing for the 2005 survey started in April 2005 and ended in December 2005. However, data from the 2005 January to March period of the 2004/5 survey was included in the analyses of the 2005 data in order to prevent seasonal bias. Since 1994 the survey has been carried out using Computer Assisted Personal

Interviewing (CAPI) on laptop computers and Blaise software by face-to-face interviewers. Since 2000, telephone interviewers have converted GHS proxy interviews to full interviews using Computer Assisted Telephone Interviewing (CATI) from a central unit. Interviews are sought with all adult members (aged 16 or over) of the sample of private households and some information about children in the household is also collected.

A letter is sent in advance of an interviewer calling at an address. The letter briefly describes the purpose and nature of the survey and prepares the recipient for a visit by an interviewer. Since 2001, postage stamps have been included in the advance letter (see 'Improving response').

### Data quality

The face-to-face and telephone interviewers who work on the GHS are recruited only after careful selection procedures after which they take part in an initial training course. Before working on the GHS they attend a briefing and new recruits are always supervised either by being accompanied in the field by a Field Manager or monitored by a Telephone Interviewing Unit (TIU) supervisor. All interviewers who continue to work on the GHS are observed regularly in their work.

### Proxy interviews and the proxy conversion exercise

On occasion it may prove impossible, despite repeated calls, to contact a particular member of a household in person and, in strictly controlled circumstances, interviewers are permitted to conduct a proxy interview with a close household member. In these cases opinion-type questions and questions on smoking and drinking behaviour, qualifications, health, family information and income are omitted.

During the review of the GHS<sup>7</sup> the conversion of proxy interviews to full interviews was examined in order to improve the quality of data (a full interview is one in which the respondent has answered all sections of the questionnaire in person, either face-to-face or by telephone). This was achieved by re-contacting the household member, who was unavailable during the initial face-to-face interview, to answer the questions that were not asked of the proxy respondent on his/her behalf. The most efficient way of re-contacting these respondents was by employing Telephone Interviewing Unit (TIU) interviewers who could contact a widely dispersed population more efficiently than would be possible by conducting face-to-face interviews. Table B.1 shows the percentages of the types of interview taken for all persons in the co-operating households since 2000 before and after the proxy conversion exercise. In 2007 the TIU increased the percentage of full interviews conducted on the GHS from 71 per cent before proxy conversion to 73 per cent. The process of proxy conversion allows the GHS to provide more information on the topics not asked in detail of proxy respondents.

**Table B.1 - Table B.1b**

Table B1 Type of interview taken by proxy conversion status

	<i>All persons</i>										<i>Great Britain</i>	
	Proxy conversion status											
	2003		2004		2005 <sup>1</sup>		2006 <sup>2</sup>		2007 <sup>3</sup>			
	Before	After	Before	After	Before	After	Before	After	Before	After		
	%	%	%	%	%	%	%	%	%	%		
Full interview	70	71	71	73	70	72	71	73	71	73		
Proxy	7	6	7	5	8	6	8	6	7	5		
Child/Other	23	23	21	21	22	22	22	22	22	22		
<i>Unweighted sample</i>	<i>24489</i>	<i>24489</i>	<i>20421</i>	<i>20421</i>	<i>30069</i>	<i>30069</i>	<i>22924</i>	<i>22924</i>	<i>21472</i>	<i>21472</i>		

1 2005 data includes last quarter of 2004/5 data due to survey change from financial year to calendar year.

2 Results for 2006 and 2007 include longitudinal data.

Table B1b Type of interview taken by wave and by proxy conversion status

	<i>All persons</i>				<i>Great Britain 2007</i>			
	Proxy conversion status							
	Wave1		Wave 2+		Wave1		Wave 2+	
	Before	After	Before	After	Before	After	Before	After
	%	%	%	%	%	%	%	%
Full interview	70	72	72	74	72	74	72	74
Proxy	8	7	7	5	7	5	7	5
Child/Other	22	22	22	22	22	22	22	22
<i>Unweighted sample</i>	<i>7368</i>	<i>7368</i>	<i>14101</i>	<i>14101</i>	<i>7368</i>	<i>7368</i>	<i>14101</i>	<i>14101</i>

## Response

The GHS is conducted with people who volunteer their time to answer questions about themselves. The voluntary nature of the survey means that people who do not wish to take part in the survey can refuse to do so. Reasons for not participating in the survey vary from a dislike of surveys to poor health that prevents them from taking part. The sample is designed to ensure that the results of the survey represent the population of Great Britain. The risk of the survey not being representative is likely to increase with every refusal or non-contact with a sampled household (survey non-response). One measure of the quality of survey results is therefore the response rate.

## Harmonised outcome codes and survey response rates

Harmonised outcome codes and definitions of response rates<sup>8</sup> were introduced for the first time on the 2002/3 GHS and other large household surveys, following recommendations

from National Statistics and the National Centre for Social Research joint working group on standard survey outcomes. The harmonised outcome codes are categorised as complete and partial interviews, non-contact, refusals and other non-responders, and unknown and known ineligibility.

The joint working group also recommended that surveys include an estimate of the proportion of cases of unknown eligibility that are eligible from 2002 onwards. It is assumed that the proportion of eligible cases amongst those cases where eligibility is unknown is the same as that amongst cases where eligibility has been established.

Four response rates are now calculated for the GHS on the basis of these outcome codes (full interviews also include cases where the complete interview has been partly completed by the selected person, and partly by proxy):

#### ***Overall response rate***

This indicates how many full and partial interviews were achieved as a proportion of those eligible for the survey. In order to obtain the most conservative response rate measures, the denominator includes an estimate of the proportion of cases of unknown eligibility that would in fact be eligible for interview. In 2007 the overall response rate was 75 per cent.

#### ***Full response rate***

This is similar to the overall response rate calculated above, but only full interviews are included in the numerator. The full response rate for the GHS in 2007 was 66 per cent.

#### ***Co-operation rate***

This indicates the number of achieved interviews as a proportion of those contacted during the fieldwork period. The co-operation rate for the GHS in 2007 was 78 per cent.

#### ***Contact rate***

The contact rate measures the proportion of cases in which some household members were reached by the interviewer even though they might then have refused or been unable to give further information about the household or to participate in the survey. In 2007 the contact rate for the GHS was 95 per cent.

Table B.2 shows the outcome of visits to the addresses selected for the 2007 sample and the resultant number of households interviewed. Out of the 12,765 addresses that were selected, 11,930 were eligible and this yielded a sample of 12,023 eligible households. In 8,871 households, interviews (including proxies) were achieved with every member of the household. In a further 219 households interviews were achieved with some but not all members of the household. This produced a total of 9,080 full or partial interviews.

In total, 22 per cent of households selected for interview in 2007 were lost to the sample altogether, because they did not wish to take part (17 per cent) or because they could not be contacted (5 per cent) (table not shown). Table B.3 shows annual response by interview outcome category.

### **Tables B.2-B.3**

## Sample Design and Response

Table **B2** The sample of addresses and households

Great Britain: 2007

Selected addresses		12765
Ineligible addresses:		835
Demolished or derelict		
Used wholly for business purposes		
Empty		
Institutions		
Other ineligible		
No sample selected at address		
Address not traced		
Eligible addresses		11930
Number of households at eligible addresses		12023
Number of households where all individual interviews achieved (including proxies)	8871	9080
Number of households where some but not all individual interviews achieved	219	

Table **B3** Annual Response

Households

Great Britain: 2007

Outcome category	No.	%
1 Complete household co-operation	7599	63.2
2 Non-interview with one of more household members, proxy taken	1272	10.6
3 Non-contact with one or more household members	80	0.7
4 Refusal by at least one household member	139	1.2
5 Non-contact with household/resident	758	6.3
6 HQ refusal	396	3.3
7 Other refusal	1772	14.7
8 Other non-response	4	0.1
<i>Unweighted sample base = 100%</i>		<i>12020</i>

## Trends in response

In order to continue to measure the response to the survey over time, a 'middle' response rate has been calculated since 1971. The middle response rate includes full interviews and accepts some of the partial household interviews as response – that is, it includes households where information has been collected by proxy and is therefore missing certain sections (category 2 in Table B.3), but does not include those where information is missing altogether for one or more household members (categories 3 and 4 in Table B.3). In other words, this middle rate can be thought of as the proportion of the sample of households known to be eligible from whom all or nearly all the information was obtained.

For the purposes of comparison, the middle response rate has been calculated, although it is not in itself a classification of the harmonised response rates. In 2007, full interviews also included complete interviews completed partly by the selected person and partly by proxy.

In 2007 the middle response rate was 73 per cent. Table B.4 shows middle response rates by Government Office Region. Trends in the middle response rate are shown in Table B.5. Since 1971, the middle response rate has shown some fluctuation. The decline in response rate since the early 1990s is due to an increase in the proportion of households refusing to participate (12 per cent in 1991 rising to 21 per cent in 2006) rather than failure to contact people. This decline reflects a general trend in decreasing response experienced by all survey organisations.

### Tables B.4-B.5

**Figure B.4** Middle response rates by wave and Government Office Region

Households Government Office Region	Great Britain: 2007			
	Wave 1 %	Wave 2 + %	%	Rank
North East	57.7	82.6	72.3	9
North West	61.8	79.2	72.5	8
Yorkshire and the Humber	64.8	80.4	74.6	5
East Midlands	68.5	85.7	79.2	1
West Midlands	60.2	78.1	71.0	10
East of England	66.4	82.0	75.5	4
London	50.7	75.5	63.2	11
South East (excluding Greater London)	64.5	80.6	74.4	6
South West	59.3	82.4	73.8	7
Wales	73.2	80.4	77.8	2
Scotland	68.6	81.3	76.4	3
Great Britain	62.6	80.6	73.4	

Full interviews include complete interviews partly completed by selected person and partly by proxy.

Table **B5** Trends in the middle response rate: 1971 to 2007

<i>Households</i>	<i>Great Britain</i>
Year	Response rate
	%
1971	83
1972	81
1973	81
1974	83
1975	84
1976	84
1977	83
1978	82
1979	83
1980	82
1981	84
1982	84
1983	82
1984	81
1985	82
1986	84
1987	85
1988	85
1989	84
1990	81
1991	84
1992	83
1993	82
1994	80
1995	80
1996	76
1998	72
2000	67
2001	72
2002	69
2003	70
2004	69
2005	72
2006	76
2007	73

2005 data includes last quarter of 2004/5 data due to survey change from financial year to calendar year.

From 2005 full interviews include complete interviews partly completed by selected person and partly by proxy.

### Improving response

The GHS uses a number of methods to try to improve response. One ongoing method of improving response has been to reissue addresses to interviewers where there is a possibility of obtaining a better outcome, for example if there was initially a non-contact or a circumstantial refusal.

During the 2001/2 survey the advance letter was changed to mention that the survey had been running for 30 years. This change shows respondents how important the survey is

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and how many people take part. For subsequent years a similar advance letter has been produced informing respondents that the survey has been running for over 30 years.

Another method was introduced in 2002 following the findings of the Response Working Group of the Office for National Statistics. The Group found that response was higher among households who received postage stamps with their advance letters. Since August 2002, stamps have been included in all advance letters.

Respondents receive a £10 gift voucher for each full follow up interview they complete. Where a follow up interview is taken by proxy, a voucher is only issued if the TIU convert the proxy interview to a full interview.

**Sample sizes**

Tables B.6 and B.7 show the numbers of households and individuals interviewed on the 2007 GHS by age, sex, region and country.

**Tables B.6-B.7**

**Table B6** Unweighted bases: number of household reference persons in GHS 2007 by age, sex, region and country

	<i>Household reference persons</i>							<i>Great Britain: 2007</i>
	Age							All
	16-24	25-34	35-44	45-54	55-64	65-74	75+	
<b>Sex</b>								
Male	102	620	1159	1087	1156	935	663	5722
Female	94	422	667	583	556	451	596	3369
<b>Government Office Region</b>								
North East	9	36	75	63	76	76	59	394
North West	29	136	225	189	183	172	152	1086
Yorkshire and the Humber	28	108	157	169	154	133	103	852
East Midlands	17	80	163	133	143	120	115	771
West Midlands	7	82	143	154	148	129	98	761
East of England	21	108	187	176	172	147	126	937
London	20	127	208	141	123	87	100	806
South East	20	125	258	247	247	190	198	1285
South West	12	88	180	153	171	129	125	858
<b>Country</b>								
England	163	890	1596	1425	1417	1183	1076	7750
Wales	11	46	74	92	123	79	63	488
Scotland	22	106	156	153	172	124	120	853
<b>Total</b>	196	1042	1826	1670	1712	1386	1259	9091

Shaded figures also show the number of households in each region and country.

Table B7 Unweighted bases: number of people in GHS by age, sex, region and country

<i>All persons</i>	<i>Great Britain: 2007</i>									
	Age									All
	0-4	5-15	16-24	25-34	35-44	45-54	55-64	65-74	75+	
<b>Sex</b>										
Male	606	1611	1008	1029	1507	1392	1429	1073	740	10395
Female	621	1511	1007	1186	1731	1491	1479	1125	926	11077
<b>Government Office Region</b>										
North East	50	101	71	81	125	110	131	112	74	855
North West	150	409	212	271	394	307	320	252	200	2515
Yorkshire and the Humber	101	288	222	223	286	288	256	193	131	1988
East Midlands	102	208	164	173	267	228	274	203	145	1764
West Midlands	109	283	179	172	267	262	260	213	126	1871
East of England	109	332	224	246	334	309	278	247	179	2258
London	148	338	190	279	353	248	182	132	126	1996
South East	171	465	285	282	467	442	409	313	268	3102
South West	105	291	174	184	333	271	309	202	167	2036
<b>Country</b>										
England	1045	2715	1721	1911	2826	2465	2419	1867	1416	18385
Wales	61	176	118	94	134	165	200	134	93	1175
Scotland	121	231	176	210	278	253	289	197	157	1912
<b>Total</b>	<b>1227</b>	<b>3122</b>	<b>2015</b>	<b>2215</b>	<b>3238</b>	<b>2883</b>	<b>2908</b>	<b>2198</b>	<b>1666</b>	<b>21472</b>

## Notes and references

<sup>1</sup> A limit is put on the number of households that are contacted per address. This is explained in detail at the 'Conversion of multi-occupancy addresses to households' section of Appendix B.

<sup>2</sup> From 1984 to 1998, the stratifiers used were a regional variable (based on the standard statistical region until 1996 and on the Government Office Region in 1998) and variables that measured the prevalence of privately rented accommodation, local authority accommodation and people in professional and managerial socio-economic groups.

<sup>3</sup> Insalaco F Choosing stratifiers for the General Household Survey *ONS Social Survey Division, Survey Methodology Bulletin*, No. 46, January 2000.

<sup>4</sup> The GOR regional stratifier:

1. North East Met
2. North East Non Met
3. North West Met
4. North West Non Met
5. Merseyside

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6. Yorks and Humberside Met
7. Yorks and Humberside Non Met
8. East Midlands
9. West Midlands Met
10. West Midlands Non Met
11. Eastern Outer Met
12. Eastern Other
13. Inner London North-East
14. Inner London North-West
15. Inner London South-East
16. Inner London South-West
17. Outer London North-East
18. Outer London North-West
19. Outer London South-East
20. Outer London South-West
21. South East Outer Met
22. South East Other
23. South West
24. Wales 1 – Glamorgan, Gwent
25. Wales 2 – Clwydd, Gwynedd, Dyfed, Powys
26. Highlands, Grampian, Tayside
27. Fife, Central, Lothian
28. Glasgow Met
29. Strathclyde (excl. Glasgow)
30. Borders, Dumfries, Galloway

<sup>5</sup> Most institutions and business addresses are not listed on the small-user PAF. If an address was found in the field to be non-private (e.g. boarding house containing four or more boarders at the time the interviewer calls), the interviewer was instructed not to take an interview. However, a household member in hospital at the time of interview was included in the sample provided that he or she had not been away from home for more than six months and was expected to return. In this case a proxy interview was taken.

<sup>6</sup> In 1988, the GHS interviewing year was changed from a calendar year to a financial year basis. From 2005, the GHS interviewing year was changed back from financial year to calendar year.

<sup>7</sup> Walker A et al *Living in Britain Results from the 2000 General Household Survey: Appendix E*. TSO London 2002. Also available on the web: [www.statistics.gov.uk/lib](http://www.statistics.gov.uk/lib)

<sup>8</sup> Lynn P, Beerten R, Laiho J and Martin J. Recommended Standard Final Outcome Categories and Standard Definition of Response Rate for Social Surveys. ISER Working Papers. Number 2001 – 23. <http://www.iser.essex.ac.uk/pubs/workpaps/pdf/2001-23.pdf>