

Longitudinal Studies Centre - Scotland

Home of the Scottish Longitudinal Study



THE SCOTTISH LONGITUDINAL STUDY

Tracing rates and sample quality for the 1991 Census SLS sample

LSCS Working Paper 2.0

October 2007

Lin Hattersley

LSCS & General Register Office for Scotland

Gillian Raab

LSCS & University of St Andrews

Paul Boyle

LSCS & University of St Andrews



Contents

- 1 Introduction**
- 2 Creation and selection of the 1991 Census samples**
- 3 Tracing and flagging using the National Health Service Central Register (NHSCR)**
 - 3.1 Duplicates
 - 3.2 Dummies
- 4 The quality of tracing in the 1991 Census – SLS sample**
 - 4.1 Age and sex (100% variables)
 - 4.2 Age, sex, marital status (100% variables)
 - 4.3 Country of birth (100% variables)
 - 4.4 Region of usual residence (100% variables)
 - 4.5 Household type (100% variables)
 - 4.6 Economic position (100% variables)
 - 4.7 Social Class (based on 10% variables recoded to 100%)
 - 4.8 Socio-economic group (based on Census 10% variables recoded to 100%)
- 5 Modelling factors that influence not traced rates for 1991 SLS members**

6 The quality of sampling in the 1991 Census – SLS sample

- 6.1 Quality of sampling by age, and sex (100% variables)**
- 6.2 Quality of sampling by age, sex and marital status (100% variables)**
- 6.3 Quality of sampling by sex and country of birth (100% variables)**
- 6.4 Quality of sampling by sex and region (100% variables)**
- 6.5 Quality of sampling by sex and household type (100% variables)**
- 6.6 Quality of sampling by sex and social class (based on Census 10% variables recoded to 100%)**
- 6.7 Quality of sampling by sex and socio-economic group (based on Census 10% variables recoded to 100%)**

7 Conclusion

8 Appendix 1: Modelling results for 1991 tracing rates

1 Introduction

The Scottish Longitudinal Study (SLS) is a large scale linkage study which has been created by utilizing data available from routinely collected administrative and statistical datasets. These sources currently include Census data, Vital Events data (births, deaths, and marriages), National Health Service Central Register (NHSCR) data (migration in or out of Scotland) and NHS data (cancer registrations and hospital discharges).

The SLS is a 5.3% representative sample of the Scottish population starting with data drawn from the 1991 Census. The sample is selected using 20 semi-random dates of birth occurring every year. The SLS date distribution follows the annual Scottish births distribution pattern and included within these dates are the four England and Wales Longitudinal Study (LS) dates. The inclusion of the LS dates within the SLS provides the opportunity for the construction of a 1% UK longitudinal study dataset (England and Wales, Scotland and Northern Ireland) in the future.

This working paper covers the creation, selection and quality of the 1991 Census SLS sample that was used as the starting point of this study. It provides details of the methods used to select the sample from the 1991 Census returns and the process of flagging the study members on the NHSCR system. It goes on to discuss the quality of the tracing rates and sampling fractions. This is designed to be a technical report and for a more general introduction to the SLS, please refer to LSCS Working Paper 1 “The Scottish Longitudinal Study: an introduction”.

2 Creation and selection of the 1991 Census sample

The 1991 SLS sample was selected from the 1991 Scottish Census using 20 semi-random dates of birth (day and month) occurring in every year as the sampling criteria. Anyone with the correct birthday was extracted from the 1991 Census microdata. The size of the initial sample was 274,055 persons or 5.5% of the Scottish population. The sample size was reduced slightly, after dummies and duplicates (see below) were removed, leaving 270,385 persons or a 5.3% sample. As the SLS has been set up to be a longitudinal study which links together records from administrative sources over time it requires a mechanism to achieve that linkage. This mechanism is provided by the NHSCR who maintain a database of all

UK residents who are registered with a General Practitioner. This is probably the most comprehensive 'register' of the UK population in existence currently. Consequently, this database is used in numerous medical studies. Names are one of the basic pieces of information required by the NHSCR to allow them to 'trace' an individual in their database and then 'flag' that person so that they are identified as being part of a particular medical study. More detailed information about this process is provided below.

We needed to trace our chosen SLS sample in the NHSCR dataset. For most studies, and indeed for later stages in the development of the SLS, 'electronic linkage' is possible. This involves providing the required minimum search criteria (name, date of birth and sex) to NHSCR in an electronic file which is then run against their database. Traced individuals can then be identified.

However, the 1991 Census form contained a statement that the names and addresses given on the form would not be computerised at any point during the Census process. Thus, while most of the information about each person captured in the 1991 census was held on computer, these vital pieces of information were not. This meant that a manual system had to be developed to extract the names of potential SLS members from the original Census forms. This involved a series of steps. First, those people with the correct dates of birth were identified in the electronically held Census data. Included in this information was a geographical identifier. This was used to identify the box that the person's census form was held in, as they had been ordered by Region and Enumeration District number once they had been processed. Once the sample member's form was found their name was identified on the form and it was transcribed into a 'batch book'. 1,109 'batch books' had already been created from the electronically held Census data, each of which contained sheets containing some known census details about 250 potential SLS members. The size of the batch books was constrained by the number of forms that would fit into the Census form storage boxes used for the SLS sample (see below). The data in the batch books therefore included some basic information about the person, as well as spaces for the forename and surname to be written in by hand once their form had been located (Table 2.0).

Table 2.0: Contents of the Batch Books

Data in Batch Books	Comments
Geographical region	Used to help locate Census form
Batch number	Running from 1 to 1109 books
Enumeration District number	Used to help locate Census form
Form number	Census form number used to help locate correct Census form
Person number	Used to locate potential SLS member within a Census form
Person type	P for person in private household C for person in communal establishment
10% sample	Identified if the data from this form had been fully (100%) coded. Only those forms in the 10% sample were fully coded
Date of birth	Crucial information for identifying a SLS member and used by NHSCR for tracing
Sex	Required by NHSCR for tracing
Marital status	Helpful to NHSCR in tracing
SLS number	SLS unique identifier – used as flag on the NHSCR database once the person was traced
Forename	To be written in by hand. Required by NHSCR for tracing
Surname	To be written in by hand. Required by NHSCR for tracing

When a form containing a potential SLS member (or members) was found it was extracted from the original 1991 Census box and a marker labelled 'Scottish Longitudinal Study' was inserted into the original box in its place. The SLS processing team member then recorded, by hand, the forename and surname of the potential SLS member in the space provided in the appropriate batch book. The extracted census forms were not re-filed into their original boxes but were placed into new SLS boxes, which were also ordered geographically and have been kept separate to date. Each SLS box was labelled with Region, Batch number, ED number range and SLS team member name.

Once all the names had been entered into a batch book it was ready to be sent to the NHSCR for flagging (see below). Each batch book had a control form associated with it which was used for tracking the progress of the batch books to and from NHSCR. A daily logging form was also filled in to reconcile form numbers and to ensure that all batch books and census forms were securely stored at the end of each day.

Retrieval of the 1991 Census forms began in Autumn 2001 and was completed in June 2002. Of the 255,610 forms that were searched for, 255,607 were found. The first batch book was handed to the NHSCR in October 2001 and a pilot was run to locate any problems in procedures. The last book was sent in June 2002. The full manual search was begun by NHSCR in December 2001 and completed in October 2005.

3 Tracing and Flagging using the National Health Service Central Register (NHSCR)

Flagging of the SLS members was achieved through the use of NHSCR's database which contains entries for everyone born in Scotland or registered with a Scottish NHS doctor. The NHSCR system is used to maintain the accuracy of Scottish healthcare systems and to trigger the movement of patients' medical records across UK borders. This makes it a valuable tool for identifying the location of individuals and this is used in numerous medical studies where the aim is to follow persons over time.

Tracing each SLS individual involves finding an entry for that person on the NHSCR database using the name, sex and date of birth as a minimum set of search criteria. Using the batch books to provide the necessary search terms each potential SLS member identified at the 1991 Census had to be traced manually in the system. If that person was found the SLS number was keyed in to the database and that person was then 'flagged' with this unique identifier. When the NHSCR could not make an 'exact' match from the information provided in the batch book (about 10% of cases) then further information was requested from the SLS team including:

- Address and postcode
- Spouse (if available) – name and date of birth
- Parents (if available) – names and dates of birth
- Other household members – names and dates of birth

This required the SLS team to return to the appropriate census form and then annotate the sheet sent by NHSCR with these details manually. The majority of these cases were then found in the NHSCR and the final percentage of untraced cases was less than 2%.

3.1 Duplicates

Duplicate records occur in the census where the same person has been enumerated more than once, usually in more than one location. The majority of cases involved students enumerated at both their term-time and vacation addresses and children of

divorced parents enumerated as usually resident at both parental addresses on Census night. Other cases included persons enumerated at both their home address and at a communal establishment and persons who filled in forms at two addresses, incorrectly giving both as their usual residence. The final count of duplicate forms in our sample was 377 and each one was investigated so that the problem could be resolved and the appropriate record deleted.

The cases were resolved as follows:

- 3.1.1. Student double enumerations were resolved by counting them at their home (vacation) address following the instructions on the 1991 Census form and deleting their record (including their second SLS number) at their term-time address
- 3.1.2. Where a child of divorced parents was enumerated separately at both addresses the resolution was to place the child at the mothers' address as this would be their most likely permanent residence
- 3.1.3. The other cases were resolved by the SLS Unit looking at the records and, where the solution was not obvious, arbitrarily allocating the person to one address

NHSCR was informed of the decision and asked to remove the flag from the duplicate record and retain the flag on the correct record on their database.

3.2 Dummies

Dummy forms were created by census enumerators where no one could be found in residence at the time of the census. These forms had minimal details on them such as number of rooms and numbers of usual residents, with the information often provided by a neighbour. Dummies in the Census returns were allocated values for some variables including date of birth and, as a result, some were included in the original file provided by GROS Census to locate the 1991 SLS census sample on the census forms. This meant that dummy persons were given SLS numbers and included in the batch books sent to NHSCR. If a potential SLS member was identified as coming from a dummy form the entry in the batch book was marked 'DUMMY' and NHSCR did not flag them on their database. Census data was not provided for these dummy persons and their SLS numbers and any associated records were deleted from the SLS database.

4 The Quality of tracing in the 1991 Census – SLS sample

As described above, the 1991 Census – SLS sample was selected from the 1991 Census usually resident population in Scotland using the selection criteria of 20 birthdates which provided a sample of 270,385 persons (129,232 males and 141,153 females). This section describes how successfully this sample could be traced in the NHSCR database.

For a SLS member to be traced they must have an entry in the NHSCR database (i.e. registered with a doctor within the NHS system). Those persons defined as 'not traced' had not been found by NHSCR at the time of flagging the 1991 sample. Many of these 'not traced' SLS members have become traced at a later date, especially those persons who were recent immigrants at the time of the 1991 Census but who had not registered with a GP at the time. If SLS Members remain as 'not traced' it is not possible to link other administrative data (births, deaths, marriages, cancer registrations etc.) to their record.

It is therefore important that accurate tracing rates are calculated and the 'not traced' rate is measured as:

$$\frac{\text{number not traced in subgroup}_i}{\text{original sample in subgroup}_i} \times 100\%$$

and the traced rate is defined as:

$$100 - (\text{the 'not traced' rate}).$$

Overall, the tracing rate was a remarkable 98.13%. This was particularly impressive, given that the 1991 census sample was being traced over a decade later and it demonstrates the reliability of the linkage system being used. The NHSCR staff have considerable skills in this field and use a range of data resources (such as birth and marriage records) to help trace difficult cases.

However, the tracing rate obviously varies by population sub-group. For example, slightly more males than females were traced (98.34% of males and 97.93% of

females); the lower proportion of women being traced is mainly due to problems associated with name changes that occur following marriage or divorce. Below we explore the tracing rates by a range of census variables. These tables provide useful indicators of the reliability of different population sub-groups in the SLS¹.

4.1 Age and sex (100% variables)

Table 2.1 shows the 1991 Census – SLS sample by age and sex and ‘not traced’ rates. The highest ‘not traced’ rates were found among men who were aged 20 – 24 in 1991 (2.52%), 25 – 29 (2.18%), 50 – 54 (2.29%), 55 – 59 (2.18%) and 65 – 69 (2.23%). Among women the pattern was different with the highest ‘not traced’ rates occurring among those aged 40 and over. As stated above, this appears to be mainly due to name changes on divorce and marriage or re-marriage subsequent to the 1991 Census. These data are shown in Figures 2.1 and 2.2 below, where their interpretation is discussed further.

¹ Note that where a table title refers to ‘100% variables’ these are variables that were fully coded by Census for 100% of the enumerated population. Where a variable is referred to as a ‘10%’ variable’ only 10% of the responses for that variable were coded by Census for the total population. The SLS Unit fully recoded these ‘10% variables’ for the SLS so that 100% of responses for SLS members (and for other persons in their households) are available in the SLS database.

Table 2.1: 1991 SLS sample population by sex, age and 'not traced' rates

Age	Males					Females					Total				
	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.
0 – 4	8763	52	8815	0.590	0.164	8483	57	8650	0.659	0.175	17246	109	17355	0.628	0.120
5 – 9	8661	56	8717	0.642	0.172	8463	64	8600	0.744	0.186	17124	120	17244	0.696	0.127
10 – 14	8756	59	8815	0.669	0.174	8072	52	8199	0.634	0.176	16828	111	16939	0.655	0.124
15 – 19	8913	98	9011	1.088	0.220	8796	125	9014	1.387	0.248	17709	223	17932	1.244	0.167
20 – 24	9457	244	9701	2.515	0.322	9933	217	10350	2.097	0.285	19390	461	19851	2.322	0.216
25 – 29	10096	225	10321	2.180	0.291	10688	192	11088	1.732	0.250	20784	417	21201	1.967	0.193
30 – 34	9861	197	10058	1.959	0.279	10252	198	10593	1.869	0.266	20113	395	20508	1.926	0.194
35 – 39	8875	157	9032	1.738	0.277	9304	173	9563	1.809	0.275	18179	330	18509	1.783	0.196
40 – 44	9261	168	9429	1.782	0.275	9544	221	9868	2.240	0.301	18805	389	19194	2.027	0.206
45 – 49	8043	142	8185	1.735	0.291	7933	241	8254	2.920	0.376	15976	383	16359	2.341	0.239
50 – 54	7253	170	7423	2.290	0.351	7645	239	7967	3.000	0.388	14898	409	15307	2.672	0.264
55 – 59	6947	155	7102	2.182	0.351	7329	230	7656	3.004	0.396	14276	385	14661	2.626	0.268
60 – 64	6454	130	6584	1.974	0.346	7368	244	7719	3.161	0.405	13822	374	14196	2.635	0.272
65 – 69	5877	134	6011	2.229	0.385	7004	247	7385	3.345	0.426	12881	381	13262	2.873	0.294
70 – 74	4231	72	4303	1.673	0.394	5939	160	6223	2.571	0.407	10170	232	10402	2.230	0.293
75+	5638	87	5725	1.520	0.326	11482	258	11935	2.162	0.269	17120	345	17465	1.975	0.213
Total	127086	2146	129232	1.661	0.072	138235	2918	141153	2.067	0.077	265321	5064	270385	1.873	0.053

4.2 Age, sex, marital status (100% variables)

Table 2.2 shows the 'not traced' rates by age, sex and marital status. Among single SLS members in 1991 only those aged 0 – 19 show low 'no trace' rates for both sexes, although single women aged between 45 – 64 also have low 'no trace' rates. The highest 'not traced' rates were found among those who were widowed or divorced at the 1991 Census but these are partly due to low numbers particularly among the younger age groups. Excluding those who were in the married, widowed and divorced categories aged under 20, the highest 'not traced' rates were found among single males aged 50 – 64 (4.06%) and divorced females aged 45 – 49 (6.21%).

Table 2.2: 1991 SLS sample by age, sex, marital status and 'not traced' rates, single

Age	Males					Females				
	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.
0 – 15	27872	183	28055	0.652	0.096	26658	185	26843	0.689	0.101
16 – 19	7178	80	7258	1.102	0.246	7002	106	7108	1.491	0.290
20 – 24	8152	210	8362	2.511	0.347	7372	169	7541	2.241	0.345
25 – 29	4797	123	4920	2.500	0.451	3662	103	3765	2.736	0.539
30 – 34	2353	64	2417	2.648	0.662	1749	48	1797	2.671	0.771
35 – 39	1319	50	1369	3.652	1.033	920	25	945	2.646	1.058
40 – 44	1106	27	1133	2.383	0.917	633	19	652	2.914	1.337
45 – 49	791	24	815	2.945	1.202	458	5	463	1.080	0.966
50 – 64	1773	75	1848	4.058	0.937	1674	33	1707	1.933	0.673
65+	1388	56	1444	3.878	1.036	3253	70	3323	2.107	0.504
Total	56729	892	57621	1.548	0.104	53381	763	54144	1.409	0.102

SLS sample by age, sex, marital status and 'not traced' rates, married

Age	Males					Females				
	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.
0 – 15	0	0	0	0.000		0	0	0	0.000	
16 – 19	42	2	44	4.545	6.428	146	5	151	3.311	2.962
20 – 24	1263	31	1294	2.396	0.861	2436	43	2479	1.735	0.529
25 – 29	4995	89	5084	1.751	0.371	6400	73	6473	1.128	0.264
30 – 34	6875	114	6989	1.631	0.306	7554	130	7684	1.692	0.297
35 – 39	6878	93	6971	1.334	0.277	7354	111	7465	1.487	0.282
40 – 44	7423	113	7536	1.499	0.282	7793	144	7937	1.814	0.302
45 – 49	6587	97	6684	1.451	0.295	6466	175	6641	2.635	0.398
50 – 64	16917	320	17237	1.856	0.208	16284	491	16775	2.927	0.264
65+	10851	160	11011	1.453	0.230	8404	247	8651	2.855	0.363
Total	61831	1019	62850	1.621	0.706	62837	1419	64256	2.208	0.117

SLS sample by age, sex, marital status and 'not traced' rates, widowed

Age	Widowed									
	Males					Females				
	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.
0 – 15	0	0	0	0.000		0	0	0	0.000	
16 – 19	1	0	1	0.000	0.000	3	1	4	25.000	50.000
20 – 24	3	0	3	0.000	0.000	4	0	4	0.000	0.000
25 – 29	4	0	4	0.000	0.000	24	0	24	0.000	0.000
30 – 34	18	2	20	10.000	14.142	49	2	51	3.922	5.546
35 – 39	27	0	27	0.000	0.000	81	4	85	4.706	4.706
40 – 44	48	2	50	4.000	5.657	156	7	163	4.294	3.246
45 – 49	80	0	80	0.000	0.000	269	12	281	4.270	2.466
50 – 64	806	28	834	3.357	1.269	3019	121	3140	3.854	0.701
65+	3157	66	3223	2.048	0.504	12212	318	12530	2.538	0.285
Total	4144	98	4242	2.310	0.467	15817	465	16282	2.856	0.265

SLS sample by age, sex, marital status and 'not traced' rates, divorced

Age	Divorced									
	Males					Females				
	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.
0 – 15	0	0	0	0.000		0	0	0	0.000	
16 – 19	0	0	0	0.000	0.000	5	1	6	16.667	33.333
20 – 24	39	3	42	7.143	8.248	121	5	126	3.968	3.549
25 – 29	300	13	313	4.153	2.304	602	16	618	2.589	1.294
30 – 34	615	17	632	2.690	1.305	900	18	918	1.961	0.924
35 – 39	651	14	665	2.105	1.125	949	33	982	3.360	1.170
40 – 44	684	26	710	3.662	1.436	962	51	1013	5.035	1.410
45 – 49	585	21	606	3.465	1.512	740	49	789	6.210	1.774
50 – 64	1158	32	1190	2.689	0.951	1365	68	1433	4.745	1.151
65+	350	11	361	3.047	1.837	556	30	586	5.119	1.869
Total	4382	137	4519	3.032	0.518	6200	271	6471	4.188	0.509

4.3 Country of birth (100% variables)

Ninety seven per cent of the 1991 SLS sample population was born in the UK and of those 92% were born in Scotland (see Table 2.3). Unsurprisingly, tracing rates among those born in Scotland were higher than for those born elsewhere (99% of Scottish born males and 98.5% of Scottish born females were traced at NHSCR).

Among the 3% of the sample born outside the UK, 13.4% of males and 12.51% of females were untraced at NHSCR. The high proportion of untraced SLS members in this group is partly an effect of the low numbers of those born outside the UK who were living in Scotland at the time of the 1991 Census. However, this group contains persons who were not registered with a GP in 1991 and are still not registered with a NHS GP, others who may have registered with a GP with a different date of birth from that given on their Census form and those who were not registered at the time of the 1991 Census and have subsequently left Scotland. For example, the 'not traced' rate is quite high for those born in the USA. However, this group likely includes members of the US Armed Forces who will have been captured on the 1991 Census, but who do not register with the NHS because medical services are provided for them.

Table 2.3: Country of Birth

Country of Birth	Males					Females					Total				
	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.
England & Wales	9311	346	9657	3.583	0.385	9733	400	10133	3.947	0.395	19044	746	19790	3.770	0.276
Scotland	113726	1229	114955	1.069	0.061	124039	1909	125948	1.516	0.069	237765	3138	240903	1.303	0.047
Northern Ireland	646	45	691	6.512	1.942	742	77	819	9.402	2.143	1388	122	1510	8.079	1.463
Other UK	4	0	4	0.000		2	0	2	0.000		6	0	6	0.000	
United Kingdom	123687	1620	125307	1.293	0.064	134516	2386	136902	1.743	0.071	258203	4006	262209	1.528	0.048
Outside UK	3399	526	3925	13.401	1.169	3719	532	4251	12.515	1.085	7118	1058	8176	12.940	0.796
					0.000					0.000					0.000
Irish Republic *	508	54	562	9.609	2.615	594	89	683	13.031	2.763	1102	143	1245	11.486	1.921
Old Commonwealth	352	26	378	6.878	2.698	449	30	479	6.263	2.287	801	56	857	6.534	1.746
New Commonwealth & Pakistan	1036	156	1192	13.087	2.096	1053	181	1234	14.668	2.180	2089	337	2426	13.891	1.513
India	218	33	251	13.147	4.577	237	44	281	15.658	4.721	455	77	532	14.474	3.299
Pakistan	233	55	288	19.097	5.150	186	58	244	23.770	6.242	419	113	532	21.241	3.996
African Commonwealth	181	18	199	9.045	4.264	195	24	219	10.959	4.474	376	42	418	10.048	3.101
Caribbean Commonwealth	40	6	46	13.043	10.650	53	3	56	5.357	6.186	93	9	102	8.824	5.882
Remainder New Commonwealth	364	44	408	10.784	3.252	382	52	434	11.982	3.323	746	96	842	11.401	2.327
European Community	537	60	597	10.050	2.595	728	61	789	7.731	1.980	1265	121	1386	8.730	1.587
Other Europe	221	32	253	12.648	4.472	140	24	164	14.634	5.974	361	56	417	13.429	3.589
USA	201	113	314	35.987	6.771	272	84	356	23.596	5.149	473	197	670	29.403	4.190
Elsewhere & not stated	544	85	629	13.514	2.931	483	63	546	11.538	2.907	1027	148	1175	12.596	2.071
Total	127086	2146	129232	1.661	0.072	138235	2918	141153	2.067	0.077	265321	5064	270385	1.873	0.053

* Includes Ireland part not stated

4.4 Region of usual residence (100% variables)

Table 2.4 shows the 1991 SLS sample population by sex, region of usual residence and 'not traced' rates. The lowest and highest 'not traced' rates were found among persons usually resident in the Island regions of Scotland, the highest rates being found in Shetland and the lowest in Orkney and the Western Isles. Excluding the Islands, the highest 'not traced' rates were found among males and females resident in the Lothian region ('not traced' rates of 2.05% and 2.58% respectively). The lowest regional 'not traced' rates in 1991 were found for males resident in the Central belt (0.98%) and for females resident in Dumfries and Galloway (1.44%). Overall, though, the geographical variability in the 'not traced' rates is relatively small.

Table 2.4: 1991 SLS sample population by sex, region of usual residence and 'not traced' rates

Region of usual residence	Males					Females					Total				
	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.
Borders	2655	44	2699	1.630	0.492	2870	54	2924	1.847	0.503	5525	98	5623	1.74	0.352
Central	6744	67	6811	0.984	0.240	7581	123	7704	1.597	0.288	14325	190	14515	1.31	0.190
Dumfries & Galloway	3888	46	3934	1.169	0.345	4178	61	4239	1.439	0.368	8066	107	8173	1.31	0.253
Fife	8879	114	8993	1.268	0.237	9515	140	9655	1.450	0.245	18394	254	18648	1.36	0.171
Grampian	13125	235	13360	1.759	0.229	13936	223	14159	1.575	0.211	27061	458	27519	1.66	0.156
Highland	5367	76	5443	1.396	0.320	5441	117	5558	2.105	0.389	10808	193	11001	1.75	0.253
Lothian	18287	382	18669	2.046	0.209	19975	528	20503	2.575	0.224	38262	910	39172	2.32	0.154
Strathclyde	56555	977	57532	1.698	0.109	62255	1402	63657	2.202	0.118	118810	2379	121189	1.96	0.080
Tayside	9619	162	9781	1.656	0.260	10623	209	10832	1.929	0.267	20242	371	20613	1.80	0.187
Orkney Islands	522	3	525	0.571	0.660	557	3	560	0.536	0.619	1079	6	1085	0.55	0.452
Shetland Islands	616	33	649	5.085	1.770	545	33	578	5.709	1.988	1161	66	1227	5.38	1.324
Western Isles	829	7	836	0.837	0.633	759	25	784	3.189	1.276	1588	32	1620	1.98	0.698
SCOTLAND - Total	127086	2146	129232	1.661	0.072	138235	2918	141153	2.067	0.077	265321	5064	270385	1.87	0.053

4.5 Household type (100% variables)

Table 2.5 shows the 1991 SLS sample population by sex, household type and 'not traced' rates. Over 94% of the 1991 SLS Census sample members were enumerated in private households. Of these persons only 1.57% of males and 2.03% of females have not been traced at NHSCR. This compares with a 'not traced' rate of 6.01% (8.5% of males and 4.31% of females) for those persons who were enumerated in communal establishments in 1991. It should be noted, however, that the 'no trace' rates range from 0% for children resident in Children's Homes to nearly 17% for men enumerated in Defence Establishments. The 'no trace' rates for communal establishments are based on small numbers and the members of some groups (such as those in long-term psychiatric hospitals and those in the Armed Forces) would have been outside the NHS system in 1991.

Table 2.5: 1991 SLS sample population by sex, household type and 'not traced' rates

Household type	Males					Females					Total				
	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.
Private Households	125578	2006	127584	1.572	0.070	135925	2814	138739	2.028	0.076	261503	4820	266323	1.810	0.052
Non-Private Households*															
Hotels	227	19	246	7.724	3.544	203	12	215	5.581	3.222	430	31	461	6.725	2.416
Psychiatric Hospitals	202	20	222	9.009	4.029	271	13	284	4.577	2.539	473	33	506	6.522	2.271
Other Hospitals	232	10	242	4.132	2.613	497	23	520	4.423	1.845	729	33	762	4.331	1.508
Children's Homes	13	0	13	0.000	0.000	19	0	19	0.000	0.000	32	0	32	0.000	0.000
Other Homes	402	21	423	4.965	2.167	1163	40	1203	3.325	1.051	1565	61	1626	3.752	0.961
Educational Establishments	63	11	74	14.865	8.964	63	6	69	8.696	7.100	126	17	143	11.888	5.767
Places of Detention	78	2	80	2.500	3.536	4	0	4	0.000	0.000	82	2	84	2.381	3.367
Defence Establishments	162	30	192	15.625	5.705	16	6	22	27.273	22.268	178	36	214	16.822	5.607
Other Establishments **	129	27	156	17.308	6.662	74	4	78	5.128	5.128	203	31	234	13.248	4.759
Total Communal	1508	140	1648	8.495	1.436	2310	104	2414	4.308	0.845	3818	244	4062	6.007	0.769
Total	127086	2146	129232	1.661	0.072	138235	2918	141153	2.067	0.077	265321	5064	270385	1.873	0.053

4.6 Economic position (100% variable)

Males and females aged 16 or over are included in the table of tracing rates by economic position (Table 2.6). Those persons over retirement age (aged 60/65 at the 1991 Census) were considered economically active if they were working or looking for work in the week prior to the Census.

Tracing rates were higher for all those who were economically active compared with those who were not (98.01% and 97.53% traced respectively). Among the economically active the highest rates were found for those in employment (98.24% of males and 97.95% of females). More women than men were 'not traced', particularly those women aged 45 and over. This may be partially due to the problems of tracing older women due to name changes mentioned earlier.

The economically inactive showed generally higher 'not traced' rates than those who were economically active. The highest 'not traced' rates (6.96%) were found amongst those in the 'Other Inactive' category where the number of persons was particularly small. The lowest 'not traced' rates for the economically inactive group were found among those men who were in the category 'Wholly Retired' (1.68%) and for women who were in the category 'Looking after the house' (2.36%).

Table 2.6: 1991 SLS sample population by sex, economic position, Age and 'not traced' rates

Note: Economic activity in this table based on ECONPO9 - the 100% coded version

Economic position & age	Males - Aged 16+					Females - Aged 16+					Total - Aged 16+				
	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.
Economically Active															
In employment															
16 - 24	10553	198	10751	1.842	0.262	10169	159	10328	1.540	0.244	20722	357	21079	1.694	0.179
25 - 34	16749	300	17049	1.760	0.203	12875	226	13101	1.725	0.229	29624	526	30150	1.745	0.152
35 - 44	15430	243	15673	1.550	0.199	12877	230	13107	1.755	0.231	28307	473	28780	1.644	0.151
45 - 54	12308	225	12533	1.795	0.239	9980	279	10259	2.720	0.326	22288	504	22792	2.211	0.197
55 - 64	7564	152	7716	1.970	0.320	4789	154	4943	3.116	0.502	12353	306	12659	2.417	0.276
65+	1098	23	1121	2.052	0.856	513	23	536	4.291	1.789	1611	46	1657	2.776	0.819
Total	63702	1141	64843	1.760	0.104	51203	1071	52274	2.049	0.125	114905	2212	117117	1.889	0.080
Out of employment															
16 - 24	2480	52	2532	2.054	0.570	1440	42	1482	2.834	0.875	3920	94	4014	2.342	0.483
25 - 34	2157	55	2212	2.486	0.671	1120	31	1151	2.693	0.967	3277	86	3363	2.557	0.552
35 - 44	1520	49	1569	3.123	0.892	639	31	670	4.627	1.662	2159	80	2239	3.573	0.799
45 - 54	1317	39	1356	2.876	0.921	574	29	603	4.809	1.786	1891	68	1959	3.471	0.842
55 - 64	1176	29	1205	2.407	0.894	300	15	315	4.762	2.459	1476	44	1520	2.895	0.873
65+	15	6	21	28.571	23.328	18	1	19	5.263	10.526	33	7	40	17.500	13.229
Total	8665	230	8895	2.586	0.341	4091	149	4240	3.514	0.576	12756	379	13135	2.885	0.296
All economically active															
16 - 24	13033	250	13283	1.882	0.238	11609	201	11810	1.702	0.240	24642	451	25093	1.797	0.169
25 - 34	18906	355	19261	1.843	0.196	13995	257	14252	1.803	0.225	32901	612	33513	1.826	0.148
35 - 44	16950	292	17242	1.694	0.198	13516	261	13777	1.894	0.235	30466	553	31019	1.783	0.152
45 - 54	13625	264	13889	1.901	0.234	10554	308	10862	2.836	0.323	24179	572	24751	2.311	0.193
55 - 64	8740	181	8921	2.029	0.302	5089	169	5258	3.214	0.494	13829	350	14179	2.468	0.264
65+	1113	29	1142	2.539	0.943	531	24	555	4.324	1.765	1644	53	1697	3.123	0.858
Total	72367	1371	73738	1.859	0.100	55294	1220	56514	2.159	0.124	127661	2591	130252	1.989	0.078

Economic position & age	Males - Aged 16+					Females - Aged 16+					Total - Aged 16+				
	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.
Economically Inactive															
Wholly retired															
16 - 24	5	0	5	0.000	0.000	8	0	8	0.000	0.000	13	0	13	0.000	0.000
25 - 34	5	0	5	0.000	0.000	13	1	14	7.143	14.286	18	1	19	5.263	10.526
35 - 44	22	1	23	4.348	8.696	21	1	22	4.545	9.091	43	2	45	4.444	6.285
45 - 54	112	3	115	2.609	3.012	183	4	187	2.139	2.139	295	7	302	2.318	1.752
55 - 64	1698	35	1733	2.020	0.683	4431	140	4571	3.063	0.518	6129	175	6304	2.776	0.420
65+	13830	229	14059	1.629	0.215	17597	484	18081	2.677	0.243	31427	713	32140	2.218	0.166
Total	15672	268	15940	1.681	0.205	22253	630	22883	2.753	0.219	37925	898	38823	2.313	0.154
Permanently sick															
16 - 24	225	7	232	3.017	2.281	216	6	222	2.703	2.207	441	13	454	2.863	1.588
25 - 34	558	9	567	1.587	1.058	557	14	571	2.452	1.311	1115	23	1138	2.021	0.843
35 - 44	883	17	900	1.889	0.916	814	31	845	3.669	1.318	1697	48	1745	2.751	0.794
45 - 54	1416	42	1458	2.881	0.889	1364	52	1416	3.672	1.019	2780	94	2874	3.271	0.675
55 - 64	2827	64	2891	2.214	0.553	1407	46	1453	3.166	0.934	4234	110	4344	2.532	0.483
65+	682	29	711	4.079	1.515	779	24	803	2.989	1.220	1461	53	1514	3.501	0.962
Total	6591	168	6759	2.486	0.384	5137	173	5310	3.258	0.495	11728	341	12069	2.825	0.306
At school/student															
16 - 24	3332	67	3399	1.971	0.482	3331	71	3402	2.087	0.495	6663	138	6801	2.029	0.345
25 - 34	314	50	364	13.736	3.885	303	18	321	5.607	2.643	617	68	685	9.927	2.408
35 - 44	86	13	99	13.131	7.284	209	7	216	3.241	2.450	295	20	315	6.349	2.839
45 - 54	30	1	31	3.226	6.452	53	1	54	1.852	3.704	83	2	85	2.353	3.328
55 - 64	2	0	2	0.000	0.000	5	0	5	0.000	0.000	7	0	7	0.000	0.000
65+	3	1	4	25.000	50.000	0	1	1	100.000	200.000	3	2	5	40.000	56.569
Total	3767	132	3899	3.385	0.589	3901	98	3999	2.451	0.495	7668	230	7898	2.912	0.384

Looking after house

16 - 24	39	0	39	0.000	0.000	1889	45	1934	2.327	0.694	1928	45	1973	2.281	0.680
25 - 34	138	7	145	4.828	3.649	6061	99	6160	1.607	0.323	6199	106	6305	1.681	0.327
35 - 44	172	1	173	0.578	1.156	4269	93	4362	2.132	0.442	4441	94	4535	2.073	0.428
45 - 54	102	1	103	0.971	1.942	3407	114	3521	3.238	0.606	3509	115	3624	3.173	0.592
55 - 64	114	2	116	1.724	2.438	3747	119	3866	3.078	0.564	3861	121	3982	3.039	0.552
65+	107	1	108	0.926	1.852	5443	130	5573	2.333	0.409	5550	131	5681	2.306	0.403
Total	672	12	684	1.754	1.013	24816	600	25416	2.361	0.193	25488	612	26100	2.345	0.190

Other Inactive

16 - 24	44	2	46	4.348	6.149	36	7	43	16.279	12.306	80	9	89	10.112	6.742
25 - 34	36	1	37	2.703	5.405	11	1	12	8.333	16.667	47	2	49	4.082	5.772
35 - 44	23	1	24	4.167	8.333	19	1	20	5.000	10.000	42	2	44	4.545	6.428
45 - 54	11	1	12	8.333	16.667	17	1	18	5.556	11.111	28	2	30	6.667	9.428
55 - 64	20	3	23	13.043	15.061	18	0	18	0.000	0.000	38	3	41	7.317	8.449
65+	11	4	15	26.667	26.667	75	2	77	2.597	3.673	86	6	92	6.522	5.325
Total	145	12	157	7.643	4.413	176	12	188	6.383	3.685	321	24	345	6.957	2.840

All economically inactive

16 - 24	3645	76	3721	2.042	0.469	5480	129	5609	2.300	0.405	9125	205	9330	2.197	0.307
25 - 34	1051	67	1118	5.993	1.464	6945	133	7078	1.879	0.326	7996	200	8196	2.440	0.345
35 - 44	1186	33	1219	2.707	0.943	5332	133	5465	2.434	0.422	6518	166	6684	2.484	0.386
45 - 54	1671	48	1719	2.792	0.806	5024	172	5196	3.310	0.505	6695	220	6915	3.181	0.429
55 - 64	4661	104	4765	2.183	0.428	9608	305	9913	3.077	0.352	14269	409	14678	2.786	0.276
65+	14633	264	14897	1.772	0.218	23894	641	24535	2.613	0.206	38527	905	39432	2.295	0.153
Total	26847	592	27439	2.158	0.177	56283	1513	57796	2.618	0.135	83130	2105	85235	2.470	0.108

Total All Persons Aged 16+	99214	1963	101177	1.940	0.088	111577	2733	114310	2.391	0.091	210791	4696	215487	2.179	0.064
NCR <16	27872	183	28055	0.652	0.096	26658	185	26843	0.689	0.101	54530	368	54898	0.670	0.070
Total	127086	2146	129232	1.661	0.072	138235	2918	141153	2.067	0.077	265321	5064	270385	1.873	0.053

4.7 Social class (based on 10% variables recoded to 100%)

The social class variable used to construct Table 2.7 is SCLSEAT9 (see the data dictionary). This variable splits students into two groups, those who were economically active as well as being students and those who were full time students. The former were allocated a social class based on their occupation while the latter were placed in the economically inactive group 'Students'.

The 'not traced' rates for those allocated a social class were all low – the highest were for those Social Class I professional males (2.04%) and Social Class V unskilled females (2.79%). The 'not traced' rates were higher for those who did not have a social class. Persons in the Armed Forces had the highest 'not traced' rates of all with only 87.64% of males and 77.92% of females being traced at NHSCR. This is mainly because a high proportion of armed forces personnel were outside the NHS system in 1991. Among the economically inactive the highest 'not traced' rates were found for male full time students (3.4%) and female SLS members who were classed as permanently sick (3.3%)².

² It should be noted that 4337 persons who were included as economically active in Table 2.7 are excluded from this table. 4172 of these persons were not working in the 10 years previous to Census although they stated that they were unemployed or waiting to take up a job at Census. The remainder included 54 persons who were found to be aged under 16 and 106 who were categorized as fully retired. This appears to be mainly due to the fact that Table 2.7 is based on the 100% Census coded variable Economic Position (ECONPO9 – see the data dictionary), whilst Table 2.9 uses recoded variables where both economic position and age may differ from the 100% version.

Table 2.7: 1991 SLS sample population by sex, social class and 'not traced' rates

Social class	Males - Aged 16+					Females - Aged 16+					Total				
	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.
Economically Active															
I Professional	4138	85	4223	2.013	0.437	1040	25	1065	2.347	0.939	5178	110	5288	2.080	0.397
II Intermediate	16746	311	17057	1.823	0.207	14417	332	14749	2.251	0.247	31163	643	31806	2.022	0.159
IIIN Skilled Non-manual	7427	108	7535	1.433	0.276	19778	323	20101	1.607	0.179	27205	431	27636	1.560	0.150
IIIM Skilled Manual	23018	310	23328	1.329	0.151	4058	86	4144	2.075	0.448	27076	396	27472	1.441	0.145
IV Partly skilled	11952	182	12134	1.500	0.222	8269	183	8452	2.165	0.320	20221	365	20586	1.773	0.186
V Unskilled	3798	71	3869	1.835	0.436	5037	145	5182	2.798	0.465	8835	216	9051	2.386	0.325
Total	67079	1067	68146	1.566	0.096	52599	1094	53693	2.038	0.123	119678	2161	121839	1.774	0.076
Armed forces	859	121	980	12.347	2.245	59	17	76	22.368	10.850	918	138	1056	13.068	2.225
On a Government Scheme	1320	43	1363	3.155	0.962	845	24	869	2.762	1.127	2165	67	2232	3.002	0.733
Not stated or inadequately described	456	18	474	3.797	1.790	298	16	314	5.096	2.548	754	34	788	4.315	1.480
Total	2635	182	2817	6.461	0.958	1202	57	1259	4.527	1.199	3837	239	4076	5.864	0.759
All economically active	69714	1249	70963	1.760	0.100	53801	1151	54952	2.095	0.123	123515	2400	125915	1.906	0.078
Economically Inactive															
Student	3752	132	3884	3.399	0.592	3885	96	3981	2.411	0.492	7637	228	7865	2.899	0.384
Permanently Sick	6590	168	6758	2.486	0.384	5135	175	5310	3.296	0.498	11725	343	12068	2.842	0.307
Retired	15742	268	16010	1.674	0.205	22344	633	22977	2.755	0.219	38086	901	38987	2.311	0.154
Other Inactive	740	24	764	3.141	1.282	25084	615	25699	2.393	0.193	25824	639	26463	2.415	0.191
All economically inactive	26824	592	27416	2.159	0.177	56448	1519	57967	2.620	0.134	83272	2111	85383	2.472	0.108
NCR Aged<16 (also see note 2)	30414	297	30711	0.967	0.112	28120	256	28376		0.113	58534	553	59087	0.936	0.080
Total	126952	2138	129090	1.656	0.072	138369	2926	141295	2.071	0.077	265321	5064	270385	1.873	0.053

Note 1: based on 10% social class variable SCLSEAT9.

Note 2: 4337 economically active persons are missing from this table when compared with table 2.6: 4172 of these persons had a value for economic activity (ECONPOT9) but not for social class (SCLSEAT9): as they were not working in the week before Census and had not worked in the previous 10 years. Among the remaining missing persons 54 were found to be aged under 16 and 106 were re-categorised as retired and economically inactive. There are 148 additional economically inactive persons in this table compared with table 2.6.

4.8 Socio-economic group (based on Census 10% variables recoded to 100%)

Table 2.8 shows the 1991 SLS sample population by sex, socio-economic group and 'not traced' rates. All members of this table were categorized as economically active³. The largest proportion of the economically active population in Scotland in 1991 was found among Junior Non-manual workers (21%) with Skilled Manual workers coming second at 16%. Among men, the lowest 'not traced' rates were for Farmers, both in the employers & managers and own-account groups (0.52% and 0.69%) and Non-manual foremen and supervisors (0.86%). It should be noted that the numbers employed in these categories were low. Among the other socio-economic groups Skilled manual workers (who make up 26% of the males shown in this table) had the next lowest 'not traced' rate at 1.17%. The highest 'not traced' rates were found among members of the Armed Forces as might be expected. Generally, though, the 'not traced' rates are low for most socio-economic groups.

For women, tracing in 1991 was best for farmers (both employers and own account), the professional self-employed and agricultural workers with tracing rates ranging from 99 to 98.6% but the numbers in these groups were very small. Women in Junior non-manual positions show the next highest rate of tracing at 98.4% and it should be noted that this category contains 35% of all the women in the table. The lowest tracing rates for women were found for those who were in the armed forces at the time of Census with 25.93% untraced.

³ Again there are differences between the total number of economically active persons recorded and those expected with 4,881 persons missing when compared with the number of economically active persons in table 2.7. The majority of these persons had stated that they were unemployed at the time of Census. As they had also stated they had not worked in the previous 10 years there was no available occupation data for a socio-economic group to be based on.

Table 2.8: 1991 SLS sample population by sex, socio-economic group and 'not traced' rates

Socio-economic group	Males - Aged 16+					Females - Aged 16+					Total				
	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.	Traced cases	Un-traced cases	Selected sample	'Not traced' rate	+/- C.I.
Employers large & small establishments	2265	50	2315	2.160	0.611	792	23	815	2.822	1.177	3057	73	3130	2.332	0.546
Managers large & small establishments	7818	131	7949	1.648	0.288	3432	85	3517	2.417	0.524	11250	216	11466	1.884	0.256
Professional - self-employed	819	15	834	1.799	0.929	151	2	153	1.307	1.849	970	17	987	1.722	0.835
Professional - employees	3312	72	3384	2.128	0.501	891	23	914	2.516	1.049	4203	95	4298	2.210	0.454
Ancillary workers & artists	6443	126	6569	1.918	0.342	9842	214	10056	2.128	0.291	16285	340	16625	2.045	0.222
Foremen & supervisors - non-manual	578	5	583	0.858	0.767	662	13	675	1.926	1.068	1240	18	1258	1.431	0.675
Junior non-manual workers	6702	93	6795	1.369	0.284	19311	312	19623	1.590	0.180	26013	405	26418	1.533	0.152
Personal service workers	1343	51	1394	3.659	1.025	5038	104	5142	2.023	0.397	6381	155	6536	2.371	0.381
Foremen/supervisors - manual	1783	31	1814	1.709	0.614	348	9	357	2.521	1.681	2131	40	2171	1.842	0.583
Skilled manual workers	17916	212	18128	1.169	0.161	1578	29	1607	1.805	0.670	19494	241	19735	1.221	0.157
Semi-skilled manual workers	9574	138	9712	1.421	0.242	4854	110	4964	2.216	0.423	14428	248	14676	1.690	0.215
Unskilled manual workers	3698	70	3768	1.858	0.444	5025	144	5169	2.786	0.464	8723	214	8937	2.395	0.327
Own account workers (not professional)	3541	80	3621	2.209	0.494	862	29	891	3.255	1.209	4403	109	4512	2.416	0.463
Farmers - employers and managers	576	3	579	0.518	0.598	91	1	92	1.087	2.174	667	4	671	0.596	0.596
Farmers - own account	579	4	583	0.686	0.686	102	1	103	0.971	1.942	681	5	686	0.729	0.652
Agricultural workers	1118	14	1132	1.237	0.661	209	3	212	1.415	1.634	1327	17	1344	1.265	0.614
Members of armed forces	870	132	1002	13.174	2.293	60	21	81	25.926	11.315	930	153	1083	14.127	2.284
Inadequately described occupations	490	19	509	3.733	1.713	312	17	329	5.167	2.506	802	36	838	4.296	1.432
Total	69425	1246	70671	1.763	0.100	53560	1140	54700	2.084	0.123	122985	2386	125371	1.903	0.078

Note 1: All SLS cases were categorised as economically active - (uses variable ECONPOT9 to derive economically active Aged 16+).

Note 2: 4881 economically active persons are missing from this table when compared with Table 2.6. 4715 of these persons had a value for economic activity (ECONPOT9) but not for socio-economic group (SEG). These include 543 persons on a Government scheme, 70 persons waiting to start a job & 4102 who were unemployed. The remaining 166 were categorised as economically inactive by ECONPOT9 and are not included in this table.

5 Modelling factors that influence not-traced rates for SLS 1991 members

To explore the independent factors that influence tracing rates, multivariate logistic regression models were fitted for males (127,086 traced, 2,146 untraced, 1.66% not-traced rate) and females (138,235 traced, 2,918 not traced, 2.07% not-traced rate) separately. A similar methodology was used in each model. First a stepwise model was run to determine the order in which the variables would be investigated. Then each factor was examined in detail and a final model developed by selecting categories and investigating interactions.

For men, the final model contained the main effects of age, social class/economic status, country of birth, establishment type, marital status and local government region. For women, the final model contained the main effects of age, social class/economic status, country of birth, establishment type, marital status and local government region, as well as an interaction between age and marital status (two separate marital status factors were thus used, one for women below 30 and one for older women). Details of the final models by sex are provided in Appendix 1.

In general, the effects seen in the multivariate model mirrored those illustrated for the univariate data in Tables 2.1 to 2.8. For both men and women those in the armed forces and those born abroad have particularly high odds of being untraced. The odds of being untraced are greater for less advantaged social groups and for the unemployed for both men and women, but increased for students only for men. The influence of marital status is opposite for men and women. Single men have the greatest odds of being untraced, whereas the odds are highest for divorced and widowed women. The effect of marital status on tracing rates is greater for women over 30, suggesting that it may relate to name changes, as discussed above.

Figures 2.1 and 2.2 illustrate how the tracing rates vary by age for men and women (Table 3.1 above) and also show the rates adjusted for all the other factors in the model. The pattern of the adjusted rates (the absolute levels are not meaningful) show the independent effect of age that is not explained by other factors in the model.

For both sexes the peak at age group 20-24 has been largely explained by other factors in the model. These are mainly the concentration of people in the armed forces and people born abroad in these age groups.

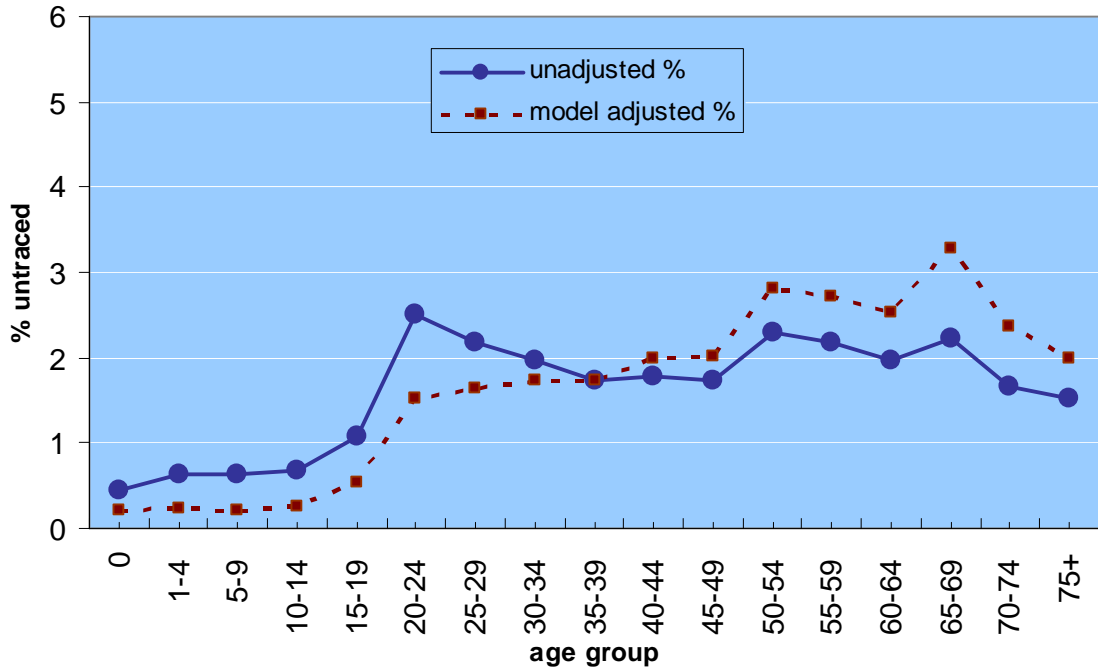


Figure 2.1 Tracing rates by age and model-adjusted rates for men based on the model in Appendix 1.

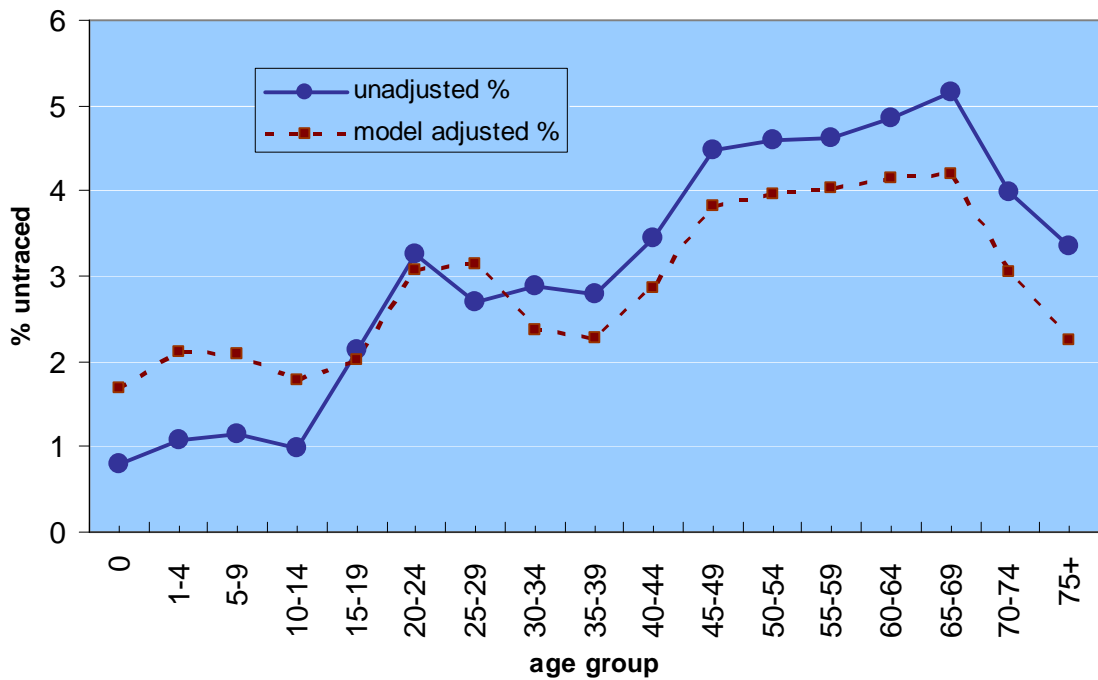


Figure 2.2 Tracing rates by age and model-adjusted rates for women based on the model in Appendix 1.

The differences between the observed and adjusted untraced rates from age 25 upwards can be explained by the effect of marital status. For men, the unadjusted rates remain stable or fall slightly with age. This is in part due to the falling proportion of single men who

have the highest untraced rates. Adjusting for this shows an underlying trend of a modest increase with age. For women the sharper increase with age in unadjusted untraced rates, largely due to the higher proportions of widows and divorcees, is not evident in the adjusted rate. For both sexes. For both sexes there is a sharp decline in untraced rates for the oldest age groups, perhaps due to the registration of deaths with NHSCR.

6 The quality of sampling in the 1991 Census – SLS sample

The 1991 SLS sample was chosen to be a 5.5% representative sample of the Scottish population at the point of the Census. However, because it is a sample it is important to measure whether it is truly representative, both of the total population and of specific sub-groups within it. Biases may occur because of variations in tracing rates and in the accuracy of the birth dates given on the Census forms. The SLS has calculated the observed net sampling fractions for the sample to give some measure of this bias.

The majority of analysis using the SLS uses only those SLS members who have been traced at NHSCR and can therefore be linked to events occurring to them. The calculation of the sampling fraction for the i^{th} subgroup of interest is as follows:

$$\frac{\text{number in subgroup } i \text{ (traced SLS population)}}{\text{number in subgroup in census population}} \times 100$$

The sampling tables below show the 1991 Census percentage distributions together with the SLS observed sampling fractions. The sample was originally selected to include 20 birthdates to provide a 5.5% sample of the Scottish population. However, the inclusion of over 3000 dummy forms within the selected sample had the effect of lowering both the observed sampling fractions to 5.31% for males and 5.30% for females.

6.1 Quality of sampling by age, and sex (100% variables)

Tables 2.9a-b show the SLS sample population by Age, sex, percentage distributions and observed and expected sampling fractions. On the whole, the pattern of the Census and SLS percentage distributions of the population by age group match extremely well. However, slight over-sampling is shown in the 0 – 14 age group and slight under-sampling in the 20 – 24 age group for both sexes. Over-sampling is also seen among women aged 35 – 39 and among men aged 45 – 49 and 80 – 84. Women consistently show a small degree of under-sampling at age 55 and over. This is due in part to the tracing problems

found for older women due to name changes, but also to differences in the dates of birth recorded on the census forms and on the NHSCR database.

Table 2.9a: 1991 SLS sample population by sex, age, percentage distributions and sampling fractions males

Age	1991 Census males	% Distribution	Traced 1991 SLS males	% Distribution	Sampling fraction
0 - 4	162486	6.79	8763	6.90	5.39
5 - 9	162513	6.79	8661	6.82	5.33
10 - 14	160057	6.69	8756	6.89	5.47
15 - 19	168726	7.05	8913	7.01	5.28
20 - 24	184410	7.71	9457	7.44	5.13
25 - 29	190350	7.96	10096	7.94	5.30
30 - 34	183321	7.66	9861	7.76	5.38
35 - 39	167089	6.99	8875	6.98	5.31
40 - 44	177396	7.42	9261	7.29	5.22
45 - 49	146940	6.14	8043	6.33	5.47
50 - 54	136353	5.70	7253	5.71	5.32
55 - 59	130492	5.46	6947	5.47	5.32
60 - 64	123713	5.17	6454	5.08	5.22
65 - 69	111387	4.66	5877	4.62	5.28
70 - 74	80045	3.35	4231	3.33	5.29
75 - 79	58482	2.44	3067	2.41	5.24
80 - 84	32659	1.37	1800	1.42	5.51
85 - 89	12351	0.52	610	0.48	4.94
90 +	3191	0.13	161	0.13	5.05
Total	2391961	100.00	127086	100.00	5.31

Table 2.9b: 1991 SLS sample population by sex, age, percentage distributions and sampling fractions females

Age	1991 Census females	% Distribution	Traced 1991 SLS females	% Distribution	Sampling fraction
0 - 4	154748	5.94	8483	6.14	5.48
5 - 9	155136	5.95	8463	6.12	5.46
10 - 14	151879	5.83	8072	5.84	5.31
15 - 19	163401	6.27	8796	6.36	5.38
20 - 24	190103	7.29	9933	7.19	5.23
25 - 29	202288	7.76	10688	7.73	5.28
30 - 34	191887	7.36	10252	7.42	5.34
35 - 39	170847	6.55	9304	6.73	5.45
40 - 44	179372	6.88	9544	6.90	5.32
45 - 49	150497	5.77	7933	5.74	5.27
50 - 54	144525	5.54	7645	5.53	5.29
55 - 59	141552	5.43	7329	5.30	5.18
60 - 64	141339	5.42	7368	5.33	5.21
65 - 69	135504	5.20	7004	5.07	5.17
70 - 74	113448	4.35	5939	4.30	5.23
75 - 79	97559	3.74	5089	3.68	5.22
80 - 84	70069	2.69	3674	2.66	5.24
85 - 89	37119	1.42	1923	1.39	5.18
90 +	15333	0.59	796	0.58	5.19
Total	2606606	100.00	138235	100.00	5.30

6.2 Quality of sampling by age, sex and marital status (100% variables)

Tables 2.10a-d show the 1991 SLS population by Age, sex, marital status, percentage distributions and sampling fractions. At the 1991 Census 45% of men in the SLS sample were single, 49% married, 3% widowed and 3% divorced. Among the sample women 39% were single, 45% married, 11% widowed and 5% divorced. 56,729 men and 53,381 women in the SLS sample described themselves as single at the 1991 Census. There were no major differences between the Census and SLS percentage distributions by age group. However, when compared with the overall sampling fractions of 5.31% for all males and 5.30% for all females, slightly fewer men were sampled (Sampling fraction for single males of 5.29%) and slightly more women (5.33%). The lowest sampling fractions were found among women aged 25 – 29, 40 – 49 and 70 – 74. Among men the lowest sampling fractions were found among those aged 70 – 79 and 85 – 89, but the numbers in these age groups were small. The highest sampling fraction (5.97%) was found among those aged 90+ but there were only 20 men in this category.

Table 2.10a: 1991 SLS sample population by sex, age, marital status, percentage distributions and sampling fractions

Single males

Age	1991 Census males	% Distribution	Traced 1991 SLS males	% Distribution	Sampling fraction
0 – 15	517677	48.23	27872	49.13	5.38
16 - 19	135189	12.60	7178	12.65	5.31
20 – 24	159412	14.85	8152	14.37	5.11
25 – 29	92767	8.64	4797	8.46	5.17
30 – 34	45662	4.25	2353	4.15	5.15
35 – 39	26013	2.42	1319	2.33	5.07
40 – 44	20154	1.88	1106	1.95	5.49
45 – 49	14093	1.31	791	1.39	5.61
50 – 54	12103	1.13	631	1.11	5.21
55 – 59	11196	1.04	560	0.99	5.00
60 – 64	11412	1.06	582	1.03	5.10
65 – 69	10402	0.97	531	0.94	5.10
70 – 74	7248	0.68	349	0.62	4.82
75 – 79	5305	0.49	263	0.46	4.96
80 – 84	3073	0.29	165	0.29	5.37
85 - 89	1304	0.12	60	0.11	4.60
90+	335	0.03	20	0.04	5.97
Total	1073345	100.00	56729	100.00	5.29

Single females

Age	1991 Census females	% Distribution	Traced 1991 SLS females	% Distribution	Sampling fraction
0 – 15	492643	49.19	26658	49.94	5.41
16 - 19	129874	12.97	7002	13.12	5.39
20 – 24	141662	14.15	7372	13.81	5.20
25 – 29	71815	7.17	3662	6.86	5.10
30 – 34	33440	3.34	1749	3.28	5.23
35 – 39	17530	1.75	920	1.72	5.25
40 – 44	12656	1.26	633	1.19	5.00
45 – 49	9014	0.90	458	0.86	5.08
50 – 54	8931	0.89	463	0.87	5.18
55 – 59	9815	0.98	536	1.00	5.46
60 – 64	12568	1.25	675	1.26	5.37
65 – 69	14296	1.43	738	1.38	5.16
70 – 74	12818	1.28	647	1.21	5.05
75 – 79	12883	1.29	724	1.36	5.62
80 – 84	11268	1.13	593	1.11	5.26
85 - 89	6993	0.70	370	0.69	5.29
90+	3249	0.32	181	0.34	5.57
Total	1001455	100.00	53381	100.00	5.33

For married persons, 61,831 men and 62,837 women in the SLS sample were currently married at the time of the 1991 Census (shown in Table 2.10b). The percentage group distributions between the 1991 Census population and the SLS sample show very few differences. The Sampling fractions were higher than those found in the overall SLS population (5.37% for men against 5.31 and 5.35% for women against 5.30). Among men the highest sampling fractions were found for those aged 25 – 34 and 45 – 49, the lowest among those aged 16 – 19 and 85 and over. It should be noted that the lower sampling fractions were affected by the small numbers of men who were married at those ages. Among women, the highest sampling fractions were found for those aged 16 – 19, but very few women were married in this age group. Among women in other age groups the highest sampling fractions were found for women aged 30 – 44 and 80 – 84.

Table 2.10b: 1991 SLS sample population by sex, age, marital status, percentage distributions and sampling fractions

Married males

Age	1991 Census males	% Distribution	Traced 1991 SLS males	% Distribution	Sampling fraction
0 – 15					
16 - 19	841	0.07	42	0.07	4.99
20 – 24	24081	2.09	1263	2.04	5.24
25 – 29	91658	7.95	4995	8.08	5.45
30 – 34	126031	10.94	6875	11.12	5.46
35 – 39	127936	11.10	6878	11.12	5.38
40 – 44	141851	12.31	7423	12.01	5.23
45 – 49	119563	10.38	6587	10.65	5.51
50 – 54	111529	9.68	6000	9.70	5.38
55 – 59	106859	9.27	5717	9.25	5.35
60 – 64	98691	8.56	5200	8.41	5.27
65 – 69	84899	7.37	4527	7.32	5.33
70 – 74	57502	4.99	3094	5.00	5.38
75 – 79	37315	3.24	1998	3.23	5.35
80 – 84	17639	1.53	958	1.55	5.43
85 - 89	5013	0.44	233	0.38	4.65
90+	872	0.08	41	0.07	4.70
Total	1152280	100.00	61831	100.00	5.37

Married females

Age	1991 Census females	% Distribution	Traced 1991 SLS females	% Distribution	Sampling fraction
0 – 15					
16 - 19	2485	0.21	146	0.23	5.88
20 – 24	45740	3.90	2436	3.88	5.33
25 – 29	118705	10.12	6400	10.19	5.39
30 – 34	139625	11.90	7554	12.02	5.41
35 – 39	133168	11.35	7354	11.70	5.52
40 – 44	144365	12.30	7793	12.40	5.40
45 – 49	121362	10.34	6466	10.29	5.33
50 – 54	113905	9.71	6026	9.59	5.29
55 – 59	104470	8.90	5450	8.67	5.22
60 – 64	91021	7.76	4808	7.65	5.28
65 – 69	72131	6.15	3845	6.12	5.33
70 – 74	45313	3.86	2397	3.81	5.29
75 – 79	26215	2.23	1372	2.18	5.23
80 – 84	11067	0.94	599	0.95	5.41
85 - 89	3219	0.27	161	0.26	5.00
90+	666	0.06	30	0.05	4.50
Total	1173457	100.00	62837	100.00	5.35

For the widowed, 4,144 male and 15,817 female SLS members described themselves as widowed at the 1991 Census. The number of widows and widowers in the population starts to rise at age 60, with women making up the majority. The comparison of Census and SLS percentage distributions by age group showed very few differences. Although the sampling fractions varied widely, this is mainly due to the very low numbers of widows and widowers at young ages. At older ages the differences were less but there was still some variability.

Table 2.10c: 1991 SLS sample population by sex, age, marital status, percentage distributions and sampling fractions

Widowed males

Age	1991 Census males	% Distribution	Traced 1991 SLS males	% Distribution	Sampling fraction
0 – 15					
16 - 19	18	0.02	1	0.02	5.56
20 – 24	37	0.05	3	0.07	8.11
25 – 29	128	0.16	4	0.10	3.13
30 – 34	284	0.36	18	0.43	6.34
35 – 39	514	0.64	27	0.65	5.25
40 – 44	1036	1.30	48	1.16	4.63
45 – 49	1656	2.07	80	1.93	4.83
50 – 54	2765	3.46	150	3.62	5.42
55 – 59	4808	6.02	259	6.25	5.39
60 – 64	8216	10.28	397	9.58	4.83
65 – 69	12468	15.61	639	15.42	5.13
70 – 74	13528	16.93	686	16.55	5.07
75 – 79	14930	18.69	760	18.34	5.09
80 – 84	11618	14.54	661	15.95	5.69
85 - 89	5925	7.42	312	7.53	5.27
90+	1956	2.45	99	2.39	5.06
Total	79887	100.00	4144	100.00	5.44

Widowed females

Age	1991 Census females	% Distribution	Traced 1991 SLS females	% Distribution	Sampling fraction
0 – 15					
16 - 19	53	0.02	3	0.02	5.66
20 – 24	178	0.06	4	0.03	2.25
25 – 29	527	0.17	24	0.15	4.55
30 – 34	1045	0.34	49	0.31	4.69
35 – 39	1779	0.58	81	0.51	4.55
40 – 44	3318	1.07	156	0.99	4.70
45 – 49	5426	1.75	269	1.70	4.96
50 – 54	9866	3.19	562	3.55	5.70
55 – 59	18104	5.85	910	5.75	5.03
60 – 64	30987	10.02	1547	9.78	4.99
65 – 69	44128	14.26	2145	13.56	4.86
70 – 74	52404	16.94	2766	17.49	5.28
75 – 79	56710	18.33	2893	18.29	5.10
80 – 84	46886	15.16	2450	15.49	5.23
85 - 89	26632	8.61	1381	8.73	5.19
90+	11329	3.66	577	3.65	5.09
Total	309372	100.00	15817	100.00	5.37

For the divorced, 4,382 men and 6,200 women in the SLS sample described themselves as divorced in 1991. When comparing the percentage distributions between the Census

figures and the SLS sample there are a number of noticeable differences with higher percentages of male sample members being selected at ages 30 – 34 and 55 – 59. This variation is not so noticeable among women and is probably due to the low numbers of divorced men in this table.

In general, more variability was seen in the sampling fractions for the divorced of both sexes than was seen for sample members who were single, married or widowed. Some differences may be due to persons who were divorced describing themselves as single or married on the Census form.

Table 2.10d: 1991 SLS sample population by sex, age, marital status, percentage distributions and sampling fractions

Divorced males

Age	1991 Census males	% Distribution	Traced 1991 SLS males	% Distribution	Sampling fraction
0 – 15					
16 - 19	57	0.07	0	0.00	0.00
20 – 24	880	1.02	39	0.89	4.43
25 – 29	5797	6.71	300	6.85	5.18
30 – 34	11344	13.12	615	14.03	5.42
35 – 39	12626	14.61	651	14.86	5.16
40 – 44	14355	16.61	684	15.61	4.76
45 – 49	11628	13.45	585	13.35	5.03
50 – 54	9956	11.52	472	10.77	4.74
55 – 59	7629	8.82	411	9.38	5.39
60 – 64	5394	6.24	275	6.28	5.10
65 – 69	3618	4.19	180	4.11	4.98
70 – 74	1767	2.04	102	2.33	5.77
75 – 79	932	1.08	46	1.05	4.94
80 – 84	329	0.38	16	0.37	4.86
85 - 89	109	0.13	5	0.11	4.59
90+	28	0.03	1	0.02	3.57
Total	86449	100.00	4382	100.00	5.37

Divorced females

Age	1991 Census females	% Distribution	Traced 1991 SLS females	% Distribution	Sampling fraction
0 – 15					
16 - 19	109	0.09	3	0.05	2.75
20 – 24	2523	2.06	121	1.95	4.80
25 – 29	11241	9.19	602	9.71	5.36
30 – 34	17777	14.53	900	14.52	5.06
35 – 39	18370	15.02	949	15.31	5.17
40 – 44	19033	15.56	962	15.52	5.05
45 – 49	14695	12.01	740	11.94	5.04
50 – 54	11823	9.67	594	9.58	5.02
55 – 59	9163	7.49	433	6.98	4.73
60 – 64	6763	5.53	338	5.45	5.00
65 – 69	4949	4.05	276	4.45	5.58
70 – 74	2913	2.38	129	2.08	4.43
75 – 79	1751	1.43	100	1.61	5.71
80 – 84	848	0.69	32	0.52	3.77
85 - 89	275	0.22	11	0.18	4.00
90+	89	0.07	8	0.13	8.99
Total	122322	100.00	6200	100.00	5.37

6.3 Quality of sampling by sex and country of birth (100% variables)

Tables 2.11a-b show the 1991 SLS sample population by sex, country of birth, percentage distributions and sampling fractions. 97% of the population enumerated in Scotland at the 1991 Census gave their country of birth as the United Kingdom of whom 89% were Scottish born. Only 3% of the population was born outside the UK. 123,687 men and 134,516 women in the 1991 SLS sample gave their country of birth as Scotland or one of the other constituent countries of the UK. Only 3,399 SLS men and 3,719 SLS women stated that they had been born outside the UK.

Among those SLS members born in the constituent countries of the UK the sampling fractions are very similar, with the exception of those born in Northern Ireland. Where country of birth was given as outside the UK sampling fractions tend to be below 5% and there are also some differences between the Census and SLS percentage distributions. Much of this is due to the low numbers involved together with the fact that a high proportion of some groups (for example American men working in Scotland for the oil companies) are not registered with the NHS. As a result of the low tracing rates and low numbers of non-UK born persons in the sample any analysis using country of birth may require the aggregation of countries outside the UK.

Table 2.11a: 1991 SLS sample population by sex, country of birth, percentage distributions and sampling fractions, males

Country of Birth	1991 Census males	% Distribution	Traced 1991 SLS males	% Distribution	Sampling fraction
England & Wales	180477	7.55	9311	7.33	5.16
Scotland	2126924	88.92	113726	89.49	5.35
Northern Ireland	12338	0.52	646	0.51	5.24
Other UK	91	0.00	4	0.00	4.40
United Kingdom	2319830	96.98	123687	97.33	5.33
Outside UK	72131	3.02	3399	2.67	4.71
Irish Republic *	9943	0.42	508	0.40	5.11
Old Commonwealth	6897	0.29	352	0.28	5.10
New Commonwealth & Pakistan	22335	0.93	1036	0.82	4.64
India	4612	0.19	218	0.17	4.73
Pakistan	4820	0.20	233	0.18	4.83
African Commonwealth	3749	0.16	181	0.14	4.83
Caribbean Commonwealth	769	0.03	40	0.03	5.20
Remainder New Commonwealth	8385	0.35	364	0.29	4.34
European Community	11439	0.48	537	0.42	4.69
Other Europe	4725	0.20	221	0.17	4.68
USA	6278	0.26	201	0.16	3.20
Elsewhere & not stated	10514	0.44	544	0.43	5.17
Total	2391961	100.00	127086	100.00	5.31

* Includes Ireland part not stated.

Table 2.11b: 1991 SLS sample population by sex, country of birth, percentage distributions and sampling fractions, females

Country of Birth	1991 Census females		Traced 1991 SLS females		Sampling fraction
		% Distribution		% Distribution	
England & Wales	188501	7.23	9733	7.04	5.16
Scotland	2327141	89.28	124039	89.73	5.33
Northern Ireland	14055	0.54	742	0.54	5.28
Other UK	53	0.00	2	0.00	3.77
United Kingdom	2529750	97.05	134516	97.31	5.32
Outside UK	76856	2.95	3719	2.69	4.84
Irish Republic *	12848	0.49	594	0.43	4.62
Old Commonwealth	8463	0.32	449	0.32	5.31
New Commonwealth & Pakistan	21439	0.82	1053	0.76	4.91
India	4394	0.17	237	0.17	5.39
Pakistan	4591	0.18	186	0.13	4.05
African Commonwealth	3545	0.14	195	0.14	5.50
Caribbean Commonwealth	861	0.03	53	0.04	6.16
Remainder New Commonwealth	8048	0.31	382	0.28	4.75
European Community	14266	0.55	728	0.53	5.10
Other Europe	3247	0.12	140	0.10	4.31
USA	6311	0.24	272	0.20	4.31
Elsewhere & not stated	10282	0.39	483	0.35	4.70
Total	2606606	100.00	138235	100.00	5.30

* Includes Ireland part not stated.

6.4 Quality of sampling by sex and region (100% variables)

Tables 2.12a-b show the 1991 SLS sample population by sex, region, percentage distributions and sampling fractions. Just under 90% of the Scottish population was concentrated in 6 regions of Scotland in 1991. In order of population size these were Strathclyde (encompassing Glasgow), Lothian, Grampian, Tayside, Fife and Central. The Borders, Dumfries and Galloway, Highland and the Islands make up the remainder. There were no major differences in the population distributions between the Census counts and the SLS sample.

Table 2.12a: 1991 SLS sample population by sex, region, percentage distributions and sampling fractions males

Region of usual residence	1991 Census males	% Distribution	Traced 1991 SLS males	% Distribution	Sampling fraction
Borders	49866	2.08	2655	2.09	5.32
Central	128433	5.37	6744	5.31	5.25
Dumfries & Galloway	71359	2.98	3888	3.06	5.45
Fife	164434	6.87	8879	6.99	5.40
Grampian	246190	10.29	13125	10.33	5.33
Highland	99762	4.17	5367	4.22	5.38
Lothian	345423	14.44	18287	14.39	5.29
Strathclyde	1068203	44.66	56555	44.50	5.29
Tayside	182611	7.63	9619	7.57	5.27
Orkney Islands	9602	0.40	522	0.41	5.44
Shetland Islands	11359	0.47	616	0.48	5.42
Western Isles	14719	0.62	829	0.65	5.63
SCOTLAND - Total	2391961	100.00	127086	100.00	5.31

Table 2.12b: 1991 SLS sample population by sex, region, percentage distributions and sampling fractions females

Region of usual residence	1991 Census females	% Distribution	Traced 1991 SLS females	% Distribution	Sampling fraction
Borders	49866	2.08	2655	2.09	5.32
Central	128433	5.37	6744	5.31	5.25
Dumfries & Galloway	71359	2.98	3888	3.06	5.45
Fife	164434	6.87	8879	6.99	5.40
Grampian	246190	10.29	13125	10.33	5.33
Highland	99762	4.17	5367	4.22	5.38
Lothian	345423	14.44	18287	14.39	5.29
Strathclyde	1068203	44.66	56555	44.50	5.29
Tayside	182611	7.63	9619	7.57	5.27
Orkney Islands	9602	0.40	522	0.41	5.44
Shetland Islands	11359	0.47	616	0.48	5.42
Western Isles	14719	0.62	829	0.65	5.63
SCOTLAND - Total	2391961	100.00	127086	100.00	5.31

6.5 Quality of sampling by sex and household type (100% variables)

Tables 2.13a-b show the 1991 SLS sample population by sex, household type, percentage distributions and sampling fractions. In the 1991 Census 97% of persons were enumerated in private households and the remaining 3% in communal establishments. The distribution of the SLS sample population differs from the Census distribution with 98.81% of SLS men being found in private households compared with 96.86% in the Census population and 98.33% of SLS women compared with 96.90%. Communal establishments were under-sampled with only 1.19% of traced SLS males and 1.67% of SLS females being enumerated there. It is not clear what caused the over-sampling in private households but

proportionally it is small and can probably be ignored. However, the large amount of under-sampling in communal establishments is at least partially due to the low tracing rates of people present in them on Census night.

Table 2.13a: 1991 SLS sample population by sex, household type, percentage distributions and sampling fractions males

Household type	1991 Census males	% Distribution	Traced 1991 SLS males	% Distribution	Sampling fraction
Private Households	2297049	96.86	125578	98.81	5.47
Non-Private Households*					
Hotels	19213	0.81	227	0.18	1.18
Psychiatric Hospitals	5048	0.21	202	0.16	4.00
Other Hospitals	12138	0.51	232	0.18	1.91
Children's Homes	698	0.03	13	0.01	1.86
Other Homes	9209	0.39	402	0.32	4.37
Educational Establishments	12982	0.55	63	0.05	0.49
Places of Detention	4431	0.19	78	0.06	1.76
Defence Establishments	5412	0.23	162	0.13	2.99
Other Establishments	5388	0.23	129	0.10	2.39
Total Communal	74519	3.14	1508	1.19	2.02
Total	2371568	100.00	127086	100.00	5.36

* includes non-residents, resident staff & permanent residents of communal establishments.

Table 2.13b: 1991 SLS sample population by sex, household type, percentage distributions and sampling fractions females

Household type	1991 Census females	% Distribution	Traced 1991 SLS females	% Distribution	Sampling fraction
Private Households	2510262	96.90	135925	98.33	5.41
Non-Private Households*					
Hotels	14813	0.57	203	0.15	1.37
Psychiatric Hospitals	6706	0.26	271	0.20	4.04
Other Hospitals	21589	0.83	497	0.36	2.30
Children's Homes	697	0.03	19	0.01	2.73
Other Homes	23813	0.92	1163	0.84	4.88
Educational Establishments	10289	0.40	63	0.05	0.61
Places of Detention	159	0.01	4	0.00	2.52
Defence Establishments	550	0.02	16	0.01	2.91
Other Establishments	1706	0.07	74	0.05	4.34
Total Communal	80322	3.10	2310	1.67	2.88
Total	2590584	100.00	138235	100.00	5.34

* includes non-residents, resident staff & permanent residents of communal establishments.

6.6 Quality of sampling by sex and social class (based on census 10% variables recoded to 100%)

Tables 2.14a-b show the 1991 SLS sample population by sex, social class, percentage distributions and sampling fractions. As in Table 3.8, Social Class is based on the 10% variable SCLSEAT9 and economic activity on the 10% variable ECONPOT9. It should be noted that economically active students were allocated a social class based on their occupation at the 1991 Census. Economically inactive full-time students were placed in the 'Other Inactive' category in this table.

The percentage distribution of Social Class for SLS members closely follows that of the Census distribution with the majority of economically active male SLS members being found in Social Class IIIM (23.84%) and the majority of economically active female members in Social Class IIINM (17.94%). Among economically active male SLS members the highest Sampling fractions were found among men serving in the Armed Forces (5.81%) but this is an artefact of the small numbers traced in this group. Among the other categories the highest sampling fractions were found among men in Social Class IIINM. The lowest sampling fractions were found among those who were categorized as 'Not stated or inadequately described' and those in Social Class V (3.38% and 4.73% respectively).

Like men, economically active females were found to have the highest sampling fractions among those in the Armed Forces (6.95%). Like the men this was a result of low numbers and high 'not traced rates'. Among the other economically active categories women had the

highest sampling fractions for those on a Government Scheme (5.63%) and for those who were in Social Class IV. The lowest sampling fractions were found among those women who were in the 'Not stated or inadequately described' group at 3.82%.

Table 2.14a: 1991 SLS sample population by sex, social class, percentage distributions and sampling fractions males

Social class		1991 Census males	% Distribution	Traced 1991 SLS males	% Distribution	Sampling fraction
<i>Economically Active</i>						
I	Professional	83292	4.66	4137	4.28	4.97
II	Intermediate	308538	17.27	16765	17.34	5.43
IIIN	Skilled Non-manual	132177	7.40	7472	7.73	5.65
IIIM	Skilled Manual	421668	23.60	22984	23.77	5.45
IV	Partly skilled	217641	12.18	11952	12.36	5.49
V	Unskilled	80530	4.51	3811	3.94	4.73
	Armed forces	14782	0.83	858	0.89	5.80
	On a Government Scheme	25229	1.41	1319	1.36	5.23
	Not stated or inadequately described	13493	0.76	456	0.47	3.38
<i>Economically Inactive</i>						
	Retired	289877	16.22	15766	16.31	5.44
	Other Inactive	199488	11.17	11157	11.54	5.59
Total		1786715	100.00	96677	100.00	5.41

Table 2.14b: 1991 SLS sample population by sex, social class, percentage distributions and sampling fractions females

Social class		1991 Census females	% Distribution	Traced 1991 SLS females	% Distribution	Sampling fraction
--------------	--	---------------------	----------------	-------------------------	----------------	-------------------

Economically Active						
I	Professional	19239	0.94	1041	0.95	5.41
II	Intermediate	271196	13.25	14398	13.08	5.31
IIIN	Skilled Non-manual	369037	18.04	19733	17.92	5.35
IIIM	Skilled Manual	75941	3.71	4092	3.72	5.39
IV	Partly skilled	149771	7.32	8269	7.51	5.52
V	Unskilled	97516	4.77	5024	4.56	5.15
		0				
	Armed forces	863	0.04	60	0.05	6.95
	On a Government Scheme	15026	0.73	846	0.77	5.63
	Not stated or inadequately described	7807	0.38	298	0.27	3.82
Economically Inactive						
	Retired	405424	19.81	22320	20.27	5.51
	Other Inactive	634253	31.00	34029	30.90	5.37
	Total	2046074	100.00	110110	100.00	5.38

6.7 Quality of sampling by sex and socio-economic group (based on census 10% variables recoded to 100%)

Tables 2.15a-b below show the 1991 SLS sample population by sex, socio-economic group, percentage distributions and sampling fractions. As in Table 2.10 Socio-economic group is based on the 10% variable SEG909 and economic activity on the 10% variable ECONPOT9. It should be noted that only economically active students were allocated a socio-economic group based on their occupation at the 1991 Census. Economically inactive full-time students were excluded from this table.

The distribution of socio-economic groups for SLS members shows some minor differences between Census and the SLS, particularly for men. The majority of economically active male SLS members were classified as Skilled Manual Workers (25.81%) compared with 24.04% of all economically active Scottish males enumerated at the Census. There were also differences between the percentages classified as Foremen/Supervisors (manual) with fewer SLS members being placed in this category than would have been expected from the Census (2.57% compared with 3.45%). It should be noted that the 1991 Census 10% sample was coded by hand from the census forms using printed indexes where supervisor/foreman was identified by a letter F. The 100% coding of occupation by the SLS unit was done automatically using a coding engine and was dependant on the occupation and job description entered onto the Census form. The original printed indexes were not available. As a result the differences between the two distributions are probably an artefact of the 100% coding of occupation for the SLS sample.

Among economically active male SLS members the highest sampling fractions were found among men who were in the socio-economic groups of 'non-manual foremen and supervisors' (6.60%) and 'farmers – employers and managers' (5.99%). It should be noted that the numbers of men in these categories are small (less than 600 in each case). Among the other categories the highest sampling fractions were found among junior non-manual workers (5.84%) and the lowest among those men who were categorized as 'manual Foremen/Supervisors' or where their occupation was 'inadequately described' (4.03% and 3.54% respectively).

Table 2.15a: 1991 SLS sample population by sex, socio-economic group, percentage distributions and sampling fractions males

Note: All SLS cases were categorised as economically active - (uses variable ECONPOT9 to derive economically active aged 16+)

Socio-economic group	1991 Census males	% Distribution	Traced 1991 SLS males	% Distribution	Sampling fraction
Employers in large & small establishments	43179	3.37	2265	3.26	5.25
Managers in large & small establishments	148380	11.58	7818	11.26	5.27
Professional - self-employed	14559	1.14	819	1.18	5.63
Professional - employees	68946	5.38	3312	4.77	4.80
Ancillary workers & artists	111689	8.72	6443	9.28	5.77
Foremen & supervisors - non-manual	8762	0.68	578	0.83	6.60
Junior non-manual workers	114724	8.95	6702	9.65	5.84
Personal service workers	25361	1.98	1343	1.93	5.30
Foremen/supervisors - manual	44245	3.45	1783	2.57	4.03
Skilled manual workers	307959	24.04	17916	25.81	5.82
Semi-skilled manual workers	173214	13.52	9574	13.79	5.53
Unskilled manual workers	77007	6.01	3698	5.33	4.80
Own account workers (not professional)	70540	5.51	3541	5.10	5.02
Farmers - employers and managers	9615	0.75	576	0.83	5.99
Farmers - own account	10599	0.83	579	0.83	5.46
Agricultural workers	20965	1.64	1118	1.61	5.33
Members of armed forces	17645	1.38	870	1.25	4.93
Inadequately described occupations	13858	1.08	490	0.71	3.54
Total	1281248	100.00	69425	100.00	5.42

The majority of economically active female SLS members were employed as 'junior non-manual workers' at the time of the 1991 Census (36.05%). However, the highest sampling fractions were found among those women who were described as farmers (8.00% for those who were employers or managers and 7.13% for those who were categorized as 'own account'). In both cases the small numbers affected the sampling fractions. Among the other socio-economic categories women had the highest sampling fractions for those

working in the personal service sector (5.87%) and the lowest among those women who were in the 'Inadequately described occupation' group at 3.92%.

Table 2.15b: 1991 SLS sample population by sex, socio-economic group, percentage distributions and sampling fractions females

Socio-economic group	1991 Census females	% Distribution	Traced 1991 SLS females	% Distribution	Sampling fraction	Expected sampling fraction
Employers in large & small establishments	16285	1.63	792	1.48	4.86	4.83
Managers in large & small establishments	69363	6.95	3432	6.41	4.95	4.93
Professional - self-employed	2792	0.28	151	0.28	5.41	5.45
Professional - employees	16610	1.66	891	1.66	5.36	5.32
Ancillary workers & artists	183488	18.38	9842	18.38	5.36	5.36
Foremen & supervisors - non-manual	11980	1.20	662	1.24	5.53	5.54
Junior non-manual workers	352854	35.35	19311	36.05	5.47	5.50
Personal service workers	85789	8.60	5038	9.41	5.87	5.86
Foremen/supervisors - manual	8254	0.83	348	0.65	4.22	4.20
Skilled manual workers	29707	2.98	1578	2.95	5.31	5.32
Semi-skilled manual workers	88988	8.92	4854	9.06	5.45	5.45
Unskilled manual workers	97495	9.77	5025	9.38	5.15	5.12
Own account workers (not professional)	18549	1.86	862	1.61	4.65	4.59
Farmers - employers and managers	1137	0.11	91	0.17	8.00	8.09
Farmers - own account	1432	0.14	102	0.19	7.13	7.22
Agricultural workers	4152	0.42	209	0.39	5.03	5.03
Members of armed forces	1259	0.13	60	0.11	4.77	3.71
Inadequately described occupations	7949	0.80	312	0.58	3.92	3.85
Total	998082	100.00	53560	100.00	5.37	5.36

Note 1: Census 10% sample updated to 100% using sampling fraction of 10.1526 - see 1991 Census report for Scotland Part 2 section 8.

Note 2: 4715 persons are missing from this table. They had a value for economic activity (ECONPOT9) but not for socio-economic group (SEG).

These include 543 persons on a Government scheme, 70 persons waiting to start a job & 4102 who were unemployed.

7 Conclusion

The quality of tracing for the 1991 Census – SLS sample is extremely good, especially given the time period between the 1991 Census and the flagging of SLS members at the NHSCR. Despite this delay of over 10 years an overall tracing rate of 98% was achieved. However, the tracing rates for some sub-groups of the population are low (persons in the armed forces, those whose country of birth was outwith the UK, and persons enumerated in communal establishments). Tracing rates by age and sex are highest for children aged 14 or under compared to other age groups and men are generally better traced than women. Older women (aged 45 – 69) show lower tracing rates (on average 1% lower) than younger women and this appears to be due to name changes on marriage, remarriage or divorce subsequent to 1991. We also reported the results from a logistic regression model to consider the factors influencing the possibility of not being traced. The results of this model broadly confirmed the findings of the tracing tables.

The original sample size was set at 5.5% of the Scottish population. This became reduced to 5.3% once dummy and duplicate forms had been removed. This reduction in sample size has little or no effect on the quality of sampling which is very high as demonstrated by comparative Census and SLS percentage distributions shown in the sampling quality tables. However, analysis of the data is affected by the tracing rate and although the overall sampling fractions for men and women stand at 5.3%, the observed net sampling fractions differ markedly within some sub-groups. This has implications when analysing these data together with subsequent event and Census data as a longitudinal sample. It must be remembered that only those SLS members who are flagged at NHSCR can have subsequent data linked to them. Those SLS members who were not traced at NHSCR in 1991 are therefore regarded as ‘lost to follow-up’, unless they are found at a later date.

Appendix 1: Modelling results for 1991 tracing rates

Model for men		Odds Ratio		
Factor in model	Estimate	95% Confidence Limits		
Age at 1991 census				
0	0.10	0.05	0.23	
1-4	0.12	0.07	0.19	
5-9	0.11	0.07	0.17	
10-14	0.12	0.08	0.19	
15-19	0.27	0.18	0.40	
20-24	0.76	0.53	1.11	
25-29	0.82	0.57	1.18	
30-34	0.87	0.61	1.24	
35-39	0.87	0.60	1.25	
40-44	0.99	0.69	1.42	
45-49	1.01	0.70	1.46	
50-54	1.42	0.99	2.02	
55-59	1.37	0.97	1.95	
60-64	1.27	0.91	1.79	
65-69	1.66	1.25	2.21	
70-74	1.19	0.86	1.65	
75+ (baseline category)	1.00			
Country of birth				
England & Wales	3.26	2.86	3.71	
Northern Ireland	5.51	4.02	7.55	
Other UK	3.88	0.92	16.38	
Eire	7.61	5.66	10.23	
Aus Can N	6.78	4.50	10.22	
India	13.30	9.11	19.42	
Pakistan	21.31	15.62	29.07	
African Commonwealth	7.86	4.75	13.03	
Caribbean Commonwealth	11.94	4.95	28.78	
Other New Commonwealth	9.83	7.07	13.65	
EU	10.10	7.62	13.39	
Other Europe	11.42	7.69	16.95	
USA	44.59	34.28	58.01	
Elsewhere	13.94	10.81	17.96	
Scotland (baseline category)	1.00			
Establishment type				
psychiatric hospital	4.32	2.63	7.10	
other hospital	2.06	1.06	3.98	
other establishment	5.48	3.48	8.63	
hotel	2.59	1.56	4.31	
homes	2.42	1.51	3.87	
educational establishment	1.45	0.70	2.98	
detention	1.11	0.26	4.76	
defence establishment	1.21	0.74	1.99	
private household (baseline)	1.00			

Continued overleaf

Model for men (continued)

Factor in model	Estimate	Odds Ratio 95% Confidence Limits	
Social class and economic activity			
Economically active			
Armed forces	3.51	2.47	4.97
I Professional etc. occupations	0.66	0.47	0.91
II Managerial and technical	0.78	0.60	1.02
IIIM Skilled occupations - manual	0.76	0.58	0.99
IIIN Skilled occupations - non-manual	0.68	0.50	0.93
IV Partly skilled occupations	0.81	0.61	1.08
Inadequately described	1.59	0.92	2.77
On a Government scheme	1.68	1.12	2.52
V Unskilled manual (baseline)	1.00		
Economically inactive			
Under 16 or unemployed last 10 years	1.90	1.40	2.57
Student	1.57	1.14	2.16
Retired	0.61	0.43	0.86
Permanently sick	0.96	0.71	1.29
Other inactive	1.13	0.70	1.84
Marital status			
Widowed	0.86	0.67	1.11
Divorced	0.96	0.78	1.19
Remarried	0.44	0.34	0.57
Married (first marriage)	0.53	0.46	0.60
Single (baseline)	1.00		
Local government region			
Borders	0.90	0.66	1.24
Central	0.63	0.49	0.81
Dumfries and Galloway	0.66	0.49	0.90
Fife	0.68	0.56	0.84
Grampian	0.86	0.74	1.01
Highland	0.71	0.55	0.91
Lothian	1.10	0.97	1.25
Orkney	0.37	0.12	1.15
Shetland	3.46	2.39	5.01
Tayside	0.89	0.75	1.06
Western Isles	0.48	0.22	1.02
Strathclyde (baseline)	1.00		

Model for women

Factor in model	Estimate	Odds Ratio 95% Confidence Limits	
Age at 1991 census			
0	0.75	0.30	1.90
1-4	0.93	0.46	1.91
5-9	0.92	0.46	1.86
10-14	0.79	0.39	1.62
15-19	0.89	0.64	1.23
20-24	1.38	1.04	1.83
25-29	1.41	1.03	1.92
30-34	1.06	0.82	1.36
35-39	1.01	0.79	1.31
40-44	1.28	1.00	1.63
45-49	1.73	1.36	2.20
50-54	1.79	1.42	2.27
55-59	1.83	1.45	2.30
60-64	1.88	1.53	2.30
65-69	1.90	1.57	2.31
70-74	1.37	1.11	1.68
75+ (baseline category)	1.00		
Country of birth			
England & Wales	2.73	2.43	3.05
Northern Ireland	6.08	4.77	7.74
Other UK	3.81	1.16	12.49
Eire	7.51	5.95	9.47
Aus Can N	4.47	3.06	6.52
India	10.31	7.39	14.38
Pakistan	21.39	15.63	29.27
African Commonwealth	8.73	5.62	13.54
Caribbean Commonwealth	3.88	1.20	12.55
Other New Commonwealth	10.10	7.47	13.66
EU	5.84	4.45	7.66
Other Europe	10.18	6.50	15.93
USA	20.56	15.70	26.93
Elsewhere	9.89	7.47	13.11
Scotland (baseline category)	1.00		
Establishment type			
psychiatric hospital	1.96	1.09	3.53
other hospital	2.08	1.35	3.22
other establishment	1.04	0.34	3.12
hotel	2.23	1.22	4.09
homes	1.44	1.03	2.03
educational establishment	1.63	0.66	4.03
detention	0.00	small numbers	
defence establishment	1.72	0.51	5.77
private household (baseline)	1.00		

continued overleaf

Model for women (continued)

Factor in model	Estimate	Odds Ratio	
		95% Confidence Limits	
Marital status for under 30yrs			
Widowed	1.66	0.22	12.43
Divorced	1.37	0.85	2.19
Remarried	0.81	0.34	1.93
Married (first marriage)	0.57	0.44	0.72
Single (baseline)	1.00		
Marital status for 30 yrs and over			
Widowed	1.24	1.03	1.48
Divorced	1.98	1.62	2.42
Remarried	1.59	1.28	1.97
Married (first marriage)	0.97	0.83	1.14
Single (baseline)	1.00		
Local government region			
Borders	0.73	0.55	0.97
Central	0.74	0.61	0.89
Dumfries and Galloway	0.58	0.45	0.76
Fife	0.63	0.53	0.76
Grampian	0.69	0.60	0.80
Highland	0.89	0.73	1.08
Lothian	1.06	0.95	1.18
Orkney	0.24	0.08	0.76
Shetland	3.18	2.20	4.58
Tayside	0.81	0.70	0.94
Western Isles	1.60	1.06	2.42
Strathclyde (baseline)	1.00		
Socio economic group			
Under 16 or no job ever	1.19	0.45	3.12
Inadequately described occupations	1.27	0.45	3.61
Members of armed forces	4.42	1.40	13.95
Agricultural workers	0.94	0.27	3.27
Farmers - own account	0.22	0.02	2.06
Farmers - employers and managers	0.38	0.05	3.10
Own account workers	0.72	0.24	2.16
Unskilled manual workers	1.16	0.44	3.06
Semi-skilled manual workers	0.93	0.35	2.46
Skilled manual workers	0.84	0.31	2.31
Foremen and supervisors - manual	0.93	0.31	2.85
Personal service workers	0.93	0.35	2.46
Junior non-manual workers	0.74	0.28	1.95
Foremen and supervisors	0.76	0.27	2.21
Ancillary workers and artists	0.74	0.28	1.95
Professional workers - employees	0.74	0.27	2.07
Professional workers - self employed	0.30	0.06	1.51
Managers	0.88	0.33	2.34
Employers in industry (baseline)	1.00		

continued overleaf

Model for women (continued)

Factor in model	Estimate	Odds Ratio	
		95% Confidence Limits	
Socio economic group			
Under 16 or no job ever	1.19	0.45	3.12
Inadequately described occupations	1.27	0.45	3.61
Members of armed forces	4.42	1.40	13.95
Agricultural workers	0.94	0.27	3.27
Farmers - own account	0.22	0.02	2.06
Farmers - employers and managers	0.38	0.05	3.10
Own account workers (other than professional)	0.72	0.24	2.16
Unskilled manual workers	1.16	0.44	3.06
Semi-skilled manual workers	0.93	0.35	2.46
Skilled manual workers	0.84	0.31	2.31
Foremen and supervisors - manual	0.93	0.31	2.85
Personal service workers	0.93	0.35	2.46
Junior non-manual workers	0.74	0.28	1.95
Foremen and supervisors	0.76	0.27	2.21
Ancillary workers and artists	0.74	0.28	1.95
Professional workers - employees	0.74	0.27	2.07
Professional workers - self employed	0.30	0.06	1.51
Managers	0.88	0.33	2.34
Employers in industry(baseline)	1.00		
Employment status			
Employees - Part time	0.74	0.64	0.86
Looking after home/family	0.70	0.60	0.82
On a Government scheme	1.09	0.69	1.73
Other economically inactive	1.24	0.64	2.39
Permanently sick	0.92	0.75	1.12
Retired	0.84	0.70	1.00
Self-employed - with employees	0.69	0.29	1.64
Self-employed - without employees	1.30	0.82	2.04
Students (Economically inactive)	0.94	0.72	1.22
Under 16	0.38	0.21	0.71
Unemployed (Economically active)	1.35	1.11	1.65
Waiting to start a job	1.09	0.47	2.51
Employee full time (baseline)	1.00		