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Financial circumstances, health and well-being of the older population in England: The 2008 English Longitudinal Study of Ageing Technical Report

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1 Introduction

This technical report provides methodological information relating to the fourth wave of the English Longitudinal Study of Ageing (ELSA) in 2008-09. The report aims to provide an overview of the sampling design, study content, fieldwork response, and weighting procedures adopted at wave 4. Reference is also made to earlier waves of the study to provide context for the reader and to highlight key changes made to the study over time. The technical reports for each wave of ELSA should be used in conjunction with other extensive materials deposited at the UK Data Archive¹ and the Economic and Social Data Service²³.

The design and collection of data for the ELSA study has been developed through a collaboration between the following institutions:

- Department of Epidemiology and Public Health, University College London
- Institute of Fiscal Studies
- National Centre for Social Research
- School of Social Sciences, University of Manchester
- Department of Psychiatry, University of Cambridge

Funding for the first four waves of ELSA was provided by the US Institute on Aging (NIA) and a consortium of British Government departments⁴. Ethical approval for the study was granted by the Multi-centre Research and Ethics Committee (MREC).

ELSA aims to better understand the social and economic conditions, and health and well-being of older people. Data from all waves of ELSA are available as public use datasets from the UK Data Archive. ELSA data has been used to explore the dynamics of ageing, to inform policy debates and for comparative analysis with the Health and Retirement Study (HRS) in the United States, and the Survey of Health and Retirement in Europe (SHARE). Findings from each wave of ELSA are presented in substantive reports (Marmot et al. 2003, Banks et al. 2006, Banks et al. 2008, Banks et al. 2010). Further analyses and publications are listed on the ELSA website (www.ifs.org.uk/elsa).

The next chapter of this technical report (Chapter 2) provides a broad overview of the ELSA study. The sample design adopted at each wave is covered in Chapter 3, and the content and structure of the wave 4 interview and nurse visit are given in

¹ <http://www.data-archive.ac.uk/>, study number 5050

² <http://www.esds.ac.uk/longitudinal/access/elsa/5050.asp>

³ A User Guide is also available for each wave which shows how to analyse the data and provides further information about weights.

⁴ Department for Education and Skills, Department of Environment, Food and Rural Affairs, Department for Work and Pensions, HM Treasury, HMRC (formerly Inland Revenue), Department for Communities and Local Government and Office for National Statistics.

Chapters 4 and 5 respectively. Information on the wave 4 fieldwork procedures are outlined in Chapter 6, and the wave 4 response rates are presented in Chapter 7. Chapter 8 describes the derivation of the longitudinal and cross-sectional weights for use with the wave 4 core dataset. Figures shown in this report are based on the most up-to-date available data and so may differ slightly from those presented in the methodology chapter of the wave 4 substantive report (Banks et al. 2010) .

2 Overview Of ELSA

This chapter aims to give a broad overview of the ELSA study design and provide some historical context for readers. It outlines the sampling design used for each Cohort (Section 2.1), the survey instruments included at each wave (Section 2.2), and presents a summary of response rates across the waves (Section 2.3).

2.1 ELSA Sample Design

The ELSA sample was designed to be representative of people aged 50 and over living in private households in England. The original cohort at wave 1 (persons born on or before 29th February 1952) were selected from households who had previously responded to the Health Survey for England (HSE) in 1998, 1999, and 2001⁵. The ELSA wave 1 interview took place in 2002-03, providing the baseline for the study. Age-eligible sample members who responded at wave 1 were renamed Cohort 1 ‘core members’ to distinguish them as the core element of the continuing ELSA sample. Interviews with core members and their partners were attempted every two years following wave 1 (wave 2 in 2004-05, wave 3 in 2006-07, wave 4 in 2008-09).

To ensure the ELSA study remained representative of the target population, two new cohorts were subsequently added.

- At wave 3, a ‘refreshment’ cohort of people just entering their 50s (born between the 1st March 1952 and the 29th February 1956) was introduced (henceforth referred to as Cohort 3). At the time of wave 3, the youngest core members from Cohort 1 were now aged 54, so Cohort 3 was introduced to ensure the study still covered the very youngest age range (those aged 50-54). The sample used to form Cohort 3 was selected from four survey years of the HSE (2001 to 2004).
- At wave 4, a cohort of people aged 50-74 (born between 1 March 1933 and 28 February 1958) was introduced (henceforth referred to as Cohort 4). The sample used to form Cohort 4 was selected from HSE 2006. There is some overlap between Cohort 4 and the other two cohorts in terms of age, but each cohort is still viewed as a distinct group recruited from different years of HSE and introduced to ELSA at different times. Cohort 4 comprises a “top-up” of people aged 52-74, and a refreshment sample of people aged 50-51.

Age-eligible sample members interviewed from each new cohort, were also renamed as “core members”⁶. Partners of core members from each cohort were also eligible

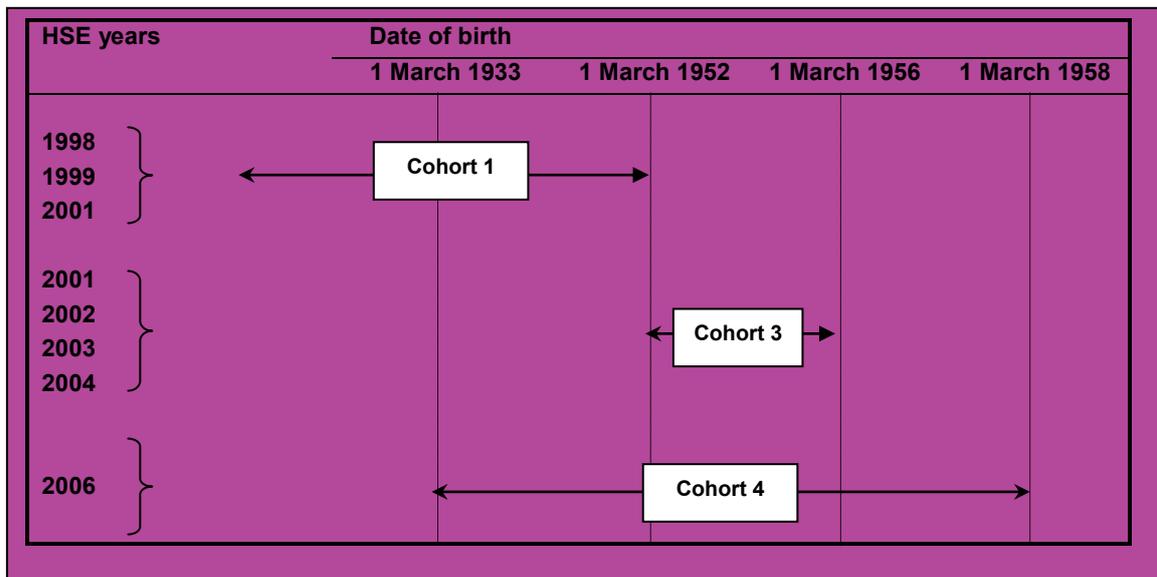
⁵ HSE 2000 was used to select a sample of individuals for questionnaire testing and piloting

⁶ The terms “Cohort 3” and “Cohort 4” were chosen to reflect the wave in which the new sample was added. There is no “Cohort 2” in ELSA because no new sample was issued at wave 2.

for interview, but the main focus for ELSA analysis is on core members as they represent the population of interest.

A summary of the ELSA sample design is shown in Figure 2.1. Cohorts 1 and 3 overlap as a number of Cohort 1 younger partners (sampled from HSE 2001) were now aged over 50 in wave 3 and were reclassified as Cohort 3 core members if successfully interviewed at wave 3. More detail on the sample selection procedure for each cohort is given in Chapter 3.

Figure 2.1 ELSA sample design



2.2 Survey instruments

This section provides an overview of the survey instruments used in ELSA, namely: the core interview, nurse visit, end of life interview, and telephone interview⁷. The remaining chapters of this report relate only to the main interview (see Chapter 4) and nurse visit (see Chapter 5).

Main interview

The core ELSA questionnaire was administered at each wave by Computer Assisted Personal Interviewing (CAPI) in the participants' home. A paper self-completion questionnaire was also given to respondents to complete at the end of their CAPI interview.

⁷ A separate Life History interview was conducted at the previous wave (wave 3) and information relating to this can be found in the Life History interview user guide (Ward et al, 2009)

As in previous waves, the topic areas covered in wave 4 were: individual and household characteristics; physical, cognitive, mental and psychological health; social participation and social support; housing and consumption, work, pensions, income and assets; expectations for the future, and effort and reward. In addition, an objective measure of health and functioning was collected by means of a timed walk. A shorter interview was attempted with a proxy informant if the core member was unable to respond because of physical or mental ill health, or cognitive impairment. Another version of the main core interview was also used for sample members who had moved into an institution (such as a residential or nursing home).

Some new topics at wave 4 included:

- Sleep
- Women’s health (e.g. menstruation, menopause)
- NHS or private funding for operations (e.g. cataracts, joint replacements)
- State pension deferral
- Informal care (questions from General Household Survey)

Table 2.1 shows the number of respondents at each wave of ELSA. This includes those who had a proxy or partial interview or those who had been interviewed in an institution⁸. At wave 4, a total of 11,050 interviews were conducted. Of these, 9,886 were with core members (6,623 Cohort 1; 972 Cohort 3; 2,291 Cohort 4).

Table 2.1 Number of respondents at each ELSA wave split by Cohort

ELSA Wave	Number of completed interviews				Total
	Cohort 1 core members	Cohort 3 core members	Cohort 4 core members	Partners	
	(n)	(n)	(n)	(n)	(n)
Wave 1	11,391	N/A	N/A	708	12,099
Wave 2	8,781	N/A	N/A	652	9,433
Wave 3	7,535	1,275 ⁹	N/A	960	9,770
Wave 4	6,623	972	2,291	1,164	11,050

Nurse visit

Like wave 2, core members interviewed at wave 4 were visited by a trained nurse to conduct a series of biomedical and physical performance measures, including the taking of blood samples. The same nurse measures were also included at wave 2;

⁸ Institutional interviews were introduced at wave 2 for those who move out of the private residential sector after the baseline wave

⁹ Includes 104 Cohort 1 young partners (from HSE 2001) who changed status in 2006-07 to become Cohort 3 core members.

blood pressure, grip strength, blood samples, standing and sitting height, weight, waist and hip measurement, lung function, balance, leg raises, chair rises and saliva samples to measure levels of cortisol. Partners of cohort members were not eligible for the nurse visit.¹⁰ Table 2.2 shows the number of nurse visits conducted at wave 2 and wave 4.

Table 2.2 Number of nurse visits split by cohort				
ELSA Wave	Number of nurse visits			Total
	Cohort 1 core members	Cohort 3 core members	Cohort 4 core members	
	(n)	(n)	(n)	
Wave 2	7,666	N/A	N/A	7,666
Wave 4	5,616	744	1,850	8,210

End of Life Interview

An “End-of-Life” CAPI interview is carried out for core members who die (and who have not asked to withdraw from the study). Interviewers approach a partner, close friend or relative of the deceased core member to invite them to participate. This approach was successfully adopted by the HRS in the United States, and the content of the HRS interview was revised for use in ELSA.

The End-of-Life interview aims to bring closure to the information already collected from the core member. It can be used to detect possible changes to their health, social, and financial circumstances since their last interview, and to determine what happened to their assets after they died.

The End-of-Life questionnaire covers the following:

- Health of deceased in year preceding death (physical and mental)
- Care and support needed in 3 months preceding death
- Memory and mood of person in last year preceding death
- Problem behaviour (e.g. aggression)
- Financial questions – private health care, funeral expenses, inheritance – houses, businesses, other assets.

Table 2.3 below summarises the number of End-of-Life interviews achieved at waves 2, 3, and 4.

¹⁰ Partners who requested a nurse visit at wave 4 were accepted, however their data will not be used by the study.

Table 2.3 Number of End-of-Life interviews

	Survey
ELSA Wave	Total (n)
Wave 2	133
Wave 3	386
Wave 4	244

The data from the End-of-Life interviews will be archived with the other ELSA datasets. It is important to note that the increase in End of Life interviews at wave 3 was a reflection of improved procedures to identify and trace potential 'End of Life' respondents, rather than due to an increased number of deaths.

Telephone Interview

A short telephone interview was included at waves 3 and 4 for some core members who had refused to be interviewed at previous waves. The content of the telephone interview remained the same at both waves.

The telephone interview was short and collected only a small amount of information (taking about 10 minutes to complete), but it was an important addition to the ELSA strategy for retaining respondents. Overall, it had three main purposes:

- To ascertain why people refuse to continue participating in ELSA;
- To give an indication of how to most effectively encourage people to come back to ELSA in the future
- To know more about people who do not take part, so as to work out if their omission is biasing ELSA results in any way.

There were ten straightforward questions which related to health, work and benefits, marital status, and accommodation. Most of the questions were taken directly from the main face-to-face interview, and were chosen because they were quick and simple and covered the key areas of interest. There was a respondent incentive for completing the telephone interview, and no proxy interviews were accepted.

A total of 804 telephone interviews were conducted at wave 3 and this increased to 1,077 at wave 4.

2.3 Response rates across the waves

This section includes a summary of **field** and **study** response rates at each wave. The field response rates are based on core members issued at the start of fieldwork. The study response rates include all core members that were theoretically eligible for the study (i.e. not known to have died, moved out of Britain or into a care home/institution). Not all those who are eligible for the study response rates are issued to field, as some for example, were permanent refusers or had remained untraced over a number of waves.

For all response rate measures, respondents were defined as those who gave a full or partial interview at a private residential address either in person or by proxy. Those living in care homes/institutions have been excluded from all response rates as they do not belong to the target population.

Chapter 7 has a more detailed analysis of wave 4 response rates for core members in each of the three cohorts.

2.3.1 Field response rates

Field response rates are often used to evaluate the quality of fieldwork practices. The two main field response rates published to date for ELSA have been the fieldwork household contact rate and the fieldwork cooperation rate (see Table 2.4 below).

The household contact rate is calculated by dividing the number of households where the interviewer made contact with at least one member of the sample by the number of eligible households found during fieldwork (issued plus newly formed households).

The co-operation rate is calculated by dividing the number of achieved individual interviews by the number of eligible individuals contacted by interviewers.

Table 2.4 Fieldwork response rates by wave ¹¹					
Type of field response rate		Response rates			
		Wave 1	Wave 2	Wave 3	Wave 4
		%	%	%	%
Household contact rate	Cohort 1	95	97	97	97
	Cohort 3	N/A	N/A	83	97
	Cohort 4	N/A	N/A	N/A	92
Fieldwork cooperation rate	Cohort 1	70	84	83	77
	Cohort 3	N/A	N/A	74	81
	Cohort 4	N/A	N/A	N/A	69

2.3.2 Study rates

Various conditional response rates can be used to show how effective ELSA has been at maintaining its original sample. Table 2.5 shows the proportion of age-eligible sample members with an HSE interview who went on to take part in ELSA within each cohort. Table 2.6 shows the proportion of Cohort 1 core members who have taken part at each wave since wave 1. Table 2.7 shows the proportion of Cohort 1 core members who have completed an interview at all waves of ELSA.

Cross-sectional response rates conditional upon wave 0 response

For each of the ELSA cohorts, potential age-eligible sample members were selected from households that had previously participated at HSE (also known as ELSA wave 0). A cross-sectional rate conditional on wave 0 response can be used to show what proportion of eligible sample members with an HSE interview took part in ELSA the first time they were approached as a potential core member.

¹¹ 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.

Table 2.5 Cross-sectional response rates conditional on wave 0 response					
Cohort	Notation	Meaning	Numerator	Denominator	Rate
Cross-sectional conditional rates					
Cohort 1	RR _{1 0}	The (cross-sectional) W1 response rate conditional upon W0 response	Responding in W1	Eligible in W1 & respondent in W0	65%
Cohort 3	RR _{3 0}	The (cross-sectional) W3 response rate conditional upon W0 response	Responding in W3	Eligible in W3 & respondent in W0	56%
Cohort 4	RR _{4 0}	The (cross-sectional) W4 response rate conditional upon W0 response	Responding in W4	Eligible in W4 & respondent in W0	65%

Cohort 1 - Cross-sectional response rates conditional upon wave 1 response

Cohort 1 core members have been part of the ELSA study since 2002 (wave 1). Of interest is to see how effective the study has been at maintaining this original panel of core members over time. Table 2.6 presents cross-sectional response rates at each wave for Cohort 1 core members conditional upon wave 1 response.

Table 2.6 Cross-sectional response rates conditional upon wave 1 response					
Calculated at wave	Notation	Meaning	Numerator	Denominator	Rate
Cross-sectional conditional rates (Cohort 1)					
Wave 2	RR _{2 1}	The (cross-sectional) W2 response rate conditional upon W1 response	Responding in W2	Eligible in W2 & respondent in W1	82%
Wave 3	RR _{3 1}	The (cross-sectional) W3 response rate conditional upon W1 response	Responding in W3	Eligible in W3 & respondent in W1	74%
Wave 4	RR _{4 1}	The (cross-sectional) W4 response rate conditional upon W1 response	Responding in W4	Eligible in W4 & respondent in W1	69%

Cohort 1 - Longitudinal conditional response rates

Table 2.7 presents longitudinal conditional response rates at each wave for Cohort 1 core members. They show the proportion of remaining *eligible* wave 1 core members who gave an interview in every wave up to and including the current wave.

Table 2.7 Longitudinal conditional response rates					
Calculated at wave	Notation	Meaning	Numerator	Denominator	Rate
Longitudinal conditional rates					
2 ¹²	RR _{2 1}	The (longitudinal) conditional W2 response rate	Responding in W2	Eligible in W2 & respondent in W1	82%
3	RR _{3,2 1}	The (longitudinal) conditional W3 response rate	Responding in W2 & W3	Eligible in W1, W2 & W3 & respondent in W1	71%
4	RR _{4,3,2 1}	The (longitudinal) conditional W4 response rate	Responding in W2 & W3 & W4	Eligible in W1, W2, W3 & W4 & respondent in W1	63%

¹² This rate is equivalent to the cross-sectional W2 response rate conditional upon W1 response

3 Sample Design

The ELSA wave 1 sample (Cohort 1) was designed to represent people aged 50 and over (persons born on or before 29th February 1952) and their partners, living in private residential addresses in England. The wave 1 sample was selected from households that had previously responded to the Health Survey for England (HSE) in 1998, 1999 and 2001. To ensure the study remained representative of those aged 50 and over, new cohorts were added at wave 3 (Cohort 3), and at wave 4 (Cohort 4). The Cohort 3 sample was selected from the HSE 2001-2004 survey years, and the Cohort 4 sample was selected from HSE 2006. There is some overlap between Cohort 4 and the other two cohorts in terms of the age of their sample members. However, the study views each cohort as a distinct group because they were recruited from different years of HSE and were introduced to ELSA at different times.

This chapter provides background information about the use of HSE as a sampling frame for ELSA (Section 3.1). The sampling and eligibility criteria relating to each Cohort is discussed in separate sections of this chapter (Section 3.2 for Cohort 1, Section 3.3 for Cohort 3, and Section 3.4 for Cohort 4).

3.1 Health Survey for England as a sampling frame

The HSE is an annual cross-sectional household survey that collects a wide range of health data and biometric measures. Each of the main HSE samples is designed to be representative of the English population living in private residential addresses.¹³ Interviewing for HSE is continuous and the sample is issued to interviewers evenly throughout the year. The HSE response rates for households and individuals are presented by survey year in Table 3.1 (HSE years used as a sampling frame for ELSA are shown by grey shading).

Response rate	HSE year								
	1998	1999	2000	2001	2002	2003	2004	2005	2006
	%	%	%	%	%	%	%	%	%
Co-operating households	74	76	75	74	76	73	72	74	68
Individual response	69	70	68	67	67	66	66	64	61

Note: Households described as 'co-operating' are those where at least one eligible person was interviewed.

¹³ People living in institutions, who are likely to be older and, on average, in poorer health than those in private residential addresses are not covered by the HSE.

Household response rates ranged from 76% in 1999 and 2002 to 68% in 2006; individual response rates from 70% in 1999 to 61% in 2006. Further details about the HSE are available from its Technical Reports (Erens and Primatesta, 1999; Erens, Primatesta and Prior, 2001; Prior et al., 2003; Sproston and Primatesta, 2003; Sproston and Primatesta, 2004; Sproston and Mindell, 2006; Craig and Mindell, 2008).

Around 16,000 adult respondents are typically included each year in the HSE, almost 90 per cent of whom agree to a follow-up visit by a nurse. Different annual rounds of the survey focus on different health outcomes (e.g. cardiovascular disease in 2003 and 2006) or on different subgroups of the population (e.g. ethnic minorities in 1999 and 2004, those living in institutions in 2000, and people aged 65 and over living in private residential addresses in 2005).

3.2 ELSA Cohort 1

This section describes the sampling and eligibility criteria for ELSA wave 1 (Cohort 1). Age-eligible sample members were followed up from HSE 1998, 1999 and 2001. HSE 1998 and 2001 had a single general population ('core') sample that was nationally representative. The HSE 1999 sample design had two components: a 'core' sample that was nationally representative and a boost sample that represented ethnic minorities. The ethnic minority boost sample was discarded since there was insufficient resource to include a sufficient sample to boost the representation of minority ethnic groups in ELSA.

3.2.1 Eligibility criteria at wave 1 (Cohort 1)

HSE households were only selected for ELSA wave 1 if they included at least one individual who was age-eligible and who, according to administrative records remained alive and gave permission to be recontacted in the future. Age-eligibility meant being born on or before 29th February 1952, and living in a private household in England at the time of the HSE interview. A sample of 11,578 households was issued for interview in ELSA wave 1 and the process of selecting the wave 1 sample is summarised in the wave 1 technical report (Taylor et al. 2007). No indication was given to respondents at the time of their HSE interview that they would be approached for the ELSA study at a later date.

Eligibility in wave 1 fieldwork and identifying new partners

The sample at wave 1 reflected the household composition as recorded at the time of HSE interviewing. However, the ELSA interview was conducted between one and four years after the HSE interview took place. As a result, some changes were anticipated (e.g. relationships between individuals would change; individuals would join the household or had left to form a new household, as well as entire households

moving). There were three particular ways in which the status of an individual could change between HSE and wave 1:

- The status of the selected individuals needed to be checked during fieldwork to ascertain whether they were living in a private residential address in England at the time of the wave 1 interview. Any who had moved out of England or out of the private residential sector (e.g. into a care home or institution) were not interviewed.
- The status of young partners was also checked. Young partners were approached for interview if, at the time of the wave 1 interview, they were still living with an age-eligible sample member. Young partners identified from HSE who had split from the age-eligible sample member before the wave 1 interview were not followed up for interview.
- A further subgroup of individuals was identified during wave 1 fieldwork. New partners (C1NP1) were defined as the cohabiting spouses or partners of age-eligible sample members at the time of the first ELSA interview, of any age, who had joined the household since the HSE.

Identification of new partners during fieldwork meant that there were three types of individual who were eligible to take part in wave 1, as illustrated in Figure 3.1.

Figure 3.1 Eligibility criteria for wave 1 interview

- **Sample members (C1SM)** were individuals who were living within the household at the time of the HSE interview in 1998, 1999 and 2001, were born on or before 29 February 1952 (age-eligible) and were still living at a private residential address in England at the time of the wave 1 interview (2002-03). Those 11,391 individuals successfully interviewed in wave 1 were later renamed '**Cohort 1 core members (C1CM)**'.
- **Young partners (C1YP)** 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 and 2001, and were still cohabiting with the sample member in wave 1. Cohort 1 young partners were born after 29 February 1952.
- **New partners (C1NP1)** were the cohabiting spouses or partners of eligible sample members at the time of the first ELSA interview, of any age, who had joined the household since the HSE interview.

3.2.2 Eligibility criteria for Cohort 1 at waves 2, 3 and 4

Only households with at least one interview with a core member at wave 1 were followed up at wave 2. However, eligible core members were not *issued* in wave 2 if all wave 1 respondents in the household had explicitly asked at the end of the last interview not to be recontacted.¹⁴

Cohort 1 core members remained eligible for interview in subsequent waves unless they had since died, or had moved out of Britain. Individuals who moved out of the private residential sector (e.g. into a residential or nursing home) after their wave 1 interview were still approached for an institutional interview (developed for use at wave 2 onwards). However, it is important to note that core members in institutions or care homes are excluded from the response rate calculations because they are no longer considered to be part of the target population (see Chapter 7).

Several other categories of individuals were also eligible for an interview in each wave. These were the partners of Cohort 1 core members (core partners, younger partners, or new partners, as described in Figure 3.2).

Figure 3.2 Summary of the Eligibility criteria for Cohort 1 members at waves 2, 3 and 4

- **Core members (C1CM)** were individuals who had been living within the household at the time of the HSE interview in 1998, 1999 and 2001, were born on or before 29 February 1952 and were subsequently interviewed as part of wave 1 living in a private residential address in England. They were not eligible for follow-up interviews if they had since died, asked not to be revisited, or moved out of Britain.
- **Core partners (C1CP)** were individuals who, like core members, had been living within the household at the time of the HSE interview 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 at subsequent waves by virtue of them being the partner of a core member.
- **Young partners (C1YP)** 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 sample member in wave 1. Young partners were born after 29 February 1952. (Cohort 1 young partners sampled from HSE 2001 who took part at wave 3 changed status in wave 3 to become Cohort 3 core members; see Section 3.3). Young partners who stopped living with their core member partner were only interviewed once following the split with their core member partner.
- **New partners (C1NP1, C1NP2, C1NP3, C1NP4)** were the cohabiting spouses or partners of core members at the time of *the first, second, third or fourth 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 were only interviewed once following the split with their core member partner.

¹⁴ Respondents who explicitly asked not to be recontacted in the future were asked to rejoin the study at the next wave if someone else in the household had implicitly consented to be recontacted.

3.3 ELSA Cohort 3

In the third wave, the aim was to supplement Cohort 1 with people born between 1 March 1952 and 29 February 1956 so that the ELSA sample would, in 2006-07, still cover people aged 50 and over. The sources for the new recruits were the 2001-2004 HSE years.¹⁵ As before, individuals were eligible if they had been living in a responding HSE household and were, at the time of the ELSA 2006-07 interview, still living at a private residential address in England. Partners were also interviewed. These people formed Cohort 3.

Unfortunately, the algorithm used to select Cohort 3 from the HSE 2001-2004 years at the time of sample selection for wave 3 excluded age-eligible sample members born between 1 March 1952 and 28 February 1953. This resulted in a gap of one year's births between Cohorts 1 and 3. However, we were able to find some existing sample members who had been born within the omitted year and had been successfully interviewed in wave 3. Originally such individuals were classified at the time of sample selection as: (1) Cohort 1 young partners (sampled from HSE 2001) or (2) Cohort 3 old partners. These were reclassified as Cohort 3 core members (but were assigned a zero cross-sectional weight at wave 3). The process of selecting the Cohort 3 sample from the 2001-2004 HSE years is summarised in the wave 3 technical report (Scholes et al. 2009).

The eligibility criteria for Cohort 3 is described in Figure 3.3. From wave 4 onwards, Cohort 3 core members were no longer eligible for interview if they had died, or moved out of Great Britain. Like Cohort 1, those Cohort 3 core members who moved into a care home or institution were approached for an interview at wave 4, but have been excluded from the response rate calculations because they are no longer considered to be part of the target population (see Chapter 7).

¹⁵ Only the general population ('core') sample was used from HSE 2004.

Figure 3.3 Summary of the eligibility criteria for Cohort 3 members for the wave 4 ELSA interview (2008-09)

- **Core members (C3CM)** were individuals who were living within the household at the time of HSE (2001-04) and were born between 1 March 1952 and 29 February 1956 (age-eligible) and were subsequently interviewed as part of the wave 3 interview 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.
- **Young and old partners (C3YP/C3OP)** were individuals who, like core members, had been living within the household at the time of HSE interview (2001 to 2004) and were still cohabiting at the time of the wave 3 interview. Younger partners were born *after* 29 February 1956 and old partners *before* 1 March 1952. New or old partners who stopped living with their core member partner were only interviewed once following the split with their core member partner.
- **New partners (C3NP3, C3NP4)** were the cohabiting spouses or partners of eligible sample members at the time of the wave 3 or wave 4 interview, of any age, who had joined the household since the HSE interview.

3.4 ELSA Cohort 4

This section describes the sampling process for Cohort 4 selected from HSE 2006¹⁶ at wave 4.

The selection criteria for Cohort 4 was people born between 1 March 1933 and 29 February 1958 (minimum age 50 , maximum age 74)¹⁷. The HSE 2006 year was chosen because it had included a nurse visit with blood sample collection which would enable HSE data to be compared with the nurse visit at wave 4.

At the time of wave 4, Cohort 1 core members were aged 56 and over, and Cohort 3 core members were aged 52-56. The Cohort 4 sample therefore had two main purposes; it firstly 'refreshed' the sample by adding the youngest age group back in (age 50-51), and secondly 'topped-up' the proportion of 52-74 year olds in the study (to help with prior wave attrition). Those aged 75 and over were not selected for Cohort 4 because the increased mortality associated with this group would make it difficult to utilise the longitudinal power of the study. Selection of those aged 50-74 also meant that most would not yet have made the transition into disability and dependence (core outcomes for longitudinal analysis).

¹⁶ For HSE methodology and documentation see Craig & Mindell. 2008.

¹⁷ Although there is overlap between Cohort 4 and the other two cohorts in terms of age, we have still chosen to view Cohort 4 as a separate cohort.

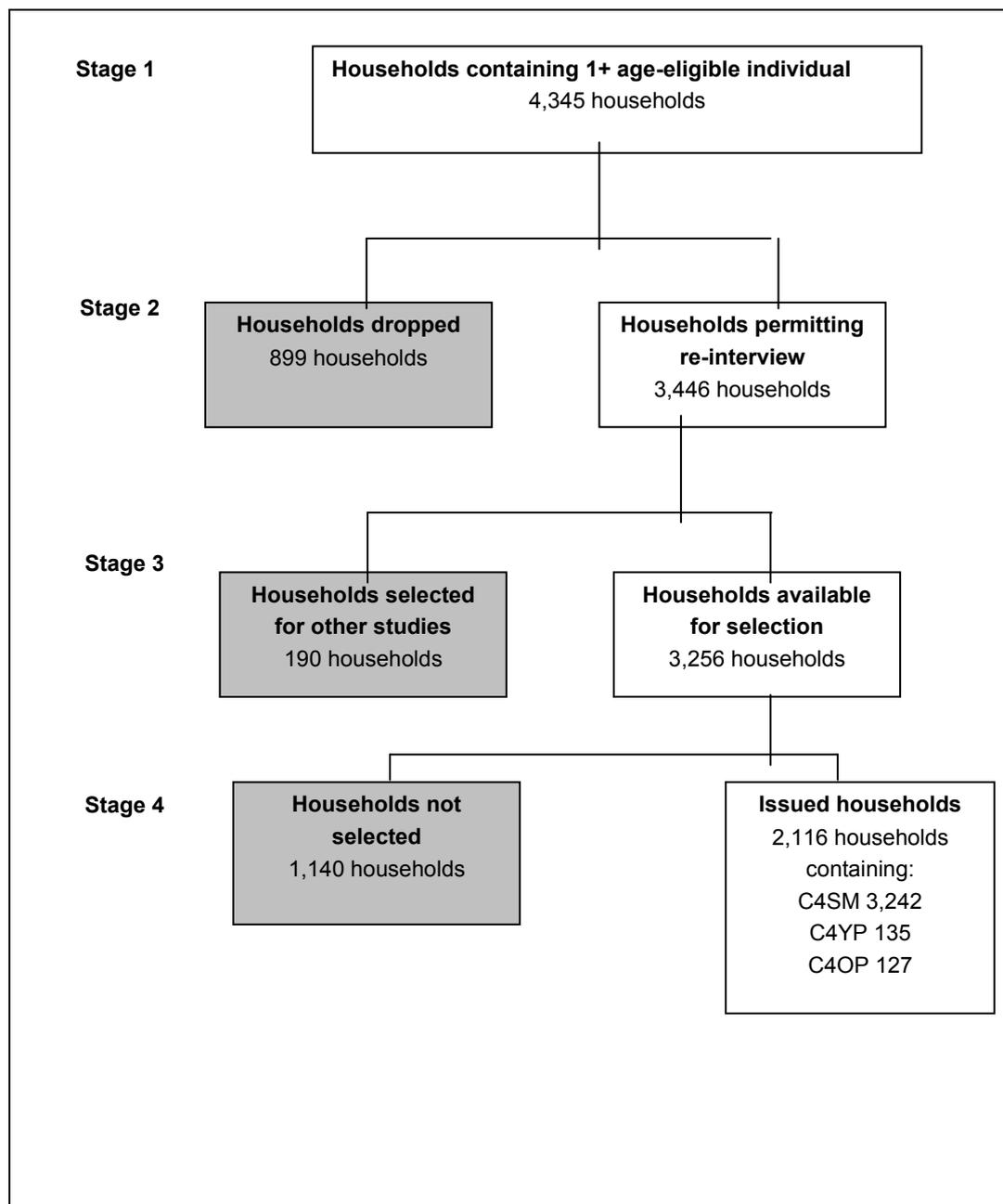
As before, people were eligible if they had been living in a responding HSE household in 2006 and were, at the time of the ELSA 2008-09 interview, still living at a private residential address in England. As for Cohorts 1 and 3, partners were also interviewed (see Figure 3.5).

Age-eligible sample members from the 2001-2004 HSE years mistakenly not issued in wave 3 (see Section 3.3) were followed up for interview in wave 4. In total, 248 were interviewed from the 492 age-eligible individuals that were issued at wave 4 instead of wave 3, and these have been treated as Cohort 4 core members.

The process of selecting the Cohort 4 sample from the 2006 HSE year (excluding the omitted cases from wave 3) is summarised below.

Figure 3.4 Cohort 4 sample definition

C4SM	Age-eligible sample member (born between 1 March 1933 and 29 February 1958) ^a
C4YP	Young partner
C4OP	Old partner



The top of Figure 3.4 shows the subset of 4,345 HSE 2006 responding households that included at least one age-eligible individual (Stage 1). Age-eligibility meant being born between 1 March 1933 and 29 February 1958.

Not all age-eligible individuals were included in the Cohort 4 sampling frame. Inclusion was conditional on at least one age-eligible individual agreeing to further contact post HSE. Sample members and young/old partners were not included in the final Cohort 4 sample if *all* HSE respondents born between 1 March 1933 and 29 February 1958 had refused, when asked, to being recontacted in the future. This is shown in Stage 2 of Figure 3.4. Using this criterion meant that 899 of the 4,345 households were removed from the final ELSA sample because no age-eligible individual had consented to recontact. Overall, 3,446 households contained at least one age-eligible individual agreeing to further contact.

The eligibility criteria for Cohort 4 is shown in Figure 3.5. For all sample types relating to Cohort 4, interviews were only conducted at households in England, and only within residential addresses. That is to say, if an individual had moved out of England or into an institution since their HSE interview, they were treated as ineligible and were not followed-up for interview at wave 4. As with the other cohorts, individuals from Cohort 4 who have now taken part in their first ELSA interview at wave 4, will remain eligible for future ELSA interviews if they later move into an institution or into Scotland or Wales.

Figure 3.5 Eligibility criteria for wave 4 interview (Cohort 4)

- **Eligible Sample members (C4SM)** were individuals who were living within the household at the time of HSE (2006) and were born between 1 March 1933 and 29 February 1958 (age-eligible). The interviewer ascertained that the individual was living in a private residential address in England at the time of the ELSA wave 4 interview. Those 2290 successfully interviewed in wave 4 were designated '**Cohort 4 core members (C4CM)**'.
- **Young and old partners (C4YP/C4OP)** were the cohabiting spouses or partners of eligible sample members, who were living within the household at the time of HSE, and were still cohabiting with the eligible sample member at the time of the wave 4 interview. Young partners were born after 29 February 1958 and old partners were born before 1 March 1933.
- **New partners (C4NP)** were the cohabiting spouses or partners of eligible sample members at the time of the wave 4 interview, of any age, who had joined the household since the original HSE interview.

4 The Main Interview

This chapter provides an overview of the structure and content of the main interview at wave 4. Section 4.1 outlines the content of each module and explains how they were administered by the interviewer. The changes made to the questionnaire at wave 4 are highlighted in Section 4.2, and variants of the main interview are discussed in Section 4.3.

4.1 ELSA questionnaire modules

As in previous waves, the wave 4 main survey comprised a computer aided personal interview (CAPI) and paper self-completion questionnaire. The ELSA wave 4 interview covered a wide range of topics (see Figure 4.1). It was similar to the questionnaire used in waves 1, 2 and 3, although every module was reviewed. Some questions were repeated exactly (e.g. to measure income and assets), some questions asked directly about change (e.g. to capture perceived changes in memory and concentration) and some were adapted to allow respondents to update or amend past responses (e.g. about work, pensions and specific health conditions). Figure 4.1 provides an overview of the content of the main ELSA interview at wave 4. For further information see Appendix A which has a breakdown of interview content by wave of the survey.

Figure 4.1 Main interview modules wave 4

Household Demographics (HD) – 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. This module also checks the eligibility for ELSA of all current household members (including New Partners).

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

Health (HE) – collection or updating of self-reported general health, chronic illness or disability; eyesight, hearing; specific diagnoses and symptoms; pain; difficulties with activities of daily living (ADLs); smoking; mental health, urinary incontinence; falls and fractures; quality of healthcare respondents received for particular health conditions.

Social Participation (SP) – covers informal care giving & volunteering, social networks and the use of public transport.

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

Income and Assets (IA) – 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. Couples decided who the respondent would be for a single financial unit, although it is suggested that the person who answered the IA module in wave 3 did so again in wave 4.

Housing (HO) – collection or updating of 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, leisure, clothing and transfers. Only one eligible ELSA respondent in the household answered the module. Respondents decided themselves who the household respondent should be, but again, it is preferable that the person who answered the HO module in wave 3 answered this module again in wave 4.

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

Expectations (EX) – measured expectations for the future in a number of dimensions; financial decision-making and relative deprivation.

Psychosocial Health (PS) – measured how the respondent viewed his or her life across a variety of dimensions.

Effort and Reward (ER) – assessed motivations behind voluntary work and caring for others; and the relationship between effort and reward.

Final questions and consents (FQ) – collection of any missing demographic information and updating of respondents' contact details, stable address, details of any proxy informants and requests permission to link to health and economic data from various administrative sources. In addition to the standard consents, consent was also collected for the nurse visit

Walking ('gait') speed test (MM) – all respondents aged 60 years and over completing the main interview on their own behalf were eligible for the walking speed test, which was performed as part of the main ELSA interview. The test involved timing how long it took to walk a distance of eight feet. Respondents began with both feet together at the beginning of the course. The interviewer started timing as soon as the respondent placed either foot down on the floor across the start line. They were asked to walk (not race) to the other end of the course at their usual speed, just as if they were walking down the street to the shops, and to walk all the way past the other end of the tape before stopping. Timing was stopped when either foot was placed on the floor across the finish line. Respondents were then asked to repeat the test by lining up their feet and walking back along the course, all the way past the other end.

Self-completion questionnaire (administered by paper) (SC) – covering quality of life, social participation, mobility, control at work, life satisfaction, social networks and alcohol consumption.

Where households contained two or more eligible individuals one person was nominated as the informant for that household. Similarly, one individual was asked to be the informant for the income and assets module on behalf of each benefit unit (BU). Benefit and financial units are defined in Figure 4.2.

Figure 4.2 Benefit and financial units

Benefit units (BUs) – are defined from individuals within the same household using their age and marital status. A BU is a single adult or couple plus any dependent children. A couple is defined as two adults that are married or living as married. An adult is defined as an individual who is aged 19+ or aged 16-18 and married. Any children are included in the BU with the appropriate adult parent. Many of the financial derived variables in the ELSA dataset are derived at the BU level. The IA section, however, is asked once per **financial unit**.

Financial units – are equivalent to BUs with the exception that couples who keep their finances separate are defined as two financial units and each answers the IA module on their own behalf. Hence the BU can be different to a financial unit. For couples that keep their finances separate, income and assets information reported separately by each member of the couple is combined to obtain a BU definition of income and wealth.

The ELSA CAPI programme allows flexibility in administering the interview. Respondents could be interviewed individually, or in households with more than one eligible respondent, interviewed at the same time (in a single session) using concurrent interviewing techniques. In a concurrent session the same block of questions was asked alternately of each person. Concurrent interviews tend to be quicker than two separate individual interview sessions, and are generally more convenient for respondents.

In concurrent interviewing sessions, the following sections were asked of both respondents concurrently:

- Individual demographics (ID)
- Health (HE)
- Social participation (SP)
- Work and pensions (WP)

Although interviews tended to follow the same module order, interviewers could choose where some modules were positioned in the interview. For example, the walking 'gait' speed test could be administered at any time after the Health (HE) module, and it was possible for interviewers to skip the Income and Assets (IA) or Housing (HO) modules if it was more convenient to do them at another time.

Five sections formed the 'private modules' block:

- Cognitive Function (CF);
- Expectations (EX);
- Psychosocial Health (PS)
- Effort and Reward (ER); and
- Final Questions (FQ).

Wherever possible, modules which form the “private block” were administered with no other household members present. If two respondents were being interviewed concurrently, whilst the first respondent was being asked the private block, the second responding individual was asked to fill in the self-completion questionnaire in a separate room. The two respondents then switched places.

The interview ends with a request for confirmation or amendment of consent to obtain health and economic data from administrative sources. Participants are asked to provide their National Insurance Number (NINO) and give permission for the ELSA team to link their survey data to official records held by the Department of Work and Pensions (i.e. National Insurance contributions, welfare and benefit receipt, tax credits claims, tax records, savings and pensions).

During their HSE interview respondents were asked to give permission to link their records to mortality and cancer registration data. At the end of each ELSA interview, respondents are reminded of the permission they have previously given and, if they had not given permission to link to mortality records they are asked again. Additional consent is also asked to link their records to Hospital Episode Statistics (HES).

4.2 Wave 4 questionnaire changes

This section provides an overview of the main questionnaire changes at wave 4. Overall, six modules were affected: health, work and pensions, housing and consumption, cognitive function, effort and reward, and psychosocial health. Table 4.1 highlights the main changes for each module at wave 4 by listing the new topics introduced, the questions reinstated from earlier waves, and topics chosen for omission. Only the major changes are described here, but all changes (including those made to routing) can be found in the wave 4 interviewer instructions.

Table 4.1 Questionnaire changes at wave 4			
Revised Module	New Topics	Topics reinstated from earlier wave(s)	Topics omitted at wave 4
Health	<ul style="list-style-type: none"> • <i>Sleep</i> • <i>Women's health</i> • <i>NHS or private funded operations</i> 	<ul style="list-style-type: none"> • <i>Dizziness/falls</i> • <i>Pain</i> • <i>Depression</i> • <i>Symptoms of difficulty in walking</i> 	<ul style="list-style-type: none"> • <i>Dental health</i>
Housing and consumption	<ul style="list-style-type: none"> • <i>Contributions to Child Trust funds</i> • <i>Sale price of previous home</i> • <i>Costs for home adaptations</i> 	<ul style="list-style-type: none"> • <i>Monetary gifts</i> • <i>Expenditure on leisure activities</i> 	
Work and pensions	<ul style="list-style-type: none"> • <i>State pension deferral</i> • <i>Reason for working beyond state pension age</i> 		
Effort and Reward	<ul style="list-style-type: none"> • <i>Formal and informal volunteering</i> • <i>Informal care provision</i> 		
Cognitive function		<ul style="list-style-type: none"> • <i>Numeracy</i> 	<ul style="list-style-type: none"> • <i>Literacy</i>
Psychosocial		<ul style="list-style-type: none"> • <i>Age participants would like to be</i> • <i>Age participants feel they are</i> 	
Self-completion	<ul style="list-style-type: none"> • <i>TV watching</i> • <i>Alcohol consumption</i> 	<ul style="list-style-type: none"> • <i>Ease of accessing services</i> 	<ul style="list-style-type: none"> • <i>Age participants¹⁸ feel they are</i>

The changes outlined in Table 4.1 are described below:

Health Module (HE)

Questions relating to dizziness and falls, and pain and depression were reinstated from wave 2. These have been used by analysts to assess overall quality of care received from General Practitioners (GPs), and allow ELSA to track any change in the quality of service provision over time.

New questions at wave 4 relating to sleep are planned to be reinstated every four years (every other wave). Participants were asked how often they experience problems with their sleep patterns (e.g. trouble falling asleep), the number of hours sleep they get on an average weeknight, and the overall quality of their sleep.

New questions at wave 4 that focussed on women's health had previously been included in a separate Life History interview at ELSA wave 3 (Ward et al. 2009). These covered menstruation, menopause, removal of the womb, removal of the ovaries, and hormone replacement therapy (HRT).

New follow-up questions in the Health Module were used to ascertain whether surgery for cataracts and joint replacements had been paid for privately or by the NHS. Those participants using a mobility aid were also asked who paid for it, and if they covered the full cost.

Housing and consumption (HO)

Some questions previously used to help determine household consumption were reinstated from wave 2. In addition to other general expenditure questions asked at each wave (e.g. how much they spend on groceries each week, how much they spend on clothing per month), participants were also asked how much they spend on leisure activities and how much money they had given to relatives or friends in the last four weeks.

New questions in the Housing and Consumption Module asked for the amount of contributions made to Child Trust Funds in the last year, and the sale price of the participant's previous home if they had moved since the last interview. Those with home adaptations were also asked who paid for them, and if appropriate, whether the full cost had been met (following the same theme as Health module).

Work and Pensions (WP)

New questions relating to state pension deferral were added at wave 4. Male respondents aged between 64 and 75 and female respondents over the age of 60 were asked whether they were receiving any income from a state pension and, if so, whether they deferred this pension income or began receiving it straight away. If the respondent was not receiving a state pension but was of State Pension Age, they were asked if they have deferred their pension, and if so, when they planned to begin claiming it.

Effort and Reward Module (ER)

Some new questions added at wave 4 were adapted from those used in the General Household Survey in 2000. The questions have been designed to distinguish

¹⁸ This topic was moved from the self-completion and inserted into the Psychosocial CAPI module

between people who provides childcare and those who provide long term care for someone because they are sick, disabled or elderly. Carers who provide care for twenty hours a week or more are asked about opportunities for respite care and how often it is used.

Other new questions added at wave 4 were designed to measure formal and informal volunteering.

Cognitive Function (CF)

Questions used to measure numeracy were reinstated from wave 1. All other tests remained the same and the cognitive function booklet itself remained unchanged from wave 3.

Psychosocial health (PS)

Questions about when the respondent thinks middle age ends and old age starts were omitted at wave 4. Other questions previously in the self-completion questionnaire, about how old respondents feel and the age they would like to be, were added at wave 4.

Self-completion (SC)

Some wave 3 questions were taken out of the main self-completion for this wave (e.g. regarding how old respondents feel). In addition some questions were reinstated from wave 2 (for example, how easy or difficult a sample member finds it to access certain services) and new questions about watching TV and alcohol consumption were added.

4.3 Variants of the main ELSA interview

The main variants of the ELSA interview are discussed in this section. While all of these types of main interview are considered to be “productive” interviews, it is important to note that institutional interviews are not eligible for inclusion in the response rate calculations in Chapter 7.

4.3.1 Proxy interviews

If cognitive impairment, physical or mental ill health prevented a respondent from conducting a face-to-face interview, a proxy interview was attempted (i.e. asking someone else to do the interview on behalf of the respondent). Likewise if the respondent was away in hospital or temporary care throughout the whole fieldwork period, a proxy interview was permitted. New guidance regarding the use of proxy interviews was introduced at wave 4. Interviewers could now offer a proxy interview for those who were extremely reluctant to complete the interview themselves.

The proxy informant (i.e. the person who answered on behalf of the eligible respondent) was any adult aged 16 and over who knew enough about the respondent's circumstances to be able to provide information about them. Where possible, a close family member such as a partner, son or daughter was approached, but other people such as carers sometimes fulfilled this role.

Table 4.2 lists the modules included in the proxy interview. Proxy respondents were asked to provide information but were *not* asked to second-guess more subjective information such as attitudes, perceptions of ageing or expectations of the future. Only respondents conducting a full/partial main interview were given the self-completion questionnaire.

Table 4.2 Proxy interview modules	
Module	Description
HD*	Household Demographics
ID	Individual Demographics
HE	Health (variant on main module)
WP	Work and Pensions
IA*	Income and Assets
HO*	Housing
FQ	Final questions and consents

All proxy interviews included questions on individual demographics, health, work and pensions and final questions/consents. However, the three modules asterisked in Table 4.2 were asked only in specific circumstances:

- In cases where there was at least one other person in the household eligible for interview, the HD and HO would already be completed, and would therefore not be asked of a proxy informant. In cases where there was no-one else in the household eligible for interview, these two sections were completed as part of the proxy interview.
- In cases where there was no-one else in the financial unit eligible for interview, the proxy interview included the IA section.¹⁹ If one member of a couple needed a proxy interview, the other member was automatically asked the IA section on behalf of the couple when they were interviewed in person. The question normally included, about whether or not they share finances, was not asked. If both members of a couple needed a proxy interview, the IA section was only asked in one of their proxy interviews, and referred to both of their

¹⁹ Benefit and financial units were defined in Section 3.3.

finances. For single people requiring a proxy, the IA section was always asked as part of the proxy interview.

4.3.2 Partial interviews

Some respondents do not manage to complete the whole interview (e.g. due to time constraints or interruptions). If respondents get as far as the Work and Pensions (WP) module but do not answer all the questions to the end of the interview it is deemed a “partial interview”. The implication of this for analysis is that there were varying totals of respondents for items depending on the position of the item in the questionnaire and the number of partial interviews accrued at that point.

4.3.3 Institutional interviews

Core members who move into an institution (care or nursing home) after their first ELSA interview are still eligible for interview. The institutional interview has the same modules as the core wave 4 interview, and the content remains broadly the same for non-proxy, and proxy institutional interviews.

Module	Description
HD	Household Demographics
ID	Individual Demographics
HE	Health (variant on main module)
WP	Work and Pensions
IA	Income and Assets
HO	Housing
FQ	Final questions and consents

Questions asked in the Income and Assets module and the Housing module are influenced by whether the person in the institution has a partner who lives with them, and whether they share finances or not (see below). Additional questions about partners at the start of the institutional interview control what modules are asked. For single people in an institution the same modules appear on-route as in a normal interview, but with fewer questions in IA and HO.

Structure of Institutional Interview for couples:

	Questions asked of spouse at home	Questions asked of spouse in institution
Partners who share finances	All IA All HO	No IA HO = consumption only
Partners who have separate finances	All IA All HO	All IA HO = consumption only

If both members of the couple are in an institution the following structure applies:

	Questions asked of spouse interviewed first in institution	Questions asked of spouse interviewed second in institution
Partners who share finances	All IA HO = reduced set of questions	All IA HO = reduced set of questions
Partners who have separate finances	All IA HO = reduced set of questions	All IA HO = reduced set of questions

5 The Nurse Visit

5.1 Setting up the nurse visit

All core members who had completed the main wave 4 interview in person (i.e. not by proxy) were eligible for a nurse visit. Each element of the nurse visit was entirely voluntary, so it was possible for respondents to agree to some measures and not others. The same measures were also taken at wave 2 and there were no major changes to the protocols.

The nurse telephoned the respondent in all cases before the visit in order to arrange or confirm the appointment and to discuss preparation for the visit. If the respondent was willing, the nurse highlighted the following key points over the phone (which were also on the respondent's appointment record card):

- That they should not eat, smoke, drink alcohol or do any vigorous exercise for 30 minutes before the visit.
- That they should wear light, non-restrictive clothing and avoid wearing thick belts or long garments that would prevent them from seeing their feet (important for the physical performance measures).

Nurses established whether respondents were eligible to have a blood sample taken by asking if they: (1) had a clotting or bleeding disorder, (2) ever had a fit or convulsion, (3) were taking anticoagulant drugs (such as Warfarin, Protamine or Acenocoumarol) or (4) were pregnant.

If they were eligible to have a blood sample, nurses then determined whether they were eligible to fast. Respondents were not eligible to fast if they: (1) were aged 80 or over, (2) were diabetic and on treatment, or (3) were malnourished or otherwise unfit to fast (as judged by the nurse). If they were eligible and willing to fast, nurses then explained the fasting rules as set out in the wave 4 nurse visit project instructions.²⁰ The nurses emphasised that respondents could still drink water and that they could take their medication as normal.

Before carrying out each measure, nurses checked the exclusion criteria with respondents and asked for their consent. In total, there were seven different consent forms presented in a booklet that respondents were asked to sign. The consent forms covered the following:

²⁰ http://www.ifs.org.uk/elsa/docs_w4/project_instructions_nurse.pdf

- send blood pressure information to GP;
- allow blood sample to be taken;
- send blood results to GP;
- send blood results to respondent
- allow remaining blood to be stored for future analysis;
- allow extraction and storage of DNA for use in future medical research studies; and
- send lung function results to GP;
- allow saliva to be tested for cortisol and future medical research studies of causes, diagnoses, treatment or outcome of disease.

If a cause for medical concern was identified during the nurse visit then the respondent's GP was notified *if* the respondent had given prior permission. The protocols for each of the measures taken can also be found in the project instructions.²⁰

Figure 5.1 Nurse visit measures

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

Blood pressure

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

Blood samples – respondents under the age of 80, who were not diabetics on treatment, and who were not deemed unfit (when screened by the nurse at the time of making the appointment) were asked to fast before giving the samples. A list of the uses to which the sample was put is given in Figure 3-4.

Saliva sample – Only pre-selected respondents were asked to supply saliva samples over a 24-hour period to measure cortisol, which is an indicator of stress.

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: grip strength, chair rises, balance and leg raises. Taken together with the gait speed (or timed walk) measure carried out during the main interview, these provide an excellent way of tracking change in physical well-being over time. The four measures are set out below:

i) **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.

ii) **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 aged 70 years and over, or up to ten rises if aged 69 years and under.

Up to six blood samples were collected from core member respondents and their partners (only if explicitly requested) who gave consent for this in order to examine the items set out in Figure 5.2.

Figure 5.2 Blood sample measures

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.

Insulin-like growth factor 1 (IGF-1) and Dehydroepiandrosterone sulphate (DHEAS) – these are hormones that help control reactions to stress and regulate various body processes including digestion, the immune system, mood, and energy usage.

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.

White cell count (WCC) and Mean corpuscular haemoglobin (MHC) – When looked at in combination with Ferritin and haemoglobin can indicate anaemia.

If the respondent had fasted and had given consent for DNA extraction then all six blood tubes were filled. They were filled in a specific order so that, if a situation arose where there would be insufficient blood to fill all the tubes, the analyses with the highest priority could still be undertaken. If the respondent had not fasted, the fasting tube was not taken, and if the respondent did not consent to DNA extraction then only the first four vials were drawn.

6 Fieldwork Procedures

Fieldwork for the fourth wave of ELSA began in early May 2008 and finished in August 2009. Eligible individuals were sent an advance letter inviting them to participate. Interviewers then visited the households or telephoned in advance to set up the interviews.

277 interviewers worked over the course of wave 4. Before starting work, all new interviewers underwent a two day personal briefing by a researcher. Interviewers who had worked at wave 3 underwent a one day refresher briefing. The briefings covered all fieldwork procedures including training on how to administer the assessments (walking speed and cognitive function). The briefings also fully explained the documents needed for the study and provided an introduction to all questions within the CAPI interview. Interviewers were also provided with written study guidelines to reinforce their learning from the briefing.

This chapter provides background information about the fieldwork procedures employed in wave 4: the follow-up rules (Section 6.1); how deaths were identified (Section 6.2); tracing procedures adopted if respondents could not be contacted (Section 6.3); and methods used to encourage response (Section 6.4).

6.1 Fieldwork follow-up rules

Cohort 1 and Cohort 3 Core Members

There were four main reasons why interviewers did **not** follow-up members from Cohort 1 or Cohort 3 at wave 4.

- deaths
- moves out of Britain
- living in a household where all eligible respondents refused to be re-contacted immediately after their first ELSA interview (note – these households have been excluded from the issued sample for all subsequent waves).
- If young or old partners who had once lived with the core member had already been interviewed since the split

At each wave, decisions about whether to issue individual cases are made by the survey team. For example, some cases were not issued at wave 4 if they had;

- moved from their address at a previous wave and could not subsequently be traced
- written a formal letter in the past and asked to be removed from the sample

-
- contacted the study team prior to the start of wave 4 fieldwork and asked not to be visited by the interviewer
 - consistently refused to be interviewed at consecutive waves (relates to Cohort 1 specifically)

It is important to note that the fieldwork response calculations in Chapter 7 are based only on those cases issued to field interviewers at wave 4. In contrast, study response rates only exclude those that have died, moved out of Britain or into an institution. All other core members are considered eligible in the study response rates even if they did not have the opportunity to be interviewed at wave 4 (i.e. through non-issue to field).

Cohort 4 Sample Members

Wave 4 represents the first attempt at face to face contact since their HSE interview in 2006. The main reasons why interviewers did **not** follow-up age-eligible sample members from HSE 2006 were:

- deaths;
- no longer living at a private residential address
- no longer living in England
- had not agreed to be recontacted after their HSE interview²¹

6.2 Deaths

Deaths were reported to the survey team through two methods. All participants who gave their permission (95%) in HSE or ELSA were 'flagged' with the National Health Service Central Register (NHSCR) run by the Office for National Statistics. This register keeps track of registrations with General Practitioners (GPs) but also with official death registrations and with people who leave the UK health system. Most of the deaths were confirmed through the NHSCR. In addition, some deaths were reported to NatCen by relatives of ELSA participants and by interviewers who learnt of the deaths when trying to contact the household.

6.3 Tracing movers

Procedures are in place to track respondents who move between waves to ensure that the more mobile sections of the ELSA sample are not lost.

²¹ Households where all age-eligible sample members refused recontact after HSE were omitted from the issued sample. However, if one age-eligible sample member refused recontact after HSE but

If the whole household had moved since the wave 3 interview, or a core member who had consented to be recontacted in future waves had moved away, interviewers were directed to try the following possible routes to trace movers:

- attempt telephone contact with the respondent (number may still connect to respondent)
- attempt to find a follow-up address
- approach the present occupants, neighbours, or friends to obtain the new address
- approach the person(s) living at the 'stable address' provided previously by the respondent – respondents had been asked to give the name and contact details of someone who could be contacted if they moved
- approach the 'proxy nominee' who was nominated to conduct an interview on behalf of the respondent should the need arise in the future.
- Consider public records such as phone books, electoral register, local shops, letting agency, estate agent, post office

A 'mover letter' was offered if interviewers identified a member of the public who was aware of the core member's new address but was reluctant to reveal it to the interviewer. This letter, which was forwarded with a pre-paid envelope by the member of the public who had been identified, asked the core member to contact the office with their new address.

Some movers were traced through the National Health Service Central Register (NHSCR). If permission was given to link to the NHSCR, the Health Authority in which the respondent lived was determined, and the Health Authority was asked to forward a letter to the GP of the ELSA sample member. The GP was then requested to forward another letter to the individual which requested that they get in touch directly with the ELSA team. Overall, an address was established for 24% of cases sent for NHSCR tracing at wave 4.

6.4 Other methods to encourage response

A number of different approaches were used to encourage participation among the issued sample, including the measures outlined in Figure 6.1.

another age-eligible person in the household hadn't, the household was still issued to interviewers (and all age-eligible persons remained eligible for interview).

Figure 6.1 Methods of encouraging response in wave 4

- Each respondent was sent an advance letter and given an information leaflet. The advance letter offered an incentive payment in the form of a £10 cheque which was provided at the end of the ELSA interview.
- Advance letters were tailored to the individual respondents, based on whether or not they had been interviewed at wave 3, they had refused to be interviewed at wave 3, were part of the wave 4 refreshment sample or had a telephone interview at wave 3 and were to be contacted face-to-face at wave 4.
- Where possible, respondents were assigned to the same interviewer in wave 4 as they had been in wave 3 or at previous waves.
- Interviewers initially made contact by telephone with those who had been interviewed at all of the three previous waves of ELSA and were under 80. It was felt that respondents who agreed to all ELSA interviews were less likely to refuse at wave 4 and were therefore the best candidates for this method. In all other cases interviewers initially made contact by a personal visit with respondents. Interviewers were asked to make at least four calls at varying times of the day and on different days of the week (with at least one call at the weekend).
- Interviewers were asked to return to the address a few weeks or months later if they found someone to be temporarily away, or if one of the core members was unwell at the time of their first visit.
- In cases where households had split, interviews were sought at both the old and new households to ensure that all eligible individuals had a chance to respond.
- Many households for which the first interview attempt had not been successful were reissued to another interviewer. The second approach was preceded by a new letter, explaining the importance of interviewing persons in the respondent's age bracket. The letter offered a £20 cheque.
- Self-completion questionnaires that had not been returned by respondents were also followed up. Non-respondents were first followed up by the nurse during their visit (they carried spare questionnaires and return envelopes in case required). If this was unsuccessful, respondents were sent a reminder letter with new questionnaires (if applicable).
- An important part of the strategy for retaining respondents are telephone interviews. These were conducted in order to better understand reluctance to continue participating in ELSA, and to understand how we might most effectively encourage people to come back to ELSA in the future. In addition, these interviews go some way towards dealing with non-response and collected key data on the respondents at this fourth wave.

6.5 Feedback to participants

Newsletters represent an important means of keeping in touch with respondents. Wave 1 respondents received the first of these in the Spring of 2004. The newsletter provided a preview of findings emerging from the previous wave of ELSA. A respondent website (www.natcen.ac.uk/elsa) was set-up with information about all four waves to date. Participants were also sent the most recent wave 4 newsletter with their advanced letters at the beginning of fieldwork in April/May 2008.

7 Response Rates At Wave 4

This chapter starts by providing an overview of achieved interviews at wave 4 (Section 7.1) and then outlines the eligibility criteria used for calculation of the response rates (Section 7.2). The main response rates for each cohort are presented in Sections 7.3 and 7.4 and response to the nurse visit is covered in Section 7.5.

Two main types of response rates are shown in this chapter. Section 7.3 has the **fieldwork response rates** based on the total issued sample at wave 4. These do not take into account core members who were not followed up for interview at wave 4 (for example because *all* responding members in the household refused to be recontacted after their first ELSA interview - see Chapter 6).

Three different fieldwork response rates are presented:

1. *Fieldwork household contact rate* –calculated by dividing the number of households where the interviewer made contact with at least one member of the sample by the number of eligible households found during fieldwork.
2. *Fieldwork cooperation rate* – calculated by dividing the number of achieved individual interviews by the number of eligible individuals contacted by interviewers.
3. *Individual response rate* – calculated by dividing the total number of individuals with a wave 4 interview by the total number of individuals eligible for wave 4. In this case, eligibility meant those core members issued at wave 4 who were not known to have died, moved into an institution or moved outside of Great Britain.

Section 7.4 presents the **study response rates**. These cover all eligible core members regardless of whether they were actually issued to field at a given wave. Core members are eligible in ELSA study response rates unless they were found to have died, moved out of Britain or into a care home or institution.

Figure 7.1 overleaf illustrates the different types of wave 4 cross-sectional conditional response rates presented in Section 7.4.

Figure 7.1 Types of wave 4 cross-sectional conditional rates

Cohort	Notation	Meaning	Numerator	Denominator
Cross-sectional conditional rates				
Cohort 1	$RR_{4 1}$	The (cross-sectional) W4 response rate conditional upon W1 response	Responding in W4	Eligible in W4 & respondent in W1
Cohort 1 and Cohort 3	$RR_{4 3}$	The (cross-sectional) W4 response rate conditional upon W3 response	Responding in W4	Eligible in W4 & respondent in W3
Cohort 4	$RR_{4 0}$	The (cross-sectional) W4 response rate conditional upon W0 response	Responding in W4	Eligible in W4 & respondent in W0

Figure 7.2 below illustrates the longitudinal conditional response rate for Cohort 1 presented in Section 7.5.

Figure 7.2 Longitudinal response rate (wave 4)

Cohort	Notation	Meaning	Numerator	Denominator
Longitudinal conditional rates				
Cohort 1	$RR_{4,3,2 1}$	The (longitudinal) conditional wave 4 response rate	Responding in W2,W3 & W4	Eligible in W1,W2,W3 & W4 & respondent in W1

7.1 Response to main interview

Productive respondents in this section are defined as those who gave a full or partial interview either in person or by proxy (including those in institutions). Table 7.1 gives a breakdown of the number of interviews for core members and their partners. Core members form the main group for analysis of response rates (representing those aged 50 and over). Overall there were 9,886 interviews with core members across the three cohorts.

Table 7.1 Sample type of wave 4 respondents by Cohort				
<i>Base: all respondents</i>				<i>ELSA</i>
Row Description	ELSA Cohort			Total
	Cohort 1	Cohort 3	Cohort 4	
Core member	6,623	972	2,291	9,886
Core partner	101	12	N/A	113
Younger partner	276	226	119	621
Older partner	N/A	106	165	271
New partner	119	25	15	159
Unweighted N	7,119	1,341	2,590	11,050

Table 7.2 shows that over two thirds of core members with a wave 4 interview were from the original Cohort (67%). A quarter of core member interviews were from Cohort 4 (23%), and one in ten were from Cohort 3 (10%).

Table 7.2 Core member respondents in wave 4, by type of interview			
<i>Base: core member respondents in wave 4, including those in institutions</i>			
	Cohort 1	Cohort 3	Cohort 4
	(n)	(n)	(n)
Type of interview in wave 4			
Full interview in person	6,353	943	2,230
Full interview by proxy	167	24	51
Partial interview in person	39	4	9
Partial interview by proxy	1	0	0
Institutional interview in person	14	0	0
Institutional interview by proxy	49	1	1
<i>Total</i>	<i>6,623</i>	<i>972</i>	<i>2,291</i>
<i>% of all interviews with core members</i>	<i>67%</i>	<i>10%</i>	<i>23%</i>

7.2 Ineligibility and unknown eligibility

Core members were classified as ineligible in response rate calculations if it became *known* that they had died, moved outside Britain, outside of England (Cohort 4 only), or moved out of the private residential sector (e.g. into a nursing care home or institution). Table 7.3 shows that 16% of the original core members from Cohort 1 were ineligible by the time of wave 4. The smaller proportion of ineligibles found for Cohort 3 and Cohort 4 can be explained by the younger age profile of these groups (i.e. fewer deaths).

Table 7.3 Core members ineligible by wave 4 (Cohort 1 and 3) and sample members from HSE ineligible at wave 4 (Cohort 4)

<i>Base: core members ineligible by wave 4</i>			
	Cohort 1	Cohort 3	Cohort 4
Reason for ineligibility	(n)	(n)	(n)
Deaths	1,596	11	61
Moves out of Britain (Cohorts 1, 3, 4) or England (Cohort 4)	131	4	34
Institutional moves	107	0	3
<i>Total</i>	<i>1,834</i>	<i>15</i>	<i>98</i>
<i>% of original core members</i>	<i>16%</i>	<i>2%</i>	<i>3%²²</i>

Unknown eligibility

Core members in wave 4 not known to be ineligible are divided into two categories: cases whose eligibility was known and those whose eligibility was unknown. Known eligibility means essentially that the core member remained a member of the target population in wave 4 and should therefore be included in the response rate calculation. In some cases, eligibility may have been unknown because the household was unwilling to provide information needed to make that determination or could not be traced.

Response rates can be adjusted to include the sub-group of individuals ‘unknown, but likely to have been eligible for interview’. Like earlier waves, the proportion of core members with unknown eligibility in wave 4 was relatively small (3% of Cohort 1 core members were coded as non-contacts or not successfully traced). The response rate calculations set out in this chapter therefore make the assumption that the sub-groups with unknown eligibility were in fact eligible.

7.3 Fieldwork response rates

Fieldwork response rates provide useful measures of fieldwork performance. The rates presented in this section include only those core members who were issued to field interviewers at the start of wave 4. It excludes those known to have become ineligible (see Section 7.2) or those selectively removed from the issued sample at wave 4 (for example due to a prior refusal or through being unable to trace).

All response rates presented here are based on the AAPOR (American Association for Public Opinion Research) standard definitions. They have been calculated from a

²² This figure represents the proportion of sample members selected from HSE that were found to be ineligible at start of wave 4.

number of sources: outcome codes from fieldwork, sampling recontact information and mortality updates.²³

Proportion of eligible core members issued to field at wave 4

Table 7.4 below shows the proportion of eligible core members that were issued to the field at wave 4 (i.e. those not known to have died, moved out of Great Britain, or into an institution). Ninety two per cent of eligible Cohort 1 core members, and 99% of Cohort 3 members had an opportunity to be interviewed at wave 4. Cohort 4 is omitted from the table because this was their first ELSA wave so all age-eligible cases were issued.

Table 7.4 Proportion of eligible core members issued to field at wave 4		
<i>Base: all eligible core members</i>		
	Cohort 1	Cohort 3
	%	%
Issued to field interviewers at wave 4	92	99
Not issued to field interviewers at wave 4	4	1
Issued for telephone interview only	4	N/A
Total	100	100
<i>Unweighted (N)</i>	9,533	1,259

Each of the fieldwork response rates for wave 4 are described below and presented in Table 7.5. When considering contact and co-operation rates the focus is on performance at this wave only (i.e. fieldwork activity and the willingness of those households/individuals *issued* for follow-up to take part in the survey). For all measures, respondents were defined as those who gave a full or partial interview at a private residential address either in person or by proxy.

Fieldwork household contact rate

The household contact rate was calculated by dividing the number of households where the interviewer made contact with at least one member of the sample by the total number of eligible households found during fieldwork. This is an indicator of the combined quality of the contact details from the sampling frame and the processes used to track movers (outlined in Section 6.3). Over the full fieldwork period a household contact rate of 97% was achieved for Cohort 1 and Cohort 3 core members, and 92% for Cohort 4 core members.

²³ This was information about deaths of respondents who had agreed to have their records linked to the National Health Service Central Register (NHSCR) and was provided by the Office for National Statistics. The mortality update provided information about deaths before the start of wave 4 fieldwork which was used to determine the composition of the issued sample.

Fieldwork co-operation rate

The co-operation rate was calculated by dividing the number of achieved individual interviews by the number of eligible individuals contacted by interviewers. Over the full fieldwork period at wave 4 an individual co-operation rate of 77% was achieved for Cohort 1 core members, 81% for Cohort 3 core members, and 69% for Cohort 4 core members.

Individual response rate

The individual response rate is defined as “total individuals with a wave 4 interview divided by total individuals eligible for wave 4”. In this case, eligibility means those core members issued at wave 4 who were not known to have died, moved into an institution or moved outside of Great Britain. The highest response rate was amongst core members in Cohort 3 (78%) followed by Cohort 1 (74%) and Cohort 4 (63%).

Table 7.5 Fieldwork response rates at wave 4 split by Cohort

Base: eligible core members issued to field at wave 4

	Cohort 1	Cohort 3	Cohort 4
Fieldwork response rates	%	%	%
Fieldwork household contact rate	97	97	92
Fieldwork cooperation rate	77	81	69
Individual response rate	74	78	63

Reasons for non-response

Table 7.6 gives a breakdown of the reasons recorded by interviewers for non-response at wave 4. It is based on contacts issued to the field at the start of wave 4 who were eligible for the response rates. Refusals made up the greatest proportion of non-response for all three cohorts, with Cohort 1 having the highest refusal rate (80%). Problems with non-contact and movers were greatest for Cohort 4 (22%) as no other attempt had been made to contact them since their HSE interview in 2006. In contrast, core members from Cohort 1 and Cohort 3 had been sent Christmas Cards and a newsletter since their last ELSA interview (thereby providing an opportunity to update address records).

Table 7.6 Reasons for non-response at wave 4 split by Cohort

Base: all non-responding eligible core members issued to field at wave 4

	ELSA Cohort		
	Cohort 1	Cohort 3	Cohort 4
	%	%	%
Refusal	80	78	70
Moved/non-contact	12	16	22

Other unproductive ²⁴	8	6	7
<i>Unweighted (N)</i>	2,240	272	1,345

7.4 Study response rates

Study response rates can be used to measure how effective a longitudinal study has been at maintaining its original panel of members. For ELSA study rates, core members would only be deemed ineligible if they had died, moved out of GB, or into an institution or care home. Therefore those who were not issued for an interview at wave 4 (e.g. due to prior refusal or being untraced) are still treated as eligible in the study response rates. Indeed, it would be misleading to evaluate the quality of the fieldwork effort using the broader study response rates shown in Section 7.3 because interviewers are not given the opportunity to interview all non-respondents.

The individual study response rates were calculated for wave 4 by dividing the number of achieved individual interviews by the number of *eligible* individuals (that is to say, individuals not known to have died, moved out of Britain or moved out of the private residential sector (e.g into an institution)). All ineligible cases were set aside before the response rates were calculated.

Again respondents were defined as core members who gave a full or partial interview at a private residential address either in person or by proxy. Different types of conditional study response rates are relevant for each cohort and are presented separately below.

7.4.1 Cohort 1

The (cross-sectional) wave 4 response rate conditional upon wave 1 response

Cohort 1 core members, by definition, took part at wave 1 and therefore represent the original core panel for follow-up at subsequent waves. In order to work out the proportion of eligible core members interviewed at wave 4, the following response rate was calculated as conditional upon response in wave 1. However, inclusion in either the numerator or denominator was *not* conditional upon response in wave 2 or 3. Hence the total respondents in wave 4 does include those Cohort 1 core members who returned to the ELSA study at wave 4 after missing one or two prior waves. A conditional response rate of 69% was achieved for Cohort 1 core members at wave 4.

²⁴ This included being ill at home, in hospital, physically or mentally unable to participate, language difficulties, “other” reasons.

$$RR4|1 = \frac{\text{Respond in wave 4 (if also respond in wave 1)}}{\text{Eligible core members in wave 4 (if also respond in wave 1)}}$$

Total C1CMs ineligible up to wave 4 = 1,858

Total C1CMs eligible at wave 4 = 9,533

Total C1CM interviews at wave 4 = 6,560²⁵

$$6,560/9,533 = 69\%$$

The (cross-sectional) wave 4 response rate conditional upon wave 3 response

Conditioning the response rate calculation on the previous wave is useful for monitoring the retention of core members from one wave to the next. 87% of core members from Cohort 1 who participated at wave 3 and remained eligible at wave 4, also had a wave 4 interview.

$$RR4|3 = \frac{\text{Respond in wave 4 (if also respond in wave 3)}}{\text{Eligible core members in wave 4 (if also respond in wave 3)}}$$

Total C1CMs with wave 3 interview=7,489

Total C1CMs with wave 3 interview ineligible at wave 4 = 392

Total C1CMs with wave 3 interview eligible at wave 4=7,097

Total C1CMs with wave 3 and wave 4 interviews = 6,155.

$$6,155/7,097 = 87\%$$

The (longitudinal) conditional wave 4 response rate

The longitudinal response rate shows the proportion of core members that have been interviewed at each wave of the study from those that were eligible at each wave. This group is selected for longitudinal analysis. The longitudinal conditional rate at wave 4 was 63%.

$$RR4,3|2|1 = \frac{\text{Respond in waves 2,3 and 4}}{\text{Eligible core members in waves 1,2,3, and 4 (if also respond in wave 1)}}$$

Total C1CMs eligible at wave 2, wave 3, and wave 4 = 9,520.

Total C1CMs with interviews at wave 2, wave 3, and wave 4=5,971

$$5,971/9,520 = 63\%$$

²⁵ 63 institutional interviews are excluded from the response calculation as per eligibility criteria

7.4.2 Cohort 3

The (cross-sectional) wave 4 response rate conditional on wave 3 response

Wave 3 represents the baseline wave of ELSA for core members belonging to Cohort 3. Therefore the wave 4 response rate conditional upon response at wave 3 reflects the proportion of core members from Cohort 3 with a wave 4 interview (of those that were still eligible). A response rate of 77% was achieved for Cohort 3 core members at wave 4.

$$RR4|3 = \frac{\text{Respond in wave 4 (if also respond in wave 3)}}{\text{Eligible core members in wave 4 (if also respond in wave 3)}}$$

Total C3CMs eligible at wave 4 = 1,259

Total C3CMs with wave 4 interview = 971²⁶

$$971/1,259 = 77\%$$

7.4.3 Cohort 4

The (cross-sectional) wave 4 response rate conditional upon W0 response

Wave 4 represents the baseline wave of ELSA for core members belonging to Cohort 4. At this stage, the most useful study response rate for this group is the cross-sectional rate conditional upon response at HSE (wave 0). It shows the proportion of age-eligible sample members issued at wave 4 with an HSE interview, that were recruited as core members at wave 4. A response rate of 65% was achieved for Cohort 4 members.

From wave 5 onwards the cross-sectional conditional rate quoted for Cohort 4 will be based on the core members recruited at wave 4 rather than using HSE as the starting point (in order to track the proportion of Cohort 4 members that are retained by the study).

$$RR4|0 = \frac{\text{Respond in wave 4 (if also respond in wave 0)}}{\text{Eligible sample members in wave 4 (if also respond in wave 0)}}$$

Total C4CMs with HSE interview = 2,221

Total C4SMs eligible at wave 4 with HSE interview = 1,209

Total eligible from HSE = 2,221 + 1,209 = 3,430

$$2,221/3,430=65\%$$

²⁶ 1 institutional interview was excluded from response calculation as per eligibility criteria

7.5 Response to wave 4 nurse visit

Core members who had completed a full or partial wave 4 interview were eligible for a nurse visit (see Chapter 5). Participants gave their consent to be visited by the nurse at the end of the main interview.

Table 7.7 below shows response to the nurse visit to be greatest amongst Cohort 1 core members (88%) and lowest amongst Cohort 3 members (79%). However, one should note the slightly higher proportion of “other unproductive” cases in Cohort 3 compared with the other cohorts. This was due to some of those who switched status from a Cohort 1 younger partner to a Cohort 3 core member mistakenly not being invited to do the nurse visit (see Section 3.3).

The most common reason for non-response to the nurse visit was refusal. Other reasons for non-response included being too ill or away at the time of fieldwork. A minority who did agree to take part from each cohort could not be contacted by the nurse. This may have reflected some people’s circumstances, but in other cases could be interpreted as a hidden refusal.

Table 7.7 Response to nurse visit at wave 4 split by Cohort			
<i>Base: all core members with a fully or partially productive main interview</i>			
	ELSA Cohort		
	Cohort 1	Cohort 3	Cohort 4
	%	%	%
Productive nurse visit	88	79	83
Refusal	10	13	14
Non-contact	<1	1	1
Other unproductive ²⁷	2	7	2
<i>Unweighted (N)</i>	6,392	947	2,239

Table 7.8 shows that 75% of Cohort 1 core members who had a nurse visit at wave 2 also had a nurse visit at wave 4. The level of non-response to the nurse visit invitation was extremely low amongst this group, however nearly one in five of those with a wave 2 nurse visit did not complete a full or partial interview at wave 4 (despite being issued and eligible at wave 4) and therefore were not invited to do the follow-up nurse visit.

²⁷ This included being ill at home, in hospital, physically or mentally unable to participate, language difficulties, “other” reasons.

Table 7.8 The cross-sectional wave 4 nurse visit response rate conditional on response to wave 2 nurse visit

Base: core members with a wave 2 nurse visit that were issued at wave 4 (and who remained eligible at wave 4)

	(n)	%
Productive nurse visit	5,155	75
Refusal to nurse visit	348	5
Non-contact by nurse	13	<1
Other nurse unproductive ²⁸	101	1
No full or partial interview at wave 4	1,229	18
<i>Unweighted (N)</i>	<i>6,846</i>	<i>100</i>

²⁸ This included being ill at home, in hospital, physically or mentally unable to participate, language difficulties, “other” reasons.

8 Weighting

This chapter describes the weighting strategy used to adjust for differential non-response at wave 4. The derivation of the main interview weights (longitudinal and cross-sectional) is described in Section 8.1. Section 8.2 describes the weighting for those responding to the self-completion questionnaire and Section 8.3 covers the weights for those with a nurse visit and those who gave a blood sample.

Advice on using the weights is provided in the “Wave 4 User Guide” available from the UK Data Archive.

8.1 Longitudinal and cross-sectional and weights

Longitudinal datasets such as ELSA can be analysed either cross-sectionally or longitudinally. Cross-sectional analysis uses data collected in one wave only, whilst 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 objectives.

In wave 4, as in wave 3, both longitudinal and cross-sectional weights have been created. Longitudinal weights are defined for the subset of core members who have taken part in *all* four waves of ELSA. Cross-sectional weights are defined for all core members belonging to the target population (i.e. living in a private household in England) who responded to wave 4, including new entrants to the study and people who missed one or more of the preceding waves (who we shall refer to as wave non-responders).

The cross-sectional and longitudinal weights are described in turn, beginning with the longitudinal weights.

8.1.1 Longitudinal weights

As in previous waves, the longitudinal weighting strategy focused only on those Cohort 1 core members who had responded at all waves up to and including the current wave (we shall refer to these individuals as the longitudinal group). The wave 4 longitudinal weight builds on the wave 3 longitudinal weight (which in turn was based on the wave 2 longitudinal weight and so on). The sequential nature of the weighting means that the longitudinal weight adjusts for historical non-response as well as non-response since the last wave. In other words it adjusts for non-response to HSE plus each of the four waves of ELSA.

Of the 7,168 core members from Cohort 1 who responded to waves 1, 2 and 3, a total of 6,806 remained eligible for the main interview in wave 4. Their response to wave 4 was modelled using logistic regression analysis on a range of household and individual-level information collected at wave 3 (supplemented by information collected at waves 1 and 2). Partial and proxy interviews were considered to be a response. (The analysis was conducted using the longitudinal weight derived in wave 3 to ensure that the wave 4 weight did not replicate the wave 3 weight.)

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

- Age (at wave 1) by sex
- Government Office Region (at wave 3)
- White/non-white ethnicity
- Highest educational qualifications (at wave 1)
- Housing tenure (at wave 3)
- Self-assessed health (at wave 3)
- Number in household (at wave 3)
- National Statistics Socio-Economic Classification NS-SEC (at wave 3)

Taking the inverse of the estimated probability of response (from the logistic regression model) yielded a non-response weight for wave 4. (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 higher weight of 2.) This non-response weight (trimmed at the 99th percentile) was then multiplied by the wave 3 longitudinal weight to create the wave 4 longitudinal weight. A total of 5,971 core members received a wave 4 longitudinal weight. The weight is scaled to the achieved sample size (giving it a mean of 1).

8.1.2 Cross-sectional weights

In order to support cross-sectional analysis, a cross-sectional weight was derived that can be used to analyse all core members responding at wave 4. This allows for the inclusion of Cohort 3 core members (new entrants at wave 3), Cohort 4 core members (new entrants at wave 4) and 'wave non-responders' (those core members from Cohort 1 who returned to the study at wave 4 after missing either wave 2 or wave 3 or both). The set of all core members responding at wave 4 will be referred to as the *combined sample*. The purpose of the cross-sectional weights is to make the combined sample representative of the population of people aged 50+ in England.

For weighting purposes, the respondent sample was regarded as comprising three distinct age cohorts: those aged 56 and over, those aged 52-55 and those aged 50-

51 (where age is defined at the beginning of wave 4). The sample Cohorts 1, 3 and 4 cut across these three groups as shown in Table 8.1 below.

Table 8.1 Core members responding at wave 4

Core member respondents in wave 4 (2008-09), excluding those in institutions

	Age at wave 4	Cohort 1	Cohort 3	Cohort 4
Those aged 56+:				
Cohort 1 longitudinal group	56+	5,971		
Cohort 1 wave non-responders	56+	589		
Cohort 4 aged 56-74	56-74			1,548
Those aged 52-55:				
Cohort 3 first issued at wave 3	52-54		900	
Cohort 3 first issued at wave 4 ²⁹	55		248	
Cohort 1 partners re-classified at wave 3	52-55		71	
Cohort 4 aged 52-55	52-55			345
Those aged 50-51+:				
Cohort 4 aged 50-51	50-51			149
Total		6,560	1,219	2042

For example, Cohort 4 comprises:

- people aged 56-74 who are therefore grouped with respondents from Cohort 1;
- people aged 52-55 who are therefore grouped with respondents from Cohort 3;
- people aged 50-51 who make up the new age cohort introduced at wave 4.

The cross-sectional weights defined for the combined sample at wave 4 were calculated using the following steps:

1. For Cohort 3 core members first issued at wave 3, response to wave 4 was modelled on information collected from wave 3. A non-response weight was then derived to adjust for non-response between wave 3 and wave 4.
2. For all Cohort 4 core members, plus those Cohort 3 core members first issued at wave 4, response to wave 4 was modelled on information collected from the HSE. A non-response weight was then derived to adjust for non-response between HSE and ELSA wave 4.
3. Population estimates for people aged 56+ were derived by combining the longitudinal group (those responding to all four waves of ELSA) with Cohort 4 core members aged 56-74³⁰.

²⁹ These cases were meant to be Cohort 3 members but were accidentally omitted at wave 3. They were instead issued at wave 4 to become part of Cohort 4.

4. The non-response weights for all core members aged 56+ at wave 4 were calibrated to 2008 household population estimates of age, sex and region plus estimates of the population profile derived in step 3.
5. The non-response weights for all core members aged 50-55 at wave 4 (Cohort 3 core members plus the Cohort 4 core members aged 50-55) were calibrated to 2008 population estimates of sex and region.³⁰
6. Finally the calibration weights from steps 3 and 4 above were combined and scaled so that the average weight was equal to 1.

These six steps are discussed in turn.

1. Non-response weights for Cohort 3

For the 1,154 Cohort 3 core members first issued at wave 3 and eligible for the main interview in wave 4, response was modelled on a range of household and individual-level information collected from wave 3. The analysis was conducted using the non-response weight derived in wave 3 to ensure that the wave 4 weight did not replicate any adjustment made by the wave 3 weight.

The results showed significant differences between respondents and non-respondents on one characteristic only, educational status. Taking the inverse of the estimated probability of responding yielded a non-response weight to adjust for possible non-response bias between wave 3 and wave 4.

103 individuals originally classified as younger partners (of Cohort 1 core members) were reclassified as Cohort 3 core members at wave 3. As these individuals were given a zero cross-sectional weight at wave 3, their response to wave 4 was modelled with Cohort 4 core members (see non-response weights for Cohort 4 below).

2. Non-response weights for Cohort 4

A cohort of people born between 1 March 1934 and 28 February 1958 was added to the ELSA sample at wave 4. They were selected from the Health Survey for England 2006 and are collectively referred to as Cohort 4. Their response to wave 4 was modelled on a range of household and individual-level information collected from HSE. Also included in this model, were:

- Core members (erroneously) omitted from ELSA wave 3, who instead were first issued at wave 4. These are now known as Cohort 4 core members.
- 103 individuals originally classified as younger partners (of Cohort 1 core members) who were reclassified as Cohort 3 core members at wave 3 when they became age-eligible in their own right.

³⁰ Age is defined here as age at 1 March 2008, immediately prior to the beginning of wave 4 fieldwork.

The results showed significant differences between respondents and non-respondents on a number of characteristics:

- Age by sex
- Highest educational qualifications
- Household type
- National Statistics Socio-Economic Classification (NS-SEC)
- Whether had a long-term limiting illness
- Marital status

Taking the inverse of the estimated probability of responding yielded a non-response weight to adjust for possible non-response bias between HSE and ELSA wave 4. (This weight was trimmed at the 99th percentile).

3. Population estimates for Cohort 1 (aged 56+)

Core members belonging to Cohort 1 and successfully interviewed at wave 4 belonged to one of two groups:

- 5,971 core members who had taken part in waves 1, 2 and 3 (eight of these respondents had moved to either Wales or Scotland between waves 3 and 4 and were therefore given zero cross-sectional weights);
- 589 wave non-responders i.e. individuals who had returned to the study at wave 4 after missing wave 2 or wave 3 or both (seven of these respondents had moved to either Wales or Scotland and were therefore given zero cross-sectional weights).

It is often speculated that wave non-responders are likely to have characteristics that differ from those who have taken part at all waves. At wave 3, it was found that the following socio-demographic features were predictive of wave non-response when compared with response to all waves:

- Housing tenure
- White/non-white ethnicity
- Highest educational qualifications
- Marital status

At wave 4, this issue was complicated by the introduction of Cohort 4 which included 1,548 core members aged 56-74 (at the start of wave 4), supplementing Cohort 1 core members (aged 56+).

In order to combine these three groups and create a representative sample of persons aged 56+, it was necessary to make sure, as far as possible, that the

characteristics of the combined sample match those of population. In order to do this, estimates of population characteristics were required.

Both the Cohort 1 core members who responded to all four waves of ELSA and the Cohort 4 core members aged 56-74 already had weights derived to adjust for non-response at wave 4, previous waves of ELSA and HSE. Either of them could therefore provide such population estimates (although the latter only for those aged 56-74).

Combining these groups (whilst accounting for the larger numbers of 56-74's by scaling down their non-response weights) provided a basis from which to estimate the population characteristics of those aged 56+. Estimates of housing tenure, white/non-white ethnicity, highest educational qualifications and marital status were derived using this method (the same characteristics that were used in wave 3 for consistency) and are shown in column 2 of Table 8.2.

4. Cross-sectional weights for Cohort 1 (those aged 56+)

The non-response weights for all core members aged 56+ at wave 4 (i.e. the two groups already described plus the wave non-responders) were then adjusted using calibration weighting so that the resulting weights, when applied to the three groups combined, match the population estimates on the four socio-demographic characteristics plus estimates of age/sex and region for those aged 56+ (from mid-2008 household population estimates, see Table 8.3). This means that the distribution of tenure, for example, in the final weighted sample (i.e. after the calibration adjustment) corresponds exactly to the estimated population distribution; the same is true for the distributions of the three other characteristics and for age/sex and region. This is shown in Table 8.2.

Column 3 of the table shows the weighted marginal distributions (pre-calibration) for this combined group. The weights within each of the three sub-groups that made up this combined group were scaled to their respective un-weighted sample sizes (i.e. so that each had a mean weight of 1). The pre-calibration weights were as follows:

- the 5,963 core members who had taken part in all four waves were given their wave 4 longitudinal weight;
- the 582 wave non-responders were given the longitudinal weight they received for the last wave in which they took part e.g. those who missed wave 3 but took part in wave 2 were given their wave 2 longitudinal weight
- the 1,548 Cohort 4 core members aged 56-74 were given their Cohort 4 non-response weight (as described above)

Use of these weights ensured that appropriate non-response adjustments had been made to each group prior to calibration.

Column 4 shows the final weighted marginal distributions (post-calibration) across the four variables. As expected, the post-calibration weighted distributions match the target distributions (shown in column 2) on each of these four dimensions.

Table 8.2 Distributions of key variables used in calibration weighting

Core member respondents aged 56+ in wave 4 (2008-09), excluding those in institutions

Wave 4 characteristics	Col.2 Target distribution (all 56+ in England from Cohorts 1 & 4)	Col.3 Combined weighted sample (pre- calibration)	Col.4 Combined weighted sample (post- calibration)
	%	%	%
Tenure			
Own outright	66.8	65.9	66.8
Mortgage	13.5	14.5	13.5
Renting	19.7	19.6	19.7
Marital status			
Single, never married	5.0	5.1	5.0
Married, first and only marriage	53.4	54.4	53.4
Remarried	11.1	11.4	11.1
Separated/divorced	10.2	10.7	10.2
Widowed	20.2	18.4	20.2
Ethnicity			
White	97.1	96.7	97.1
Non-white	2.9	3.3	2.9
Educational status			
Degree or equivalent	13.7	14.3	13.7
A level/higher education below degree	20.0	20.2	20.0
O level or other	17.1	17.4	17.1
CSE or other/ No qualifications	49.2	48.2	49.2
Bases			
<i>Unweighted</i>	<i>7511</i>	<i>8093</i>	<i>8093</i>
<i>Weighted</i>	<i>5963</i>	<i>8093</i>	<i>8093</i>

5. Cross-sectional weights for Cohort 3 and 4

Responding core members aged 50-55 at the start of wave 4 included:

- 1,219 Cohort 3 core members (one of these respondents had moved to Wales and was therefore given a zero cross-sectional weight).
- 494 Cohort 4 core members, comprising 149 50-51 year olds (the new age cohort) and 345 52-55 year olds (effectively supplementing Cohort 3).

These groups were combined and their non-response weights were adjusted using calibration weighting so that the resulting weights provide survey estimates that match population estimates of sex and region (from mid-2008 household population estimates) for those aged 50-55.³¹

6. Putting the cross-sectional weights together

The final step in the calculation of the cross-sectional weights was to take the calibrated weights from the two cohorts (Cohort 1 and Cohort 3 and 4 combined) and to scale them so that they are in the correct proportion in the final weighted sample. The final weights were then scaled so that the average weight was equal to 1.

The profile of the combined core member respondents, weighted by the cross-sectional weight, is presented in Table 8.4.

Table 8.3 Household population estimates						
<i>Mid-2008 England household population (aged 50 and over)</i>						
Age	Men	Women	Total	Men	Women	Total
				%	%	%
50-55	1,846,645	1,888,680	3,735,325	23.0	20.9	21.9
56-59	1,183,385	1,225,145	2,408,530	14.8	13.5	14.1
60-64	1,474,930	1,546,341	3,021,271	18.4	17.1	17.7
65-69	1,089,441	1,174,974	2,264,415	13.6	13.0	13.3
70-74	924,760	1,040,579	1,965,339	11.5	11.5	11.5
75-79	715,095	893,286	1,608,381	8.9	9.9	9.4
80 and over	787,112	1,276,400	2,063,512	9.8	14.1	12.1
<i>Base</i>	8,021,368	9,045,405	17,066,773	<i>100.0</i>	<i>100.0</i>	<i>100.0</i>

³¹ Age was not included because the small numbers of 50-51 year olds would have caused this group to have excessively large weights in comparison with those aged 52-55.

Table 8.4 Achieved (combined) sample of core members, by age in 2008-09 and sex (weighted)

Core member respondents in wave 4 (2008-09), including proxies but excluding those in institutions

Age at wave 4 interview	Men	Women	Total	Men	Women	Total
				%	%	%
50-55	861	870	1,730	18.7	16.7	17.6
56-59	880	919	1,799	19.1	17.7	18.4
60-64	847	888	1,736	18.4	17.1	17.7
65-69	626	675	1,301	13.6	13.0	13.3
70-74	531	598	1,129	11.5	11.5	11.5
75-79	411	513	924	8.9	9.9	9.4
80 and over	452	733	1,186	9.8	14.1	12.1
<i>Bases</i>						
<i>Unweighted</i>	<i>4,398</i>	<i>5,407</i>	<i>9,805</i>	<i>100.0</i>	<i>100.0</i>	<i>100.0</i>
<i>Weighted</i>	<i>4,608</i>	<i>5,197</i>	<i>9,805</i>	<i>100.0</i>	<i>100.0</i>	<i>100.0</i>

Notes: The apparent under-representation of the 50-55 cohort is due to the fact that some of these respondents turned 56 by the time of their wave 4 interview. The cohort of people aged 50-55 on 1st March 2008 appears in it's correct proportion in the weighted sample.

For comparative purposes Table 8.5 presents the same breakdown as Table 8.4 but uses unweighted figures. The weighting has boosted the proportion of people in the younger age bands.

Table 8.5 Achieved (combined) sample of core members, by age in 2008-09 and sex (unweighted)

Core member respondents in wave 4 (2008-09), including proxies but excluding those in institutions

Age at wave 4 interview	Men	Women	Total	Men	Women	Total
				%	%	%
50-55	633	745	1,378	14.4	13.8	14.1
56-59	663	850	1,513	15.1	15.7	15.4
60-64	909	1,098	2,007	20.7	20.3	20.5
65-69	701	793	1,494	15.9	14.7	15.2
70-74	666	781	1,447	15.1	14.4	14.8
75-79	400	495	895	9.1	9.2	9.1
80 and over	426	645	1,071	9.7	11.9	10.9
<i>Base</i>						
<i>Unweighted</i>	<i>4,398</i>	<i>5,407</i>	<i>9,805</i>	<i>100.0</i>	<i>100.0</i>	<i>100.0</i>

8.2 Self-completion weights

For the 9,563 core members living in private households in England who completed a full/partial wave 4 main interview, response to the self-completion questionnaire was modelled on a range of household and individual level information collected from the ELSA wave 4 main interview. The weighting strategy aimed to minimise any bias arising from differential non-response to the self-completion questionnaire. The analysis was conducted on data weighted by the wave 4 cross-sectional weight.

The results showed significant differences between core member respondents to the self-completion and non-respondents on a number of characteristics:

- Age by sex
- Government Office Region
- Highest educational qualifications
- White/non-white ethnicity
- Housing tenure
- Self-assessed health status
- Household size
- Financial unit type (single/couple with separate finances/couple with joint finances)
- Current activity
- Whether needed help with showcards

A non-response weight for the 8,310 self-completion respondents was created by taking the inverse of the estimated probability of responding. The final self-completion weight was a product this non-response weight and the wave 4 cross-sectional weight.

8.3 Nurse visit and blood sample weights

8.3.1 Nurse visit weights

For 9,562 core members living in private households in England who completed a full/partial wave 4 main interview, response to the nurse visit was modelled on a range of household and individual level information collected from ELSA wave 4. The weighting strategy aimed to minimise any bias arising from differential non-response to the nurse visit. The analysis was conducted on data weighted by the wave 4 interview weight

The results showed significant differences between core member respondents to the nurse visit and non-respondents on a number of characteristics:

-
- Age by sex
 - Government Office Region
 - Housing tenure
 - Income quintile
 - Frequency of moderate sports or activities
 - White/non-white ethnicity
 - Current smoking status
 - Whether has children living with them
 - Whether has limiting long-term illness
 - Self-reported health status

A non-response weight for the 8,195 respondents with a nurse visit was created by taking the inverse of the estimated probability of responding. The final nurse visit weight was a product of this non-response weight and the wave 4 cross-sectional weight.

8.3.2 Blood sample weights

For the 8,195 core members living in private households in England who took part in the nurse visit, response to the blood sample was modelled on a range of household and individual level information collected from ELSA wave 4. The weighting strategy for the blood sample aimed to minimise any bias arising from differential non-response in provision of a blood sample. The analysis was conducted on data weighted by the nurse weight.

The results showed significant differences between core member respondents to the blood sample and non-respondents on a number of characteristics.³² Non-responders to the blood sample showed differences compared to responders across the following characteristics:

- Age by sex
- Government Office Region
- Frequency of moderate sports or activities
- White/non-white ethnicity
- Current smoking status
- Whether has children living with them
- Whether has limiting long-term illness
- Self-reported health status
- Self-reported eyesight

³² The logistic regression model of response to the blood sample is shown in Appendix F.

A non-response weight for the 6,438 respondents with a blood sample was created by taking the inverse of the estimated probability of responding. The final blood sample weight was a product of this non-response weights and the nurse visit weight.

9 References

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Appendix A Key Survey Measures By Wave

Appendix Table A.1 Content of the health data collection at each wave of the ELSA study, from wave 0 up until wave 4

	Wave 0	Wave 1	Wave 2	Wave 3	Wave 4
Physical health					
Self-rated general health; (Limiting) long-standing illness	√	√	√	√	√
Incontinence	√	√	√	√	√
Eyesight and hearing		√	√	√	√
Physician diagnosed conditions	√	√	√	√	√
Diagnostic symptom assessments: Rose Angina, MRC Respiratory Questionnaire, Edinburgh Claudication Questionnaire	√*	√	√	√	√
Age-related symptoms and events, including pain; falls		√	√	√	√
Quality of medical care			√	√	√
Disabilities: ADLs, including caring and aids		√	√	√	√
Walking speed performance test (part of EPESE battery)		√	√	√	√
Smoking, alcohol consumption)	√	√	√	√	√
Mental health					
General Health Questionnaire (GHQ-12)	√	√			
CES-D depression scale		√	√	√	√
Physical examination and performance data					
Height; Demi-span	√		√		√
Blood pressure; Waist-hip ratio	√		√		√
Lung function	√*		√		√
Chair stands; Balance; Grip strength; Leg length			√		√
Weight	√		√		√
Blood assays					
Triglycerides	√*		√		√
Total and HDL-cholesterol	√*		√		√
C-reactive protein, fibrinogen	√*		√		√
Haemoglobin and ferritin	√		√		√
Fasting lipids, glucose, glycated haemoglobin			√		√
Cortisol			√		√
IgE/HDM IgE	√*				

DNA extraction and storage			√		
<i>Note: * Not included for all interviews</i>					

Appendix Table A.2 Content of the economics / financial data collected at each wave of the ELSA study

	Wave 0	Wave 1	Wave 2	Wave 3	Wave 4
Household income					
Earnings		√	√	√	√
State benefits (by source and recipient)		√	√	√	√
Private pensions		√	√	√	√
Asset income (by asset category)		√	√	√	√
Other income		√	√	√	√
Wealth					
Financial assets (11 categories)		√	√	√	√
Physical assets (five categories)		√	√	√	√
Business wealth		√	√	√	√
Debt (three categories)		√	√	√	√
Housing wealth and mortgage debt		√	√	√	√
Pensions					
Current plan details		√	(√)	(√)	(√)
Date joined plan		√	(√)	(√)	(√)
Current contributions		√	√	√	√
Self-reported accrued pension wealth		√	√	√	√
Past pension details (up to three past pensions)		√	(√)	(√)	(√)
Plan names		√	(√)	(√)	(√)
Employment					
Main job details	√	√	(√)	(√)	(√)
Health and work disability			√	√	√
Normal pay and hours	√	√	√	√	√
Secondary and other economic activity details		√	√	√	√
Age and reason for retirement (if retired)		√	(√)	(√)	(√)
Employer name and permission to contact		√	(√)	(√)	(√)
Consumption					
Housing (rent and mortgage payments)	√	√	√	√	√
Vehicle ownership		√	√	√	√
Durable ownership		√	√	√	√
Durable purchases			√	√	√
Food in, food out		√	√	√	√
Fuel expenditures			√	√	√
Health insurance contributions		√	√	√	√

Expectations					
Mortality		√	√	√	√
Employment		√	√	√	√
Bequest and inheritances		√	√	√	√
Health limit ability to work		√	√	√	√
Income adequacy		√	√	√	√
Movement into nursing home			√	√	√
House value		√	√	√	√
Moving house			√	√	√
Public and private pension income			√	√	√

Appendix Table A.3 Social measures at each wave of the ELSA study

	Wave 0	Wave 1	Wave 2	Wave 3	Wave 4
Informal care giving and volunteering		√	√	√	√
Membership of and activities in organisations		√	√	√	√
Participation in cultural activities (cinema, art gallery, etc.)		√	√	√	√
Participation in political activities (voting, membership of party, etc.)		√	√	√	√
Quality of social networks		√	√	√	√
Social isolation			√	√	√
Access to public transport		√	√	√	√
Difficulty accessing facilities (health services, supermarket etc.)		√	√	√	√
Social capital		√		√	

Appendix Table A.4 Cognitive function measures at each wave of the ELSA study

	Wave 0	Wave 1	Wave 2	Wave 3	Wave 4
Memory					
Self-rated memory		√	√	√	√
Orientation in time		√	√	√	√
Word list learning		√	√	√	√
Prospective memory		√	√	√	√
Executive function/other items					
Word-finding		√	√	√	√
Letter cancellation		√	√	√	√
Basic abilities					
Numerical ability		√		√	
Literacy			√		√

Appendix Table A.5 Psychological measures at each wave of the ELSA study

	Wave 0	Wave 1	Wave 2	Wave 3	Wave 4
Psychosocial factors					
Control and demand (work, home and in general)		√	√	√	√
Effort-reward imbalance (work, volunteering, caring and in general)			√	√	√
Perceived social status (position on a ladder)		√	√	√	√
Perceived financial difficulties		√	√	√	√
Relative deprivation			√	√	√
Psychological and social well-being					
Quality of life (CASP-19)		√	√	√	√
Life satisfaction (Diener)			√	√	√
General Health Questionnaire (GHQ-12)		√	√	√	√
CES-D depression scale	√	√			
Ryff well-being scale*			√		

Appendix B Model Of Response To Main Interview (Cohort 1)

Appendix Table B.1 Model of response to main interview (Cohort 1)

Term	N	Odds ratio	95% confidence interval	
			Lower	Upper
Age (at wave 1) by sex (p<0.001)				
Male 50-54	653	1		
Male 55-59	659	1.16	0.84	1.60
Male 60-64	492	1.26	0.89	1.80
Male 65-69	492	1.10	0.77	1.58
Male 70-74	354	1.67	1.09	2.56
Male 75-79	225	0.88	0.57	1.36
Male 80+	134	0.74	0.44	1.24
Female 50-54	803	1.15	0.85	1.55
Female 55-59	766	1.28	0.92	1.78
Female 60-64	598	1.56	1.08	2.24
Female 65-69	573	1.49	1.02	2.18
Female 70-74	486	0.95	0.67	1.36
Female 75-79	313	1.16	0.78	1.74
Female 80+	258	0.62	0.41	0.92
Highest educational qualifications (at wave 1) (p<0.001)				
Degree or equivalent	897	1		
A level/higher education below degree	1328	0.84	0.61	1.16
O level or other	1209	0.74	0.53	1.04
CSE or other	906	0.63	0.44	0.89
No qualifications	2466	0.52	0.38	0.71
Government Office Region (at wave 3) (p<0.001)				
North East	464	1		
North West	818	0.64	0.46	0.89
Yorkshire and The Humber	765	0.99	0.69	1.42
East Midlands	703	1.05	0.72	1.52
West Midlands	739	0.99	0.69	1.41
East of England	830	1.23	0.85	1.78
London	593	0.83	0.57	1.19
South East	1092	0.97	0.68	1.37
South West	802	0.83	0.58	1.18
White/non-white ethnicity (p<0.001)				
White	6667	1		
Non-white	139	0.45	0.32	0.65
Housing tenure (at wave 3) (p=0.031)				
Own it outright	4427	1		
Buying it with the help of a mortgage or loan	1247	0.98	0.79	1.20
Rent it	1132	0.78	0.64	0.94
Self-assessed health (at wave 3) (p<0.001)				

Very good	1650	1		
Good	2963	0.92	0.76	1.12
Fair	1748	0.94	0.76	1.16
Bad/Very bad	445	0.61	0.46	0.81
Number in household (at wave 3)				
(p<0.001)				
1	1835	1		
2	3956	0.62	0.51	0.75
3	729	0.77	0.58	1.02
4	286	0.76	0.52	1.12
NS-SEC (at wave 3) (p=0.020)				
Managerial and professional occupations	2098	1		
Intermediate occupations	967	1.00	0.76	1.32
Small employers and own account workers	748	1.28	0.95	1.71
Lower supervisory and technical occupations	722	0.90	0.68	1.18
Semi-routine occupations	2093	0.84	0.67	1.06
Other	178	0.66	0.45	0.97

Notes:

1. The dependent variable in the logistic regression model was 1 = response; 0 = non-response. Only the 6,806 Cohort 1 core members who had taken part in waves 1-3 *and* were considered eligible for wave 4 were included in the model.
2. The data were weighted by the wave 3 main interview weight prior to running the model.
3. The p-value (quoted in parentheses) for each variable is based on a **Wald** test with the appropriate number of degrees of freedom.

Appendix C Model Of Response To Main Interview (Cohort 3)

Appendix Table C.1 Model of response to main interview (Cohort 3)

Term	N	Odds ratio	95% confidence interval	
Highest educational qualifications (at wave 3) (p=0.002)				
Degree or equivalent	297	1		
A level/higher education below degree	333	0.61	0.40	0.93
O level or other	270	0.46	0.30	0.71
CSE or other	74	0.49	0.27	0.89
No qualifications	180	0.43	0.27	0.68

Notes:

1. The dependent variable in the logistic regression model was 1 = response; 0 = non-response. Only the 1,154 Cohort 3 core members who had taken part in wave 3 *and* were considered eligible for wave 4 were included in the model.
2. The data were weighted by the wave 3 main interview weight prior to running the model.
3. The p-value (quoted in parentheses) for each variable is based on a **Wald** test with the appropriate degrees of freedom.

Appendix D Model Of Response To Main Interview (Cohort 4)

Appendix Table D.1 Model of response to main interview (Cohort 4)

Term	N	Odds ratio	95% confidence interval	
			Lower	Upper
Age (at wave 4) by sex (p<0.696)				
Male 50-54	264	1		
Male 55-59	517	0.77	0.57	1.05
Male 60-64	311	0.90	0.65	1.23
Male 65-69	269	0.96	0.68	1.34
Male 70-74	234	0.92	0.65	1.32
Female 50-54	357	0.78	0.58	1.04
Female 55-59	670	0.92	0.67	1.25
Female 60-64	369	0.99	0.72	1.36
Female 65-69	282	0.85	0.61	1.20
Female 70-74	253	0.99	0.69	1.42
Limiting longstanding illness (p=0.005)				
Limiting longstanding illness	1076	1		
Non limiting longstanding illness	911	1.13	0.93	1.37
No longstanding illness	1539	0.84	0.71	1.00
Marital status (p=0.012)				
Single	224	1		
Married/cohabiting	2652	0.56	0.37	0.83
Divorced/separated	422	0.64	0.44	0.94
Widowed	228	0.88	0.57	1.36
Highest educational qualifications (p<0.001)				
Degree or equivalent	590	1		
A level/higher education below degree	809	0.95	0.74	1.21
O level or other	732	0.69	0.53	0.88
CSE or other	261	0.73	0.52	1.03
No qualifications	1134	0.60	0.47	0.77
NS-SEC (p<0.001)				
Managerial and professional occupations	1487	1		
Intermediate occupations	260	0.88	0.65	1.18
Small employers and own account workers	431	0.85	0.67	1.08
Lower supervisory and technical occupations	392	0.60	0.47	0.76
Semi-routine occupations	956	0.82	0.67	0.99
Household type (p<0.001)				
1 adult	627	1		
2 adults	1979	1.37	0.98	1.91
Family	235	0.83	0.54	1.29
Large adult household	685	0.93	0.66	1.32

Notes:

1. The dependent variable in the logistic regression model was 1 = response; 0 = non-response. Only the 3,526 Cohort 4 core members who had taken part in the HSE *and* were considered eligible for wave 4 were included in the model.
2. The data were weighted by the HSE main interview weight prior to running the model.

3. The p-value (quoted in parentheses) for each variable is based on a **Wald** test with the appropriate degrees of freedom.

Appendix E Model Of Response To Self-Completion Questionnaire

Appendix Table E.1 Model of response to self-completion questionnaire

Term	N	Odds ratio	95% confidence interval	
			Lower	Upper
Age-by-sex (p<0.001)				
Male 50-54 (ref)	462	1		
Male 55-59	799	1.05	0.79	1.41
Male 60-64	888	1.14	0.83	1.58
Male 65-69	680	1.09	0.75	1.60
Male 70-74	652	1.01	0.67	1.52
Male 75-79	387	0.89	0.58	1.38
Male 80-84	249	0.44	0.29	0.68
Male 85 and over	154	0.53	0.33	0.86
Female 50-54	552	1.10	0.80	1.52
Female 55-59	1020	1.14	0.85	1.53
Female 60-64	1083	1.38	0.97	1.95
Female 65-69	777	1.40	0.94	2.08
Female 70-74	771	1.11	0.75	1.65
Female 75-79	485	0.88	0.60	1.30
Female 80-84	325	0.68	0.45	1.02
Female 85 and over	279	0.60	0.40	0.89
Government Office Region (p<0.001)				
North East	591	1		
North West	1165	0.48	0.35	0.65
Yorkshire and The Humber	1026	0.96	0.69	1.34
East Midlands	1000	0.90	0.64	1.26
West Midlands	1044	0.91	0.66	1.26
East of England	1191	1.13	0.81	1.58
London	854	1.00	0.72	1.39
South East	1600	0.99	0.72	1.36
South West	1092	1.18	0.84	1.65
Highest educational qualifications (p<0.001)				
Degree or equivalent	1750	1		
A level/higher education below degree	2248	1.00	0.80	1.24
O level or other	1807	0.91	0.72	1.14
CSE or other	1106	0.91	0.71	1.17
no qualifications	2652	0.62	0.50	0.76
White/non-white ethnicity (p<0.001)				
White	9274	1		
Non-white	289	0.28	0.22	0.37
Housing tenure (p<0.001)				
Own it outright	6033	1		
Buying it with the help of a mortgage or loan	1926	0.76	0.64	0.91

Rent it	1604	0.66	0.56	0.77
Self-reported general health (p<0.001)				
Excellent	1182	1		
Very good	2767	0.81	0.64	1.03
Good	3061	0.80	0.64	1.01
Fair	2553	0.60	0.47	0.76
Number in household (p=0.007)				
1	2464	1		
2	5452	0.90	0.72	1.12
3	1056	0.72	0.55	0.94
4+	591	0.66	0.48	0.89
Financial unit type (p<0.001)				
Single	3003	1		
Couple, but finances separate	1240	1.61	1.25	2.08
Couple with joint finances	5320	2.33	1.89	2.89
Activity status (p<0.001)				
Retired/semi-retired	5219	1		
Employed	2580	0.79	0.63	0.99
Self-employed	606	0.52	0.39	0.69
Unemployed, permanently sick/disabled	560	0.74	0.56	0.96
Looking after home or family	598	1.01	0.76	1.34
Help needed with showcards (p<0.001)				
No help needed with showcards	9219	1		
Help needed reading showcards	344	0.44	0.35	0.56

Notes:

1. The dependent variable in the logistic regression model was 1 = response; 0 = non-response. Only the 9,563 core members who had completed a full/partial wave 4 main interview were included in the model.
2. The data were weighted by the wave 4 main interview weight prior to running the model.
3. The p-value (quoted in parentheses) for each variable is based on a **Wald** test with the appropriate degrees of freedom.

Appendix F Model Of Response To Nurse visit/Blood samples

Appendix Table F.1 Model of response to nurse visit

Term	N	Odds ratio	95% confidence interval	
			Lower	Upper
Age-by-sex (p<0.001)				
Male 50-54 (ref)	462	1		
Male 55-59	799	0.95	0.73	1.24
Male 60-64	888	1.46	1.07	1.99
Male 65-69	680	1.20	0.86	1.67
Male 70-74	652	1.04	0.74	1.46
Male 75-79	387	1.20	0.82	1.75
Male 80-84	249	0.84	0.56	1.25
Male 85 and over	154	1.43	0.84	2.42
Female 50-54	552	0.79	0.59	1.05
Female 55-59	1020	0.86	0.66	1.11
Female 60-64	1083	1.39	1.02	1.89
Female 65-69	777	1.33	0.95	1.86
Female 70-74	771	1.26	0.89	1.78
Female 75-79	485	1.17	0.82	1.66
Female 80-84	325	0.74	0.52	1.06
Female 85 and over	278	1.00	0.68	1.45
Government Office Region (p<0.001)				
North East	591	1		
North West	1165	0.49	0.36	0.65
Yorkshire and The Humber	1026	0.95	0.69	1.31
East Midlands	1000	1.13	0.81	1.57
West Midlands	1044	1.10	0.81	1.52
East of England	1191	1.20	0.87	1.65
London	853	0.80	0.59	1.09
South East	1600	1.01	0.75	1.35
South West	1092	1.02	0.74	1.39
Housing tenure (p<0.001)				
Own it outright	6032	1		
Buying it with the help of a mortgage or loan	1926	0.80	0.69	0.94
Rent it	1604	0.76	0.65	0.88
Income quintile (p<0.001)				
Income quintile 1 (lowest)	1875	1		
Income quintile 2	1866	1.24	1.04	1.48
Income quintile 3	1865	1.45	1.21	1.74
Income quintile 4	1899	1.49	1.23	1.79
Income quintile 5 (highest)	1887	1.29	1.07	1.56
Missing income	170	0.76	0.52	1.12
Frequency does moderate sports or activities (p<0.001)				
More than once a week	5770	1		

Once a week	1361	0.87	0.73	1.02
One to three times a month	675	0.90	0.72	1.13
Hardly ever, or never	1756	0.71	0.61	0.84
White/non-white ethnicity				
(p<0.001)				
White	9273	1		
Non-white	289	0.62	0.47	0.80
Current smoking status				
(p<0.001)				
Non-smoker	8225	1		
Smoker	1337	0.79	0.68	0.92
Presence of children (p<0.001)				
Has children, lives with one or more	2258	1		
Has children, does not live with them	6127	1.16	1.00	1.34
Does not have children	1177	0.88	0.73	1.06
Limiting longstanding illness				
(p<0.001)				
Limiting longstanding illness	4318	1		
Non limiting longstanding illness	1954	1.27	1.07	1.49
No longstanding illness	3290	1.38	1.18	1.61
Self-reported general health				
(p=0.007)				
Excellent	1182	1		
Very good	2766	0.86	0.70	1.06
Good	3061	0.76	0.62	0.94
Fair	2553	0.67	0.53	0.86

Notes:

1. The dependent variable in the logistic regression model was 1 = response; 0 = non-response. Only 9,562 core members who had completed a full/partial wave 4 main interview were included in the model.
2. The data were weighted by the wave 4 main interview weight prior to running the model.
3. The p-value (quoted in parentheses) for each variable is based on a **Wald** test with the appropriate degrees of freedom.

Appendix Table F.2 Model of response to blood sample

Term	N	Odds ratio	95% confidence interval	
			Lower	Upper
Age-by-sex (p<0.001)				
Male 50-54 (ref)	385	1		
Male 55-59	661	1.18	0.89	1.57
Male 60-64	796	1.27	0.94	1.71
Male 65-69	597	1.06	0.78	1.44
Male 70-74	562	0.81	0.59	1.10
Male 75-79	341	0.75	0.54	1.04
Male 80-84	206	0.60	0.42	0.86
Male 85 and over	136	0.56	0.37	0.85
Female 50-54	438	1.02	0.75	1.39
Female 55-59	835	0.98	0.75	1.29
Female 60-64	961	1.19	0.89	1.60
Female 65-69	691	0.98	0.72	1.32
Female 70-74	679	0.93	0.69	1.27
Female 75-79	418	0.82	0.60	1.12
Female 80-84	261	0.76	0.54	1.07
Female 85 and over	228	0.98	0.68	1.40
Government Office Region (p<0.001)				
North East	517	1		
North West	887	0.94	0.71	1.25
Yorkshire and The Humber	884	0.95	0.71	1.28
East Midlands	879	0.66	0.49	0.88
West Midlands	914	1.17	0.87	1.58
East of England	1056	0.75	0.56	1.00
London	697	0.92	0.68	1.23
South East	1402	0.90	0.68	1.18
South West	959	0.87	0.65	1.16
White/non-white ethnicity (p<0.001)				
White	7983	1		
Non-white	212	0.56	0.43	0.73
Self-reported general health (p<0.001)				
Excellent	1038	1		
Very good	2413	0.91	0.74	1.13
Good	2629	0.84	0.68	1.04
Fair	2115	0.64	0.50	0.80
Limiting longstanding illness (p<0.001)				
No LS illness	3679	1		
Non-limiting LS illness	1713	0.87	0.74	1.01
Limiting LS illness	2803	0.72	0.62	0.84
Frequency does moderate sports or activities (p<0.001)				
More than once a week	5044	1		
Once a week	1165	0.95	0.80	1.12
One to three times a month	568	0.72	0.59	0.89
Hardly ever, or never	1418	0.71	0.60	0.84

Frequency does mild sports or activities (p<0.034)				
More than once a week,	6336	1		
Once a week	802	1.08	0.89	1.30
One to three times a month	281	1.05	0.79	1.40
Hardly ever, or never	776	0.79	0.65	0.95
Self-reported eyesight (p=0.013)				
Excellent	4079	1		
Very good	3090	1.05	0.93	1.19
Good	774	0.84	0.70	1.02
Fair	252	0.72	0.55	0.95

Notes:

1. The dependent variable in the logistic regression model was 1 = response; 0 = non-response. Only the 8,195 core members who took part in the nurse visit were included in the model.
2. The data were weighted by the wave 4 nurse weight prior to running the model.
3. The p-value (quoted in parentheses) for each variable is based on a **Wald** test with the appropriate degrees of freedom.