

## 9. Methodology

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This chapter presents a summary of the survey methodology for the third wave of the English Longitudinal Study of Ageing (ELSA). It includes a brief account of the sample design, the content of the interview and the approach to fieldwork. It provides basic information about response to the survey and the weighting strategies used in this report, and summarises wave on wave response looking back to the Health Survey for England (HSE). Further detail will be provided in the ELSA technical reports, which can be accessed via the ELSA website (<http://www.ifs.org.uk/elsa>).

A summary of the chapter shows the following:

- The ELSA interview covers a wide range of topics so analysts can examine the relationship between different aspects of respondents' lives. The wave 3 questionnaire was similar to that used in the previous waves.
- The wave 3 interview was also expanded to answer a variety of additional research questions. The new items included: dental health, consumption of fruit and vegetables, receipt of state pension statements, expectation of living to 85 years and anchoring vignettes. Some items included in wave 1 which are expected to change less significantly over a shorter time period were omitted at wave 2 but were collected again at wave 3: General Health Questionnaire (GHQ), social capital and the perceived timing of middle and old age.
- A cohort of people born between 1 March 1953 and 29 February 1956 was added to the wave 1 cohort in 2006–07. The wave 3 cohort was selected from four survey years of the Health Survey for England (2001–04).
- In total 9,771 main interviews were completed at wave 3. Of these, 7,535 (77.1%) were core members from the original cohort selected at wave 1 (including 47 with individuals who had originally been interviewed in a private household and had since moved into an institution, so remaining eligible for the study) and 1,276 (13.1%) were eligible sample members from the additional cohort selected at wave 3. The remaining 960 were with partners, defined as core, young, old or new partners. This report is based on core members from both the wave 1 and wave 3 cohorts.
- ELSA respondents who completed a main interview were also offered a life history interview to collect information about their employment, partners, children and the residences they lived in from their birth up until the present day.

## 9.1 Sample design

The ELSA sample is selected to be representative of people aged 50 years and over, living in private households in England. It was drawn from households that had previously responded to the HSE so that the study could benefit from data that had already been collected. Some background information about the HSE is therefore useful.

- The HSE is an annual cross-sectional household survey that gathers a wide range of health data and biometric measures. The original cohort at wave 1 (persons born on or before 29 February 1952) was selected from three survey years of the HSE (1998, 1999 core sample<sup>1</sup> and 2001).
- Each of the main HSE samples had originally been drawn in two stages. First, postcode sectors were selected from the Postcode Address File, stratified by health authority and proportion of households in the non-manual socio-economic groups. Addresses were then selected systematically from each sector and a specified number of adults and children in each household were deemed eligible for interview.
- Eligible individuals were asked to participate in a personal interview, followed by a nurse visit. Further details about the HSE years 1998, 1999 and 2001 are available from the Technical Reports (Erens and Primatesta, 1999; Erens, Primatesta and Prior, 2001; Prior et al., 2003).
- A cohort of people born between 1 March 1953 and 29 February 1956 was added to the wave 1 cohort in 2006–07 (henceforth referred to as Cohort 3). Cohort 3 was selected from four survey years of the HSE (2001 to the core sample in 2004).<sup>2</sup> The addition of new cohorts as they enter their 50s is planned at every *other* wave; hence there was no such augmentation in wave 2. Further details about the HSE years 2002–04 are available from the Technical Reports (Sproston and Primatesta, 2003; Sproston and Primatesta, 2004; Sproston and Mindell, 2006).
- Unfortunately, the algorithm used to select Cohort 3 excluded potential eligible sample members born between 1 March 1952 and 28 February 1953. This has resulted in a gap of one year's births between the wave 1 and 3 cohorts. The implications of the missing year of births are discussed in Section 9.5.

Box 9.1 summarises the eligibility criteria in wave 3 for the original cohort selected at wave 1. The wave 1 interview took place in 2002–03, providing the baseline for the study. Eligible sample members who responded at wave 1 were renamed 'core members' to distinguish them as the core element of the

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<sup>1</sup> The core sample is a general population sample. In recent years, the core sample has also been augmented by an additional boosted sample from a specific population subgroup, such as children, older people or, as in 1999 and 2004, those from the largest minority ethnic groups in England.

<sup>2</sup> Cohorts 1 and 3 overlap as a number of young partners in the original cohort selected at wave 1 (sampled from the HSE 2001) moved into their 50s in wave 3 and so were potential core members (i.e. born *after* 29 February 1952).

continuing ELSA sample. As in wave 2, core members were eligible for the main interview in wave 3 unless they had since died, had explicitly asked at the end of the first ELSA interview not to be re-contacted or had moved out of Britain. Core members form the main focus of this report. Partners of core members (core partners, new partners or young partners) were also eligible for an interview. The various sample types are described in Box 9.1.

### Box 9.1. Summary of the eligibility criteria for Cohort 1 members for the wave 3 ELSA interview

**Core members** were individuals who had been living within the household at the time of the HSE interview in 1998, 1999 or 2001, were born on or before 29 February 1952 and were subsequently interviewed as part of wave 1 at a private residential address in England. They were not eligible if they had since died, asked not to be revisited or moved out of Britain.

**Core partners** were individuals who, like core members, had been living within the household at the time of the HSE interview in 1998, 1999 or 2001 and were born on or before 29 February 1952. However they were *not* interviewed as part of wave 1, so missing the baseline survey. As a consequence they were only approached by virtue of their being the partner of a core member.

**Young partners** were the cohabiting spouses or partners of core members, who were living within the household at the time of the HSE, and were still cohabiting with the core member at the wave 1 interview. They were born *after* 29 February 1952. Young partners who stopped living with their core member partner before wave 2 were not interviewed if they had been interviewed at wave 2 (i.e. they are only interviewed once after they split with their partner).

**New partners** were the cohabiting spouses or partners of core members at the time of the first, second or third ELSA interview who had joined the household *since* the original HSE interview. As with young partners, new partners who stopped living with their core member partner before wave 2 were not interviewed if they had been interviewed at wave 2 (i.e. they are only interviewed once after they split with their partner).

### Box 9.2. Summary of the eligibility criteria for Cohort 3 members for the wave 3 ELSA interview

**Eligible sample members** were individuals who were living within the household at the time of the HSE interview (2001–04) and were born between 1 March 1952 and 29 February 1956. In order for the individual to be eligible, the interviewer had to ascertain that the individual was living in a private residential address in England at the time of the ELSA wave 3 interview.

**Young and old partners** were the cohabiting spouses or partners of eligible sample members, who were living within the household at the time of the HSE, and were still cohabiting with the core member at the wave 3 interview. Young partners were born *after* 29 February 1956 and old partners were born *before* 1 March 1952.

**New partners** were the cohabiting spouses or partners of eligible sample members at the time of the ELSA wave 3 interview who had joined the household *since* the original HSE interview.

For all four sample types, interviews were only conducted at households in England, and only within residential addresses. So, if an individual had moved out of England or into an institution since their HSE interview, they were treated as ineligible. It should be noted that in future waves, individuals who take part in the wave 3 interview and then move into an institution or into Scotland and Wales will remain eligible for interview.

We continued in wave 3 to attempt to interview all partners who had been living with a core member at the time of an ELSA interview and had been separated or divorced from them, or had been widowed, so that we could understand their circumstances after this event had occurred. The only circumstances in which a partner who had separated from the core member was not approached were if they had died, had explicitly asked at the end of their first ELSA interview not to be re-contacted, had left Britain or moved into an institution. Ex-partners are only followed up once after leaving the core member's household.

The eligibility criteria for Cohort 3 resembled those for Cohort 1 in wave 1, as described in Box 9.2. Overall, 103 of the potential eligible sample members born between 1 March 1952 and 28 February 1953 (the missing year of births) were in fact successfully interviewed in wave 3. Originally such individuals were classified as younger partners (if in Cohort 1) or older partners (if in Cohort 3). These have now been reclassified as core members from the additional cohort selected in wave 3. Potential eligible sample members mistakenly not issued at wave 3 will be followed up for interview at wave 4.

## **9.2 Development of the wave 3 interview**

Extensive discussion took place with ELSA collaborators about what changes were needed for the wave 3 interview and what new topics to include. Two pilots were conducted in August 2005 and January 2006. These tested the survey instruments and fieldwork approach for the main interview.

### **Structure and content of the wave 3 interview**

As at previous waves, the wave 3 main survey comprised a personal face-to-face interview and a self-completion questionnaire. Overall, the intention at wave 3 was to collect data about the same topics as at the two previous waves. There were, however, some additions to the content of the interview to respond to new areas of enquiry. Furthermore, a few elements of the questionnaire were amended to take account of responses given at the previous wave.

The structure of the main interview was the same as it had been at waves 1 and 2. In brief:

- In households with one respondent, or where two respondents were interviewed separately, each interview followed the course set out in Box 9.3, though some flexibility was given in the order of the walking-speed, income and assets and housing modules.
- In households where more than one eligible respondent agreed to take part, two individuals could be interviewed in a single session (unless they kept their finances separately and were not prepared to share this information). In these 'concurrent' sessions, the two respondents were interviewed alongside each other, but were separated during the course of the interview so that the later modules assessing cognitive function and

### Box 9.3. Content of the ELSA interview at wave 3

**Household demographics** – collected or updated demographic information about everyone living in the household, including sex, age and relationships to each other, and collected or updated information about children living outside the household.

**Individual demographics** – collected or updated details about respondents' legal marital status, parents' age and cause of death and number of living children.

**Health** – collected or updated self-reported general health, long-standing illness or disability, eyesight, hearing, specific diagnoses and symptoms, pain, difficulties with daily activities, smoking, mental health, urinary incontinence, falls and fractures, quality of care and dental health.

**Social participation** – covered caregiving and the use of public transport.

**Work and pensions** – collected or updated current work activities, current and past pensions, reasons for job change, health-related job limitations and receipt of state pension statements.

**Income and assets** – assessed the income that respondents received from a variety of sources over the last 12 months: wages, state pensions, private pensions, other annuity income and state benefits; also collected financial and non-financial assets.

**Housing** – collected or updated current housing situation (including size and quality), housing-related expenses, ownership of durable goods and cars, consumption including food in and out of home, fuel, durables and clothing.

**Cognitive function** – measured different aspects of the respondent's cognitive function, including memory, speed and mental flexibility.

**Expectations** – measured expectations for the future in a number of dimensions, financial decision-making and relative deprivation.

**Effort and reward** – assessed motivations behind voluntary work and caring for others, and the relationship between effort and reward.

**Psychosocial health** – measured how the respondent viewed his or her life across a variety of dimensions.

**Walking speed** – for respondents aged 60 and over, a 'timed walk' with the respondent walking a distance of 8 feet (244 cm) at their usual walking pace.

**Final questions** – collected any missing demographic information and updated contact details and consents as described below.

**Self-completion questionnaire** – covered quality of life, social participation, control at work, life satisfaction, consumption of fruit and vegetables, social networks and alcohol consumption. At this wave, some respondents were also asked to complete one of two supplementary self-completion questionnaires containing anchoring vignettes.

collecting information about expectations for the future, psychosocial health, demographic information and consents for linkages to administrative data could be administered in private.

- The self-completion questionnaire was normally completed after the face-to-face interview was over and the interviewer had left the household (if the eligible individual was interviewed alone) or while the other person in the concurrent interview session completed the 'private' modules described above.
- Where two or more eligible individuals lived in a household, one was nominated as the respondent for the housing module. Similarly, one individual was asked to be the respondent to report on income and assets on behalf of each benefit unit. However, if two individuals in the same

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benefit unit kept their finances separately the data for each financial unit were collected separately.

In addition to the standard self-completion questionnaire, some respondents were asked to complete one of two supplementary self-completion questionnaires containing anchoring vignettes. Each questionnaire was made up of two sections. The first asked respondents to rate various aspects of their own situation on a 5-point scale (for example, the health questionnaire focused on mobility, pain, cognition, sleep and depression). In the second section of the two questionnaires, respondents were asked to rate the situation of various hypothetical people who experience different circumstances on the same 5-point scale. Respondents were asked to assume that the hypothetical people used in the second section have the same age and background that they have.

Anchoring vignettes are designed to take into account the fact that people of different countries, sex, age bands and socio-economic groups may rate similar circumstances differently. The questions enable analysts to see how different respondents rate themselves compared with how they rate the hypothetical examples. This information can be used to make comparisons between different groups or across time. They will facilitate cross-group and cross-country analyses as very similar questionnaires were used in the Survey of Health and Retirement in Europe and in the Health and Retirement Study in the United States. A third of respondents were randomly selected to complete the questionnaire about health and another third were asked to complete the questionnaire on work disability. The remaining respondents were given neither.

The interview ended with a request to all those who responded in person for confirmation – or amendment – of consent to obtain health and economic data from administrative sources. Consent to obtain information from the NHS Central Register was requested from those who had completed an ELSA interview in person but who had not provided this consent at the HSE pre-baseline interview. Consent was also collected for a life history interview. None of these consents were collected from individuals for whom a proxy respondent was needed. Contact details were requested for a stable address and for a nominated individual who might respond if a proxy, institutional or end-of-life interview were needed in the future.

### **Life history interview**

ELSA respondents who had a main interview were asked to have a separate life history interview at a later date. This interview collected information about respondents' employment, partners, children and the residences they lived in from their birth up until the present day. A special computer questionnaire was developed for this interview which used an 'event history calendar' approach, which is believed to improve the accuracy of recall (Belli et al., 2004). The information respondents gave about their life events in the interview were plotted on the screen. The calendar encourages cross-referencing between different types of events, and checking of the sequence and timing of events. The life history interviews took place from February to October 2007 as a

separate fieldwork exercise. Further information about the life history interview, including response, will be reported in the future.

## 9.3 Fieldwork

Each eligible individual within a household was sent an advance letter inviting them to take part. Interviewers then visited the households and were able to explain the study and to interview willing individuals straight away, or to make appointments to call at a convenient time. A number of approaches were used to encourage participation among the sample, many of which were similar to those described in the first ELSA report (Marmot et al., 2003).

Fieldwork for the third wave of ELSA began in May 2006 and spanned 15 months, finishing in August 2007.

## 9.4 Survey response

In this section, we present summary information about survey response in wave 3 for the main interview and for key modules in the main interview. We focus mainly on the main group of respondents – core members from the original cohort selected at wave 1 – who form the main basis of this report.

### Response to main interview

Survey response and quality of fieldwork were carefully monitored throughout the study period. Ultimately, the ELSA wave 3 fieldwork produced 9,771 productive interviews (including both proxy and telephone interviews).<sup>3</sup> Forty-seven of these interviews were conducted with individuals who had originally been interviewed in a private household and had since moved into an institution and so were eligible for the study. Table 9.1 shows the number of interviews conducted for Cohort 1, broken down by sample type.

Table 9.2 shows the 7,535 core members belonging to Cohort 1 by their pattern of response, whether they gave a full or partial interview, were individual or proxy respondents and whether they were interviewed in an institution. Table 9.3 shows the subset of core members who were living in private households in wave 3.

Table 9.4 shows the number of interviews conducted for Cohort 3.

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<sup>3</sup> In addition, 392 end-of-life interviews were carried out with a relative or carer of ELSA respondents who had died since the last wave of interviewing. These interviews were first introduced at wave 2 (when 135 end-of-life interviews were conducted) and collect information about the respondent's health, social and economic circumstances in the last two years of their life. They also collect basic information about what happened to the respondents' assets after they died. Over time, these end-of-life interviews will begin to accumulate so that some analysis is possible. There will be more detailed information about the interview and response in the future.

**Table 9.1. Respondents, by sample type (Cohort 1)**

*Respondents in 2006–07, including proxies*

	Number of respondents
Core member <sup>a</sup>	7,535
Core partner <sup>b</sup>	89
Younger partner	312
New partner	102
<b><i>Unweighted N</i></b>	<b><i>8,038</i></b>

Notes: <sup>a</sup>Born on or before 29 February 1952. <sup>b</sup>Core partners are individuals sampled as core members in wave 1 but who did not respond in wave 1 and so were only interviewed in wave 3 by virtue of their being the partner of a core member.

**Table 9.2. Core member respondents, by situation in wave 3**

*Core member respondents in 2006–07*

	Number of respondents	%
<b>Pattern of response</b>		
All three waves	7,197	96
Missed wave 2	338	4
<b>Type of interview</b>		
Full interview in person	7,304	97
Full interview by proxy	121	2
Partial interview in person	63	1
Institutional interview in person	15	0
Institutional interview by proxy	32	0
<b><i>Unweighted N</i></b>	<b><i>7,535</i></b>	<b><i>100</i></b>

Note: Columns may not add up to 100% because of rounding.

**Table 9.3. Core member respondents living in private households, by situation in wave 3**

*Core member respondents in 2006–07, excluding those in institutions*

	Number of respondents	%
<b>Pattern of response</b>		
All three waves	7,168	96
Missed wave 2	314	4
In institution/Out of GB at wave 2	6	0
<b>Type of interview</b>		
Full interview in person	7,304	98
Full interview by proxy	121	2
Partial interview in person	63	1
<b><i>Unweighted N</i></b>	<b><i>7,488</i></b>	<b><i>100</i></b>

Note: Columns may not add up to 100% because of rounding.

**Table 9.4. Respondents, by sample type (Cohort 3)***Respondents in 2006–07, including proxies*

	Number of respondents
Core member <sup>a</sup>	1,276
Younger partner	294
Older partner	142
New partner	21
<b><i>Unweighted N</i></b>	<b><i>1,733</i></b>

Note: <sup>a</sup>Born between 1 March 1952 and 29 February 1956; includes 104 younger partners at wave 1 who were identified from the HSE 2001 as potential age-eligible sample members in wave 3.

## Response rates

There is no universally accepted definition of response rate. An important distinction exists between *field* and *study* response rates. Fieldwork response rates are based on the subset of individuals actually issued for interview at any particular wave. Study response rates for longitudinal surveys are broader in that they relate back to the originally selected sample, irrespective of whether eligible cases were issued to field at any particular wave. Both rates exclude cases not belonging to the target population through ‘terminating events’ such as deaths, institutional moves and moves out of Great Britain. Field response rates are discussed in this section. Section 9.6 summarises study response rates.

Contact, co-operation and response rates are measures often used to evaluate the quality of fieldwork. A summary of the rates is presented here.

External information from the National Health Service Central Register was matched to non-respondents to identify any deaths that had not been revealed in the course of fieldwork. Individuals whose outcome showed that their eligibility had *not* been confirmed during fieldwork were all assumed to be eligible for the response rate calculation.

Over the full fieldwork period, for core members in Cohort 1, a household contact rate of 97% was achieved and an individual co-operation rate of 83%.<sup>4</sup> The response rate in wave 3 was 73%.<sup>5</sup>

<sup>4</sup> Contact rate is defined as ‘total households where contact was made with at least one member of the sample divided by total eligible households’. The co-operation rate is defined as ‘total individual respondents divided by total eligible individuals contacted’. Respondents have been defined as those who gave a full or partial interview either in person or by proxy.

<sup>5</sup> The response rate is defined as ‘total individual respondents to wave 3 divided by total individuals eligible for wave 3’. By eligible we mean that core members were *not* known to have died, moved into an institution or moved outside Great Britain. Note that inclusion in either the numerator or denominator was *not* conditional upon response at wave 2. Hence the total respondents in wave 3 included those core members who returned to the study after missing wave 2. (Conditional response rates will be presented in the Wave 3 Technical Report).

**Table 9.5. Reasons for non-response (core members in Cohort 1)**

*Eligible core members but non-respondents in 2006–07*

	Frequency	%
Non-contact	88	4.6
Refusal	1,453	76.1
Moved – unable to trace	142	7.4
Other	226	11.8
<b>Unweighted N</b>	<b>1,909</b>	<b>100</b>

Note: Columns may not add up to 100% because of rounding.

**Table 9.6. Reasons for non-response (age-eligible sample members in Cohort 3)**

*Non-respondents in 2006–07*

	Frequency	%
Non-contact	54	7
Refusal	407	53
Moved – unable to trace	231	30
Other	72	9
<b>Unweighted N</b>	<b>764</b>	<b>100</b>

Note: Columns may not add up to 100% because of rounding.

The equivalent contact, co-operation and response rates for core members in Cohort 3 were 83%, 74% and 61%, respectively.

The reasons for non-response for core members in Cohort 1 *issued* to field in wave 3 are given in Table 9.5. As in wave 2, the largest component (over three-quarters) of non-response was a result of refusals. Of non-responders 7% were individuals who could not be found (this is lower than wave 2, where those who had moved and could not be traced constituted 11% of issued wave 2 non-respondents). The final category of non-response is ‘other’, grouping together such reasons as being ill or away during the survey period. A judgement of the impact of any differential non-response is reserved for Section 9.5 where bias is examined.

The reasons for non-response for age-eligible sample members in Cohort 3 are given in Table 9.6. The largest component (over half) of non-response was a result of refusals. Just under a third of non-respondents, however, were individuals who had moved and could not be traced.

### ***Response to key sections***

In addition to the overall level of response, an analysis of the response to key sections (or modules) of the survey questionnaire was conducted. Not all modules required responses at an individual level. The household demographics and housing modules were asked at the household level, while the income and assets module was asked at the financial unit level. Table 9.7 shows the responses at the appropriate level for the three key modules of the main questionnaire.

**Table 9.7. Response rates to key modules***Respondents in 2006–07, self-completion excludes proxies*

Section	Total eligible	Level	Response rate
			%
Housing	6,483	Household	99.9
Income and assets	7,097	Financial unit	99.0
Self-completion	9,539	Individual	86.4

The response rate for the housing, income and assets modules was very high and similar to the rates achieved in waves 1 and 2. Response rates for the self-completion module were good in survey terms. In addition, non-response to specific items in the interview, including economic variables, was very low, as it had been in waves 1 and 2. In addition, 2,423 respondents returned the additional self-completion questionnaires which included health vignettes while 2,497 respondents returned the additional self-completion questionnaire with work-related vignettes. This represents a response rate of 78.5% and 79.1%, respectively, but it should be noted that these were presented as ‘optional’ rather than a key part of the core survey. Further information is provided in the technical reports.

## Profile of main interview respondents

### *Cohort 1*

The profile of core member respondents belonging to Cohort 1 (born on or before 29 February 1952) is presented in Table 9.8. The distribution shows that the sample contains more women than men, as expected, and that there are relatively more older women than men.

An alternative way of looking at response differences by characteristics is to show how the response rates vary by subgroups. Tables 9.9 and 9.10 split the sample into subgroups commonly used in this report. Table 9.9 shows that among women, 74.4% aged 60–74 in wave 1 and 70.8% aged 75+ responded. The equivalent figures for men were narrower (72.3% and 71.8%,

**Table 9.8. Achieved sample of core members (Cohort 1), by age in 2006–07 and sex***Respondents in 2006–07, including proxies but excluding those in institutions*

	Men	Women	Total	Men	Women	Total
<b>Age in wave 3</b>				%	%	%
54–59	898	1,101	1,999	27	27	27
60–64	612	721	1,333	18	17	18
65–69	550	621	1,171	16	15	16
70–74	517	587	1,104	15	14	15
75–79	359	516	875	11	12	12
80–84	255	328	583	8	8	8
85 and over	150	273	423	4	7	6
<b>Unweighted N</b>	<b>3,341</b>	<b>4,147</b>	<b>7,488</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Table 9.9. Wave 3 main interview response for core members (Cohort 1), by age in 2002–03 and sex**

*Eligible core members in 2006–07*

	50–59	60–74	75+	All
	%	%	%	%
<b>Men</b>				
Respondents	74.5	72.3	71.8	73.2
Non-respondents	25.5	27.7	28.2	26.8
<b>Women</b>				
Respondents	74.4	74.4	70.8	73.8
Non-respondents	25.6	25.6	29.2	26.2
<b>Unweighted N</b>				
<i>Men</i>	1,902	2,016	645	4,563
<i>Women</i>	2,255	2,388	975	5,618

**Table 9.10. Wave 3 main interview response for core members (Cohort 1), by non-housing wealth quintile in 2002–03 and sex**

*Eligible core members in 2006–07*

	Poorest	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	Richest
	%	%	%	%	%
<b>Men</b>					
Respondents	67.6	69.0	72.1	75.6	79.0
Non-respondents	32.4	31.0	27.9	24.4	21.0
<b>Women</b>					
Respondents	68.7	72.2	73.0	77.2	78.0
Non-respondents	31.3	27.8	27.0	22.8	22.0
<b>All</b>					
Respondents	68.2	70.8	72.6	76.4	78.5
Non-respondents	31.8	29.2	27.4	23.6	21.5
<b>Unweighted N</b>					
<i>Men</i>	796	783	896	1,004	1,050
<i>Women</i>	1,114	1,100	1,144	1,087	1,113

respectively). This is consistent with the pattern in response rates shown in the methodology section of the wave 2 report (Cheshire et al., 2006).

Table 9.10 shows response in wave 3 increasing from the lowest non-housing wealth quintile to the highest (as measured in wave 1).

### **Cohort 3**

The profile of the core member respondents belonging to Cohort 3 is presented in Table 9.11. (This table *excludes* the 103 core members aged 53 who were originally classified as either younger or older partners). For both men and women, the age distribution was evenly split across the 50, 51 and 52 age bands.

**Table 9.11. Achieved sample of core members (Cohort 3), by age in 2006–07 and sex***Respondents in 2006–07, including proxies*

	Men	Women	Total	Men	Women	Total
<b>Age in wave 3</b>				%	%	%
50	177	220	397	33	35	34
51	172	209	381	32	33	32
52	188	207	395	35	33	34
<i>Unweighted N</i>	<i>537</i>	<i>636</i>	<i>1,173</i>	<i>100</i>	<i>100</i>	<i>100</i>

### Profile of proxy respondents

As mentioned in the methodology section of the wave 1 report (Taylor et al., 2003) the number of interviews conducted by proxy was expected to grow in future waves as the ELSA sample ages. A comparison in wave 1 of proxies with those of individual respondents showed that there were considerable differences between the two groups, as would be expected due to the rules employed to qualify for a proxy interview. Relative to those completing a full interview in person, proxy respondents are more likely to be older, more likely to have a long-standing illness and less likely to be in paid work or to be self-employed (Taylor et al., 2003). Table 9.12 shows the proxy respondent sample at wave 3 (core members in Cohort 1), by age and sex; 34% of men were aged 80 and over, compared with 50% of women. The equivalent figures for the 7,304 giving a full interview were 12% and 14%, respectively (results not shown).

**Table 9.12. Proxy respondent sample (Cohort 1), by age in 2006–07 and sex***Proxy respondents in 2006–07, excluding those in institutions*

	Men	Women	Total	Men	Women	Total
<b>Age in wave 3</b>				%	%	%
54–59	8	5	13	14	8	11
60–64	5	5	10	8	8	8
65–69	11	3	14	19	5	12
70–74	7	10	17	12	16	14
75–79	8	8	16	14	13	13
80 and over	20	31	51	34	50	42
<i>Unweighted N</i>	<i>59</i>	<i>62</i>	<i>121</i>	<i>100</i>	<i>100</i>	<i>100</i>

## 9.5 Implications for analyses: weighting

This section considers the implications for using the data and describes the weighting strategies recommended for use in this report to account for non-response and combining Cohorts 1 and 3.

Longitudinal data sets such as ELSA can be analysed either as a cross-section or longitudinally. Cross-sectional analysis uses data collected at a particular wave: longitudinal analysis involves data collected from more than one wave for the purposes of analysing change. Cross-sectional and longitudinal weights support these two different estimation objectives. We describe the cross-sectional and longitudinal weights constructed at wave 3 in turn, beginning with the longitudinal weight.<sup>6</sup>

### Longitudinal analysis

An analysis of non-respondents using the wealth of information collected at earlier waves helps to identify the potential for bias in the respondent sample. For those core members in Cohort 1 eligible for the main interview in wave 3, *and* who responded at wave 2, response was modelled on a full range of household and individual-level information collected from waves 0, 1 and 2. Note that the analysis was conducted using the main interview weight derived in wave 2 to ensure that the wave 3 weight did not replicate the wave 2 weight.

The results showed significant differences between respondents and non-respondents on a number of characteristics. The non-responders in wave 3 (14% of those eligible) were more likely than responders to have the following socio-demographic features:

- not interviewed at HSE
- sampled from HSE 1998 or 1999 (rather than 2001)
- living in London during wave 2
- non-white ethnicity
- renting in wave 2 compared with those who owned their property outright
- fair or poor self-assessed health in wave 2
- living in urban areas during wave 2 compared with those in ‘villages’
- limiting long-standing illness in wave 2
- CSE/other or no educational qualifications compared with those with a degree or equivalent (recorded in wave 1)

Differences in the age-sex distribution of wave 1 and wave 3 achieved samples of core members can be seen in Table 9.13. As noted in the methodology section of the wave 2 report (see Cheshire et al., 2006), women aged 85 and over in wave 1 were particularly likely to be no longer participating in the study.

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<sup>6</sup> A more technical description of the weighting strategies can be found in the User Guide accompanying the wave 3 data.

**Table 9.13. Comparison of wave 1 and wave 3 achieved samples of core members (Cohort 1), by age in 2002–03 and sex***Core member respondents in all three ELSA waves*

	Wave 1 <sup>a</sup>			Wave 3 <sup>b</sup>		
	Men	Women	Total	Men	Women	Total
<b>Age in wave 1</b>	%	%	%	%	%	%
50–54	23	20	22	25	23	24
55–59	18	16	17	20	17	18
60–64	15	14	15	16	15	16
65–69	14	13	13	15	13	14
70–74	12	12	12	11	12	12
75–79	9	11	10	8	10	9
80–84	5	7	6	4	6	5
85 and over	3	6	5	2	3	3
<b>Weighted N</b>	5,280	6,111	11,391	3,269	3,899	7,168
<b>Unweighted N</b>	5,186	6,205	11,391	3,192	3,976	7,168

Notes: <sup>a</sup>Weighted by the wave 1 weight. <sup>b</sup>Weighted by the wave 3 weight.

A longitudinal weight has been calculated in wave 3 for the set of 7,168 core members who have responded to all three waves of ELSA and remain living in private households. The sequential nature of the weighting<sup>7</sup> means that we attempt to try to reduce any bias arising specifically from (1) failure to respond at HSE, (2) refusals to be re-interviewed after HSE and (3) non-response in waves 1, 2 and 3 of ELSA.

In summary, the main interview weight to be used with data collected in wave 1 was created in two steps. First, non-response in wave 1 was modelled using information collected at HSE. The modelling was conducted in a similar way to the wave 3 modelling described above, but only using information collected at HSE. The non-response weighting aimed to correct for any differences in characteristics found between respondents and non-respondents by giving greater weight to those subgroups with lower response rates (e.g. men aged 50–54, women aged 85 and over and those living in London). The second step was a (post-stratification) adjustment to ensure that the respondent age-sex distribution matched the Census 2001 non-institutionalised distribution.

The weighting strategy in wave 2 was similarly aimed at reducing any bias arising from sample loss after wave 1. For those core members eligible for interview in wave 2, a response/non-response indicator was statistically modelled on a full range of household and individual-level information collected from both HSE and ELSA wave 1 (details given in Cheshire et al., 2006).

The weighting strategy in wave 3 aimed to reduce any bias arising from sample loss after wave 2. For those core members eligible for interview in

<sup>7</sup> That is to say, longitudinal weights are based on a sequence of attrition models for each wave, which is multiplied by the weight created at the previous wave. In this case, the weight derived in wave 3 builds on the wave 2 weight, which, in turn, built on the weight created in wave 1.

wave 3, and who had responded to waves 1 and 2, a response/non-response indicator was modelled on household and individual-level information collected from the previous waves.

Taking the inverse of the estimated probability of responding created a non-response weight in wave 3. For example, a response probability of 0.8 corresponds to a weight of 1.25, while a lower response probability of 0.5 corresponds to a greater weight of 2. The non-response weighting factor in wave 3 was then multiplied into the wave 2 weight. That is, the main interview weight in wave 3 for longitudinal analysis aims to correct for non-response bias (1) between HSE and ELSA wave 1, (2) between ELSA waves 1 and 2 and (3) between waves 2 and 3.

As an illustration of the extent to which the longitudinal weighting strategy has been successful in reducing any bias from differential non-response, Table 9.14 shows the relative comparison of the wave 1 and wave 3 distributions for educational status (as measured in wave 1).

**Table 9.14. Weighted comparison of wave 1 and wave 3 achieved samples of core members, by educational status in 2002–03**

*Core member respondents at each wave*

Educational status in wave 1	Wave 1	Wave 2	Wave 3	Wave 3	Wave 3 relative to wave 1	
	(weighted) %	(weighted) %	(unweighted) %	(weighted) %	Unweighted	Weighted
Degree or equivalent	10.8	11.1	13.1	11.4	1.22	1.06
A-level/Higher education below degree	16.8	17.3	19.3	17.6	1.15	1.05
O-level or other	15.5	16.0	17.3	16.3	1.12	1.05
CSE or other	13.4	13.3	13.3	13.2	1.00	0.99
No qualifications	43.6	42.3	37.0	41.5	0.85	0.95
<b>Weighted N</b>	<i>11,391</i>	<i>8,870</i>	–	<i>7,168</i>		
<b>Unweighted N</b>	<i>11,391</i>	<i>8,870</i>	<i>7,168</i>	<i>7,168</i>		

In order to enable comparison, Table 9.14 shows the educational status distribution for all core members in the first wave (the ‘baseline’ year), those responding in both the first and second waves and finally those responding in all three waves. The latter is shown both weighted and unweighted.

If non-response to ELSA had been uniform, then we would expect the wave 2 and 3 distributions to mirror that for wave 1. Table 9.14 clearly shows, however, that core members with a degree or equivalent are over-represented in wave 3 (13.1% compared to 10.8% in wave 1) while those with no qualifications are under-represented (37% compared to 43.6%).

Using the example of Vandecasteele and Debels (2007), we can express the under or over-representation of a certain educational status category in wave 3 relative to wave 1 by dividing the former by the latter. This is shown in the last two columns of Table 9.14. A number less than 1 indicates under-representation of the group in the longitudinal sample, while a number greater than 1 points to over-representation. So, the closer to 1, the closer the wave 3 distribution mirrors the distribution in wave 1. Performing this analysis on

both unweighted and weighted data illustrates the potential effectiveness of the weighting in reducing bias.

Looking at the unweighted distribution first, we can see the over-representation of core members with qualifications (e.g. a ratio of 1.22 for those with a degree or equivalent) compared to the under-representation of those without (a ratio of 0.85).

As we would expect, the longitudinal weighting strategy reduces, but does not eliminate, the under-representation of those without qualifications. After applying the wave 3 longitudinal weight, 41.5% of core members did not have a qualification in wave 1 compared to the baseline estimate of 43.6% (the unweighted estimate in wave 3 was 37%). The upweighting of core members without qualifications via the modelling of response, therefore, moves the wave 3 distribution closer to that in wave 1 (increasing the ratio from 0.85 unweighted to 0.95 weighted).

The longitudinal methods literature distinguishes between two types of non-response. First, *attrition* patterns of non-response describe the situation in which the respondent appears in an early wave and then fails to respond at later waves. Second, *wave non-response* represents the case in which respondents at a particular wave had failed to respond to one or more of the previous waves.

Typically, longitudinal surveys only provide longitudinal weights to compensate for attrition patterns of non-response. Compensating for wave non-response necessitates constructing an independent weight for each pattern of response. As Lynn et al. (1994) explain, the potential for error in such a situation is considerable. Furthermore, although the purpose of weighting a data set is to make it ‘representative’ of the population, small differences between survey estimates will inevitably occur when using the different sets of weights (Lynn et al., 1994, p.11).

Hence, as with other longitudinal studies (e.g. The British Household Panel Study or The Families and Children’s Study), the longitudinal weighting strategy focuses on only those core members who have responded at all waves up to and including wave 3. At each wave, as described above, the fully responding core members are re-weighted to take account of the previous wave’s respondents lost through refusal at the *current* wave or through some other form of sample attrition. The longitudinal weight derived in wave 3, therefore, was defined only for the set of 7,168 core members who have responded at each wave up to and including the third wave.<sup>8</sup>

Core members from Cohort 1 who returned to the study at wave 3 after missing wave 2 (4% of the respondents in wave 3) do not, therefore, have a positive longitudinal weight. Possible longitudinal weighting strategies to accommodate wave non-response are outlined in Lepkowski (1989) and Lynn et al. (1994). The 314 core members who returned to the study at wave 3 do, however, have a positive cross-sectional weight, discussed in the next section.

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<sup>8</sup> Both proxy and telephone respondents have positive weights. Core members known to be living in institutions are classified as respondents to the survey but are treated as ineligible for the purposes of weighting as they no longer belong to the population of interest.

## Cross-sectional analysis

Longitudinal surveys are often not as good as cross-sectional surveys at providing cross-sectional estimates. For example, compared with estimates from a cross-sectional survey, cross-sectional estimates from a longitudinal survey (from wave 2 onwards) may be more likely to suffer from coverage error (because the sample was selected longer ago and may not include recent additions to the population of interest such as immigrants). Also, a longitudinal survey may experience lower response rates than a cross-sectional survey.

Nevertheless, in order to support cross-sectional analysis of the wave 3 data, a cross-sectional weight was derived that allows for the inclusion of new entrants (Cohort 3 core members) who, by definition, do not have a longitudinal weight. A number of core members from Cohort 1 also returned to the study at wave 3 after missing wave 2 (wave non-respondents). All core members responding at wave 3 can be described as the *combined sample*.

The cross-sectional weight defined for the combined sample at wave 3 was calculated separately for the following groups:

- Cohort 1 (fully responding cases and those who returned to the study after missing wave 2);
- Cohort 3 (the refreshment sample chosen from the HSE 2001–04).

The cross-sectional weighting for these groups is discussed in turn. A more detailed description will be provided in the Technical Report.

### *Cross-sectional weight for Cohort 1*

Core members belonging to Cohort 1 successfully interviewed at wave 3 belonged to one of two groups:

- 7,168 core members who had taken part in waves 1, 2 and 3;
- 314 individuals who had returned to the study at wave 3 after missing wave 2.

It is often speculated that wave non-respondents are likely to have characteristics that differ from those who have taken part at all waves (Lynn et al., 1994). To examine this, a group membership indicator variable (0 = having taken part in all waves, 1 = returning to the study after missing wave 2) was modelled on a full range of household and individual-level information collected from wave 1. The following socio-demographic features were found to be useful predictors of group membership:

- tenure
- white/non-white ethnicity
- educational status
- marital status
- whether interviewed at HSE

Using the techniques of calibration weighting we calculated weighting factors that, when applied to the *combined* Cohort 1 sample, give estimates for the

survey that match the profile of (weighted) core members who have taken part in all three waves on these five socio-demographic characteristics.

### ***Cross-sectional weight for Cohort 3***

A cohort of people born between 1 March 1953 and 29 February 1956 was added to the wave 1 cohort in 2006–07. The wave 3 cohort was selected from four survey years of the Health Survey for England (2001–04). The cross-sectional weighting for the wave 3 cohort was complicated by the initial omission of persons born between 1 March 1952 and 28 February 1953. As mentioned in Section 9.1, 103 individuals originally classified as younger or older partners have been reclassified as core members. These individuals, however, have been given a zero cross-sectional weight (as they do not represent a random sample of persons in the HSE 2001–04 born during this year). A non-zero weight will be assigned to these cases at wave 4 as we intend to go back to the cases mistakenly excluded from the sampling.

The following discussion, therefore, relates to the cross-sectional weight assigned to the core members belonging to Cohort 3 born between 1 March 1953 and 29 February 1956. As with Cohort 1, an analysis of the non-respondents helps to identify the potential for bias in the respondent sample. For those potential core members eligible for the main interview in wave 3, response was modelled on a full range of household and individual-level information collected from the HSE.

The results showed significant differences between respondents and non-respondents on the following characteristics:

- year of selection for HSE
- limiting long-standing illness
- white/non-white
- educational status
- whether already in the ELSA study
- household type

Taking the inverse of the estimated probability of responding created a non-response weight to correct for possible non-response bias between HSE and ELSA.

### ***Putting the cross-sectional weights together***

The final step in the calculation of the cross-sectional weight was to compute a scaling factor to ensure that the *combined* sample of Cohorts 1 and 3 were represented in the same proportions in which they appear in the population.<sup>9</sup> The age-by-sex population information was taken from the latest household population estimates provided by the Office for National Statistics. (To account for the missing 53-year-olds we allocated half of the population aged

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<sup>9</sup> Age is defined here as age at 1 March 2006, immediately prior to the beginning of wave 3 fieldwork.

53 to the 50–52 age band and the remaining half to the 54–59 category). The 2006 household population estimates are shown in Table 9.15.

The profile of the combined core member respondents, weighted by the cross-sectional weight, is presented in Table 9.16.

**Table 9.15. Household population estimates**

*Mid-2006 England household population (aged 50 and over)*

Age	Men	Women	Total	Men	Women	Total
				%	%	%
50–52	1,058,968	1,086,003	2,144,971	14	12	13
54–59	2,040,835	2,099,561	4,140,396	26	24	25
60–64	1,311,280	1,369,882	2,681,162	17	15	16
65–69	1,066,203	1,147,579	2,213,782	14	13	13
70–74	894,467	1,019,937	1,914,404	11	12	11
75–79	697,071	892,960	1,590,031	9	10	10
80 and over	740,521	1,252,911	1,993,432	9	14	12
<b>Total</b>	<b>7,809,345</b>	<b>8,868,832</b>	<b>16,678,177</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Table 9.16. Achieved (combined) sample of core members, by age in 2006–07 and sex**

*Respondents in 2006–07, including proxies but excluding those in institutions*

	Men	Women	Total	Men	Women	Total
Age in wave 3				%	%	%
50–52	550	564	1,114	14	12	13
54–59	1,060	1,090	2,151	26	24	25
60–64	681	711	1,392	17	15	16
65–69	554	596	1,150	14	13	13
70–74	465	530	995	11	12	11
75–79	362	463	825	9	10	10
80 and over	385	650	1,035	9	14	12
<i>Weighted N</i>	<i>4,057</i>	<i>4,604</i>	<i>8,661</i>	<i>100</i>	<i>100</i>	<i>100</i>
<i>Unweighted N</i>	<i>3,878</i>	<i>4,783</i>	<i>8,661</i>	<i>100</i>	<i>100</i>	<i>100</i>

## 9.6 Response across the waves

So far, for core members in Cohort 1, this chapter has examined the response in wave 3 of the study based on those who were eligible and issued to field in wave 3. This represents a reasonable measure of the success of this particular phase of the project. However, longitudinal research also depends on the response in successive waves – on cumulative response. The response rate at any one wave of a longitudinal survey may be just as good as that for any other survey but after, say, three or four waves the proportion of cases that have responded *at every wave* may be quite low. Thus, the effective response rate for longitudinal analysis (using data collected at every wave) will turn out to be lower than the response rates typically associated with cross-sectional surveys.

**Table 9.17. Components of longitudinal response rates for core members**

	Wave 0	Wave 1	Wave 2	Wave 3	Total
	%	%	%	%	%
A	n/a	n/a	81.5	70.4	70.4
B	95.8	67.1	81.5	70.4	36.9
C	93.6	61.1	81.5	70.4	32.8
D	71.1	61.1	81.5	70.4	24.9

Notes: The Total column is calculated as the multiplication of the single wave response rates for measures B, C and D, and as (responded to *all* relevant waves)/(eligible for all relevant waves) for measure A.

Technical notes: The response information in the table above uses the most up-to-date data sources. This implies that if an individual was believed to have been eligible to respond to a particular wave but is now known to have died beforehand, then they will be classified as ineligible. The single wave response rate for wave 3 uses a denominator of all individuals eligible for wave 3 (responded in wave 1, and met eligibility criteria set out in Box 9.1). In contrast to the cross-sectional rate presented in Section 9.4 inclusion in the numerator is conditional here on having participated in *all* three waves.

The response rate in wave 1 for measure B is the fieldwork rate, which restricts the denominator to those issued (i.e. excludes non-co-operating households in wave 0 and individuals in co-operating households in wave 0 where there was not at least one person aged 50 or more who had agreed to be contacted again beyond wave 0).

Measures C and D use a wider definition, where the denominator includes all individuals eligible for wave 1. The response rate in wave 0 was calculated using different denominators for each longitudinal rate. Measure B uses all those aged 50 years old and over in co-operating households in wave 0 where at least one had agreed to be re-contacted beyond wave 0 and measure C uses all those aged 50 or over in co-operating households in wave 0. Measure D uses all those aged 50 years or more in wave 0 which was estimated using the published rates and knowledge of differences between all adults and the subgroup of interest.

Unfortunately, there is no single definition of longitudinal response that is applicable in all circumstances. As a result, a number of representations were put forward in the methodology section of the wave 2 report (see Cheshire et al., 2006) and are carried forward here. The results are summarised in Table 9.17. More detail will be provided in the Technical Report. We focus here on responses to the main interview.

The strictest interpretation of longitudinal response *based on eligibility to take part at each stage* takes wave 1 *respondents* as the baseline sample and considers what happened subsequently. In one sense, this reflects the original intention of the study and the study's eligibility criteria, and shows that of those eligible, 7,168 were successfully interviewed at *each* wave up to and including wave 3 (measure A in Table 9.17). However, it is important to understand that this rate does not consider *any* losses before or during wave 1, and takes *no* account of loss of representativeness of the study as various individuals no longer participate in the study.

At the other end of the spectrum, we can account for all losses of individuals since interviewers began to identify respondents for the HSE surveys in 1998, 1999 and 2001. A consideration of this kind provides a better indication of how representative the sample is of the population, since it measures the dropout at *every* stage from the origin of the sample at HSE (which we term wave 0) through to the wave 3 interview. On the other hand, it could be construed as unreasonable because it makes no allowance for the very large number of individuals who were ineligible for the study and could never have

been interviewed (e.g., persons living in non-co-operating households at wave 0 were discarded from the wave 1 sampling frame as there was no available information about residents that would have made it possible to identify those who were born on or before 29 February 1952).

Using an estimated 71% response in wave 0, 61% in wave 1 and 82% in wave 2, we calculated in wave 2 a cumulative longitudinal response rate of 35%. Multiplying this rate by the estimated single wave 3 response rate of 70% suggests a cumulative longitudinal response rate of 25% (measure D in Table 9.17).

Two interim measures may provide more realistic summaries of response over time. The first removes from the denominator the households for whom age information was never collected (i.e., excludes non-co-operating households) in wave 0 and suggests a response rate of 33% (measure C). The second restricts the denominator further by excluding the households in wave 0 which did not contain at least one adult of 50 years or older in the household who, at the end of the HSE interview, did not give explicit agreement to be re-contacted at some time in the future. Reducing the subgroup of interest in this way to reflect these exclusions results in an overall response rate of 37% (measure B). These two measures are perhaps more accurate. All four have value as they represent different ways of looking at the study over time.

As we mentioned in the wave 2 report (see Cheshire et al., 2006), the choice of response rate depends ultimately on the perspective taken. Considerations to take into account are whether wave 0 is included in the definition of longitudinal and whether the focus is sample representativeness or feasible participation in the study.

## **9.7 Conclusions**

ELSA is now reaching the stage where genuine longitudinal exploration has become possible. The study remains strong and has been successful in achieving many of its scientific aims. Wave 3 has seen the introduction of several methodological developments (such as the life history interview) and adaptations to the questionnaire (for example, two supplementary self-completion components using anchoring vignettes) in order to reflect the long-term aims of the project. We continue to aim for high response rates. A number of core members not interviewed at wave 2 returned to the study at wave 3 and a new cohort of respondents just entering their 50s was added to the wave 1 cohort. No single rate can represent the overall level of response to studies such as ELSA but two or three figures are indicative. At wave 3, 73% of eligible core members (from Cohort 1) were successfully interviewed and this represents a reasonable measure of the success of this particular wave. A broader perspective is given by looking at response across the waves. Taking account of dropout at every stage from the origin of the sample at HSE to wave 3 (that is, from before ELSA began) we estimate a cumulative longitudinal response rate of 25%. In other words, we estimate that a quarter of all persons aged 50+ potentially selected at HSE 1998, 1999 and 2001 have taken part at HSE and at every wave of ELSA (waves 1, 2 and 3). If we consider a narrower group – those who we successfully interviewed at the

ELSA survey in 2002–03 who formed our baseline, we have interviewed 70% successfully at subsequent waves (waves 2 and 3). We will continue to work hard to achieve the maximum possible response at wave 4, which also includes a nurse visit, and to ensure that the study remains high quality and innovative.

Finally, we acknowledge and appreciate the enormous contribution of all the individuals who take part in the study, and the interviewers and nurses who carry it out in such a committed way.

## References

- Belli, R.F., Lee, E.H., Stafford, F.P. and Chou, C. (2004), 'Calendar and question-list survey methods: association between interviewer behaviours and data quality', *Journal of Official Statistics*, vol. 20, no. 2, pp. 185–218.
- Cheshire, H., Cox K., Lessof, C. and Taylor, R. (2006), 'Methodology', in J. Banks, E. Breeze, C. Lessof and J. Nazroo (eds), *Retirement, Health and Relationships of the Older Population in England: The 2004 English Longitudinal Study of Ageing*, London: Institute for Fiscal Studies.
- Erens, B. and Primatesta, P. (eds) (1999), *Health Survey for England 1998, Vol. 2: Methodology and Documentation*, London: The Stationery Office.
- Erens, B., Primatesta, P. and Prior, G. (eds) (2001), *Health Survey for England. The Health of Minority Ethnic Groups 1999, Vol. 2: Methodology and Documentation*, London: The Stationery Office.
- Lepkowski, J.M. (1989) 'Treatment of wave nonresponse in panel surveys', in D. Kasprzyk, G. Duncan, G. Kalton and M.P. Singh (eds), *Panel Surveys*, New York: John Wiley & Sons, pp. 348–374.
- Lynn, P., Purdon, S., Hedges, B. and McAleese, I. (1994), *The Youth Cohort Study: An Assessment of Alternative Weighting Strategies and their Effects*, Employment Department Research Series YCS Report no. 30.
- Marmot, M., Banks, J., Blundell, R., Lessof, C. and Nazroo, J. (eds) (2003), *Health, Wealth and Lifestyles of the Older Population in England: The 2002 English Longitudinal Study of Ageing*, London: Institute for Fiscal Studies ([http://www.ifs.org.uk/elsa/report\\_wave1.php](http://www.ifs.org.uk/elsa/report_wave1.php)).
- Prior, G., Deverill, C., Malbut, K. and Primatesta, P. (eds) (2003), *Health Survey for England. The Health of Minority Ethnic Groups 2001, Vol. 2: Methodology and Documentation*, London: The Stationery Office.
- Sproston, K. and Mindell, J. (eds) (2006), *Health Survey for England 2004, Vol. 2: Methodology and Documentation*, London: The Stationery Office.
- Sproston, K. and Primatesta, P. (eds) (2003), *Health Survey for England 2002, Vol. 3: Methodology and Documentation*, London: The Stationery Office.
- Sproston, K. and Primatesta, P. (eds) (2004), *Health Survey for England 2003, Vol. 3: Methodology and Documentation*, London: The Stationery Office.
- Taylor, R., Conway, L., Calderwood, L. and Lessof, C. (2003), 'Methodology', in M. Marmot, J. Banks, R. Blundell, C. Lessof and J. Nazroo (eds), *Health, Wealth and Lifestyles of the Older Population in England: The 2002 English Longitudinal Study of Ageing*, London: Institute for Fiscal Studies (December 2003).
- Vandecasteele, L. and Debels, A. (2007), 'Attrition in panel data: the effectiveness of weighting', *European Sociological Review*, vol. 23, no. 1, pp. 81–97.





