



THE SCOTTISH LONGITUDINAL STUDY

The 1991 – 2001 Scottish Longitudinal Study Census Link

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1 Introduction

The Scottish Longitudinal Study (SLS) was begun by extracting a 5.3% sample of the Scottish population from the 1991 Census (see LSCS Working Paper 1 and LSCS Working Paper 2)

<http://www.lscs.ac.uk/sls/LSCS%20WP%201.0.pdf>.

<http://www.lscs.ac.uk/sls/LSCS%20WP%202.0.pdf>. The study was set up to reflect changes in the population over time with new members joining through birth and immigration and exiting via death and emigration. It was also designed to include information from each subsequent Census based on the same 5.3% sample which would be added to the database and matched and linked to the existing sample. This working paper covers the linkage of the 1991 and 2001 SLS Census samples. It examines the quality of the linkage and explains why linkages may not be possible in some cases.

2 The 1991 – 2001 Linkage Process

The SLS is a longitudinal study which links together records from administrative sources over time and it requires a mechanism to achieve this. The mechanism is provided by the National Health Service Central Register (NHSCR) who maintain a database of all residents in Scotland who are registered with a NHS General Practitioner. This is probably the most comprehensive 'register' of the population in existence currently. Consequently, this database is used in numerous medical studies. Names and dates of birth are two 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.

The details of the role of NHSCR in tracing, matching and linking data are given in LSCS Working Paper 1 the Introduction to the SLS, Working Paper 2 on the 1991 SLS sample and Working Paper 3 on the 2001 SLS sample.

<http://www.lscs.ac.uk/sls/LSCS%20WP%203.0.pdf>

The 1991 SLS Census sample was taken using 20 birthdates occurring in any year and each SLS member was given a unique 1991 SLS number which was used to flag their entry in the NHSCR database.

The 2001 Census was sampled using the same birthdates and each potential SLS member was given a unique 2001 SLS number. A file to be used in matching the potential SLS members to previous entries (linking) or to flag new members was created by the General Register Office for Scotland (GROS) and sent to the NHSCR to be run against their database. This file included details about all those people captured in the 2001 who had one of the 20 SLS birthdays, and hence were potential members of the study. Those with one of the 20 SLS birthdates who were in the 1991 Census have been flagged on the NHSCR database. Hence, the aim of the 2001 Census exercise was to identify those potential SLS members with one of the 20 birthdays who were already flagged on the NHSCR, or were newcomers to the study.

The 2001 match file was sent to NHSCR to run against their database using a three stage process:

1. Automatic matching (exact matching)
2. Probability matching
3. Manual matching

The full details of this process are explained in LSCS Working Paper 3 (2001 SLS sample). Where a SLS member already existed and was flagged on the NHSCR database their existing flag was added to the match file and the NHSCR database entry was not changed. This created a linkage record in the match file. If the SLS member had a record on the NHSCR database but had not been identified previously through either being flagged as a 1991 entry or as an intercensal New Birth or Immigrant entry, then a 2001 SLS flag was added to the entry in the NHSCR database. For those potential SLS members who were not found on the NHSCR database the match file held only the original 2001 numbers and the potential SLS members were categorised as 'not traced'. Tracing at the NHSCR is an important part of the process of developing the SLS as linkages to other, non-census, datasets are done through the NHSCR. If potential SLS members cannot be traced at the NHSCR, it will not be possible to link other records to them and hence they are not included in the SLS database.

The match file was then returned to the SLS Unit with all identifiers except the SLS number(s), sex and date of birth stripped off. The categories of SLS member found in this exercise were as follows:

- SLS members traced at NHSCR who were present at the 2001 Census and flagged with a 1991 Census SLS number (193,717);

- SLS members traced at NHSCR who were present at the 2001 Census and flagged with an intercensal (1991-2001) new birth SLS number (27,132);
- SLS members traced at NHSCR who were present at the 2001 Census and flagged with an intercensal (1991-2001) immigrant SLS number (2,927);
- SLS members traced at NHSCR who were present at the 2001 Census and were new entries to the sample at the 2001 Census (32,647);
- SLS members not traced at NHSCR who were present at the 2001 Census and were treated as new not traced entries at 2001 (8,681).

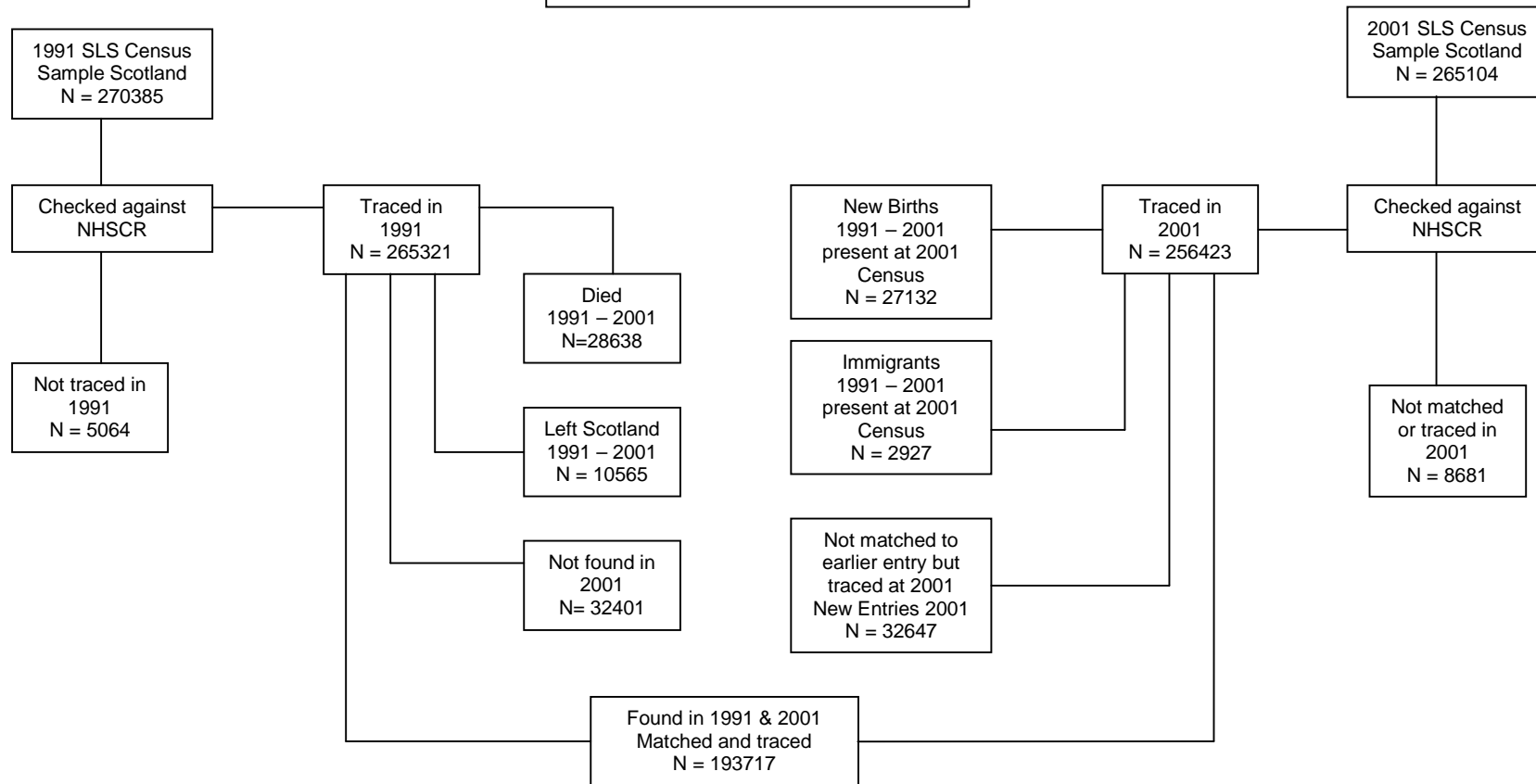
These categories are mutually exclusive.

The 1991 – 2001 linked sample contains all those SLS traced members who were present at both the 1991 and 2001 Censuses and who were flagged at NHSCR with a 1991 SLS number. The linked sample consists of 193,717 SLS members.

3 The quality of the 1991 – 2001 Census SLS linkage

The quality of the 1991 – 2001 linkage sample can be measured by looking at the forward linkage rates. That is, how many people who were enumerated in the 1991 SLS Census sample would one have expected to have been present at the 2001 Census compared with who was actually present and linked. All members who were present in 1991 but were known to have died (as recorded in vital events data collected in Scotland) or to have left Scotland (as recorded in NHSCR records in England and Wales and Northern Ireland as having moved to a GP elsewhere in the UK, or because the SLS member informed their GP of plans to emigrate) prior to the 2001 Census were excluded. An unknown proportion of people who were in the sample at 1991 will never be linked due to missing emigrations out of Scotland prior to 2001, date of birth discrepancies at 2001 and under-enumeration in the Census. Figure 1 below illustrates the sampling at both the 1991 and 2001 censuses and shows the numbers who were linked or not.

Fig 1: 1991 – 2001 Linkage



3.1 Forward and backward linkage

Table 1 below shows the forward and backward linkage rates for the 1991 SLS Census sample. Both forward and backward linkages are shown as they help illustrate the quality of entry and exit information.

At the time of the 1991 Census 274,055 potential SLS members were enumerated as usually resident in Scotland. The identification of duplicates reduced this figure to 270,385. At the 2001 Census 268,428 potential SLS members were enumerated and the removal of duplicates reduced this figure to 265,104. A total of 265,321 (98%) of the 1991 sample and 256,423 (97%) of the 2001 sample were traced at NHSCR at the time of the Census link. Intercensal exits had reduced the size of the 1991 sample that was eligible to be forward linked to 226,118 SLS members (265,321 minus 28,638 deaths and 10,565 known exits from Scotland). Linkage failure occurred in 32,401 cases.

Table 1: Forward and backward linkage of the 1991 and 2001 SLS Census samples

Forward Linkage	Number	Backward Linkage	Number
1991 Census sample*	265,321	2001 Census sample*	256,423
Died before the 2001 Census	28,638	Born after the 1991 Census and still in Scotland in 2001	27,132
Left Scotland before the 2001 Census	10,565	Migrated into Scotland after 1991 Census and still in Scotland in 2001	2,927
Eligible to be in the 2001 Census	226,118	Should have been in 1991 Census	226,364
Recorded in the 2001 Census	193,717	Recorded in the 1991 Census	193,717
Forward linkage rate	85.7%	Backward linkage rate	85.6%

* Traced at NHSCR

The backward linkage rate includes all new births and immigrants entering into, and remaining in, the SLS sample in the intercensal period. Out of 32,896 new births occurring between the 1991 and 2001 Censuses 27,132 (82.5%) were found and linked at Census and of the original 10,594 immigrants into Scotland between 1991 and 2001 only 2,927 (27.6%) were still found in the sample in 2001. Only 1,761 of these intercensal entries (1,080 new births and 681 immigrants) were known to be migrants out of Scotland before the 2001 Census. This left 11,670 intercensal new birth or immigrant entries that were lost to link by 2001.

4 Forward linkage

In the next section forward linkage is examined by the sex, age, marital status, household circumstances, country of birth, ethnicity, tenure, economic position, social class and limiting long-term illness of SLS members, as recorded at the 1991 Census.

4.1 Forward linkage between the 1991 and 2001 Censuses by sex in 1991

Table 2 shows the forward linkage rates between the 1991 and 2001 censuses by sex as recorded in 1991. There were 126,952 male and 138,369 female traced SLS members present at the 1991 Census of whom 108,709 males and 118,039 females were eligible to link, following known inter-censal exits. Of these 90,724 (84%) of the eligible male and 102,993 (87%) of the eligible female SLS members were successfully linked. The 'not linked' category includes exits from Scotland that have not been recorded for SLS members and the majority of these are likely to be cross-border moves. Estimates based on the 100% census-based migration figures for Scotland suggest that approximately 25,000 SLS members would have exited from Scotland during the 10 year period rather than just the 10,565 emigrations out of Scotland recorded in this (and following) tables. Inclusion of these migrations would have reduced the 'not linked' category to just over 17,000 and the linkage success rate would have risen to 91.5%. Work is on-going to try and improve the estimates of out-migrants from Scotland to the rest of the UK.

Table 2: Forward linkage rates between 1991 and 2001 Censuses by sex in 1991
Sample members traced at NHSCR in 1991

Sex in 1991	Members present in 1991	Position in 2001 %				Linkage success rate per cent*
		Linked at 2001 Census	Died before 2001 Census	Embarked before 2001 Census	Not Linked	
Male	126,952	71.46	10.76	4.11	13.67	83.94
Female	138,369	74.43	10.83	3.87	10.87	87.25
All	265,321	73.01	10.79	3.98	12.21	85.67

*The denominator for the percentage linkage success rate is those members present at the 1991 Census minus deaths and embarkations prior to the 2001 Census.

4.2 Forward linkage between the 1991 and 2001 Censuses by sex and 5 year age-groups in 1991

Table 3 shows forward linkage rates by sex and 5 year age-groups as given in 1991. Among males the highest forward linkage success rates were found for those who were aged 0 – 4 (87%) and 40 – 65 (88% to 91%) in 1991. Those aged 4 and under would have been in full time education by 2001 when they would have been 10 to 14 years of age. The higher linkage rates among men in older age groups are probably associated with more settled lifestyles.

The lowest forward linkage success rate for men was found for those aged 75 and over (66%). Among other age groups the lowest forward linkage success rates were, as expected, to be found among those aged 10 – 24 in 1991 (72 – 77%). It should be noted that highest out-migration rates were also found for men who were aged 10 – 29 in 1991.

Among women, the highest linkage success rates were found for children aged 0 – 4 in 1991 (87%) and also for those aged 30 - 69 (90 – 91%). Whereas for men a higher proportion appeared to be settled by the age of 40, women were more likely to be settled by the time they had reached the age of 30. This probably echoes the normal marriage pattern in Britain where partnered women tend to be slightly younger than men.

The lowest linkage rates for women followed the same pattern as that found for men with a higher proportion of women being either lost to link or migrating in the 10 – 24 age group. However, smaller proportions of women aged 10 – 24 were lost to link (between 13 and 17%) compared to men where the loss to link stood at between 21% and 24%. Migration figures for women aged 10 – 19 in 1991 were higher than for men in the same age-group. The patterns of 'lost to link' and 'out-migration' are suggestive of the fact that many of those 'lost to link' in these age groups had in fact left Scotland by the time of the 2001 Census. Among elderly women (aged 75 and over in 1991) the linkage success rate was only 70% and, among those eligible to link, 10% were not found in 2001.

The elderly form a particularly interesting group as although their rates for migration out of Scotland appear to be much lower than for other age groups their loss to link is proportionately much higher. For men aged 75 and over in 1991 (85 and over in 2001) among those not known to have died or left Scotland by 2001 (1,540 men) one third were lost to link. Among women this proportion stood at 30%. Many of these elderly SLS members may either have moved to stay with relatives or into communal establishments located outwith Scotland before 2001. If this were the case any 2001 census forms they completed would not have been included in the SLS 2001 census sample. It may also be likely that if they had still been resident in Scotland, whether in private accommodation or communal establishments, a large proportion of entries on their 2001 census forms may have contained date of birth and

name anomalies (see Working Paper 3) which would have made it unlikely that NHSCR would have been able to trace them.

Table 3: Forward linkage rates between 1991 and 2001 Censuses by sex and age group in 1991
Sample members traced at NHSCR in 1991

Age Group in 1991	Males						Females					
	Members present in 1991	Position in 2001 %				Linkage success rate per cent *	Members present in 1991	Position in 2001 %				Linkage success rate per cent *
		Linked at 2001 Census	Died before 2001 Census	Embarked before 2001 Census	Not Linked			Linked at 2001 Census	Died before 2001 Census	Embarked before 2001 Census	Not Linked	
0 – 4	8763	82.95	0.19	4.63	12.22	87.16	8492	82.56	0.22	5.05	12.16	87.16
5 – 9	8671	80.16	0.25	3.63	15.95	83.41	8468	82.55	0.11	3.71	13.64	85.82
10 – 14	8762	71.39	0.70	5.39	22.53	76.01	8064	75.97	0.24	6.44	17.36	81.40
15 – 19	8928	65.86	0.99	8.71	24.44	72.93	8794	74.08	0.41	9.59	15.92	82.31
20 – 24	9454	70.18	0.94	8.42	20.46	77.43	9946	78.19	0.40	8.06	13.34	85.42
25 – 29	10098	75.97	0.89	6.63	16.51	82.15	10709	83.05	0.60	5.39	10.96	88.34
30 – 34	9828	79.89	1.39	4.82	13.89	85.19	10255	84.81	1.05	4.55	9.59	89.85
35 – 39	8871	81.90	1.78	3.92	12.40	86.85	9325	85.55	1.67	3.29	9.48	90.02
40 – 44	9245	82.62	3.53	2.93	10.92	88.32	9547	85.94	2.60	2.34	9.12	90.40
45 – 49	8025	81.86	6.45	2.44	9.25	89.85	7953	86.07	3.75	2.11	8.07	91.43
50 – 54	7233	79.04	10.58	1.67	8.71	90.07	7647	83.25	6.60	1.78	8.37	90.86
55 – 59	6935	74.91	16.15	1.54	7.40	91.01	7358	79.75	10.25	1.58	8.43	90.44
60 – 64	6438	64.60	26.33	1.48	7.60	89.48	7386	72.53	17.52	1.52	8.43	89.58
65 – 69	5873	51.30	39.81	1.06	7.83	86.75	7013	64.72	25.00	1.51	8.77	88.07
70 – 74	4217	38.84	52.76	1.00	7.40	84.00	5930	51.94	37.94	1.40	8.72	85.63
75+	5611	18.13	71.45	1.10	9.32	66.04	11482	23.91	64.68	1.29	10.12	70.26
Total	126952	71.46	10.76	4.11	13.67	83.94	138369	74.43	10.83	3.87	10.87	87.25

* The denominator for the percentage linkage success rate is those members present at the 1991 Census minus deaths & embarkations prior to the 2001 Census

4.3 Forward linkage between the 1991 and 2001 Censuses by sex and legal marital status in 1991

Table 4 shows the forward linkage success rates between the 1991 and 2001 Censuses by sex and legal marital status as recorded in 1991.

As might be expected the highest linkage success rates were found among those who were married in 1991 and the lowest among those who were widowed, particularly men. Those who were single in 1991 were more likely to have left Scotland in the interim but their linkage rates were still higher than for the widowed.

A slightly higher percentage of single females are known to have left Scotland than males between 1991 and 2001 (5.9 and 5.8% respectively). Loss to link was highest for both sexes among those who were either single or divorced in 1991. Deaths were highest among the widowed with half of widowed men and 45% of widowed women dying before the 2001 Census.

Table 4: Forward linkage rates between 1991 and 2001 Censuses by marital status in 1991
Sample members traced at NHSCR in 1991

Marital status in 1991	Males						Females					
	Members present in 1991	Position in 2001 %				Linkage success rate per cent *	Members present in 1991	Position in 2001 %				Linkage success rate per cent *
		Linked at 2001 Census	Died before 2001 Census	Embarked before 2001 Census	Not Linked			Linked at 2001 Census	Died before 2001 Census	Embarked before 2001 Census	Not Linked	
Single	56726	72.59	3.28	5.77	18.36	79.82	53384	76.20	4.09	5.93	13.78	84.68
Married	61722	73.46	14.29	2.75	9.49	88.56	62946	80.13	8.22	2.80	8.85	90.05
Divorced	4377	64.70	14.99	4.41	15.90	80.27	6205	77.52	8.01	3.51	10.96	87.61
Widowed	4127	33.15	56.17	1.28	9.40	77.90	15834	44.64	44.99	1.28	9.08	83.10
All	126952	71.46	10.76	4.11	13.67	83.94	138369	74.43	10.83	3.87	10.87	87.25

* The denominator for the percentage linkage success rate is those members present at the 1991 Census minus deaths & embarkations prior to the 2001 Census

4.4 Forward linkage between the 1991 and 2001 Censuses by sex and household circumstances in 1991

The highest linkage success rates and the lowest losses to follow-up for both males and females were found among married couples whether or not they had dependent children living at home (see Table 5). Loss to follow-up was greater for males than females and greatest among those SLS members of either sex who had been enumerated as dependent children living in one parent families in 1991. By 2001 many of these children would have left home and some will have married, resulting in a name change for many of the women and hence making them less easy to find at the NHSCR. As might be expected, the largest percentage of the sample who had died before the 2001 Census were either living in Communal Establishments in 1991 or, if they were female, were living alone in 1991 or, if male, were in married couple households with no children.

Table 5: Forward linkage rates between 1991 and 2001 Censuses by sex & household circumstances in 1991
Sample members traced at NHSCR in 1991

Household circumstances in 1991	Males						Females					
	Members present in 1991	Position in 2001 %				Linkage success rate per cent *	Members present in 1991	Position in 2001 %				Linkage success rate per cent *
		Linked at 2001 Census	Died before 2001 Census	Embarked before 2001 Census	Not Linked			Linked at 2001 Census	Died before 2001 Census	Embarked before 2001 Census	Not Linked	
Living in communal establishment	1515	32.28	35.91	10.89	20.92	60.67	2313	21.88	60.83	4.06	13.23	62.32
Adult living alone	32045	63.55	13.77	5.20	17.47	78.44	38245	62.41	22.52	3.94	11.13	84.86
Married couple no children	34631	67.79	22.44	2.04	7.73	89.76	33987	76.33	12.79	2.28	8.60	89.88
Cohabiting couple no children	2767	72.61	5.46	5.85	16.08	81.87	2678	77.67	3.10	7.62	11.61	86.99
Married adult living with spouse & dependent children	24199	83.07	2.37	3.50	11.07	88.24	24670	86.76	1.43	3.25	8.57	91.01
Cohabiting adult living with partner & dependent children	1512	70.63	3.04	5.03	21.30	76.83	1481	83.05	1.08	4.66	11.21	88.11
Lone parent	555	74.59	5.23	3.78	16.40	81.98	6412	81.96	1.62	3.43	12.99	86.32
Dependent child living with two parents	23937	79.10	0.38	5.28	15.24	83.84	22981	81.30	0.20	5.90	12.60	86.58
Dependent child living with single parent	5791	66.78	0.71	5.30	27.21	71.05	5602	71.87	0.20	5.77	22.17	76.42
All	126952	71.46	10.76	4.11	13.67	83.94	138369	74.43	10.83	3.87	10.87	87.25

* The denominator for the percentage linkage success rate is those members present at the 1991 Census minus deaths & embarkations prior to the 2001 Census

4.5 Forward linkage between the 1991 and 2001 Censuses by sex and country of birth in 1991

Table 6 below shows forward linkage rates between 1991 and 2001 by sex and country of birth. The majority of SLS members who were enumerated in 1991 stated they were born in the UK (97% of the traced 1991 sample) and 92% were of Scots origin. By the 2001 Census 72% of males and 75% of females born in the UK still remained in the linked sample. Eleven per cent had died and 4% had migrated out of Scotland in the interim period. A higher proportion of those SLS members who had been born in other parts of the UK had left Scotland (between 12-18% of males and between 11-17% of females) and the proportions lost to link were far higher than those for native born Scots. Overall the linkage success rates for those born in the UK were 84% for males and 88% for females.

Loss to follow-up was generally greater among those born outside the UK and this was particularly the case for male and female SLS members who had been born in the USA (39% of eligible males and 34% of eligible females). A good proportion of these will have been in the military. Despite these quite high loss to follow-up rates, it should be noted that only 3,359 males and 3,677 females in the traced SLS sample had stated that they had been born outside the UK on the 1991 Census form. Overall, the linkage success rate for those born outwith the UK was 66% for males and 73% for females.

Table 6: Forward linkage rates between 1991 and 2001 Censuses by Country of birth in 1991
Sample members traced at NHSCR in 1991

Country of Birth in 1991	Males						Females					
	Members present in 1991	Position in 2001 %				Linkage success rate per cent *	Members present in 1991	Position in 2001 %				Linkage success rate per cent *
		Linked at 2001 Census	Died before 2001 Census	Embarked before 2001 Census	Not Linked			Linked at 2001 Census	Died before 2001 Census	Embarked before 2001 Census	Not Linked	
England & Wales	9304	61.11	8.48	17.73	12.67	82.83	9740	63.77	8.24	17.04	10.94	85.35
Scotland	113601	72.94	10.91	2.79	13.36	84.52	124164	75.80	11.09	2.59	10.52	87.81
Northern Ireland	644	58.07	15.99	11.65	14.29	80.26	744	61.69	12.50	11.42	14.38	81.10
Other UK	44	52.27	11.36	18.18	18.18	74.19	44	56.82	9.09	13.64	20.45	73.53
United Kingdom	123593	71.97	10.75	3.97	13.32	84.39	134692	74.84	10.89	3.69	10.58	87.62
Outside UK	3359	52.93	11.02	9.32	26.73	66.44	3677	59.48	8.38	10.33	21.81	73.17
Irish Republic **	506	49.01	20.36	6.32	24.31	66.85	596	55.70	17.11	7.05	20.13	73.45
Old Commonwealth	351	55.84	13.68	7.69	22.79	71.01	450	63.56	6.00	8.44	22.00	74.29
New Commonwealth & Pakistan	1039	58.04	5.77	10.49	25.70	69.31	1050	66.00	4.86	11.62	17.52	79.02
India	218	54.13	11.01	6.42	28.44	65.56	237	63.71	8.86	10.55	16.88	79.06
Pakistan	234	58.55	4.27	6.84	30.34	65.87	185	68.11	5.41	10.81	15.68	81.29
African Commonwealth	183	57.92	4.92	13.66	23.50	71.14	193	68.91	3.63	10.36	17.10	80.12
Caribbean Commonwealth	39	69.23	2.56	12.82	15.38	81.82	54	62.96	7.41	12.96	16.67	79.07
Remainder New Commonwealth	365	58.90	4.38	13.42	23.29	71.67	381	65.35	2.36	13.12	19.16	77.33
European Community	537	53.45	7.45	10.61	28.49	65.23	728	60.71	5.91	11.68	21.70	73.67
Other Europe	235	45.96	30.64	5.53	17.87	72.00	149	55.03	9.40	8.05	27.52	66.67
USA	201	45.27	5.97	9.45	39.30	53.53	272	46.69	10.66	8.46	34.19	57.73
Elsewhere & not stated	490	50.00	7.14	11.43	31.43	61.40	432	52.08	9.72	13.43	24.77	67.77
Total	126952	71.46	10.76	4.11	13.67	83.94	138369	74.43	10.83	3.87	10.87	87.25

** Includes Ireland part not stated

* The denominator for the percentage linkage success rate is those members present at the 1991 Census minus deaths & embarkations prior to the 2001 Census

4.6 Forward linkage between the 1991 and 2001 Censuses by sex and ethnicity in 1991

The majority of the SLS sample described themselves as White in 1991 and among those eligible to be linked 84% of males and 87% of females were successfully forward linked. Thirteen percent of white males and 11% of white females were lost to link (Table 7).

Only 2,907 SLS members (1,555 males and 1,352 females) who were present in 1991 described themselves as other than white in 1991. Rates of migration out of Scotland are very high among the non-whites suggesting that they are more mobile than their white counterparts. High percentages lost to link suggest both a greater likelihood of moving out of Scotland and problems with variant spelling of names and different ordering of surnames and forenames as given on the 2001 Census forms. This was found particularly among those of Indian, Pakistani, and other South Asian backgrounds. Name discrepancies between those held at NHSCR and those given on the 2001 Census forms were a major source of problems with tracing.

Table7: Forward linkage rates between 1991 and 2001 Censuses by Sex & Ethnicity in 1991
Sample members traced at NHSCR in 1991

Ethnicity in 1991	Males						Females					
	Members present in 1991	Position in 2001 %				Linkage success rate per cent *	Members present in 1991	Position in 2001 %				Linkage success rate per cent *
		Linked at 2001 Census	Died before 2001 Census	Embarked before 2001 Census	Not Linked			Linked at 2001 Census	Died before 2001 Census	Embarked before 2001 Census	Not Linked	
White	125397	71.68	10.86	4.01	13.45	84.20	137017	74.55	10.91	3.78	10.76	87.39
Indian	264	56.82	3.79	14.77	24.62	69.77	248	63.31	1.61	15.73	19.35	76.59
Pakistani	538	61.52	2.42	6.69	29.37	67.69	434	65.21	2.76	10.83	21.20	75.47
Bangladeshi	25	64.00	0.00	28.00	8.00	88.89	23	56.52	0.00	21.74	21.74	72.22
Other South Asian	78	38.46	3.85	11.54	46.15	45.45	112	57.14	0.00	17.86	25.00	69.57
Chinese	255	56.08	1.96	9.02	32.94	63.00	201	61.19	2.49	11.44	24.88	71.10
Black Caribbean	22	36.36	9.09	22.73	31.82	53.33	23	82.61	4.35	8.70	4.35	95.00
Black African	89	33.71	1.12	24.72	40.45	45.45	72	52.78	2.78	16.67	27.78	65.52
Black other	29	41.38	0.00	17.24	41.38	50.00	35	77.14	0.00	2.86	20.00	79.41
Any Mixed	118	57.63	1.69	14.41	26.27	68.69	132	68.18	0.76	13.64	17.42	79.65
Other	137	40.15	0.73	16.79	42.34	48.67	72	50.00	1.39	11.11	37.50	57.14
Total	126952	71.46	10.76	4.11	13.67	83.94	138369	74.43	10.83	3.87	10.87	87.25

* The denominator for the percentage linkage success rate is those members present at the 1991 Census minus deaths & embarkations prior to the 2001 Census

4.7 Forward linkage between the 1991 and 2001 Censuses by sex and housing tenure in 1991

Table 8 shows that 58% of SLS sample members were living in owner occupied dwellings in 1991 and this had risen to 59% among those members who were successfully linked in 2001. Both males and females in owner occupation had the highest linkage success rates at 87% and 89% respectively. Regardless of tenure type women had higher linkage success rates and lower loss to link than men.

As might be expected the lowest linkage success rates were found for SLS members who were enumerated in Communal Establishments in 1991, with 21% of eligible men and 13% of eligible women being lost to link by 2001. The high percentage of men in Communal Establishments in 1991 who were known to have left Scotland before the 2001 Census (11%) may reflect a large proportion in the armed services who were posted elsewhere in the inter-censal period.

SLS members who were recorded as living in privately rented accommodation in 1991 had lower linkage rates than either those living in owner occupied or social housing. They also had higher out-migration rates and loss to linkage and this group will have included quite a high proportion of students and mobile workers in 1991.

Table 8: Forward linkage rates between 1991 and 2001 Censuses by Tenure in 1991
Sample members traced at NHSCR in 1991

Tenure in 1991	Males					Linkage success rate per cent *	Members present in 1991	Females				Linkage success rate per cent *		
	Members present in 1991	Position in 2001 %						Linkage success rate per cent *	Members present in 1991	Position in 2001 %				
		Linked at 2001 Census	Died before 2001 Census	Embarked before 2001 Census	Not Linked					Linked at 2001 Census	Died before 2001 Census		Embarked before 2001 Census	Not Linked
Living in communal establishment	1515	32.28	35.91	10.89	20.92	60.67	2313	21.88	60.83	4.06	13.23	62.32		
Owner occupier	72125	76.81	7.71	4.25	11.23	87.24	74665	79.08	7.01	4.37	9.54	89.23		
Living in social housing	45475	65.77	15.03	2.64	16.55	79.90	53462	71.27	14.32	2.20	12.21	85.38		
Renting privately	7837	62.84	9.12	10.00	18.03	77.71	7929	67.32	8.65	10.30	13.72	83.07		
Total	126952	71.46	10.76	4.11	13.67	83.94	138369	74.43	10.83	3.87	10.87	87.25		

* The denominator for the percentage linkage success rate is those members present at the 1991 Census minus deaths & embarkations prior to the 2001 Census

4.8 Forward linkage between the 1991 and 2001 Censuses by sex and economic position in 1991

Forward linkage rates between the 1991 and 2001 Census by sex and economic activity are shown in Table 9. Those SLS members who were classified as economically active in 1991 were more likely to still be in the sample in 2001 (86% of eligible men and 90% of eligible women were successfully forward linked) compared with those who had been recorded as economically inactive (80% and 86% respectively).

Among the economically active those who had been out of employment at the time of the 1991 Census were less likely to have been successfully forward linked (74% of men and 84% of women) compared with those who had been in employment (87% and 90% respectively). A higher proportion of those registered as unemployed had died before 2001 and among unemployed men the proportion lost to link was twice as large as that found among employed men. A higher proportion of unemployed women, compared to either employed or unemployed men, had left Scotland prior to 2001 but the proportion of unemployed women lost to link (15%), although higher than that found for both employed women and employed men, was still lower than that found for unemployed men.

Among those classified as economically inactive in 1991, the highest forward linkage success rates were found for men who had stated they were either permanently sick or were retired (83% for both) and for women who were looking after the house (88%). The lowest forward linkage rates were found among men and women who were classified as 'other inactive' (60% and 70% respectively) but the numbers in this group were very small. Students had low forward linkage rates but they also had the highest proportion of out-migrants of any group either economically active or inactive, as well as high rates of loss to link. Logically it could be expected that those who were enumerated as students or school children in 1991 would be more likely to move out of Scotland to work or to go to university than other groups. Much of their loss to link is probably due to missed migration. Certainly this is a group who are likely to be young and fit and may well not register with a GP after moving unless they become sick.

Table 9: Forward linkage rates between 1991 and 2001 Censuses by Sex & Economic Position in 1991 (based on 10% economic activity variable ECONPOT9)
Sample members traced at NHSCR in 1991

Economic Position in 1991	Males aged 16 & over						Females aged 16 & over					
	Members present in 1991	Position in 2001 %				Linkage success rate per cent *	Members present in 1991	Position in 2001 %				Linkage success rate per cent *
		Linked at 2001 Census	Died before 2001 Census	Embarked before 2001 Census	Not Linked			Linked at 2001 Census	Died before 2001 Census	Embarked before 2001 Census	Not Linked	
Economically Active												
In employment	63502	80.11	4.07	4.02	11.80	87.16	51109	84.86	2.14	3.73	9.27	90.16
Out of employment	8741	65.52	7.52	4.60	22.37	74.55	4147	76.13	3.16	5.93	14.78	83.74
All economically active	72243	78.34	4.49	4.09	13.08	85.70	55256	84.21	2.22	3.90	9.68	89.69
Economically Inactive												
Wholly retired	15739	38.87	51.79	1.18	8.16	82.64	22344	48.08	41.38	1.30	9.24	83.88
Permanently sick	6590	56.98	30.23	1.34	11.46	83.26	5135	63.15	24.62	1.40	10.83	85.36
At school/student	3748	59.39	0.64	16.46	23.51	71.64	3882	66.92	0.70	15.58	16.80	79.94
Looking after house	593	62.06	19.90	3.71	14.33	81.24	24908	74.10	12.49	3.26	10.16	87.94
Other inactive	147	51.02	6.80	8.16	34.01	60.00	176	42.05	32.39	7.39	18.18	69.81
All economically inactive	26817	46.77	38.39	3.45	11.40	80.41	56445	62.21	24.28	3.17	10.34	85.75
Total	99060	69.80	13.67	3.92	12.62	84.69	111701	73.09	13.37	3.53	10.01	87.95

* The denominator for the percentage linkage success rate is those members present at the 1991 Census minus deaths & embarkations prior to the 2001 Census

4.9 Forward linkage between the 1991 and 2001 Censuses by sex and social class in 1991

Table 10 provides forward linkage rates between the 1991 and 2001 Census by sex and social class. In this case social class is indicated using the Registrar General's social class classification. This was the measure used in the 1991 Census, but it was replaced with the National Statistics Socio-economic Classification (NS-SEC) classification in the 2001 Census. For purposes of comparability both the Registrar General's social class and NS-SEC have been coded in the SLS for 1991 and 2001.

Eighty-six percent of men and 90% of women who could be given a social class were successfully forward linked (note that persons who were aged less than 16 in 1991 or who had not worked in the 10 years previous to the 1991 Census are excluded). Among those with a Registrar General's Social Class of I to V, men in Social Class II (intermediate) and women in Social Class IIIN (skilled non-manual) had the highest forward linkage success rates (89% and 91% respectively). The lowest forward linkage rates were found among men and women who had been in the Armed Forces in 1991 at 72% and 50%. High proportions of this group had left Scotland prior to the 2001 Census and the 18% of men and 25% of women who were lost to link probably represent postings out of Scotland where no record has been found at NHSCR. It should be taken into account that when dealing with SLS members who were in the Armed Forces that the numbers are small, particularly for women, and that care should be taken when including this group in any analysis.

Table 10: Forward linkage rates between 1991 and 2001 Censuses by Sex & Social Class in 1991
Sample members traced at NHSCR in 1991

Social Class in 1991	Males aged 16 and over						Females aged 16 and over					
	Members present in 1991	Position in 2001 %				Linkage success rate per cent *	Members present in 1991	Position in 2001 %				Linkage success rate per cent *
		Linked at 2001 Census	Died before 2001 Census	Embarked before 2001 Census	Not Linked			Linked at 2001 Census	Died before 2001 Census	Embarked before 2001 Census	Not Linked	
I Professional	4138	79.31	3.14	6.48	11.07	87.75	1040	79.33	0.96	9.71	10.00	88.81
II Intermediate	16746	81.36	3.74	5.06	9.84	89.21	14417	84.47	1.96	4.47	9.09	90.28
IIIN Skilled Non-manual	7427	80.93	3.30	4.47	11.30	87.75	19778	85.70	1.78	3.80	8.72	90.77
IIIM Skilled Manual	23018	80.45	4.49	2.49	12.58	86.48	4058	84.15	2.32	3.01	10.52	88.89
IV Partly skilled	11952	77.14	5.33	3.15	14.37	84.29	8269	83.90	2.31	3.54	10.24	89.12
V Unskilled	3798	73.75	6.08	2.63	17.54	80.79	5037	84.00	4.23	1.77	10.01	89.36
Total	67079	79.69	4.33	3.72	12.26	86.67	52599	84.67	2.17	3.81	9.35	90.06
Armed forces	859	47.38	1.16	32.95	18.51	71.91	59	25.42	0.00	49.15	25.42	50.00
On a Government Scheme	1320	69.09	2.88	5.83	22.20	75.68	845	79.76	1.42	4.38	14.44	84.67
Not stated or inadequately described	456	66.45	8.99	2.85	21.71	75.37	298	77.85	2.01	5.37	14.77	84.06
Total	2635	61.56	3.38	14.16	20.91	74.64	1202	76.62	1.50	6.82	15.06	83.58
All	69714	79.00	4.29	4.12	12.59	86.26	53801	84.49	2.16	3.87	9.48	89.92

Note: 3,984 economically active persons are missing from this table when compared with Table 9. These persons had a value for economic activity (ECONPOT9) but not for social class (SCLASEAT9) as they were not working in the week before Census and had not worked in the previous 10 years.

4.10 Forward linkage between the 1991 and 2001 Censuses by sex and National Statistics Socio-Economic Classification (NS-SEC) in 1991

NS-Sec was adopted as the new socio-economic classification at the 2001 Census as it was felt that the previous socio-economic classifications (the Registrar General's Social Class and SEG) did not take into account the degree of responsibility and autonomy that a particular type of occupation would have. For information on the development of NS-SEC see Rose D., Pevalin D.J. and O'Reilly K. (2005) *The National Statistics Socio-economic Classification: Origins, Development and Use*. London: ONS. The NS-SEC classification used here is the reduced version which had to be programmed and back-coded to 1991 by the SLS Unit.

Forward linkage rates between the 1991 and 2001 Censuses by sex and NS-SEC are shown in Table 11. The linkage success rate was better for women than men, with 87% of women and 84% of men being found in 2001. The highest proportion of SLS members who were lost to link were full time students in 1991 (21% of males and 16% of females) and these were also the group most likely to have left Scotland and indeed the UK by 2001. Among the other occupational groups loss to link was highest among men who were classified as either in routine occupations (15%) or semi-routine occupations (13%) and women who had been in professional occupations (11%) or in routine occupations (10%) in 1991.

Table 11: Forward linkage rates between 1991 and 2001 Censuses by sex and reduced NS-SEC in 1991
Sample members traced at NHSCR in 1991

NS-SEC in 1991	Males						Females					
	Members Present in 1991 Census	Position in 2001				Linkage success rate % **	Members Present in 1991 Census	Position in 2001				Linkage success rate % **
		% Linked at 2001 Census	% Died before 2001 Census	% Embarked before 2001 Census	% Not linked			% Linked at 2001 Census	% Died before 2001 Census	% Embarked before 2001 Census	% Not linked	
1. Higher managerial & professional occupations												
1.1 Large employers & higher managerial occupations	3471	77.15	6.40	7.66	8.79	89.78	560	80.00	3.39	7.68	8.93	89.96
1.2 Higher professional qualifications	4946	77.66	5.16	6.43	10.76	87.83	1502	78.76	2.00	8.66	10.59	88.15
2. Lower managerial & professional occupations	12525	78.91	7.03	4.50	9.57	89.18	13085	83.65	3.30	4.28	8.77	90.52
3. Intermediate occupations	8070	77.62	5.92	6.28	10.17	88.41	18045	84.72	2.99	3.96	8.32	91.05
4. Small employers & own account workers	7135	80.52	5.30	2.52	11.66	87.35	2148	82.91	2.61	4.61	9.87	89.36
5. Lower supervisory & technical occupations	11840	77.83	8.43	2.52	11.22	87.40	2064	83.82	4.84	2.47	8.87	90.43
6. Semi-routine occupations	11740	74.24	9.41	3.07	13.28	84.83	17034	83.35	4.20	3.03	9.43	89.84
7. Routine occupations	18931	73.39	9.76	2.34	14.51	83.50	14581	81.59	5.49	2.49	10.43	88.66
8. Full-time students	1406	58.11	0.50	20.48	20.91	73.54	1768	67.76	0.74	15.72	15.78	81.11
9. No code required	45906	63.55	15.64	4.30	16.51	79.38	66921	65.59	18.17	3.83	12.40	84.10
Not classified*	982	50.61	31.16	1.93	16.29	75.65	661	64.90	17.70	4.39	13.01	83.30
Total	126952	71.46	10.76	4.11	13.67	83.94	138369	74.43	10.83	3.87	10.87	87.25

*Not classified - persons where occupation was not stated or inadequately described

** The denominator for the percentage linkage success rate is those members present at the 1991 Census minus deaths & embarkations prior to the 2001 Census

4.11 Forward linkage between the 1991 and 2001 Censuses by sex and limiting long-term illness in 1991

A question on limiting long-term illness (LLTI) was first asked in the 1991 Census and 13.5% of SLS members stated at that time that they had a LLTI. Of these over one third of both men and women had died before 2001 and fewer embarked or were lost to link than those SLS members who had stated they did not have a LLTI. Only 48% of eligible person who had a LLTI in 1991 were linked at the 2001 Census, compared with those who had stated they had no health problem. Eighty-four per cent of 'healthy' males and 87% of 'healthy' females compared with 82% of 'sick' males and 83% of 'sick' females were successfully forward linked. Migration out of Scotland and loss to linkage were higher among those who had stated they were healthy in 1991.

Table 12: Forward linkage rates between 1991 and 2001 Censuses by Sex & Limiting Long-term Illness in 1991
Sample members traced at NHSCR in 1991

Limiting long-term illness in 1991	Males						Females					
	Members present in 1991	Position in 2001 %				Linkage success rate per cent *	Members present in 1991	Position in 2001 %				Linkage success rate per cent *
		Linked at 2001 Census	Died before 2001 Census	Embarked before 2001 Census	Not Linked			Linked at 2001 Census	Died before 2001 Census	Embarked before 2001 Census	Not Linked	
Has a LLTI	16238	48.55	38.81	1.71	10.93	81.62	19677	48.42	39.86	1.72	10.00	82.89
Does not have a LLTI	110714	74.82	6.64	4.46	14.07	84.17	118692	78.75	6.01	4.22	11.02	87.72
Total	126952	71.46	10.76	4.11	13.67	83.94	138369	74.43	10.83	3.87	10.87	87.25

* The denominator for the percentage linkage success rate is those members present at the 1991 Census minus deaths & embarkations prior to the 2001 Census

5 Inconsistencies between the 1991 and 2001 Censuses

Using the linked sample it is possible to examine inconsistencies between censuses in the answers to questions about characteristics that are not likely to change over time. Those characteristics are date of birth (although if this was altered in 2001, the SLS member would not have been linked), age (all respondents should be 10 years older by the next census), sex, ethnicity (although some people do change their self-reported ethnic identities over time, and the question was more detailed in 2001 than in 1991) and country of birth. Table 13 shows the level of inconsistencies for these characteristics in 2001.

It should be remembered that the 2001 Census data held in the SLS database, unlike the data in published Census tables, includes missing values because we have not included imputed values. Table 13 therefore includes the proportion of cases that had missing values in 2001 as well as the percentage of cases with inconsistent responses.

Responses to both the sex and age questions remained remarkably consistent over time with only 0.24% of persons being coded with an inconsistent sex in 2001 and 0.45% with an inconsistent age. Sex was missing a value in 2001 for 0.25% of SLS members. Among the 1,140 persons who had an inconsistency in their ages in 2001, 51% had entered in dates of birth that were later than the ones they had given in 1991 and 49% had entered earlier dates of birth than previously. In these cases the year of birth was mis-recorded – had the month or day been mis-recorded they would not have been linked. Only 277 SLS members had missing values for date of birth in 2001 as a result of either leaving their year of birth blank or entering it in a form that could not be scanned. Again, missing values for the day or month of birth would have resulted in a failure to link.

Responses to the ethnicity and country of birth questions showed greater inconsistencies between the censuses than either sex or age. Although the overall inconsistency rate for ethnicity was only 0.39%, this was due to the majority of the SLS sample who had stated they were 'White' in 1991 remaining consistent in their responses to the question over time. Those SLS members who considered themselves members of other ethnic groups had high inconsistency rates varying from 5.6% for those who stated they were Chinese in 1991 but changed their ethnic affiliation in 2001 to 73% for those who were included in the 'Other' category in 1991. It is not clear what caused SLS members to change their ethnic background by 2001 but the two ethnicity questions differed in both structure and content. The 1991 question referred to 'descent from an ethnic or racial group' and 'ancestry' whereas the 2001 question referred to 'cultural background'.

More SLS members did not answer this question than did not answer the country of birth question in 2001 (3.43% overall compared to 1.22%). Whether this is because the ethnicity question is not well understood or whether it is due to people finding it intrusive is not clear.

Table 13: Inconsistencies between 1991 and 2001 Census responses

Characteristics in 1991 Census	Characteristics in 2001 Census					
	Consistent with 1991	Inconsistent with 1991	Value missing in 2001	Totals	% inconsistent	% with value missing in 2001
Sex						
Male	90239	260	225	90724	0.29	0.25
Female	102521	214	258	102993	0.21	0.25
Persons	192760	474	483	193717	0.24	0.25
Ethnic Group						
White	185047	395	6582	192024	0.21	3.43
Indian	277	25	5	307	8.14	1.63
Pakistani	555	35	24	614	5.70	3.91
Bangladeshi	22	3	4	29	10.34	13.79
Chinese	242	15	9	266	5.64	3.38
Black *	52	38	5	95	40.00	5.26
Any Mixed	62	88	8	158	55.70	5.06
Other **	51	163	10	224	72.77	4.46
Total	186308	762	6647	193717	0.39	3.43
* Black includes Black Caribbean & Black African						
** Other includes Black Other & Other S. Asian						
Country of birth						
E&W	11453	330	114	11897	2.77	0.96
Scotland	174060	729	2185	176974	0.41	1.23
NI & Rest of UK	826	49	6	881	5.56	0.68
Eire	542	25	13	580	4.31	2.24
Old CW	454	23	5	482	4.77	1.04
India	242	21	6	269	7.81	2.23
Pakistan & Bangladesh	252	23	8	283	8.13	2.83
African CW	214	21	4	239	8.79	1.67
Rest NCW	342	154	9	505	30.50	1.78
EU	676	47	6	729	6.45	0.82
Rest Europe	148	39	3	190	20.53	1.58
USA	202	13	3	218	5.96	1.38
Other	433	32	5	470	6.81	1.06
Total	189844	1506	2367	193717	0.78	1.22
Age Group						
0 - 9	28020	162	39	28221	0.57	0.14
10 - 19	24600	148	28	24776	0.60	0.11
20 - 29	30839	102	36	30977	0.33	0.12
30 - 39	31638	110	44	31792	0.35	0.14
40 - 49	29082	121	54	29257	0.41	0.18
50 - 59	22998	115	33	23146	0.50	0.14
60 - 69	16970	73	25	17068	0.43	0.15
70 +	8520	32	18	8480	0.38	0.21
Total	192577	863	277	193717	0.45	0.14

One would assume that, aside from errors caused by misreading the question, or typographical errors, the majority of people would not change their country of birth between censuses. Just under 1% of the linked sample gave inconsistent answers but this disguises wide variation ranging from the Scots, where 2.77% of them had changed their country of birth in 2001, to 30.5% of those who had stated that their country of birth was in 'the rest of the New Commonwealth' in 1991.

The inconsistencies themselves are interesting as Table 14 shows. The change in country of birth is only shown for those respondents who had inconsistent responses.

Table 14: Inconsistencies in Country of Birth – Change between 1991 and 2001

1991 Country Birth	2001 Country of Birth	Most common change in Country of Birth % changes
England & Wales	Scotland	88.5
Scotland	England & Wales	63.9
Northern Ireland & rest of UK	Scotland	42.9
	Eire	42.9
Eire	Scotland	44.0
Old Commonwealth	Scotland	52.2
India	Pakistan & Bangladesh	33.3
Pakistan & Bangladesh	India	30.4
African Commonwealth	Other	76.2
Rest of New Commonwealth	Other	89.0
EU	Scotland	53.2
Rest of Europe	EU	66.7
USA	Scotland	84.6
Other	Rest of Europe	50.0

6 Linkage Failures

6.1 Who failed to link?

Among the 226,118 SLS members who were eligible to be linked at the 2001 Census, 32,401 were lost to follow-up of whom 54% were male and 46% female. The characteristics in 1991 of those SLS members most likely to be lost to link by 2001 were as follows. They were aged between 20 and 29 or were aged 75 and over. They were more likely to be either single or divorced than married or widowed and their household circumstances included those who were living as dependent children in single parent households, male adults living alone,

cohabiting male parents with dependent children or persons who were living in communal establishments at the time of the 1991 Census. They were more likely to have been born outside the UK and have recorded an ethnicity other than white. Aside from those SLS members who were living in communal establishments who had a high attrition rate, they were more likely to be privately renting rather than living in owner occupied or social housing. They were more likely to be economically inactive (either at school, a student or classified as 'other inactive' persons). Among those who were economically active the unemployed were more likely to be lost to link than the employed. For those aged 16 and over with a social class in 1991 attrition was higher among males who were classified as unskilled (Registrar General's Social Class V) or on a government scheme in 1991. Females were more likely to be lost to link if they were (or had been) skilled manual workers (Social Class IIIIM) or were in the armed forces. Both males and females were more likely to be lost to link by 2001 if they had been categorised as healthy in 1991.

6.2 Why was there failure to link?

Twelve per cent of the SLS sample who were eligible to link failed to do so. A large proportion of those lost to link are probably missed migrations out of Scotland. Based on the 100% figures for migrations out of Scotland in the 1991 – 2001 period approximately 25,000 SLS members should have left rather than the 10,565 that were identified as having left by being picked up in the NHSCR records. If this were the case migrations of SLS members would have risen to 9% and those lost to link would have dropped to 7%. There is no data to confirm this at present, but the main age groups affected (the 20 to 29 year-olds) are those who are known have the highest out migration rates. It is hoped that changes in the way migrations are now reported to the SLS Team will allow us to re-examine this problem in the near future.

Approximately 3% of SLS members who should have been linked were not because of errors caused by the use of scanning to input data from the 2001 Census forms. The basic search criteria required by NHSCR to trace SLS members (forename, surname, date of birth and sex) were often either missing, incorrectly scanned or illegible. Dates may have been written outside the boxes which defined the limits for the scanner and as a result were incomplete or not read at all. Many of the SLS members who were enumerated in Communal Establishments on Census night did not fill in their names at all and to make tracing even more difficult, person numbers were also missing occasionally from the Individual (I) forms. This was particularly the case in large student halls of residence where there were hundreds of I forms for the one communal establishment.

The remaining percentage of unlinked cases are probably due to errors in birth dates over time, changes of name and people who genuinely did not fill in a census form although they were present at the census. There are always a number of people who change their

birthdates from census to census giving an SLS date at one and not the other. This can either lose a person to link as their entry at NHSCR has a different birth date or add a person to the SLS who should not really be there. Name changes are also becoming more common and they make tracing a lot harder for NHSCR.

7 Conclusion

The quality of linkage attained in the 1991 – 2001 SLS Census link is good with an overall 85.67% forward linkage success rate. This linkage rate has been affected by the problem of capturing accurate historic migration data as well as particular difficulties associated with the scanning process used in data capture at the 2001 Census. For any researcher wishing to use the linked sample in analysis it is suggested that they take account of those groups where attrition is known to be highest when designing their study.