

## 9 Sampling fractions

This chapter examines sampling fractions in the whole LS sample and in subgroups of the sample at each census point (1971, 1981 and 1991) where a new LS sample has been selected.

### 9.1 THE DEFINITION AND USE OF SAMPLING FRACTIONS IN THE LS

The LS was designed as a 1 per cent sample of the enumerated census population of England and Wales. When a new LS sample is taken at a census, it is essential to measure how representative the sample is and what biases exist in it. Sampling fractions are used to measure whether the LS population (both as a whole and in subgroups) represents approximately 1 per cent of the originating census population (or specific subgroups of that population). Because of variations in tracing rates (see Chapter 8) and in the availability of accurate birthdate data (the sampling criterion) the sample proportions may vary.

Because only the traced LS population is used in analysis, net rather than gross sampling fractions are used as these exclude the untraced population.

The observed net sampling fraction  $\alpha_i$  (where  $i$  identifies the subgroup of interest) is defined as:

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

The expected net sampling fractions give an estimate of the proportions of the LS sample that would have been expected in the census population and allow comparison with what was actually observed. Ideally, observed and expected net sampling fractions should be the same, but biases, not only in tracing rates but also in the sampling of certain population subgroups can distort that relationship.

Expected net sampling fractions are defined as:

$$\alpha_i(\text{expected}) = \alpha \frac{(1 - \beta_i)}{(1 - \beta)}$$

Where  $i$  indicates the subgroup of interest,  $\alpha$  is the overall sampling fraction (that is the sampling fraction for either all LS males, or for all females or for the total LS population) and  $\beta$  is the overall 'not traced' rate (that is the 'not traced' rate for either all LS males or for all LS females or for the total LS population).<sup>1</sup>

### 9.2 THE 1971 LS SAMPLE POPULATION

The 1971 LS sample population had an observed sampling fraction of 1.05, with expected sampling fractions of 1.06 for males and 1.05 for females.

Table 9.1 shows the percentage distributions by age and sex of the LS sample and the 1971 Census population, together with the observed and expected sampling fractions for the LS sample. Both distributions showed a similar pattern and no age group was noticeably over- or under-represented in the sample. The sampling fractions did not show a large variation. The lowest observed sampling fractions were found among young adults (males aged 20–24 and females aged 25–29), the highest among both males and females aged 50–59. The observed and expected sampling fractions did not differ markedly, the largest difference (0.05) being found among females aged 75 and over.

#### 9.2.1 Age, sex and marital status

Table 9.2 shows both percentage distributions and sampling fractions for the 1971 Census–LS sample, together with the original census population by age, sex and marital status. Very little variation was seen between the percentage distributions for the LS and for the England and Wales populations. However, the LS had proportionately fewer males in the elderly divorced category (60 and over) than expected, and females showed more variation among the widowed and divorced of all ages. In cases where the sampling fractions were very low, the calculation has been based on small numbers. Differences between observed and expected sampling fractions were greatest among the widowed and divorced groups.

#### 9.2.2 Country of birth

The population enumerated in the 1971 Census were asked to indicate their place of birth by answering question B9 on the census form. Tracing rates for LS members giving a birth place other than the UK showed a great deal of variation (see Chapter 8, section 8.3.2). The expectation was therefore that both percentage distributions and sampling fractions in the 1971 LS sample would also vary greatly and should be examined in some detail.

Table 9.3a shows the 1971 LS sample and the 1971 Census population by sex and birthplace. The distributions are somewhat different for those in the LS sample compared with the census population. A total of 6.78 per cent of males in the LS population were born overseas, compared with 6.75 per cent of the census population. The

**Table 9.1 1971 LS population and 1971 Census population by sex, age, percentage distributions and sampling fractions**

Age	LS population	% distribution	1971 Census population* (000's)	% distribution	Sampling fractions	
					Observed	Expected
<b>Males</b>						
0-4	20,949	4.08	2,002.8	4.11	1.05	1.07
5-9	21,878	4.26	2,074.2	4.25	1.05	1.07
10-14	19,828	3.86	1,865.3	3.83	1.06	1.06
15-19	17,927	3.49	1,696.1	3.48	1.06	1.05
20-24	19,161	3.73	1,876.1	3.85	1.02	1.05
25-29	16,959	3.31	1,612.1	3.31	1.05	1.05
30-34	15,646	3.05	1,460.3	3.00	1.07	1.05
35-39	15,126	2.95	1,409.8	2.89	1.07	1.05
40-44	15,712	3.06	1,466.8	3.01	1.07	1.06
45-49	16,382	3.19	1,551.8	3.18	1.06	1.06
50-54	15,016	2.93	1,412.0	2.90	1.06	1.06
55-59	15,679	3.06	1,433.7	2.94	1.09	1.07
60-64	14,088	2.75	1,330.2	2.73	1.06	1.07
65-69	11,270	2.20	1,063.3	2.18	1.06	1.07
70-74	7,224	1.41	692.0	1.42	1.04	1.07
75+	7,738	1.51	736.5	1.51	1.05	1.07
All ages	250,583	48.84	23,683.0	48.59	1.06	1.06
<b>Females</b>						
0-4	20,160	3.93	1,901.9	3.90	1.06	1.07
5-9	20,776	4.05	1,969.8	4.04	1.05	1.07
10-14	18,718	3.65	1,761.7	3.61	1.06	1.07
15-19	16,889	3.29	1,617.5	3.32	1.04	1.05
20-24	19,023	3.71	1,855.1	3.81	1.03	1.03
25-29	16,152	3.15	1,579.2	3.24	1.02	1.03
30-34	14,506	2.83	1,411.0	2.89	1.03	1.03
35-39	14,402	2.81	1,376.4	2.82	1.05	1.03
40-44	15,200	2.96	1,468.3	3.01	1.04	1.04
45-49	16,790	3.27	1,583.7	3.25	1.06	1.05
50-54	15,752	3.07	1,485.4	3.05	1.06	1.06
55-59	16,804	3.28	1,542.0	3.16	1.09	1.06
60-64	15,691	3.06	1,510.7	3.10	1.04	1.06
65-69	14,250	2.78	1,336.4	2.74	1.07	1.06
70-74	11,319	2.21	1,086.1	2.23	1.04	1.06
75+	16,046	3.13	1,581.3	3.24	1.01	1.06
All ages	262,477	51.16	25,066.6	51.42	1.05	1.05
Total persons	513,060	100.0	48,749.6	100.00	1.05	1.05

\* Including visitors to the United Kingdom.

**Table 9.2 1971 LS population and 1971 Census population by sex, age, marital status, percentage distributions and sampling fractions**

England and Wales

Age and marital status	LS population	% distribution	1971 Census population (000's)	% distribution	Sampling fractions			
					Observed	Expected		
<b>Males</b>								
Single	0-4	20,949	19.3	2,002.8	19.3	1.05	1.05	
	5-9	21,878	20.2	2,074.2	19.9	1.05	1.05	
	10-14	19,828	18.3	1,865.3	17.9	1.06	1.05	
	15-19	17,530	16.1	1,661.5	16.0	1.06	1.04	
	20-24	11,858	10.9	1,186.0	11.4	1.00	1.02	
	25-29	4,158	3.8	414.9	4.0	1.00	1.00	
	30-34	2,056	1.9	202.0	1.9	1.02	1.00	
	35-39	1,592	1.5	156.3	1.5	1.02	1.03	
	40-44	1,619	1.5	158.4	1.5	1.02	1.01	
	45-49	1,580	1.5	154.4	1.5	1.02	1.02	
	50-54	1,302	1.2	123.4	1.2	1.06	1.02	
	55-59	1,252	1.2	118.0	1.1	1.06	1.01	
	60-64	1,100	1.0	104.6	1.0	1.05	1.02	
	65+	1,859	1.7	176.8	1.7	1.05	1.03	
Total	108,560	100.0	10,398.8	100.0	1.04	1.04		
Married	16-19	397	0.3	34.6	0.3	1.15	1.04	
	20-24	7,264	5.5	686.7	5.5	1.06	1.07	
	25-29	12,634	9.5	1,180.6	9.5	1.07	1.06	
	30-34	13,323	10.0	1,233.8	9.9	1.08	1.06	
	35-39	13,265	10.0	1,226.0	9.9	1.08	1.06	
	40-44	13,741	10.3	1,275.9	10.3	1.08	1.06	
	45-49	14,334	10.8	1,354.6	10.9	1.06	1.07	
	50-54	13,158	9.9	1,238.8	10.0	1.06	1.07	
	55-59	13,680	10.3	1,247.8	10.0	1.10	1.08	
	60-64	12,031	9.0	1,134.9	9.1	1.06	1.08	
	65+	19,183	14.4	1,819.1	14.6	1.05	1.08	
	Total	133,010	100.0	12,432.9	100.0	1.07	1.07	
	Widowed	16-29	17	0.2	1.7	0.3	1.00	1.03
		30-39	49	0.7	6.3	0.9	0.78	1.01
40-44		102	1.4	8.6	1.3	1.19	1.06	
45-49		195	2.8	18.1	2.7	1.08	1.04	
50-54		318	4.5	28.1	4.2	1.13	1.07	
55-59		529	7.5	48.2	7.2	1.10	1.06	
60-64		825	11.7	75.3	11.3	1.10	1.04	
65+		5,044	71.3	479.7	72.0	1.05	1.06	
Total		7,079	100.0	665.9	100.0	1.06	1.06	
Divorced		16-29	189	9.8	18.3	9.9	1.03	1.05
	30-34	247	12.8	22.3	12.0	1.11	1.02	
	35-39	240	12.4	23.4	12.6	1.03	1.03	
	40-44	250	12.9	23.9	12.9	1.05	1.04	
	45-49	273	14.1	24.7	13.3	1.11	1.04	
	50-54	238	12.3	21.6	11.7	1.10	1.05	
	55-59	218	11.3	19.7	10.6	1.11	1.05	
	60-64	132	6.8	15.3	8.3	0.86	1.07	
	65+	147	7.6	16.1	8.7	0.91	1.04	
	Total	1,934	100.0	185.3	100.0	1.04	1.04	
All males	250,583		23,683.0		1.06	1.06		

**Table 9.2 - continued**

Age and marital status		LS population	% distribution	1971 Census population (000's)	% distribution	Sampling fractions		
						Observed	Expected	
<b>Females</b>								
Single	0-4	20,160	20.3	1,901.9	20.0	1.06	1.06	
	5-9	20,776	20.9	1,969.8	20.7	1.05	1.06	
	10-14	18,718	18.8	1,761.7	18.5	1.06	1.06	
	15-19	15,373	15.5	1,476.9	15.5	1.04	1.05	
	20-24	7,411	7.4	737.2	7.7	1.01	1.02	
	25-29	2,131	2.1	209.7	2.2	1.02	1.01	
	30-34	1,091	1.1	110.7	1.2	0.99	0.99	
	35-39	992	1.0	97.0	1.0	1.02	1.02	
	40-44	1,082	1.1	108.9	1.1	0.99	1.02	
	45-49	1,268	1.3	123.9	1.3	1.02	1.03	
	50-54	1,299	1.3	123.8	1.3	1.05	1.03	
	55-59	1,590	1.6	147.7	1.6	1.08	1.04	
	60-64	1,787	1.8	173.4	1.8	1.03	1.05	
	65+	5,814	5.8	570.6	6.0	1.02	1.05	
Total	99,493	100.0	9,513.1	100.0	1.05	1.05		
Married	16-19	1,516	1.2	140.4	1.1	1.08	1.01	
	20-24	11,531	8.8	1,107.2	8.9	1.04	1.03	
	25-29	13,719	10.5	1,337.6	10.7	1.03	1.04	
	30-34	12,989	9.9	1,259.1	10.1	1.03	1.04	
	35-39	12,922	9.8	1,231.6	9.9	1.05	1.04	
	40-44	13,383	10.2	1,293.2	10.4	1.03	1.04	
	45-49	14,465	11.0	1,355.1	10.9	1.07	1.05	
	50-54	12,905	9.8	1,210.3	9.7	1.07	1.07	
	55-59	12,542	9.6	1,151.3	9.2	1.09	1.07	
	60-64	10,231	7.8	982.1	7.9	1.04	1.06	
	65+	15,068	11.5	1,419.7	11.4	1.06	1.07	
	Total	131,271	100.0	12,487.6	100.0	1.05	1.05	
	Widowed	16-29	53	0.2	5.7	0.2	0.93	1.02
		30-39	245	0.9	23.0	0.8	1.07	1.00
40-44		382	1.3	32.8	1.2	1.16	1.01	
45-49		706	2.5	68.3	2.5	1.03	1.04	
50-54		1,189	4.1	118.5	4.3	1.00	1.04	
55-59		2,340	8.1	212.6	7.7	1.10	1.04	
60-64		3,443	12.0	330.2	11.9	1.04	1.04	
65+		20,409	70.9	1,981.9	71.5	1.03	1.04	
Total		28,767	100.0	2,773.0	100.0	1.04	1.04	
Divorced		16-29	330	11.2	37.1	12.7	0.89	0.95
	30-34	329	11.2	33.6	11.5	0.98	0.98	
	35-39	340	11.5	32.5	11.1	1.05	1.00	
	40-44	353	12.0	33.4	11.4	1.06	1.01	
	45-49	351	11.9	36.4	12.4	0.96	1.03	
	50-54	359	12.2	32.8	11.2	1.09	1.02	
	55-59	332	11.3	30.3	10.4	1.10	1.03	
	60-64	230	7.8	25.1	8.6	0.92	1.04	
	65+	322	10.9	31.8	10.8	1.01	1.04	
	Total	2,946	100.0	292.9	100.0	1.01	1.01	
	All females	262,477		25,066.6		1.05	1.05	

corresponding figures for females were 6.16 and 6.24 per cent. The observed sampling fractions showed wide variations, the highest being for males born in India (1.40) and Pakistan (1.49) and the lowest for males and females born in the USA (0.60 and 0.68 respectively). For persons born in the New Commonwealth, only those born in the American New Commonwealth (the West Indies and Caribbean) and the remainder of the New Commonwealth (the Far East) showed lower observed sampling fractions than the overall sampling fractions of 1.06 and 1.05. Expected sampling fractions were low for all those born outside the UK due to the high 'not traced' rates among these population subgroups.

Table 9.3b examines the New Commonwealth born population further, showing observed and expected sampling fractions by age and sex. (Figures given in brackets are based on extremely small numbers and therefore should be treated with caution). It is particularly noticeable that both males and females from the Indian subcontinent were over represented in the 1971 LS sample. Males born in India showed far higher observed sampling fractions in all age groups than expected, as did males from Pakistan in all age groups except the retired. Females from both India and Pakistan also showed high observed sampling fractions at the child-bearing ages (15–44).

**Tables 9.3a 1971 LS population and 1971 Census population by sex, country of birth, percentage distributions and sampling fractions**

Country of birth	LS population	% distribution	1971 Census population	% distribution	Sampling fractions	
					Observed	Expected
<b>Males</b>						
United Kingdom	233,598	93.2	22,083,995	93.25	1.06	1.07
Outside UK*	16,985	6.78	1,598,985†	6.75	1.06	0.93
Irish Republic	3,406	1.36	323,555	1.37	1.05	0.96
Old Commonwealth	583	0.23	59,525	0.25	0.98	0.98
New Commonwealth	7,617	3.04	616,660	2.60	1.24	0.90
African Commonwealth	923	0.37	86,975	0.37	1.06	0.93
American Commonwealth	1,576	0.63	151,495	0.64	1.04	0.94
India	2,372	0.95	169,330	0.71	1.40	0.92
Pakistan	1,470	0.59	98,520	0.42	1.49	0.82
Mediterranean Commonwealth	763	0.30	60,040	0.25	1.27	0.91
Remainder of New Commonwealth	513	0.20	50,300	0.21	1.02	0.93
Europe, excluding USSR	3,145	1.26	271,955	1.15	1.16	0.99
USA	321	0.13	53,970	0.23	0.60	0.88
Elsewhere and not stated	1,913	0.76	219,735	0.93	0.87	0.93
<b>Total</b>	<b>250,583</b>	<b>100.00</b>	<b>23,682,980†</b>	<b>100.00</b>	<b>1.06</b>	<b>1.06</b>
<b>Females</b>						
United Kingdom	246,298	93.84	23,501,200	93.76	1.05	1.05
Outside UK*	16,179	6.16	1,565,395†	6.24	1.03	0.94
Irish Republic	3,801	1.45	352,315	1.41	1.08	0.97
Old Commonwealth	684	0.26	69,350	0.28	0.98	0.98
New Commonwealth	5,633	2.15	504,780	2.01	1.12	0.91
African Commonwealth	755	0.29	71,280	0.28	1.06	0.95
American Commonwealth	1,500	0.57	150,990	0.60	0.99	0.92
India	1,819	0.69	143,515	0.57	1.27	0.91
Pakistan	452	0.17	37,630	0.15	1.20	0.79
Mediterranean Commonwealth	647	0.25	55,045	0.22	1.18	0.88
Remainder of New Commonwealth	460	0.18	46,325	0.18	0.99	0.96
Europe, excluding USSR	3,800	1.45	331,470	1.32	1.15	0.97
USA	317	0.12	46,490	0.19	0.68	0.89
Elsewhere and not stated	1,944	0.74	217,085	0.87	0.90	0.96
<b>Total</b>	<b>262,477</b>	<b>100.00</b>	<b>25,066,595†</b>	<b>100.0</b>	<b>1.05</b>	<b>1.05</b>

\* Includes not stated.

† Includes visitors to United Kingdom.

**Table 9.3b 1971 observed and expected sampling fractions by sex and age for selected countries of birth**

Sex and country of birth		Age group				
		0-14	15-29	30-44	45-retired	Retired+
<b>Males</b>						
New Commonwealth	Observed	1.05	1.19	1.36	1.24	1.12
	Expected	0.88	0.86	0.93	0.94	0.98
African Commonwealth	Observed	0.94	0.99	1.22	(1.44)	(1.31)
	Expected	0.90	0.91	0.96	(0.95)	(1.09)
American Commonwealth	Observed	0.85	0.99	1.04	1.20	1.16
	Expected	0.96	0.90	0.94	0.97	(0.94)
India	Observed	1.24	1.39	1.62	1.19	(1.11)
	Expected	0.86	0.87	0.95	0.95	(1.04)
Pakistan	Observed	1.23	1.57	1.66	1.16	(1.02)
	Expected	0.71	0.78	0.88	0.85	(0.78)
Other Asian Commonwealth	Observed	1.11	0.95	1.04	(0.92)	(1.04)
	Expected	1.02	0.87	0.88	(0.95)	(1.09)
Mediterranean Commonwealth	Observed	0.93	1.06	1.51	1.71	(1.16)
	Expected	0.99	0.84	0.92	0.91	(0.88)
<b>Females</b>						
New Commonwealth	Observed	0.99	1.13	1.17	1.16	1.07
	Expected	0.90	0.89	0.90	0.93	0.99
African Commonwealth	Observed	0.98	1.08	1.09	(1.23)	(1.41)
	Expected	0.94	0.95	0.97	(0.91)	(1.02)
American Commonwealth	Observed	0.85	0.96	1.02	1.17	(0.85)
	Expected	0.93	0.92	0.92	0.91	(0.98)
India	Observed	1.20	1.41	1.35	1.07	1.07
	Expected	0.83	0.88	0.90	0.99	1.03
Pakistan	Observed	(0.97)	1.35	1.30	(1.06)	(0.65)
	Expected	(0.66)	0.83	0.84	(0.74)	(1.09)
Other Asian Commonwealth	Observed	0.96	1.07	(0.97)	(1.03)	(0.53)
	Expected	1.07	0.91	(0.89)	(0.99)	(1.09)
Mediterranean Commonwealth	Observed	1.01	0.92	1.30	1.52	(1.61)
	Expected	0.98	0.84	0.84	0.88	(0.88)

Note: sampling fractions in brackets are calculated from sample numbers under 100.

### 9.2.3 Regional variation

Table 9.4 shows the 1971 LS sample, together with the observed and expected sampling fractions for each of the nine standard regions of England and Wales plus Greater London. There was very little difference between observed and expected sampling fractions at the regional level. Consequently the 1971 LS regional data should be representative of the full England and Wales regional data recorded as at the 1971 Census.

### 9.2.4 Household types

At the 1971 Census 97.3 per cent of the enumerated population of England and Wales lived in private households. Table 9.5 shows that the male and female sampling fractions for this section of the LS sample mirrored those for the whole 1971 Census population. In Chapter 8 (section 8.3.4) it was shown that in 1971 the 2.7 per cent of LS members who were enumerated in non-private households had higher 'not traced' rates than those LS members enumerated in private households. It is therefore not surprising that the sampling fractions for the different types of non-private establishments shown in Table 9.5 were very low.

**Table 9.4 1971 LS population and 1971 Census population by sex, region of usual residence and observed and expected sampling fractions**

Region	Males				Females			
	LS population	1971 Census population (000's)	Sampling fractions		LS population	1971 Census population (000's)	Sampling fractions	
			Observed	Expected			Observed	Expected
North	17,170	1,609.0	1.07	1.07	17,628	1,687.1	1.04	1.05
Yorkshire and Humberside	24,868	2,337.9	1.06	1.06	26,025	2,461.3	1.06	1.06
North West	34,761	3,256.0	1.07	1.07	37,013	3,486.5	1.06	1.06
East Midlands	17,680	1,671.6	1.06	1.07	17,972	1,718.7	1.05	1.06
West Midlands	27,065	2,527.8	1.07	1.05	26,767	2,581.8	1.04	1.04
East Anglia	8,512	822.5	1.04	1.07	8,888	847.0	1.05	1.06
South East	87,363	8,307.3	1.05	1.05	92,941	8,923.0	1.04	1.04
Greater London	37,546	3,578.2	1.05	1.04	40,372	3,874.1	1.04	1.03
Remainder	49,817	4,729.0	1.05	1.06	52,569	5,048.9	1.04	1.05
South West	19,068	1,823.4	1.05	1.07	20,607	1,957.5	1.05	1.06
Wales	14,096	1,327.5	1.06	1.07	14,636	1,403.7	1.04	1.05
Total	250,583	23,683.0	1.06	1.06	262,477	25,066.6	1.05	1.05

**Table 9.5 1971 LS population and 1971 Census population by sex, household type and observed and expected sampling fractions**

Household type	Males				Females			
	LS population	1971 Census population	Sampling fractions		LS population	1971 Census population	Sampling fractions	
			Observed	Expected			Observed	Expected
<b>Private households</b>	244,083	22,927,425	1.06	1.06	256,290	24,368,755	1.05	1.05
<b>Non-private households</b>								
Hotels, etc.	1,147	149,805	0.77	0.95	925	116,740	0.79	0.98
Psychiatric hospitals	731	85,530	0.85	0.96	762	95,510	0.80	0.95
Other hospitals	914	101,935	0.90	0.99	1,879	207,900	0.90	0.91
Educational establishments	1,168	134,780	0.87	1.03	755	83,790	0.90	1.05
Children's homes	183	21,195	0.86	1.00	216	21,005	1.03	1.01
Places of detention	448	45,795	0.98	0.98	18	2,530	0.71	0.89
Defence establishments	692	80,975	0.85	0.97	93	10,280	0.90	0.95
Other establishments	1,217	129,455	0.94	1.01	1,539	154,890	0.99	1.02
Total non-private households	6,500	749,465	0.87	0.99	6,187	692,650	0.89	1.00

## 9.2.5 Social class and socio-economic groupings

Table 9.6 shows the LS sample and the 1971 Census population in the working age groups (15–64) by sex and

social class, while Table 9.7 gives a more detailed socio-economic breakdown. Neither table shows any marked deviation from the overall sampling fraction, and what variation is seen tends to be in groups where the numbers are very small, such as the armed forces.

**Table 9.6 1971 LS population and 1971 Census population by sex, social class and observed and expected sampling fractions**

Social class	Males (aged 15-64)				Females (aged 15-64)			
	LS population	1971 Census population	Sampling fractions		LS population	1971 Census population	Sampling fractions	
			Observed	Expected			Observed	Expected
<b>Non-manual</b>	51,648	4,816,460	1.07	1.08	47,362	4,471,770	1.06	1.06
I Professional	7,820	715,450	1.09	1.07	807	78,670	1.02	1.04
II Intermediate	26,253	2,465,500	1.06	1.08	13,915	1,318,030	1.06	1.05
III(N) Skilled non-manual	17,575	1,635,510	1.07	1.08	32,640	3,075,070	1.06	1.06
<b>Manual</b>	94,677	8,751,870	1.08	1.07	36,103	3,387,400	1.07	1.05
III(M) Skilled manual	57,732	5,353,070	1.08	1.08	8,301	794,730	1.04	1.05
IV Partly skilled	25,750	2,351,550	1.09	1.06	21,775	2,033,400	1.07	1.05
V Unskilled	11,195	1,047,250	1.06	1.05	6,027	559,270	1.08	1.05
Armed forces and inadequately described	4,533	482,920	0.93	1.03	7,387	736,290	1.00	1.06
<b>Total</b>	<b>150,858</b>	<b>14,051,250</b>	<b>1.07</b>	<b>1.07</b>	<b>90,852</b>	<b>8,595,460</b>	<b>1.06</b>	<b>1.05</b>

**Table 9.7 1971 LS population and 1971 Census population by sex, socio-economic group and observed and expected sampling fractions**

Socio-economic group	Males (aged 15-64)				Females (aged 15-64)			
	LS population	1971 Census population	Sampling fractions		LS population	1971 Census population	Sampling fractions	
			Observed	Expected			Observed	Expected
Employers and managers in central/ local government, etc.								
Large establishments	5,904	538,830	1.09	1.08	975	95,470	1.02	1.06
Small establishments	11,916	1,117,190	1.07	1.07	3,058	287,680	1.06	1.05
Professionals - self employed	1,292	115,420	1.12	1.08	106	9,660	1.10	1.06
Professionals - employees	6,528	600,030	1.08	1.07	701	69,010	1.02	1.05
Intermediate non-manual workers	8,444	807,190	1.05	1.07	9,729	917,500	1.06	1.06
Junior non-manual workers	17,816	1,658,260	1.07	1.08	32,871	3,094,510	1.06	1.07
Personal service workers	1,503	136,250	1.10	0.97	10,613	998,280	1.06	1.05
Foremen and supervisors - manual	5,515	510,610	1.08	1.08	509	50,930	1.00	1.06
Skilled manual workers	45,808	4,248,690	1.08	1.08	5,295	501,120	1.06	1.06
Semi-skilled manual workers	19,623	1,785,320	1.10	1.06	11,013	1,035,390	1.06	1.05
Unskilled manual workers	10,688	1,000,900	1.07	1.05	6,018	557,910	1.08	1.05
Own account workers	6,930	649,150	1.07	1.07	1,671	158,800	1.05	1.06
Farmers - employers and managers	1,094	97,940	1.12	1.08	146	12,220	1.19	1.05
Farmers - own account	1,151	109,250	1.05	1.09	207	18,100	1.14	1.07
Agricultural workers	2,113	193,300	1.09	1.07	553	52,590	1.05	1.06
Members of armed forces	1,948	222,840	0.87	0.97	102	11,600	0.88	0.98
Inadequately described occupation	2,585	260,080	0.99	1.03	7,285	724,690	1.00	1.05
<b>Total</b>	<b>150,858</b>	<b>14,051,250</b>	<b>1.07</b>	<b>1.07</b>	<b>90,852</b>	<b>8,595,460</b>	<b>1.06</b>	<b>1.05</b>

### 9.3 THE 1981 LS SAMPLE POPULATION

The LS sample population selected at the 1981 Census had observed and expected sampling fractions of 1.09 for both males and females as well as for the overall population.

Table 9.8 shows the percentage distributions by age and sex for the 1981 LS sample and the 1981 Census population, together with the observed and expected sampling fractions for the LS population. The patterns of the two distributions were similar, with no age group being either over- or under-represented in the LS sample. Sampling fractions also showed very little variation between observed and expected values. Slightly higher than expected sampling fractions were observed for males in most age groups while those for females showed more variability. The largest difference between observed and expected sampling fractions (0.04) was found among females aged 65–69.

#### 9.3.1 Age, sex and marital status

Table 9.9 shows sampling fractions and percentage distributions by age, sex and marital status in 1981. Very little variation was seen between the percentage distributions for the LS sample and the 1981 Census population. Generally only divorced females were under-represented and divorced males over-represented in the sample. Widowed males were over-represented in the sample at age 50 and over. An examination of the difference between observed and expected sampling fractions among these groups showed divorced females to have been undersampled by 2 per cent, divorced males oversampled by 1 per cent and widowed males to have been oversampled by 3 per cent.

#### 9.3.2 Country of birth

In the 1981 Census respondents were asked to indicate their country of birth by completing question 9 on the Census form.

Table 9.10 shows the LS population and the 1981 Census population by sex and country of birth. The distribution of the LS population by country of birth differs quite markedly from that of the census population. Only 92.06 per cent of LS males gave the UK as their birthplace compared with 93.25 per cent of males in the census. Among females the proportions were 92.53 per cent and 93.48 per cent respectively. The distribution of the LS population born outside the UK showed a great deal of variation. Individuals from the New Commonwealth and Pakistan were particularly over-represented in the LS sample. Although all countries in the New Commonwealth contributed to this, the largest contribution was from LS persons stating their country of birth as India.

The observed and expected sampling fractions for the 1981

LS sample were very variable. Among males the observed sampling fractions ranged from a low of 0.62 to a high of 1.89. The corresponding expected sampling fractions had a much more limited range, 0.60 to 1.11. For females the range of both observed and expected sampling fractions was more restricted, 0.70 to 1.60 for observed and 0.74 to 1.10 for expected. The highest observed sampling fractions were seen for males who gave their birthplace as Pakistan and for females who gave theirs as India.

#### 9.3.3 Regional variation

Table 9.11 shows the observed and expected sampling fractions in the 1981 LS sample for each of the nine standard regions of England and Wales. A small amount of variation was found between observed and expected sampling fractions, but the largest differences were only 0.02 per cent. The 1981 sample should therefore be considered broadly representative of the 1981 Census population at the regional level.

#### 9.3.4 Household types

Table 9.12 shows the 1981 LS sample and the 1981 Census population by household type. A total of 97.5 per cent of the England and Wales population were enumerated in private households at the 1981 Census.

No differences were seen between the observed and expected sampling fractions for males and females in private households and males and females in the whole LS sample (see Table 9.8). A slightly smaller proportion of LS members were enumerated in non-private households than in 1971 (2.5 per cent compared with 2.7 per cent). As in 1971 the observed sampling fractions for individuals enumerated in this type of household tended to be very variable and lower than expected. Only males enumerated in homes for the elderly had a higher than expected observed sampling fraction (1.13 observed compared with 1.06 expected).

#### 9.3.5 Social class and socio-economic groupings

Table 9.13 shows the 1981 LS sample and the 1981 Census population of working age (16–59/64) by sex and social class. Among males, Social Classes I, II and III N were undersampled while Classes IV, V and those in the armed forces and inadequately described category were over-represented. Females were oversampled in Class I and in the armed forces and inadequately described category. They were undersampled in all other classes. It should be noted that only small numbers of women are found in Social Class I and among the armed forces.

A further breakdown of the working population by socio-economic group is shown in Table 9.14. The observed sampling fractions for both males and females are highly variable with over-sampling more common among men.

**Table 9.8 1981 LS population and 1981 Census population by sex, age, percentage distributions and sampling fractions**

Age	LS population	% distribution	1981 Census population*	% distribution	Sampling fractions	
					Observed	Expected
<b>Males</b>						
0-4	16,398	3.09	1,492,426	3.08	1.10	1.08
5-9	17,979	3.39	1,647,040	3.39	1.09	1.08
10-14	21,071	3.97	1,971,754	4.06	1.07	1.08
15-19	22,224	4.19	2,053,606	4.23	1.08	1.08
20-24	19,926	3.76	1,804,691	3.72	1.10	1.07
25-29	18,291	3.45	1,647,665	3.40	1.11	1.07
30-34	19,886	3.75	1,834,564	3.78	1.08	1.08
35-39	17,204	3.24	1,554,411	3.20	1.11	1.08
40-44	15,631	2.95	1,405,282	2.90	1.11	1.08
45-49	14,978	2.82	1,351,065	2.78	1.11	1.08
50-54	15,261	2.88	1,380,575	2.85	1.11	1.08
55-59	15,089	2.85	1,403,432	2.89	1.08	1.08
60-64	13,047	2.46	1,195,789	2.46	1.09	1.08
65-69	12,113	2.28	1,099,900	2.27	1.10	1.08
70-74	9,350	1.76	870,876	1.79	1.07	1.09
75+	9,746	1.84	911,642	1.88	1.07	1.08
All ages	258,194	48.69	23,873,362	49.20	1.08	1.08
<b>Females</b>						
0-4	15,461	2.92	1,417,738	2.92	1.09	1.09
5-9	17,144	3.23	1,559,549	3.21	1.10	1.08
10-14	20,195	3.81	1,874,518	3.86	1.08	1.09
15-19	21,248	4.01	1,966,388	4.05	1.08	1.08
20-24	19,508	3.68	1,759,521	3.63	1.11	1.07
25-29	17,987	3.39	1,627,096	3.35	1.11	1.08
30-34	19,955	3.76	1,821,540	3.75	1.10	1.08
35-39	16,820	3.17	1,538,026	3.17	1.09	1.08
40-44	14,963	2.82	1,387,078	2.86	1.08	1.08
45-49	14,787	2.79	1,338,070	2.76	1.11	1.08
50-54	15,214	2.87	1,404,398	2.89	1.08	1.08
55-59	16,171	3.05	1,474,043	3.04	1.10	1.08
60-64	14,624	2.76	1,337,023	2.76	1.09	1.08
65-69	14,828	2.80	1,326,339	2.73	1.12	1.08
70-74	12,856	2.42	1,190,859	2.45	1.08	1.08
75+	20,273	3.82	1,874,692	3.86	1.08	1.08
All ages	272,034	51.31	25,281,325	52.10	1.08	1.08
Total	530,228	100.00	48,521,596	100.00	1.09	1.09

\* Including visitors to England and Wales.

**Table 9.9 1981 LS population and 1981 Census population by sex, age, marital status, percentage distributions and sampling fractions**

Age and marital status		LS population	% distribution	1981 Census population	% distribution	Sampling fractions	
						Observed	Expected
<b>Males</b>							
Single	0-15	59,924	53.35	5,525,642	53.32	1.08	1.10
	16-19	17,496	15.58	1,617,004	15.60	1.08	1.09
	20-24	14,725	13.11	1,350,089	13.03	1.09	1.08
	25-29	6,093	5.42	561,691	5.42	1.08	1.08
	30-34	3,252	2.89	304,542	2.94	1.07	1.08
	35-39	1,884	1.68	173,658	1.68	1.08	1.08
	40-44	1,387	1.23	130,369	1.26	1.06	1.08
	45-49	1,305	1.16	120,912	1.17	1.08	1.07
	50-64	3,871	3.45	355,487	3.43	1.09	1.08
	65+	2,395	2.13	223,190	2.15	1.07	1.07
Total	112,332	100.00	10,362,584	100.00	1.08	1.09	
Married	16-19	247	0.19	21,929	0.18	1.13	1.08
	20-24	5,080	3.84	443,146	3.68	1.15	1.08
	25-29	11,580	8.75	1,030,500	8.56	1.12	1.09
	30-34	15,603	11.79	1,438,710	11.95	1.08	1.09
	35-39	14,368	10.86	1,295,016	10.75	1.11	1.09
	40-44	13,314	10.06	1,192,174	9.90	1.12	1.09
	45-49	12,790	9.67	1,150,563	9.55	1.11	1.10
	50-64	36,572	27.64	3,354,894	27.86	1.09	1.10
	65+	22,740	17.19	2,115,113	17.56	1.08	1.10
	Total	132,294	100.00	12,042,045	100.00	1.10	1.10
Divorced	16-19	4	0.06	196	0.03	2.04	1.11
	20-24	117	1.88	10,986	1.95	1.06	1.07
	25-29	607	9.76	54,204	9.63	1.12	1.09
	30-34	998	16.05	88,538	15.74	1.13	1.09
	35-39	908	14.61	81,636	14.51	1.11	1.09
	40-44	867	13.95	75,583	13.43	1.15	1.08
	45-49	755	12.14	66,908	11.89	1.13	1.08
	50-64	1,453	23.37	136,759	24.31	1.06	1.09
	65+	508	8.17	47,820	8.50	1.06	1.09
	Total	6,217	100.00	562,630	100.00	1.10	1.09
Widowed	16-19	1	0.01	55	0.01	1.82	1.11
	20-24	4	0.05	470	0.07	0.85	0.74
	25-29	11	0.15	1,270	0.19	0.87	1.11
	30-34	33	0.45	2,774	0.42	1.19	1.11
	35-39	44	0.60	4,101	0.62	1.07	1.08
	40-44	63	0.86	7,156	1.09	0.88	1.09
	45-49	128	1.74	12,682	1.93	1.01	1.09
	50-64	1,501	20.42	132,656	20.18	1.13	1.09
	65+	5,566	75.72	496,295	75.49	1.12	1.09
	Total	7,351	100.00	657,459	100.00	1.12	1.09
All males		258,194		23,624,718		1.09	1.09

**Table 9.9 - continued**

Age and marital status	LS population	% distribution	1981 Census population*	% distribution	Sampling fractions		
					Observed	Expected	
<b>Females</b>							
Single	0-15	57,043	57.22	5,247,636	57.05	1.09	1.10
	16-19	16,040	16.09	1,482,095	16.11	1.08	1.09
	20-24	10,157	10.19	945,341	10.28	1.07	1.08
	25-29	3,318	3.33	312,682	3.40	1.06	1.08
	30-34	1,728	1.73	157,891	1.72	1.09	1.08
	35-39	985	0.99	92,276	1.00	1.07	1.08
	40-44	801	0.80	74,654	0.81	1.07	1.09
	45-49	843	0.85	76,095	0.83	1.11	1.08
	50-64	3,238	3.25	298,941	3.25	1.08	1.09
	65+	5,537	5.55	511,333	5.56	1.08	1.09
	Total	99,690	100.00	9,198,944	100.00	1.08	1.09
Married	16-19	957	0.72	87,767	0.73	1.09	1.08
	20-24	8,972	6.75	781,760	6.46	1.15	1.09
	25-29	13,622	10.24	1,220,771	10.09	1.12	1.09
	30-34	16,837	12.66	1,531,978	12.67	1.10	1.09
	35-39	14,426	10.85	1,318,860	10.91	1.09	1.09
	40-44	12,777	9.61	1,186,132	9.81	1.08	1.09
	45-49	12,526	9.42	1,129,956	9.34	1.11	1.09
	50-64	34,729	26.11	3,180,833	26.30	1.09	1.10
	65+	18,161	13.65	1,655,319	13.69	1.10	1.09
	Total	133,007	100.00	12,093,376	100.00	1.10	1.09
Divorced	16-19	7	0.08	487	0.06	1.44	1.10
	20-24	359	4.19	30,625	3.84	1.17	1.09
	25-29	990	11.56	89,356	11.22	1.11	1.09
	30-34	1,298	15.16	122,898	15.43	1.06	1.09
	35-39	1,222	14.27	112,366	14.10	1.09	1.08
	40-44	1,081	12.62	99,876	12.54	1.08	1.09
	45-49	902	10.53	82,277	10.33	1.10	1.09
	50-64	1,869	21.82	175,876	22.07	1.06	1.08
	65+	836	9.76	82,971	10.41	1.01	1.08
	Total	8,564	100.00	796,732	100.00	1.07	1.09
Widowed	16-19	1	0.00	208	0.01	0.48	1.10
	20-24	20	0.06	1,795	0.06	1.11	1.05
	25-29	57	0.19	4,287	0.15	1.33	1.08
	30-34	92	0.30	8,773	0.31	1.05	1.06
	35-39	187	0.61	14,524	0.52	1.29	1.08
	40-44	304	0.99	26,416	0.94	1.15	1.08
	45-49	516	1.68	49,742	1.77	1.04	1.08
	50-64	6,173	20.06	559,814	19.94	1.10	1.09
	65+	23,423	76.12	2,142,267	76.30	1.09	1.09
	Total	30,773	100.00	2,807,826	100.00	1.10	1.09
All females	241,261		22,089,052		1.09	1.09	

**Tables 9.10 1981 LS population and 1981 Census population by sex, country of birth, percentage distributions and sampling fractions**

Country of birth	LS population	% distribution	1981 Census population	% distribution	Sampling fraction	
					Observed	Expected
<b>Males</b>						
United Kingdom	237,691	92.06	22,028,903	93.25	1.08	1.10
Outside UK						
Irish Republic*	3,000	1.16	272,652	1.15	1.10	1.05
Old Commonwealth	670	0.26	63,433	0.27	1.06	1.03
New Commonwealth and Pakistan	10,923	4.23	769,955	3.26	1.42	1.03
India	3,262	1.26	194,448	0.82	1.68	1.05
Pakistan	1,949	0.75	103,311	0.44	1.89	1.03
African Commonwealth	1,632	0.63	137,379	0.58	1.19	1.03
Caribbean Commonwealth	1,570	0.61	143,709	0.61	1.09	1.03
Mediterranean Commonwealth	891	0.35	64,899	0.27	1.37	1.05
Remainder New Commonwealth	1,619	0.63	126,209	0.53	1.28	1.00
Europe	3,576	1.39	262,791	1.11	1.36	1.05
USA	347	0.13	56,050	0.24	0.62	0.60
Elsewhere and not stated	1,987	0.77	170,934	0.72	1.16	0.97
<b>Total</b>	<b>258,194</b>	<b>100.00</b>	<b>23,624,718</b>	<b>100.00</b>	<b>1.09</b>	<b>1.09</b>
<b>Females</b>						
United Kingdom	251,709	92.53	23,273,811	93.48	1.08	1.10
Outside UK						
Irish Republic*	3,448	1.27	307,181	1.23	1.12	1.06
Old Commonwealth	791	0.29	74,022	0.30	1.07	1.05
New Commonwealth and Pakistan	9,429	3.47	703,736	2.83	1.34	1.04
India	3,015	1.11	188,329	0.76	1.60	1.04
Pakistan	1,241	0.46	78,428	0.32	1.58	1.01
African Commonwealth	1,455	0.53	122,398	0.49	1.19	1.05
Caribbean Commonwealth	1,676	0.62	149,923	0.60	1.12	1.05
Mediterranean Commonwealth	775	0.28	61,594	0.25	1.26	1.02
Remainder New Commonwealth	1,267	0.47	103,064	0.41	1.23	1.02
Europe	4,239	1.56	331,450	1.33	1.28	1.05
USA	351	0.13	49,802	0.20	0.70	0.74
Elsewhere and not stated	2,067	0.76	156,876	0.63	1.32	1.00
<b>Total</b>	<b>272,034</b>	<b>100.00</b>	<b>24,896,878</b>	<b>100.00</b>	<b>1.09</b>	<b>1.09</b>

\* Including Ireland, part not stated

**Table 9.11 1981 LS population and 1981 Census population by sex, region of usual residence and observed and expected sampling fractions**

Region	Males				Females			
	LS population	1981 Census population	Sampling fractions		LS population	1981 Census population	Sampling fractions	
			Observed	Expected			Observed	Expected
North	16,225	1,509,157	1.08	1.08	17,002	1,595,196	1.07	1.08
Yorkshire and Humberside	25,634	2,363,679	1.08	1.08	26,678	2,496,805	1.07	1.08
East Midlands	20,043	1,876,170	1.07	1.08	20,838	1,943,017	1.07	1.08
East Anglia	9,524	917,569	1.04	1.06	10,073	954,066	1.06	1.07
South East*	87,587	8,126,374	1.08	1.07	93,074	8,669,382	1.07	1.06
South West	22,210	2,095,221	1.06	1.08	24,138	2,253,687	1.07	1.08
West Midlands	27,760	2,534,002	1.10	1.08	28,056	2,614,343	1.07	1.07
North West	33,557	3,098,551	1.08	1.08	35,777	3,315,617	1.08	1.08
Wales	14,474	1,352,639	1.07	1.08	15,262	1,439,212	1.06	1.07
Total	257,014	23,873,362	1.08	1.08	270,898	25,281,325	1.07	1.07

\* Includes Greater London.

**Table 9.12 1981 LS population and 1981 Census population by sex, household type and observed and expected sampling fractions**

Household type	Males				Females			
	LS population	1981 Census population	Sampling fractions		LS population	1981 Census population	Sampling fractions	
			Observed	Expected			Observed	Expected
<b>Private households</b>	252,468	23,271,797	1.08	1.08	266,273	24,675,960	1.08	1.08
<b>Non-private households</b>								
Hotels	991	120,455	0.82	1.04	788	89,091	0.88	1.04
Psychiatric hospitals	666	66,471	1.00	1.02	718	74,412	0.96	1.02
Other hospitals	872	87,632	1.00	1.04	1,802	185,376	0.97	1.06
Homes for the elderly	616	54,647	1.13	1.06	1,499	150,715	0.99	1.06
Childrens homes	130	15,106	0.86	1.05	121	12,728	0.95	1.05
Educational establishments	529	56,185	0.94	1.06	289	33,844	0.85	1.07
Places of detention	428	41,859	1.02	1.03	13	1,612	0.81	1.01
Defence establishments	771	87,027	0.89	0.97	97	9,622	1.01	1.03
Other establishments	723	128,350	0.56	1.03	434	81,791	0.53	1.02
Total communal	5,726	601,565	0.95	1.03	5,761	605,365	0.95	1.05
Total	258,194	23,873,362	1.08	1.08	272,034	25,281,325	1.08	1.08

**Table 9.13 1981 LS population and 1981 Census population by sex, social class and observed and expected sampling fractions**

Social class	Males (aged 16-64)				Females (aged 16-59)			
	LS population	1981 Census population	Sampling fractions		LS population	1981 Census population	Sampling fractions	
			Observed	Expected			Observed	Expected
I Professional	8,506	775,500	1.10	1.11	1,009	90,370	1.12	1.06
II Intermediate	33,399	3,059,030	1.09	1.12	18,984	1,802,280	1.05	1.07
IIIN Skilled non-manual	17,657	1,594,930	1.11	1.12	36,755	3,468,340	1.06	1.07
IIIM Skilled manual	54,011	4,848,140	1.11	1.11	7,561	718,130	1.05	1.07
IV Partly skilled	25,821	2,256,040	1.14	1.11	19,741	1,874,110	1.05	1.06
V Unskilled	9,302	837,810	1.11	1.10	5,681	590,180	0.96	1.07
Armed forces and inadequately described	7,636	707,310	1.08	1.06	4,160	382,070	1.09	1.02
<b>Total</b>	<b>156,332</b>	<b>14,078,760</b>	<b>1.11</b>	<b>1.11</b>	<b>93,891</b>	<b>8,925,480</b>	<b>1.05</b>	<b>1.05</b>

**Table 9.14 1981 LS population and 1981 Census population by sex, socio-economic group and observed and expected sampling fractions**

Socio-economic group	Males (aged 16-64)				Females (aged 16-59)			
	LS population	1981 Census population	Sampling fractions		LS population	1981 Census population	Sampling fractions	
			Observed	Expected			Observed	Expected
Employers and managers in large establishments	8,011	765,260	1.05	1.12	1,806	181,860	0.99	1.05
Employers and managers in small establishments	14,412	1,275,480	1.13	1.11	4,038	401,200	1.01	1.05
Professionals - self-employed	1,354	131,760	1.03	1.12	125	12,640	0.99	1.06
Professionals - employees	7,120	641,330	1.11	1.11	881	77,590	1.14	1.05
Intermediate non-manual workers	11,312	1,038,770	1.09	1.12	13,654	1,275,420	1.07	1.05
Junior non-manual workers	15,022	1,350,770	1.11	1.12	35,662	3,346,950	1.07	1.06
Personal service workers	1,855	158,430	1.17	1.07	10,792	1,074,110	1.00	1.05
Foremen and supervisors - manual	5,630	504,160	1.12	1.12	597	59,730	1.00	1.06
Skilled manual workers	41,150	3,667,860	1.12	1.12	3,837	351,960	1.09	1.05
Semi-skilled manual workers	21,937	1,905,260	1.15	1.11	10,260	932,870	1.10	1.05
Unskilled manual workers	8,906	799,510	1.11	1.10	5,658	587,620	0.96	1.05
Own account workers (not professional)	8,349	785,400	1.06	1.11	1,669	170,680	0.98	1.05
Farmers - employers and managers	895	91,320	0.98	1.12	94	10,920	0.86	1.05
Farmers - own account	915	91,520	1.00	1.12	126	12,250	1.03	1.06
Agricultural workers	1,828	164,620	1.11	1.11	532	47,610	1.12	1.06
Members of armed forces	2,244	222,230	1.01	0.99	158	16,700	0.95	0.89
Inadequately described occupations	5,392	485,080	1.11	1.09	4,002	365,370	1.10	1.03
<b>Total</b>	<b>156,332</b>	<b>14,078,760</b>	<b>1.11</b>	<b>1.11</b>	<b>93,891</b>	<b>8,925,480</b>	<b>1.05</b>	<b>1.05</b>

## 9.4 THE 1991 LS SAMPLE POPULATION

The 1991 LS sample population had observed and expected sampling fractions of 1.07 for both males and females as well as for the overall population.

Table 9.15 shows the percentage distributions by age and sex for the LS sample and the 1991 Census population, together with the observed and expected sampling fractions in the LS.

As in 1971 and 1981 the pattern of age distributions in the LS sample and the census population showed similar patterns with no age group being over- or under-represented in the sample. Only slight variation was noted in the observed sampling fractions, with a range of 1.04 to 1.10 for males and 1.05 to 1.09 for females. There was very little difference between observed and expected sampling fractions, the largest being found among males aged 50-54 (0.03).

**Table 9.15 1991 LS population and 1991 Census population by sex, age, percentage distributions and sampling fractions**

Age	LS population	% distribution	1991 Census population	% distribution	Sampling fractions	
					Observed	Expected
<b>Males</b>						
0- 4	18,000	3.37	1,696,098	3.40	1.06	1.07
5- 9	17,039	3.19	1,599,581	3.21	1.07	1.07
10- 14	16,429	3.07	1,532,019	3.07	1.07	1.07
15- 19	17,662	3.30	1,636,124	3.28	1.08	1.07
20- 24	19,133	3.58	1,844,532	3.70	1.04	1.06
25- 29	20,383	3.81	1,957,808	3.92	1.04	1.06
30- 34	19,450	3.64	1,800,696	3.61	1.08	1.06
35- 39	17,956	3.36	1,645,575	3.30	1.09	1.07
40- 44	19,377	3.62	1,824,168	3.66	1.06	1.07
45- 49	16,633	3.11	1,537,361	3.08	1.08	1.07
50- 54	14,919	2.79	1,360,870	2.73	1.10	1.07
55- 59	14,015	2.62	1,274,953	2.56	1.10	1.08
60- 64	13,448	2.52	1,235,649	2.48	1.09	1.08
65- 69	12,215	2.28	1,152,977	2.31	1.06	1.08
70- 74	9,268	1.73	870,015	1.74	1.07	1.08
75+	12,829	2.40	1,214,567	2.43	1.06	1.07
All ages	258,756	48.40	24,182,993	48.47	1.07	1.07
<b>Females</b>						
0- 4	17,444	3.26	1,620,130	3.25	1.08	1.08
5- 9	16,266	3.04	1,523,042	3.05	1.07	1.08
10- 14	15,624	2.92	1,455,517	2.92	1.07	1.08
15- 19	17,153	3.21	1,569,340	3.15	1.09	1.08
20- 24	19,861	3.71	1,886,843	3.78	1.05	1.06
25- 29	21,271	3.98	2,013,101	4.04	1.06	1.06
30- 34	19,613	3.67	1,822,012	3.65	1.08	1.07
35- 39	17,980	3.36	1,662,607	3.33	1.08	1.07
40- 44	19,900	3.72	1,837,947	3.68	1.08	1.08
45- 49	16,589	3.10	1,536,262	3.08	1.08	1.08
50- 54	14,542	2.72	1,358,987	2.72	1.07	1.07
55- 59	13,980	2.61	1,291,916	2.59	1.08	1.07
60- 64	14,178	2.65	1,323,056	2.65	1.07	1.08
65- 69	14,371	2.69	1,337,539	2.68	1.07	1.08
70- 74	12,231	2.29	1,144,379	2.29	1.07	1.08
75+	24,888	4.66	2,324,606	4.66	1.07	1.07
All ages	275,891	51.60	25,707,284	51.53	1.07	1.07
Total persons	534,647	100.00	49,890,277	100.00	1.07	1.07

### 9.4.1 Age, sex and marital status

A breakdown of the LS sample and the 1991 Census population by age, sex and marital status is shown in Table 9.16. Very little variation in percentage distributions was seen between the LS sample and the census population. Widowed males up to the age of 34 appeared to be over-represented in the sample but this was an artefact of the small numbers of widowers at low ages. The same pattern was observed for widowed females below the age of 55. Divorced females were also slightly over-represented in most age groups.

Among males, the overall observed sampling fractions ranged from 1.04 for divorced males to 1.09 for married males. For females, the overall observed sampling fractions showed a narrower range, from 1.06 for single females to 1.08 for both the married and widowed subgroups. Differences between observed and expected sampling fractions were quite marked where the numbers in the LS sample were very low (for married males aged 16–19, widowed males between 16 and 34, divorced males between 16 and 24, married females aged 16–19, widowed females between 16 and 24 and divorced females aged under 20).

### 9.4.2 Country of birth

In 1991 a question on ethnic group (question 11) was asked for the first time at the census. This did not replace the question on country of birth (question 10 on the 1991 schedule) but was supplementary to it. Before 1991 the only way to estimate the ethnicity of the population was to use the answers to the question on country of birth in the census schedule. Because country of birth data was only available in 1971 and 1981, it has been used throughout this volume to estimate the ethnicity of LS members. Answers to the 1991 ethnic question have not been used.

Table 9.17 shows the 1991 LS sample and Census population by sex and country of birth. A total of 92.05 per cent of males and 92.05 per cent of females in the LS gave their country of birth as the UK compared with 92.80 and 92.66 per cent of the census population. The distribution of the LS population who gave their country of birth as other than the UK showed a great deal of variability. The majority of LS members born outside the UK gave their area of origin as one of the New Commonwealth countries or Europe. Among New Commonwealth countries both India and Pakistan were over-sampled. India showed observed sampling fractions of 1.67 for males and 1.57 for females compared with expected sampling fractions of 1.03 and 1.01 respectively. The figures for Pakistan were even higher, with observed sampling fractions of 1.94 for males and 1.66 for females. These compare with expected sampling fractions of 1.02 for males and 0.99 for females. No real change has been seen in these sampling fractions since 1981.

### 9.4.3 Regional variation

The observed and expected sampling fractions by sex and standard regions of England and Wales for the 1991 LS sample are shown in Table 9.18. Very little variation in sampling was seen across any of the standard regions, though slight undersampling was seen among LS members in East Anglia and slight oversampling in the West Midlands. Even so, the 1991 LS sample appears to be representative of the 1991 Census regional population data.

### 9.4.4 Household types

A total of 97.6 per cent of traced LS members were enumerated in private households at the 1991 Census. The observed sampling fractions for both males and females in private households were slightly higher than expected (1.08 per cent compared with 1.07). The remaining 2.4 per cent of the traced 1991 LS population was enumerated in communal establishments. 'Not traced' rates for persons in these establishments tended to be high and as a result, with the exception of LS members sampled in homes for the elderly, observed sampling fractions tended to be very low.

### 9.4.5 Social class and socio-economic groupings

Table 9.20 shows the 1991 LS sample and Census population aged 16 to 59/64 by sex and social class. The overall observed sampling fractions for males, at 1.29, and females, at 1.45, were slightly lower than the expected sampling fractions of 1.31 and 1.47 respectively. Both males and females showed a large amount of variability across social classes. Males were undersampled in Class I and among the armed forces and inadequately described group, and oversampled in Social Classes IV and V. Females showed more oversampling than males, with oversampling being found in Classes IIIM, IV, V and among those in the armed forces or inadequately described. Undersampling was particularly noticeable for females in the professional class (Class I).

Table 9.21 shows the sampling fractions for the 1991 LS sample by sex and socio-economic group. Variability was high, with oversampling generally being more common among males. Females tended to be undersampled in the professional and managerial socio-economic groups and oversampled in the manual groups.

### References

- 1 Fox A J and Goldblatt P O. *Longitudinal study: socio-demographic mortality differentials*. OPCS Series LS no.1, HMSO (London 1982).

**Table 9.16 1991 LS population and 1991 Census population by sex, age, marital status, percentage distributions and sampling fractions**

Age and marital status	LS population	% distribution	1991 Census population	% distribution	Sampling fractions			
					Observed	Expected		
<b>Males</b>								
Single	0-15	54,565	47.85	5,128,982	47.37	1.06	1.06	
	16-19	14,455	12.68	1,326,324	12.25	1.09	1.06	
	20-24	16,865	14.79	1,628,987	15.05	1.04	1.05	
	25-29	10,749	9.43	1,060,650	9.80	1.01	1.04	
	30-34	5,252	4.61	506,547	4.68	1.04	1.04	
	35-39	2,837	2.49	275,695	2.55	1.03	1.04	
	40-44	2,127	1.87	209,217	1.93	1.02	1.05	
	45-49	1,453	1.27	141,150	1.30	1.03	1.05	
	50-54	1,140	1.00	111,778	1.03	1.02	1.04	
	55-59	1,069	0.94	102,347	0.95	1.04	1.05	
	60-64	1,095	0.96	105,237	0.97	1.04	1.04	
	65+	2,430	2.13	230,425	2.13	1.05	1.04	
	Total	114,037	100.00	10,827,339	100.00	1.05	1.05	
	Married	16-19	95	0.08	7,662	0.07	1.24	1.10
20-24		2,180	1.73	205,259	1.77	1.06	1.06	
25-29		8,930	7.08	829,971	7.16	1.08	1.08	
30-34		12,915	10.24	1,167,392	10.08	1.11	1.08	
35-39		13,532	10.73	1,219,001	10.52	1.11	1.08	
40-44		15,340	12.16	1,431,955	12.36	1.07	1.09	
45-49		13,551	10.74	1,238,517	10.69	1.09	1.09	
50-54		12,327	9.77	1,109,401	9.58	1.11	1.09	
55-59		11,557	9.16	1,045,408	9.02	1.11	1.09	
60-64		10,920	8.66	998,368	8.62	1.09	1.10	
65+		24,776	19.64	2,331,956	20.13	1.06	1.09	
Total		126,123	100.00	11,584,890	100.00	1.09	1.09	
Widowed		16-19	4	0.05	208	0.03	1.92	1.08
		20-24	2	0.03	428	0.06	0.47	0.72
	25-29	15	0.20	1,174	0.16	1.28	1.01	
	30-34	30	0.39	2,330	0.32	1.29	1.04	
	35-39	41	0.54	4,290	0.60	0.96	1.01	
	40-44	83	1.08	8,292	1.15	1.00	1.04	
	45-49	111	1.45	12,191	1.69	0.91	1.03	
	50-54	229	2.99	19,943	2.77	1.15	1.06	
	55-59	357	4.66	33,635	4.67	1.06	1.05	
	60-64	676	8.83	61,655	8.57	1.10	1.06	
	65+	6,107	79.78	575,539	79.97	1.06	1.07	
	Total	7,655	100.00	719,685	100.00	1.06	1.07	
	Divorced	16-19	11	0.10	646	0.06	1.70	1.07
		20-24	86	0.79	9,858	0.94	0.87	1.02
25-29		689	6.30	66,013	6.28	1.04	1.03	
30-34		1,253	11.45	124,427	11.84	1.01	1.04	
35-39		1,546	14.13	146,589	13.95	1.05	1.04	
40-44		1,827	16.70	174,704	16.62	1.05	1.03	
45-49		1,518	13.87	145,503	13.84	1.04	1.04	
50-54		1,223	11.18	119,748	11.39	1.02	1.03	
55-59		1,032	9.43	93,563	8.90	1.10	1.04	
60-64		757	6.92	70,389	6.70	1.08	1.04	
65+		999	9.13	99,639	9.48	1.00	1.03	
Total		10,941	100.00	1,051,079	100.00	1.04	1.03	
All males		258,756		24,182,993		1.07	1.07	

**Table 9.16- continued**

Age and marital status		LS population	% distribution	1991 Census population	% distribution	Sampling fractions		
						Observed	Expected	
<b>Females</b>								
Single	0-15	52,363	50.91	4,884,421	50.47	1.07	1.07	
	16-19	13,786	13.40	1,255,983	12.98	1.10	1.07	
	20-24	14,930	14.52	1,425,269	14.73	1.05	1.06	
	25-29	7,874	7.66	777,869	8.04	1.01	1.05	
	30-34	3,404	3.31	333,376	3.44	1.02	1.05	
	35-39	1,682	1.64	168,780	1.74	1.00	1.05	
	40-44	1,247	1.21	117,324	1.21	1.06	1.06	
	45-49	818	0.80	78,021	0.81	1.05	1.05	
	50-54	681	0.66	66,609	0.69	1.02	1.05	
	55-59	745	0.72	68,679	0.71	1.08	1.05	
	60-64	859	0.84	82,011	0.85	1.05	1.05	
	65+	4,456	4.33	419,068	4.33	1.06	1.06	
	Total	102,845	100.00	9,677,410	100.00	1.06	1.06	
	Married	16-19	327	0.26	26,094	0.23	1.25	1.05
		20-24	4,612	3.65	431,371	3.69	1.07	1.06
25-29		12,009	9.50	1,108,568	9.48	1.08	1.07	
30-34		14,137	11.18	1,299,369	11.11	1.09	1.08	
35-39		14,004	11.07	1,281,625	10.96	1.09	1.08	
40-44		16,002	12.65	1,467,343	12.55	1.09	1.09	
45-49		13,283	10.50	1,234,457	10.56	1.08	1.09	
50-54		11,494	9.09	1,077,543	9.22	1.07	1.08	
55-59		10,693	8.46	982,909	8.41	1.09	1.09	
60-64		9,795	7.75	912,274	7.80	1.07	1.09	
65+		20,109	15.90	1,868,957	15.99	1.08	1.09	
Total		126,465	100.00	11,690,510	100.00	1.08	1.08	
Widowed		16-19	4	0.01	521	0.02	0.77	0.88
		20-24	17	0.05	1,511	0.05	1.13	0.93
		25-29	49	0.16	4,364	0.15	1.12	1.03
	30-34	90	0.29	7,929	0.27	1.14	1.05	
	35-39	159	0.51	13,796	0.47	1.15	1.05	
	40-44	299	0.95	27,088	0.93	1.10	1.06	
	45-49	500	1.59	43,123	1.48	1.16	1.06	
	50-54	849	2.70	74,416	2.55	1.14	1.06	
	55-59	1,447	4.61	133,556	4.58	1.08	1.07	
	60-64	2,596	8.27	244,576	8.38	1.06	1.07	
	65+	25,383	80.86	2,367,614	81.12	1.07	1.08	
	Total	31,393	100.00	2,918,494	100.00	1.08	1.08	
	Divorced	16-19	7	0.05	1,010	0.07	0.69	1.09
		20-24	302	1.99	28,692	2.02	1.05	1.04
		25-29	1,339	8.82	122,300	8.61	1.09	1.06
30-34		1,982	13.05	181,338	12.76	1.09	1.07	
35-39		2,135	14.06	198,406	13.96	1.08	1.07	
40-44		2,352	15.49	226,192	15.92	1.04	1.06	
45-49		1,988	13.09	180,661	12.71	1.10	1.07	
50-54		1,518	9.99	140,419	9.88	1.08	1.07	
55-59		1,095	7.21	106,772	7.51	1.03	1.07	
60-64		928	6.11	84,195	5.93	1.10	1.07	
65+		1,542	10.15	150,885	10.62	1.02	1.06	
Total		15,188	100.00	1,420,870	100.00	1.07	1.07	
All females		275,981		25,707,284		1.07	1.07	

**Tables 9.17 1991 LS population and 1991 Census population by sex, country of birth, percentage distributions and sampling fractions**

Country of birth	LS population	% distribution	1991 Census population	% distribution	Sampling fractions	
					Observed	Expected
<b>Males</b>						
United Kingdom	238,190	92.05	22,442,910	92.80	1.06	1.08
Outside UK						
Irish Republic*	2,729	1.05	264,395	1.09	1.03	1.01
Old Commonwealth	729	0.28	73,921	0.31	0.99	0.97
New Commonwealth and Pakistan	11,239	4.34	819,298	3.39	1.37	1.02
India	3,237	1.25	194,386	0.80	1.67	1.03
Pakistan	2,245	0.87	115,806	0.48	1.94	1.02
African Commonwealth	1,836	0.71	164,335	0.68	1.12	1.00
Caribbean Commonwealth	1,331	0.51	124,812	0.52	1.07	1.01
Mediterranean Commonwealth	752	0.29	63,646	0.26	1.18	1.02
Remainder New Commonwealth	1,838	0.71	156,313	0.65	1.18	1.01
Europe	3,436	1.33	306,076	1.27	1.12	0.99
USA	425	0.16	81,958	0.34	0.52	0.63
Elsewhere and not stated	2,008	0.78	194,435	0.80	1.03	0.91
<b>Total</b>	<b>258,756</b>	<b>100.00</b>	<b>24,182,993</b>	<b>100.00</b>	<b>1.07</b>	<b>1.07</b>
<b>Females</b>						
United Kingdom	253,955	92.05	23,821,558	92.66	1.07	1.08
Outside UK						
Irish Republic*	3,264	1.18	305,364	1.19	1.07	1.03
Old Commonwealth	878	0.32	88,074	0.34	1.00	1.02
New Commonwealth and Pakistan	10,894	3.95	825,324	3.21	1.32	1.01
India	3,224	1.17	205,630	0.80	1.57	1.01
Pakistan	1,805	0.65	108,890	0.42	1.66	0.99
African Commonwealth	1,802	0.65	159,684	0.62	1.13	1.01
Caribbean Commonwealth	1,491	0.54	138,149	0.54	1.08	1.02
Mediterranean Commonwealth	704	0.26	74,673	0.29	0.94	0.99
Remainder New Commonwealth	1,868	0.68	138,298	0.54	1.35	1.01
Europe	4,262	1.54	380,452	1.48	1.12	1.02
USA	475	0.17	88,410	0.34	0.54	0.74
Elsewhere and not stated	2,163	0.78	198,102	0.77	1.09	0.92
<b>Total</b>	<b>275,891</b>	<b>100.00</b>	<b>25,707,284</b>	<b>100.00</b>	<b>1.07</b>	<b>1.07</b>

\* Including Ireland part not stated.

**Table 9.18 1991 LS population and 1991 Census population by sex, region of usual residence and observed and expected sampling fractions**

Region	Males				Females			
	LS population	1991 Census population	Sampling fractions		LS population	1991 Census population	Sampling fractions	
			Observed	Expected			Observed	Expected
North	15,833	1,462,355	1.08	1.08	16,793	1,564,377	1.07	1.08
Yorkshire and Humberside	25,435	2,344,129	1.09	1.08	26,972	2,492,395	1.08	1.08
East Midlands	20,762	1,933,762	1.07	1.08	21,829	2,019,610	1.08	1.08
East Anglia	10,262	992,531	1.03	1.06	10,982	1,034,473	1.06	1.07
South East*	88,379	8,330,324	1.06	1.06	94,478	8,877,940	1.06	1.06
South West	23,843	2,225,411	1.07	1.08	25,774	2,384,013	1.08	1.08
West Midlands	27,349	2,516,643	1.09	1.08	28,706	2,633,544	1.09	1.08
North West	32,238	3,007,734	1.07	1.08	34,731	3,235,963	1.07	1.08
Wales	14,642	1,370,104	1.07	1.08	15,606	1,464,969	1.07	1.08
<b>Total</b>	<b>258,743</b>	<b>24,182,993</b>	<b>1.07</b>	<b>1.07</b>	<b>275,871</b>	<b>25,707,284</b>	<b>1.07</b>	<b>1.07</b>

\* Including Greater London.

**Table 9.19 1991 LS population and 1991 Census population by sex, household type and observed and expected sampling fractions**

Household type	Males				Females			
	LS population	1991 Census population	Sampling fractions		LS population	1991 Census population	Sampling fractions	
			Observed	Expected			Observed	Expected
<b>Private households</b>	253,025	23,535,089	1.08	1.07	268,893	24,982,524	1.08	1.07
<b>Non-private households</b>								
Hotels	1,129	134,068	0.84	1.02	866	101,268	0.86	1.03
Psychiatric hospitals	164	18,871	0.87	1.01	205	21,468	0.95	0.99
Other hospitals	787	84,693	0.93	1.05	1,269	133,311	0.95	1.06
Homes for the elderly	999	81,949	1.22	1.06	3,045	231,558	1.32	1.06
Childrens homes	52	6,447	0.81	1.07	54	5,298	1.02	1.05
Educational establishments	1,145	141,335	0.81	1.06	891	105,407	0.85	1.07
Places of detention	268	37,345	0.72	0.97	9	1,698	0.53	0.89
Defence establishments	463	52,783	0.88	0.95	76	7,744	0.98	0.96
Other establishments	724	90,413	0.80	1.02	583	117,008	0.50	1.04
<b>Total communal</b>	<b>5,731</b>	<b>647,904</b>	<b>0.88</b>	<b>1.07</b>	<b>6,998</b>	<b>724,760</b>	<b>0.97</b>	<b>1.07</b>
<b>Total</b>	<b>258,756</b>	<b>24,182,993</b>	<b>1.07</b>	<b>1.07</b>	<b>275,891</b>	<b>25,707,284</b>	<b>1.07</b>	<b>1.07</b>

**Table 9.20 1991 LS population and 1991 Census population by sex, social class and observed and expected sampling fractions**

Social class	Males (aged 16-64)				Females (aged 16-59)			
	LS population	1991 Census population	Sampling fractions		LS population	1991 Census population	Sampling fractions	
			Observed	Expected			Observed	Expected
I Professional	10,732	892,220	1.20	1.29	2,341	184,820	1.27	1.42
II Intermediate	45,399	3,624,940	1.25	1.29	35,827	2,722,340	1.32	1.45
IIIN Skilled non-manual	18,936	1,433,030	1.32	1.29	55,139	3,817,760	1.44	1.45
IIIM Skilled manual	54,110	4,177,870	1.30	1.29	10,722	697,270	1.54	1.45
IV Partly skilled	27,308	1,983,260	1.38	1.29	26,204	1,657,960	1.58	1.45
V Unskilled	9,244	688,950	1.34	1.29	10,979	687,250	1.60	1.45
Armed forces and inadequately described	3,253	333,970	0.97	1.16	1,451	104,750	1.39	1.36
<b>Total</b>	<b>168,982</b>	<b>13,134,240</b>	<b>1.29</b>	<b>1.31</b>	<b>142,663</b>	<b>9,872,150</b>	<b>1.45</b>	<b>1.47</b>

**Table 9.21 1991 LS population and 1991 Census population by sex, socio-economic group and observed and expected sampling fractions**

Socio-economic group	Males (aged 16-64)				Females (aged 16-59)			
	LS population	1991 Census population	Sampling fractions		LS population	1991 Census population	Sampling fractions	
			Observed	Expected			Observed	Expected
Employers and managers in large establishments	9,007	768,120	1.17	1.30	3,390	309,100	1.10	1.45
Employers and managers in small establishments	21,212	1,662,150	1.28	1.29	9,918	749,700	1.32	1.44
Professional - self-employed	2,035	183,910	1.11	1.29	350	27,510	1.27	1.45
Professional - employees	8,649	704,430	1.23	1.29	1,981	156,640	1.26	1.46
Intermediate non-manual workers	15,571	1,257,600	1.24	1.24	23,354	1,739,230	1.34	1.45
Junior non-manual workers	15,964	1,189,120	1.34	1.30	52,494	3,594,810	1.46	1.44
Personal service workers	2,813	202,830	1.39	1.30	12,864	842,820	1.53	1.46
Foremen/supervisors - manual	5,451	377,790	1.44	1.29	1,065	72,270	1.47	1.45
Skilled manual workers	36,641	2,768,930	1.32	1.28	4,414	268,720	1.64	1.45
Semi-skilled manual workers	22,011	1,579,650	1.39	1.29	15,635	968,630	1.61	1.44
Unskilled manual workers	8,290	604,330	1.37	1.30	10,854	678,620	1.60	1.45
Own account workers (not professional)	14,667	1,230,860	1.19	1.30	3,748	282,180	1.33	1.47
Farmers - employers and managers	838	72,380	1.16	1.30	159	12,360	1.29	1.45
Farmers - own account	980	80,170	1.22	1.10	190	12,800	1.48	1.07
Agricultural workers	1,600	118,000	1.36	1.25	796	52,010	1.53	1.41
Members of armed forces	1,750	175,980	0.99	1.27	169	14,410	1.17	1.44
Inadequately described occupations	1,503	157,990	0.95	1.29	1,282	90,340	1.42	1.44
<b>Total</b>	<b>168,982</b>	<b>13,134,240</b>	<b>1.29</b>	<b>1.31</b>	<b>142,663</b>	<b>9,872,150</b>	<b>1.45</b>	<b>1.47</b>