

12. Methodology

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Key aspects of the ELSA survey of methodological interest include 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 2 questionnaire was similar to that used in wave 1, but every module was reviewed to ensure that it would provide data that measures change over time. This was achieved by repeating some measures exactly (e.g., to measure income and assets), by asking directly about change (e.g., to capture perceived changes in memory and concentration) and by adapting questions to allow people to update or amend past responses (e.g., about work, pensions and specific health conditions).
- The wave 2 interview was also expanded to answer a variety of additional research questions. The new items included: quality of healthcare received; household spending on leisure, clothing and transfers; perceptions of deprivation relative to others; perceptions of ageing; levels of literacy; perceived effort and reward for care-giving; and voluntary activities.
- Core sample members who completed a main interview were also offered a nurse visit. This was similar to the one that many respondents had agreed to when interviewed as part of the Health Survey for England in 1998, 1999 or 2001 and included tests of blood pressure, lung function, blood tests, anthropometric measures and physical performance measures.
- In total 9,432 main interviews were completed. Of these, 8,780 (93%) were with eligible core members, who form the basis of this report. The remaining 652 were with partners, defined as core, young or new partners.
- Eighty-two per cent of those who completed a wave 1 interview and were eligible for a wave 2 interview as an ELSA 'core member' took part in the survey. Of these, 88% also took part in the nurse interview (representing 71% of those eligible for a wave 2 interview). The response to specific elements of the interview was high.

This chapter presents a summary of the survey methodology for the second wave of the English Longitudinal Study of Ageing (ELSA). It includes a brief account of the sample design, content of the interview and nurse visit, and the approach to fieldwork. It provides basic information about responses to the survey and the weighting strategy 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>.

12.1 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 ELSA sample was selected from three survey years of the HSE (1998, 1999 core sample 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 are available from the Technical Reports (Erens and Primatesta, 1999; Erens, Primatesta and Prior, 2001; Prior et al., 2003).

Eligibility for interview in ELSA wave 1 and wave 2

Within HSE households, there were three types of individual who were eligible to take part in wave 1 of ELSA, as illustrated in Box 12.1.

The wave 1 interview took place in 2002–2003, providing the baseline for the study. Eligible sample members who responded at this stage were renamed ‘core members’ to distinguish them as the core element of the continuing ELSA sample. They were eligible for the main interview in wave 2 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 who completed a main interview in wave 2 were also eligible for a nurse visit. Core members form the main focus of this report.

Several other categories of individuals were also eligible for an interview (but not a nurse visit) in wave 2. These were the partners of core members (core partners, new partners or young partners, as described in Box 12.2). They were not included in the analysis presented in this report.

Box 12.1. Summary of the eligibility criteria for the wave 1 ELSA interview

Eligible sample members were individuals who were 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 still living at a private residential address in England at the time of the ELSA wave 1 interview.

Young partners were the cohabiting spouses or partners of eligible sample members, who were living within the household at the time of the HSE in 1998, 1999 or 2001, and were still cohabiting with the sample member during the wave 1 interview. They were born *after* 29 February 1952.

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

Box 12.2. Summary of the eligibility criteria for the wave 2 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. Consequently, they were only approached by virtue of their being the partner of a core member.

Young 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 sample member at the time of the wave 1 interview. They were born *after* 29 February 1952. Most, but not all, young partners took part in a wave 1 interview.

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

Core, young and new partners who had been identified in wave 1 were eligible for a full wave 2 interview even if they were no longer living with a core member at the time of the second interview. That is to say, we attempted 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 partners 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.

Core, young and new partners (those identified in both waves 1 and 2) were not eligible for a nurse visit. Although they are not included in the analysis

presented in this report in their own right, the fact that many of them completed a main interview means that we can take into account differing characteristics of partners or of joint income that are relevant for the health and well-being of the core member.

Two further types of interview were conducted with specific sub-populations. An 'end of life' interview was sought with a relative, friend or carer of core members who had died since participating in the first ELSA interview. An institution interview was sought with core members who had since moved from a private household into a residential care home or similar institution, or with a proxy who could respond on their behalf. The data collected during these types of interviews have not been used in this report.

Sample allocation

The eligible sample for wave 2 was allocated in monthly batches, for which invitations were to be issued over the fieldwork period. Those to be contacted at each address were allocated to one of four two-month time periods by referring to the date of the wave 1 interview and selecting the period closest to two years from that interview. To create the most efficient grouping for interviewers, addresses were 'bunched' and assigned to one of the two-month time periods.

12.2 Development of the wave 2 interview and nurse visit

Extensive discussion took place with ELSA collaborators about necessary changes to the wave 1 interview. Early pre-tests helped with the development of the nurse visit and the physical performance measures, and two pilots were conducted in August 2003 and January 2004. These tested the survey instruments and fieldwork approach for the main interview and all aspects of the nurse visit. An approach to dependent interviewing was developed – that is, feeding information from a past interview into the current one.

Structure and content of wave 2 interview

As in the previous wave, the wave 2 main survey comprised a personal face-to-face interview and a self-completion questionnaire. Overall, the intention in wave 2 was to collect data about the same topics as in wave 1. There were, however, some additions to the content of the interview to respond to new areas of enquiry. Furthermore, several elements of the questionnaire were amended to take account of responses given during the previous wave.

The structure of the main interview was the same as it had been for wave 1. In brief:

- In households with one respondent, or where two respondents were interviewed separately, each interview followed the course set out in Box 12.3, though some flexibility was given in the order of the walking-speed, income and assets, and housing modules.

Box 12.3. Content of the ELSA interview in wave 2

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

Individual demographics – collection or updating of details about respondents' legal marital status, parent's age and cause of death and number of living children.

Health – collection or updating of self-reported general health, chronic 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.

Social participation – covering care-giving and the use of public transport.

Work and pensions – collection or updating of current work activities; current and past pensions; reasons for job change and health-related job limitations.

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

Housing – collection or updating of current housing situation (inc. size and quality), housing-related expenses, ownership of durable goods and cars; consumption including food in and out of home, fuel, durables, leisure, clothing and transfers.

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

Expectations – measured expectations for the future in a number of dimensions; financial decision-making; relative deprivation and subjective views of ageing.

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

Effort and reward – new questions to assess motivations behind voluntary work and caring for others; and the relationship between effort and reward.

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

Final questions – collection of any missing demographic information and updating of contact details and consents as described below.

Self-completion questionnaire – covering quality of life, social participation, mobility, control at work, life satisfaction, views of ageing, social networks and alcohol consumption.

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

Box 12.4. Content of the ELSA nurse interview at wave 2

The nurse visit included the taking of several standard measures including:

Blood pressure

Lung function – a measure of how much air respondents can exhale from lungs, and is measured using a spirometer.

Blood sample – most respondents under the age of 80 were asked to fast before giving the sample. A list of the uses to which the sample was put is given in Box 12.5.

Anthropometric measures – weight, sitting height, standing height, and waist and hip measurement (to assess the distribution of body fat across the body). In addition, nurses took four **physical performance** measures. Taken together with the gait speed (or timed walk) measure carried out during the personal interview, these provide an excellent way of tracking change in physical well-being over time.

Grip strength – a measure of upper body strength, during which the respondent was asked to squeeze a grip gauge up to three times with each hand.

Chair rises – a measure of lower body strength, during which respondents were asked to stand up from a firm chair without using their arms. If they succeeded, they were asked to stand up and sit down as quickly as they could for either five rises if they are aged 70 years and over, or up to ten rises if aged 69 years and under.

Balance – respondents were asked to stand in 3 different positions for up to 30 seconds.

Leg raise – respondents under 70 years old were asked to lift one foot off the ground for up to 30 seconds.

Box 12.5. Purpose of the blood sample in wave 2

Fibrinogen – A protein necessary for blood clotting. High levels are also associated with a higher risk of heart disease.

Total cholesterol – Cholesterol is a type of fat present in the blood, related to diet. Too much cholesterol in the blood increases the risk of heart disease.

HDL cholesterol – This is 'good' cholesterol which protects against heart disease.

Triglycerides – Together with total and HDL cholesterol, triglycerides provide a lipid profile, which can give information on the risk of cardiovascular disease.

Ferritin and haemoglobin – These are measures of iron levels in the body, related to diet and other factors.

C-reactive protein – The level of this protein in the blood gives information on inflammatory activity in the body and is also associated with risk of heart disease.

Apolipoprotein E – This is involved in the transport of cholesterol and plays a protective role.

Fasting glucose and glycated haemoglobin – Both indicate the presence or risk of type 2 diabetes, which is associated with an increased risk of heart disease.

Genetics – Genetic factors are associated with some common diseases, such as diabetes and heart disease, and relate to general biological aspects of the ageing process.

- The self-completion questionnaire was normally concluded 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 live in a household, one was nominated as the informant for that household. Similarly, one individual was asked to be the informant on income and assets on behalf of each benefit unit. However, if two individuals in the same benefit unit keep their finances separately, then the data for each financial unit was collected separately.

The interview ended with a request 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 not provided this at the HSE pre-baseline interview. Consent was also collected for a nurse visit. Contact details were requested for a stable address and for a nominated individual who might respond if a proxy, institution, or end of life interview were needed in the future.

Structure and content of wave 2 nurse visit

After conducting the interview, the interviewer made an appointment for the nurse to visit the respondent, or set up contact between the nurse and respondent. The nurse then visited the respondent to carry out a series of measurements listed in Box 12.4. These were only obtained if the appropriate consents were given and the respondent was able to respond affirmatively to relevant safety questions.

Two additional measures were collected during the nurse visit. First, respondents were asked to supply saliva samples over a 24-hour period to measure cortisol, which is an indicator of stress. Second, a sample of one-in-ten respondents was asked to complete an experimental questionnaire, designed by Carol Ryff, about how they felt about themselves and their lives, in the form of 43 statements with which the respondent was asked to agree or disagree (Ryff and Keyes, 1995).

As described above, a blood sample was collected from respondents who gave consent for this in order to examine the items in Box 12.5.

12.3 Fieldwork

Fieldwork for the first wave of ELSA began in June 2004 and spanned 14 months, finishing in July 2005. Each eligible individual within a household was sent an advance letter inviting them to take part. Interviewers then visited the households to explain the study and to interview willing individuals straight away, or to make appointments to call at a convenient time. A number of different approaches were used to encourage participation among the sample, many of which were similar to those described in the previous ELSA report (Marmot et al., 2003).

12.4 Survey response

In this section, we present summary information about survey response in wave 2 for the main interview, for key modules in the main interview, and for the nurse visit. We focus on the main group of respondents – core members – who form the basis of this report.

Main interview

Survey response and quality of fieldwork were carefully monitored throughout the study period. Ultimately, the ELSA wave 2 fieldwork produced 9,432 productive interviews. The number of interviews conducted is given in Table 12.1, broken down by sample type. This report focuses on the 8,780 core member respondents, which includes 39 partially completed interviews and 92 responses given by a proxy informant, and excludes partners.

Table 12.1. Respondents, by sample type

Sample type	Number of respondents^a
Core member	8,780
Core partner ^b	57
Younger partner	501
New partner	94
<i>Unweighted N</i>	<i>9,432</i>

^aExcluded from this and all other tables in this report is one additional core member respondent (a woman aged 85 or over) whose data are in the process of being recovered.

^bCore partners are individuals sampled as core members in wave 1 but who did not respond in wave 1 and so were only interviewed by virtue of their being the partner of a core member.

Contact, co-operation and response rates are measures often used to evaluate the quality of fieldwork. A summary of the rates is presented here (for full details see the wave 2 Technical Report, which can be accessed via the ELSA website (<http://www.ifs.org.uk/elsa>)).

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, a household contact rate of 97% was achieved and an individual co-operation rate of 84%.¹ The response rate in wave 2 for core members was 82%.²

¹Contact 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.

²The response rate is defined as ‘total individual respondents to wave 2 divided by total individuals eligible for wave 2’. The base includes those who were assumed eligible in the absence of information to the contrary. Previously, the household level response rate was presented because the majority of the non-responses at wave 1 occurred at the household level.

Table 12.2. Reasons for non-response for core members

Reason for non-response	Frequency	%
Non-contact	49	2.5
Refusal	1,530	76.9
Moved – unable to trace	221	11.1
Other	190	9.5
<i>Unweighted N</i>	<i>1,990</i>	<i>100.0</i>

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

The reasons for non-response are given in Table 12.2. The largest component (over three-quarters) of non-response was a result of refusals. Though many people who had moved were traced from their wave 1 residence, 11% of non-responders were individuals who could not be found. This is slightly higher than wave 1, where those who had moved and could not be traced constituted 10% of issued wave 1 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 the non-response is reserved for a later section where bias is examined.

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 12.3 shows the responses at the appropriate level for the three key modules of the main questionnaire, and for the nurse visits conducted in wave 2 after the main interviews.³

Table 12.3. Response rates to key modules

Section	Total eligible	Level	Response rate %
Housing	6,246	Household	99.9
Income and assets	6,712	Financial unit	99.0
Self-completion	9,307	Individual	89.8
Nurse visit	8,688	Individual	88.2

The response rate for the housing, income and assets modules was very high and similar to the rates achieved in wave 1. Response rates for the self-completion module (again similar to wave 1) and nurse visit were good in survey terms. Further information about weighting to address non-response to the nurse visit, to the self-completion module and the blood sample collection is given in Section 12.5 below. In addition, non-response to specific items in

While this is still the case for wave 2, it has been omitted because it is most informative to present the response findings at the intended level of analysis (individual level).

³A household or financial unit or individual was classified as ‘responding’ if data were available for the nominated unit and key questions were asked of all respondents within the module. For the nurse visit, response was defined by the outcome assigned during fieldwork by the nurse conducting the visit.

the interview, including economic variables, was very low, as it had been in wave 1. Further information is provided in the technical reports.

Profile of main interview respondents

The profile of core member respondents is presented in Table 12.4. 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 sub-groups. Tables 12.5 and 12.6 split the sample into sub-groups commonly used in the report. Table 12.5 shows no significant differences between men of different ages although it looks as though a higher percentage of men aged 50–59 years responded. Women aged 75 years or over are significantly less likely to respond than women aged 60–74 years (at 5% significance level).

Table 12.4. Achieved sample of core members, by age and sex

Age in wave 2	Men	Women	Total	Men	Women	Total
				%	%	%
52–54	347	397	744	9	8	8
55–59	851	1,002	1,853	22	21	21
60–64	667	810	1,477	17	17	17
65–69	659	738	1,397	17	15	16
70–74	566	646	1,212	14	13	14
75–79	431	546	977	11	11	11
80–84	274	423	697	7	9	8
85+	155	268	423	4	6	5
<i>Unweighted N</i>	<i>3,950</i>	<i>4,830</i>	<i>8,780</i>	<i>100</i>	<i>100</i>	<i>100</i>

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

Table 12.5. Wave 2 main interview response for core members, by age and sex at wave 1

		50–59	60–74	75+	Total
		%	%	%	%
Men	Respondents	82.1	80.6	80.9	81.3
	Non-respondents	17.9	19.4	19.1	18.7
	<i>Unweighted N</i>	<i>1,958</i>	<i>2,144</i>	<i>759</i>	<i>4,861</i>
Women	Respondents	81.7	82.8	79.6	81.7
	Non-respondents	18.3	17.2	20.4	18.3
	<i>Unweighted N</i>	<i>2,299</i>	<i>2,470</i>	<i>1,140</i>	<i>5,909</i>

Note: Wave 1 age at issuing (not at interview).

Table 12.6. Wave 2 main interview response for core members, by wealth quintile at wave 1

	Poorest	2 nd	3 rd	4 th	Richest	All
	%	%	%	%	%	%
Respondents	76.6	78.8	83.7	83.5	84.7	81.6
Non-respondents	23.4	21.2	16.3	16.5	15.3	18.4
<i>Total</i>	<i>2,024</i>	<i>2,102</i>	<i>2,158</i>	<i>2,168</i>	<i>2,220</i>	<i>10,672</i>

Note: All core members (excluding those with a non-responding spouse).

Table 12.6 shows response increasing from the lowest quintile to the highest. Core members in the lowest two quintiles are significantly less likely to respond than core members from other quintiles.

Nurse visit response and profile

In total, 7,666 nurse visits were completed. ELSA core members were eligible for the nurse visit if they had completed an ELSA wave 2 main interview in person (and not by proxy). Of the 8,688 core sample members who did so, nearly nine-in-ten went on to complete a nurse visit. As a percentage of all ELSA core members who were eligible for a wave 2 main interview (10,770), this constitutes a yield of 71%. The age-sex profile of nurse visit respondents is shown in Table 12.7.

Table 12.7. Achieved nurse visits with core members, by age and sex

Age in wave 2	Men	Women	Total	Men	Women	Total
				%	%	%
52–54	310	354	664	9	8	9
55–59	752	906	1,658	22	21	22
60–64	578	710	1,288	17	17	17
65–69	596	677	1,273	17	16	17
70–74	501	555	1,056	15	13	14
75–79	362	452	814	10	11	11
80–84	233	351	584	7	8	8
85 and over	119	210	329	3	5	4
<i>Unweighted N</i>	<i>3,451</i>	<i>4,215</i>	<i>7,666</i>	<i>100</i>	<i>100</i>	<i>100</i>

Table 12.8. Achieved nurse visits as a proportion of wave 2 interviews, by age

Age in wave 2	Productive wave 2 interview	Productive wave 2 nurse visit	% of wave 2 interviews resulting in a nurse visit
52–54	741	664	90
55–59	1,843	1,658	90
60–64	1,468	1,288	88
65–69	1,392	1,273	91
70–74	1,199	1,056	88
75–79	964	814	84
80–84	688	584	85
85 and over	393	329	84
<i>Unweighted N</i>	<i>8,688</i>	<i>7,666</i>	<i>88</i>

Note: Productive interview count includes full and partial interviews only.

Although overall 88% of those who were eligible for a nurse visit responded, the response varied according to the age of the respondents. This is shown in Table 12.8 and ranges from 90% (among the youngest ELSA core sample members who were in their 50s) to approximately 84% (among the oldest ELSA core sample members who were aged 75 and over).

People gave a number of reasons for not taking part in the nurse visit, but the most common was refusal (see Table 12.9). A minority who did agree to take part could not be contacted by the nurse. This may reflect some people's circumstances, but in other cases this could be interpreted as hidden refusal,

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despite the fact that consent had been given to be visited by the nurse at the end of the main interview. Other reasons for non-response include being too ill or away at the time.

Tables 12.10 and 12.11 present an alternative way of looking at differences in response by sub-groups, in a similar fashion to the earlier section looking at main interview response. Table 12.10 shows that those aged 75 and over are significantly less likely to have completed the nurse visit than core members of other ages, regardless of gender (significant at 1% level). In addition, there are significant differences between women in each age group, where the youngest are most likely to respond (significant at 5% level).

Table 12.11 shows response increasing from the lowest quintile to the highest. The differences between the first and second quintiles, the second and third quintiles, and the fourth and fifth quintiles are significant (at 5% level).

Table 12.9. Reasons for non-response to nurse visit for core members

Reason for non-response	Frequency	%
Non-contact	89	8.7
Refusal	801	78.4
Other	132	12.9
<i>Unweighted N</i>	<i>1,022</i>	<i>100.0</i>

Notes: Core members who responded to wave 2 interview, but had no nurse visit.

Table 12.10. Wave 2 nurse response, by age and sex at wave 1

		50–59	60–74	75+	Total
		%	%	%	%
Men	Respondents	89.2	88.9	84.9	88.4
	Non-respondents	10.8	11.1	15.1	11.6
	<i>Total</i>	<i>1,521</i>	<i>1,749</i>	<i>636</i>	<i>3,906</i>
Women	Respondents	90.1	87.9	84.0	87.9
	Non-respondents	9.9	12.1	16.0	12.1
	<i>Total</i>	<i>1,796</i>	<i>2,071</i>	<i>915</i>	<i>4,782</i>

Note: All core members with wave 2 interview.

Table 12.11. Wave 2 nurse response, by wealth quintile and sex at wave 1

	Poorest	2 nd	3 rd	4 th	Richest	Total
	%	%	%	%	%	%
Respondents	82.6	87.2	89.9	88.9	90.9	88.1
Non-respondents	17.4	12.8	10.1	11.1	9.1	11.9
<i>Total</i>	<i>1,527</i>	<i>1,633</i>	<i>1,789</i>	<i>1,798</i>	<i>1,866</i>	<i>8,613</i>

Note: All core members with wave 2 interview (excluding those with a non-responding spouse).

12.5 Implications for analyses: weighting

This section considers the implications for using the data and describes the weighting strategy recommended for use in this report to account for non-response. Reflections on the main interview are presented first, followed by

other elements of the study: the self-completion module, nurse visit and blood sample.

Main interview

An analysis of the non-respondents helps to identify the potential for bias in the respondent sample. For those individuals eligible for the main interview in wave 2, response was modelled on a full range of household and individual level information collected from both HSE and ELSA wave 1. Note that the analysis was conducted using the main interview weight of wave 1 to ensure that the wave 2 weight did not replicate the wave 1 weight.

The results showed significant differences between respondents and non-respondents on a number of characteristics. The non-responders in wave 2 were more likely than responders to have the following characteristics:

- not interviewed at HSE
- limiting long-standing illness recorded at HSE
- head of household at HSE in the lower supervisory and technical, semi-routine or other social classes
- living in London during wave 1
- sampled from HSE 1999 (rather than 1998 or 2001)
- non-white ethnicity
- renting or other 'non-owning' category compared with owner-occupiers in wave 1 (recorded in wave 1, or HSE if missing in wave 1)
- marital status of single (never married) or married (first and only marriage) at wave 1
- CSE/other or no educational qualifications compared with those with a degree or equivalent in wave 1 (recorded in wave 1, or HSE if missing in wave 1)
- were not current smokers in HSE
- women aged 85 years or over in wave 1

Differences in the age-sex distribution of wave 1 and wave 2 achieved samples of core members can be seen in Table 12.12.⁴ Women aged 85 and over in wave 1 were particularly likely to be lost from the sample. Hence, although the profiles are relatively similar, the analysis above suggests that the reduction in the sample between waves 1 and 2 cannot be ignored.

The main aim of the weighting strategy in wave 1 was 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 wave 1. Its aim was then, more generally, to ensure that the respondent sample was representative of the population.

⁴This analysis was performed on data weighted by the wave 1 weight.

Table 12.12. Weighted comparison of wave 1 and wave 2 achieved samples of core members, by age and sex

Age at wave 1	wave 1 Men	wave 1 Women	wave 1 Total	wave 2 Men	wave 2 Women	wave 2 Total
	%	%	%	%	%	%
50–54	23	20	22	25	21	23
55–59	18	16	17	19	17	18
60–64	15	14	15	16	15	15
65–69	14	13	13	14	13	14
70–74	12	12	12	11	12	12
75–79	9	11	10	8	11	10
80–84	5	7	6	4	7	6
85+	3	6	5	2	4	3
<i>Weighted N</i>	<i>5,281</i>	<i>6,111</i>	<i>11,392</i>	<i>4,030</i>	<i>4,707</i>	<i>8,737</i>
<i>Unweighted N</i>	<i>5,187</i>	<i>6,205</i>	<i>11,392</i>	<i>3,950</i>	<i>4,830</i>	<i>8,780</i>

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

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 2 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 sub-groups with lower response rates. The second step was a (post-stratification) adjustment to ensure that the respondent age-sex distribution matched the Census 2001 non-institutionalised distribution.

The wave 2 weighting strategy was similarly aimed at reducing any bias arising from sample loss after wave 1. For those individuals who were eligible for interview at wave 2, a response or 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 above).

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

Nurse visit and other modules

Further weights have been created to adjust for non-response to the nurse visit stage and the refusal to give a blood sample. Such weighting mirrors the non-response weighting introduced to the HSE from 2003 onwards (Sproston and Primates, 2004). The weights were built up in stages. The nurse visit weight, therefore, contains a correction for both non-response to the main interview and the subsequent nurse visit. Similarly, the blood sample weight contains a correction for non-response to the main interview, the nurse visit and the blood sample collection. A further weight is anticipated to analyse the self-

completion questionnaires, to allow for additional non-response at this stage of the survey, but was not used in this report.

12.6 Response across the waves

So far, this chapter has examined the response in wave 2 of the study based on those who were eligible to take part in wave 2. 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. Unfortunately, there is no single definition of longitudinal response that is applicable in all circumstances. As a result, a number of representations are put forward here and summarised in Table 12.13. Greater detail is provided in the ELSA technical reports. We focus here on core members' 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, slightly more than eight-in-ten responded (measure A in Table 12.13). 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 are excluded.

At the other end of the spectrum, we can account for all losses of living 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 2 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. For the time being, we set aside these limitations. In order to calculate a rate of this kind we needed to make several practical adjustments to the response rates that had previously been reported for the HSE and wave 1 as individual surveys. First, we re-estimated the HSE response as 71% to take account of the fact that the ELSA sample was drawn from three separate HSE years and to correct for the observation that those aged 50 and over had a higher response rate than adults in general. Second, we adjusted the wave 1 field response rate (from 67 to 61%) to take account of individuals *not issued* for wave 1 because no-one in their household agreed to be re-contacted, or because they responded negatively to an advance letter before wave 1 interviewing began. Working on the basis of an estimated 71% response at wave 0, 61% at wave 1 and 82% at wave 2, we calculated a cumulative longitudinal response rate of 35% (measure D in Table 12.13).

Neither of these two extremes – the 82% based on eligibility and the 35% based on the original sampling frame – gives a true measure of longitudinal response when taken alone. The first takes no account of losses before the baseline survey and the second takes no account of the many individuals who did not have a chance to take part in the study.

Table 12.13. Components of longitudinal response rates for core members

Response rate measure	Single wave 0	Single wave 1	Single wave 2	Total
	%	%	%	%
A	n/a	n/a	81.5	81.5
B	95.8	67.1	81.5	52.4
C	93.6	61.1	81.5	46.6
D	71.1	61.1	81.5	35.4

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 are now known to have died beforehand, then they will be classified as ineligible. The single wave response rate for wave 2 uses a denominator of all individuals eligible for wave 2 (responded in wave 1, and met eligibility criteria set out in Section 12.1).

The response rate for wave 1 for measure B is the fieldwork rate, which restricts the denominator to those issued (i.e. excludes non-co-operating households at wave 0 and individuals in cooperating households at 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 for wave 0 was calculated using different denominators for each longitudinal rate. Measure B uses all those aged 50 years old or over in co-operating households at wave 0 where at least one had agreed to be re-contacted beyond wave 0; measure C uses all those aged 50 or over in co-operating households at wave 0; and 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 sub-group of interest.

The wave 1 Technical Report contains further details about waves 0 and 1 response rate calculations.

Two interim measures may provide more realistic summaries of response over time. The first removes the households for whom age information was never collected (non-cooperating households in wave 0) and suggests a response rate of 47% (measure C). The second goes further and also removes the households which did not include an age-eligible resident who agreed to be re-contacted. Reducing the sub-group of interest in this way to reflect these exclusions results in an overall response rate of 52% (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, and all four will be reported in future waves of the study.

Ultimately, the choice of response rate depends 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. The non-response model used in the weighting is based on measure C, that is, it tries to account for losses from wave 0 co-operating households onwards. However, the weighting also then adjusts for earlier losses at wave 0 (non-co-operating households) as much as is possible with the available information through post-stratification using calibration methods. Therefore the weighting strives to account for all losses (equivalent to the most pessimistic response rate, measure D).

12.7 Conclusions

The ELSA has gone from strength to strength. Wave 2 has seen the introduction of several methodological developments and adaptations to the questionnaire in order to reflect the long-term aims of the project. The level of response in wave 2 (81%) is now high and we hope it will remain stable. We acknowledge and appreciate the 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.

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