NatCen
Social Research that works for society

The dynamics of ageing: The 2018/2019 English Longitudinal Study of Ageing (Wave 9)

Technical Report

Authors: Bruno Pacchiotti, David Hussey, Gary Bennett
Date: January 2021

Contents

Tables

List of Figures

Acknowledgements

The authors would like to acknowledge the valuable contribution made to the study by colleagues at University College London (UCL), the Institute for Fiscal Studies (IFS), the University of Manchester, NatCen Social Research (NatCen) and the University of East Anglia.

The ELSA study is managed by a small committee chaired by Professor Andrew Steptoe (UCL) and, for the data collection in wave 9, comprised of Professor James Banks, Dr G David Batty, Kate Coughlin, Rowena Crawford, Anni Oskala, Professor Sir Michael Marmot, Professor James Nazroo, Zoe Oldfield, Professor Nicholas Steel, Martin Wood and Dr Paola Zaninotto.

Other team members involved in the development of wave 9 were:
At UCL – Dr Jessica Abell, Dr Dorina Cadar, Dr Cesar de Oliveira, Dr Panayotes Demakakos, Dr Camille Lasalle.
At IFS – Dr Gemma Tetlow and Rowena Crawford.
At NatCen –Tahmineh Hendron, Bruno Pacchiotti, Josi Breeden, Kavita Deepchand, Melanie Norton, Clare Littleford, Dhriti Mandalia, Stoyanka Dimitrova, Nasima Begum, Caroline Brouwer, Gianfranco Addario, Elaine Thornton, Lesley Henson and Claire Taylor.
At the University of Manchester – Dr Katey Matthews and Professor Neil Pendleton.

Thanks also are due to all members of the computing and service departments at NatCen who have worked so hard to implement the study. Nearly three hundred dedicated interviewers and nurses have also been crucial to the success of the study and their perseverance is very much appreciated. Finally, the main group to thank are our participants who so generously give up their time and without whom the study could not continue.

The UK government departments that contributed to wave 9 included the Department of Health and Social Care, Department for Transport and Department for Work and Pensions. We are particularly grateful to Joanna Burrage, James Canton, Rachel Conner, Rob Hardcastle, Rachel Pinto, Richard Hardcastle, Andrew Scott and Jonathan White, all of whom have made valuable contributions to ELSA over this period.

We are also grateful for funding from the National Institute on Aging in the USA and the involvement of colleagues there in advising the study.

1 Introduction

This technical report provides methodological information relating to the ninth wave of the English Longitudinal Study of Ageing (ELSA) in 2018-19. The report aims to provide an overview of the sampling design, study content, fieldwork response, weighting procedures and data preparation adopted at wave 9. 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 materials deposited at the UK Data Service.[1,2]

1.1 Overview

The English Longitudinal Study of Ageing (ELSA) aims to better understand the social and economic conditions, and the health and well-being of older people. It measures characteristics across a wide range of domains to provide high-quality multidisciplinary data that can be used to investigate health, financial, social and other experiences encountered by older adults in England. These include health trajectories, disability and healthy life expectancy; biological markers of disease; multiple dimensions of economic position in older age; household and family structure, social networks and social supports; and predictors of well-being. Interview data are collected every two years from a representative sample of the English population aged 50 years and older living in private residential accommodation in England. ELSA begun in 2002 with the interview of 12,099 men and women, of which 11,391 were interviews with core members.

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 for Fiscal Studies
- NatCen Social Research
- School of Social Sciences, University of Manchester
- Norwich Medical School, University of East Anglia

ELSA is harmonised with ageing studies in other countries to facilitate international comparisons, and is linked to financial and health registry data. The ELSA data have 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). Funding for the first nine waves of ELSA was provided by the US Institute on Aging (NIA) and a

[1] https://discover.ukdataservice.ac.uk/catalogue/?sn=5050&type=Data%20catalogue

[2] A User Guide covering all the waves is also available. This shows how to analyse the data and provides further information about weights.

consortium of British Government departments. Ethical approval for the study was granted by the South Central Berkshire Research Ethics Committee (REC) through an application to the National Research Ethics Service (NRES).

Data from all waves of ELSA are publicly available via the UK Data Service. Findings from each wave of ELSA are presented in substantive biennial reports (Marmot et al., 2003; Banks et al., 2006; Banks et al., 2008; Banks et al., 2010; Banks et al., 2012; Banks et al., 2014; Banks et al., 2016; Banks et al., 2018). Further analyses and publications are listed on the ELSA website (www.ifs.org.uk/elsa).

ELSA aims to be representative of individuals living in private residential accommodation in England aged 50 years and older. The original sampling frame for the study was the Health Survey for England (HSE), an annual survey, itself representative of the English population. To ensure the sample remains representative of the older population, refreshment samples of particular age groups have periodically been added to the study. Data are collected every two years by computer assisted personal interviews (CAPI) in the participants' home. A paper self-completion questionnaire is also given to respondents to complete in each wave. A nurse visit was carried out every four years to collect health examination data and blood samples. To date there have been nine waves of data collection: wave 1 (2002/3), wave 2 (2004/5), wave 3 (2006/7), wave 4 (2008/9), wave 5 (2010/11), wave 6 (2012/13), wave 7 (2014/15), wave 8 (2016/17) and wave 9 (2018/19), with nurse data collected in wave 2, wave 4 wave 6 and waves 8 and 9[3].

As in previous waves, the topic areas covered in wave 9 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; effort and reward; and timed walk. Interviewers also collected measured participants' weight. The nurse visit was shorter compared to previous waves and covered prescribed medications and drug coding and collect blood samples and measurements of blood pressure, grip strength and cognitive functioning.

A total of 8,736 main interviews were completed at wave 9 involving six cohorts. This included a total of 7,289 interviews (83%) conducted with core members[4]. Specifically, 3,660 interviews were with Cohort 1 core members from the original wave 1 sample, 688 were with core members from Cohort 3, 1,307 were with core members from Cohort 4, 523 were with core members from Cohort 6, and 212 were with core members from Cohort 7, and 899 were with core members from Cohort 9. The remaining 1,447 interviews (17%) were with partners of core members (who can be further categorised into core, young, old or new partners).

[3] The nurse visits on wave 9 were carried out only for 50% of the sample. The other 50% had received a nurse visit during wave 8. More information can be found in section 4.1.

[4] The concept of core members is introduced in the next chapter (2.1 Introduction to sample design, p. 4).

1.2 Content of this report

This report describes the design and implementation details of wave 9 of ELSA, carried out between July 2018 and July 2019. It begins by providing an overview of the sample design adopted at each wave of the ELSA study in Chapter 2. The content and structure of wave 9 survey data collection instruments is given in Chapters 3 and 4. Information on the wave 9 fieldwork procedures are outlined in Chapter 5, and the wave 9 response rates are presented in Chapter 6. Chapter 7 describes the derivation of the longitudinal and cross-sectional weights for use with the wave 9 core dataset. Finally, Chapter 8 describes data preparation procedures.

2 Sample design

Beginning with an introduction to the ELSA sample design, this chapter describes the use of the Health Survey for England (HSE) as a sampling frame for ELSA (Section 2.2). The sampling and eligibility criteria relating to each Cohort is discussed in separate sections (Section 2.3 for Cohort 1, Section 2.4 for Cohort 3, Section 2.5 for Cohort 4, Section 2.6 for Cohort 6, and Section 2.7 for Cohort 7).

2.1 Introduction to sample design

The original ELSA wave 1 sample (Cohort 1) was designed to be nationally representative of people aged 50 and over (born on or before 29th February 1952) living in private residential addresses in England along with their partners. The wave 1 sample was selected from households that previously responded to the Health Survey for England (HSE) in 1998, 1999 and 2001[5]. 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 named '**C**ohort **1** **c**ore **m**embers' (C1CM) to distinguish them as the core element of the continuing ELSA sample. Interviews with Cohort 1 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, wave 5 in 2010-11, wave 6 in 2012-13, wave 7 in 2014-15, wave 8 2016-2017 and wave 9 2018-2019).

To ensure the study remained representative of those aged 50 and over, new (refreshment) cohorts were added at wave 3 (Cohort 3), wave 4 (Cohort 4), wave 6 (Cohort 6), wave 7 (Cohort 7) and wave 9 (Cohort 9). The Cohort 3 sample was selected from the HSE 2001-2004 survey years, the Cohort 4 sample from HSE 2006, the Cohort 6 sample from HSE 2009, 2010 and 2011, the Cohort 7 sample from HSE 2011 and 2012, and the Cohort 9 sample from HSE 2013 – 2015.

- At wave 3, a 'refreshment' cohort of people entering their 50s (born between 1st March 1952 and 29th February 1956) was introduced (referred to as Cohort 3). At wave 3, the youngest core members from Cohort 1 were aged 54, so Cohort 3 ensured the study still covered ages 50 to 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 (referred to as Cohort 4). The sample used to form Cohort 4 was selected from HSE 2006. Cohort 4 comprises a "top-up" of people aged 52-74, and a refreshment sample of people aged 50-51.
- At wave 6, a further 'refreshment' cohort aged 50-55 (born between 1st March 1956 and 28th February 1962) was introduced to ensure that those in their

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

early 50s remained represented in the overall ELSA sample. Cohort 6 came from three later HSE survey years (2009, 2010 and 2011).

- At wave 7, a 'refreshment' cohort aged 50-51 (born between 1st March 1962 and 28th February 1964) was introduced. The Cohort 7 sample again ensured that younger age groups remained represented in the ELSA sample.
- At wave 9, a 'refreshment' cohort aged 50-53 (born between 1 March 1964 and 29 February 1968) was introduced to ensure the ELSA sample represented the younger groups.

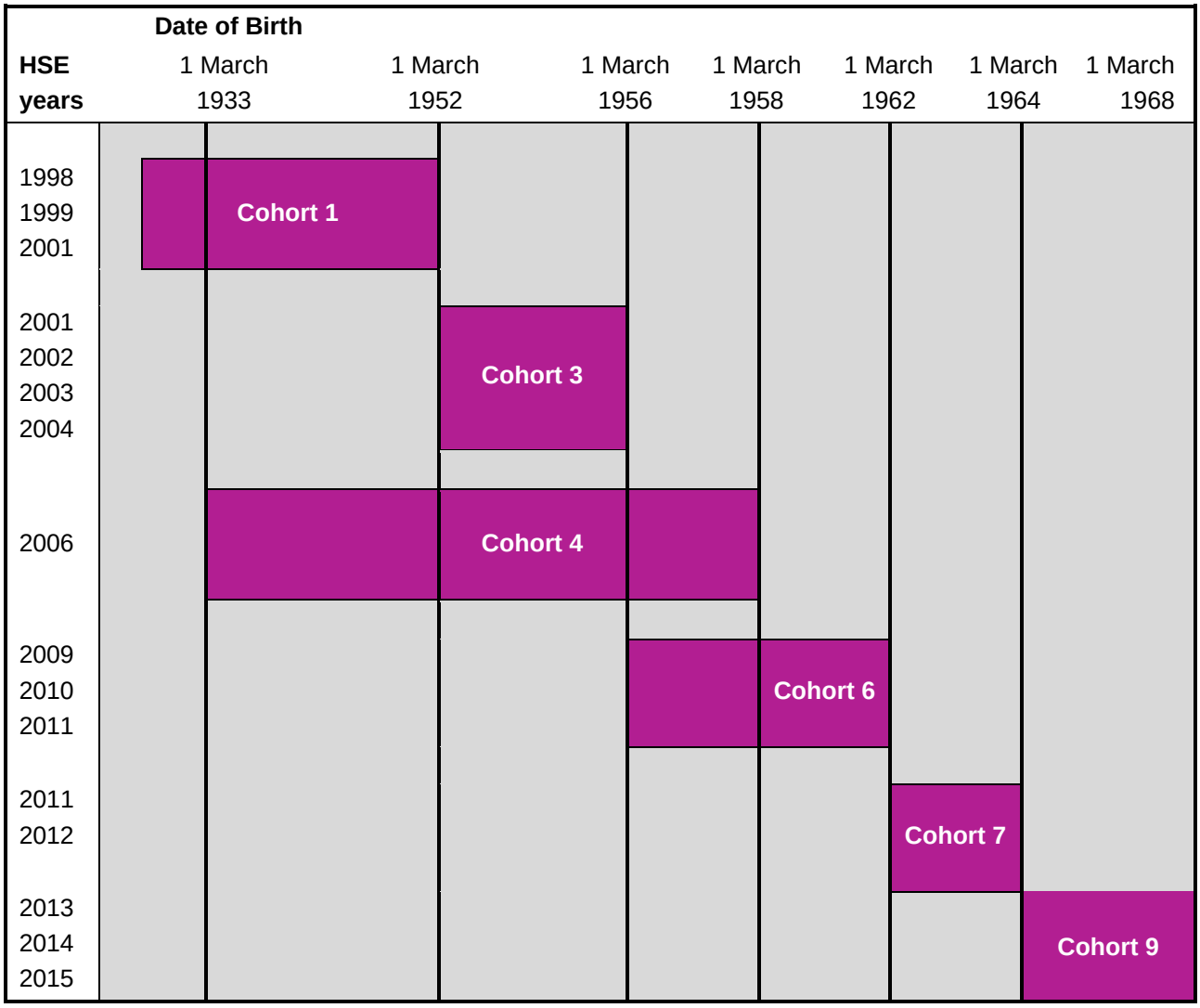
There is some overlap between the cohorts in terms of age, but each cohort is still viewed as a distinct group recruited from different years of HSE and introduced to ELSA at different times. Age-eligible sample members from each new cohort who are interviewed at their first wave are referred to as 'core members'[6]. Partners of core members from each cohort are also eligible for interview, but the main focus is on core members as they represent the sampled population of interest. A summary of the ELSA sample design is shown in

[6] The Cohort number was chosen to reflect the wave in which the new sample was added. There is no "Cohort 2" or "Cohort 5" in ELSA because no new sample was issued at wave 2 or at wave 5.

Figure 2.1[7]. More detail on the sample selection procedure for each cohort is given in the rest of this chapter.

[7] 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.

Figure 2.1 ELSA sample design



2.2 HSE 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, sampling from the Postcode Address File (see Taylor et al., 2007 for further details[8]). 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 2.1 (HSE years used as a sampling frame for ELSA are shown by grey shading).

[8] 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.

Table 2.1 HSE response rates							
Response rate	**HSE year (1998-2004)**						
	1998 %	1999 %	2000 %	2001 %	2002 %	2003 %	2004 %
Co-operating households	74	76	75	74	76	73	72
Individual response	69	70	68	67	67	66	66
	HSE year (2005-2011)						
	2005 %	2006 %	2007 %	2008 %	2009 %	2010 %	2011 %
Co-operating households	74	68	66	64	68	66	66
Individual response	64	61	58	58	61	59	59
	HSE year (2012-2018)						
	2012 %	2013 %	2014 %	2015 %	2016 %	2017 %	2018 %
Co-operating households	64	64	62	60	59	60	59
Individual response	56	58	55	57	55	55	54
Note: Households described as ‘co-operating’ are those where at least one eligible person was interviewed.							

Household response rates ranged from 76% in 1999 and 2002 to 59% in 2016 and 2018; individual response rates from 70% in 1999 to 54% in 2018 with a slight recovery to 57% in 2015. 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; Craig and Hirani, 2010; Craig and Mindell, 2011; Craig and Mindell, 2012; Craig and Mindell, 2013; Craig and Mindell, 2014; Craig, Fuller and Mindell, 2015; Neave, 2016).

Around 8,000 adult respondents are typically included each year in the HSE, around 85% 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, 2006 and 2011) 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).

2.3 Cohort eligibility

Table 2.2 presents a summary of the eligibility criteria for selection as a core member for each of the six cohorts that were interviewed in ELSA wave 9. This outlines the HSE sample years from which the samples were drawn, the age criteria for selection, and other eligibility criteria.

Table 2.2 Core member cohort 1-9 eligibility criteria for wave 9						
	Cohort 1 (Wave 1)	Cohort 3 (Wave 3)	Cohort 4 (Wave 4)	Cohort 6 (Wave 6)	Cohort 7 (Wave 7)	Cohort 9 (Wave 9)
Cohort codename	C1CM	C3CM	C4CM	C6CM	C7CM	C9CM
HSE year sample was selected from	1998, 1999, 2001	2001-2004	2006	2009-2011	2011-2012	2013, 2014, 2015
Original cohort age eligibility	born on or before 29th February 1952	born between 1 March 1952 and 29 February 1956	born between 1 March 1933 and 28 February 1958	born between 1 March 1956 and 28 February 1962	born between 1 March 1962 and 28 February 1964	born between 1 March 1964 and 29 February 1968
Entry eligibility criteria	Living in a private residential household at the time of HSE interview, consenting to be re-contacted for research purposes, and still living in a private residential address in England at the time of first interview					
Wave 9 eligibility (existing participants)	Productive baseline interview in original wave, and not since died, asked not to be revisited or moved out of Britain					

Figure 2.2 in the next page shows the eligibility flowchart used in ELSA and Table 2.3 presents the eligibility criteria for inclusion in the sample as a partner of a core member for each cohort.

Figure 2.2 ELSA sample design

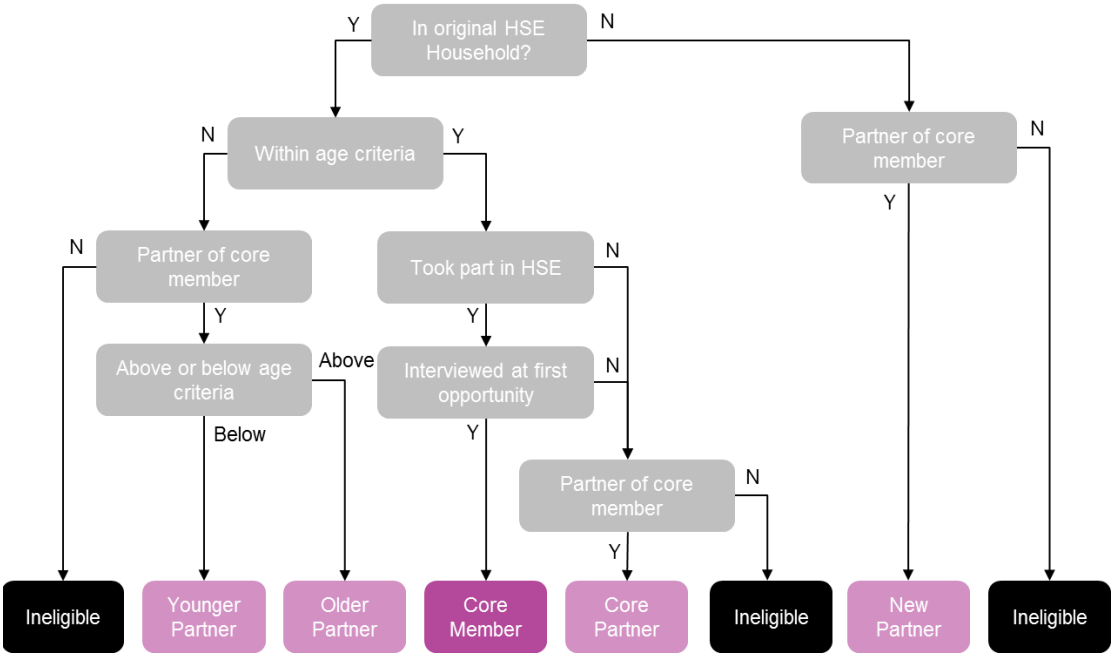


Table 2.3 Partner eligibility criteria for all cohorts at wave 9						
	Cohort 1 Wave 1	Cohort 3 Wave 3	Cohort 4 Wave 4	Cohort 6 Wave 6	Cohort 7 Wave 7	Cohort 9 Wave 9
Cohort codename[9]	C1YP C1CP C1NP1-7	C3YP C3OP C3NP3-7	C4YP C4OP C4NP4-7	C6YP C6OP C6NP6-7	C7YP C7OP C7NP	C9YP C9OP C9NP
HSE sample frame years	1998, 1999, 2001	2001-2004	2006	2009-2011	2011-2012	2013, 2014, 2015
Younger partner (YP)	born after 29 February 1952	born after 29 February 1956	born after 28 February 1958	born after 28 February 1962	born after 28 February 1964	born after 28 February 1968
Older partner (OP)	N/A	born before 1 March 1952	born before 1 March 1933	born before 1 March 1956	born before 1 March 1962	Born before 1 March 1964
Core partner (CP)	Age-eligible individuals who were meant to be core members, but were not interviewed as part of original wave, so missing the baseline survey. Only approached at subsequent waves by virtue of them being the					

[9] The first two digits of the codenames used for the cohorts indicate the number of the cohort (e.g. C1 indicates Cohort 1, while C6 indicates Cohort 6). The last two digits classify the study participant in 5 groups: CM (Core Members), CP (Core Partner), NP (New Partner), YP (Younger Partner) and OP (Older Partner).

	partner of a core member.
New partner (NP)	Spouses or partners (of any age) of core members, co-habiting at the time of their ELSA interviews, who had joined the household after the original HSE interview.
Wave 9 eligibility all	Productive baseline interview, and not since died, asked not to be revisited or moved out of Britain Partners (Core, Younger, Older or New) who separate/divorce from their Cohort Member partner remain eligible to take part until they have been successfully interviewed for **one** subsequent wave.

The following sections provide more detail on the selection of sample members for each cohort.

2.4 ELSA Cohort 1

Age-eligible sample members were followed up from HSE 1998, 1999 and 2001 for ELSA wave 1 (cohort 1) in 2002-03. 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 for ELSA sampling since there were insufficient resources to be included in the ELSA.

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 re-contacted 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 containing 18,813 individuals 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).

Fieldwork eligibility checks 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. 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. As a result, some changes were anticipated. There were three particular ways in which the status of an individual could change between HSE and ELSA 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 younger partners was also checked. Younger partners were approached for interview if, at the time of the wave 1 interview, they were still living with an age-eligible sample member. Younger 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 2.3.

Figure 2.3 Eligibility criteria for wave 1 interview

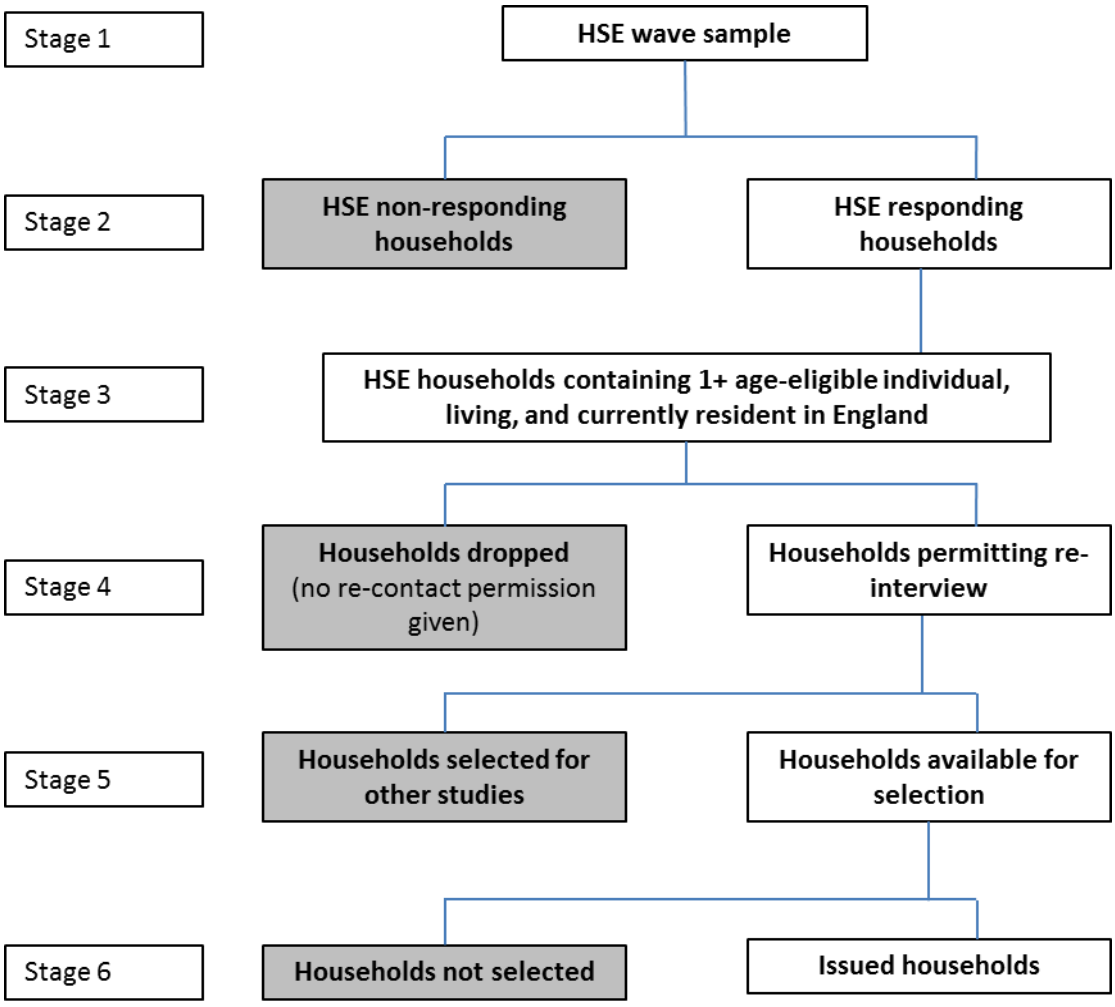
Sample members (C1SM) are individuals living within the household at the time of the HSE interview in 1998, 1999 and 2001, born on or before 29 February 1952 (age-eligible) and still living at a private residential address in England at the time of the wave 1 interview (2002-03). Those 11,391 individuals successfully interviewed in wave 1 were later renamed '**Cohort 1 core members (C1CM)**'. Those who did not take part at wave 1 remained as sample members and became ineligible to take part in ELSA and were not contacted again for an interview after the initial wave (as a non-participating, ineligible group, sample members do not feature in the archived productive ELSA data.)

Younger partners (C1YP) are the cohabiting spouses or partners of eligible sample members, living within the household at the time of the HSE in 1998, 1999 and 2001, and still cohabiting with the sample member in wave 1. Cohort 1 younger partners were born after 29 February 1952.

New partners (C1NP1) are the cohabiting spouses or partners of eligible sample members at the time of the first ELSA interview, of any age, who joined the household after the HSE interview.

Figure 2.4 below describes an example of the sample selection process used for selecting both the original sample for wave 1 and subsequent refreshment samples.

Figure 2.4 Example sample selection process for cohorts 1-9



Eligibility criteria for Cohort 1 at later waves

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 re-contacted[10].

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

[10] Respondents who explicitly asked not to be re-contacted in the future were asked to re-join the study at the next wave if someone else in the household had implicitly consented to be re-contacted. Albeit this procedure might not be aligned to the GDPR provisions, the fieldwork was carried out before the GDPR came into force. Indeed, the fieldwork ended in 2017 while GDPR was not implemented until 2018.

interview were still approached for an institutional interview (developed for use at wave 2 onwards).

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 2.5).

Figure 2.5 Summary of the Eligibility criteria for Cohort 1 at later waves

Core members (C1CM) are individuals living within the household at the time of the HSE interview in 1998, 1999 and 2001, born on or before 29 February 1952 and 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) are individuals, like core members, living within the household at the time of the HSE interview and born on or before 29 February 1952. However they were not interviewed as part of wave 1, so missed the baseline survey. As a consequence they were *only* approached at subsequent waves as the partner of a core member.

Younger partners (C1YP) are the cohabiting spouses or partners of core members, living within the household at the time of the HSE, and still cohabiting with the sample member in wave 1. Younger partners were born after 29 February 1952. Younger 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, C1NP5, C1NP6, C1NP7) are the cohabiting spouses or partners of core members at the time of *the interview at a particular wave* who joined the household since the original HSE interview. As with younger partners, new partners who stopped living with their core member partner were only interviewed once following the split with their core member partner.

2.5 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.[11] 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.

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). There were 1,770 households from HSE waves 2001-2004 containing at least one age eligible person (50-54 years old) who had agreed to be re-interviewed. We selected 1,633 of these households (the remaining households containing at least one age eligible person had already been issued as part of ELSA Wave 1). The final sample comprised 1,877 sample members and 941 partners.

[11] Only the general population ('core') sample was used from HSE 2004.

2.6 ELSA Cohort 4

The selection criteria for Cohort 4 was people born between 1 March 1933 and 28 February 1958 (minimum age 50, maximum age 74). The HSE 2006[12] 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, in 2008-09, 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 allows us to examine the transition to disease and disability compared to an older sample (core outcomes for longitudinal analysis).

There were 3,446 HSE households from wave 2006 containing at least one age eligible person (50-74 years old) who had agreed to be re-interviewed. We selected 2,116 of these households. The final sample comprised 3,242 age eligible individuals and 262 partners.

2.7 ELSA Cohort 6

At wave 6, in 2012-13, the aim was to supplement Cohort 1 with people born between 1 March 1956 and 28 February 1962 so that the ELSA sample in 2012-13 would still cover people aged 50-55. The wave 6 refreshment sample covered a period of 6 birth years and thus overlaps with w4 refreshment sample for those born between 1 March 1956 and 1 March 1958. The sources for the new recruits were the 2009, 2010 and first half of 2011 HSE years. As before, individuals were eligible if they had been living in a responding HSE household, at least one household member had not refused future follow up contact to HSE and were, at the time of the ELSA 2012-13 interview, still living at a private residential address in England. Partners were also interviewed.

There were 10,799 households in total available to sample from (based on HSE 2009-11). 1,311 of these contained at least one age eligible person (50-55) who had agreed to be re-interviewed. We selected all 1,530 available age eligible people in these households (all of whom had to have previously been interviewed themselves for HSE and agreed to follow-up). We also sampled 723 partners of these 1,530 people. The original selected sample therefore included 2,253 people. The issued sample after further checks and removal of anyone known to have died was comprised of 2,244 individuals, living in 1,310 households.

[12] For HSE methodology and documentation see Craig and Mindell (2008).

2.8 ELSA Cohort 7

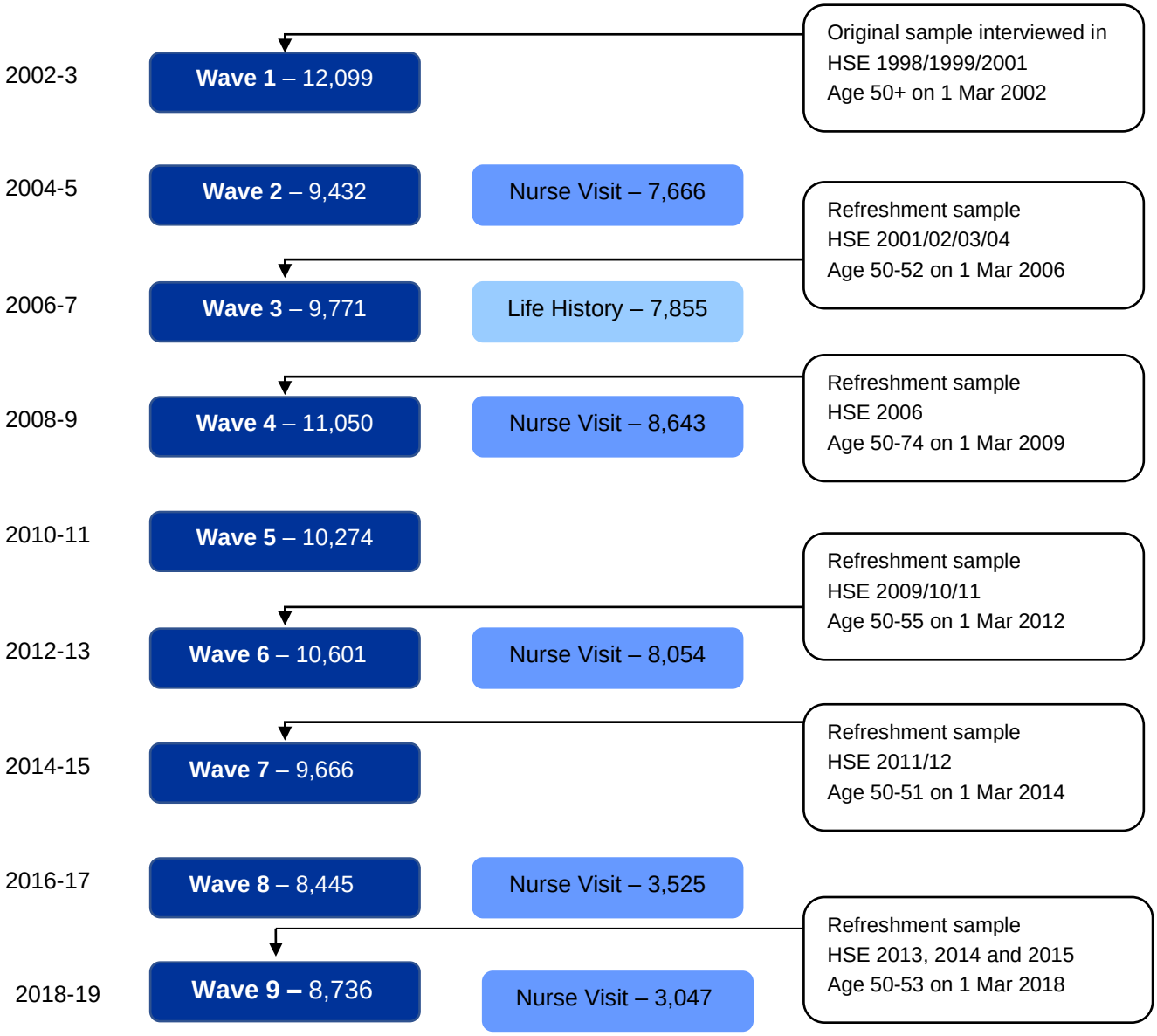
At wave 7 (2014-2015), the aim of the refreshment selection was to supplement the sample with people born between 1 March 1962 and 28 February 1964 so that it would include people aged 50-51. The sources for the new recruits were the 2011 and 2012 HSE years. As in previous waves, individuals were eligible if they had been living in a responding HSE household, at least one household member had not refused future follow up contact to HSE and were, at the time of the ELSA 2014-15 interview, still living at a private residential address in England. Partners were also interviewed. These people formed Cohort 7. Cohort 7 core members and their partners represented 6% of all issued cases at wave 7.

544 age-eligible individuals who had agreed to be re-contacted were selected from HSE 2011-2012. Additionally, 326 partners of those selected were also included. The issued refreshment sample for wave 7 therefore included 870 cases.

2.9 ELSA Cohort 9

At wave 9, the aim of the refreshment selection was to supplement a cohort of people born between 1 March 1964 and 29 February 1968 (aged 50–53) was added to the waves 1, 3, 4, 6 and 7 cohorts. The sources for the new recruits were the 2013, 2014 and 2015 HSE years. There were 1248 interviews at wave 9 and, of these, 899 became core members.

Figure 2.6 Summary of data collection in ELSA waves 1–9 (sample sizes are all completed interviews)[13]



[13] Sample size by cohort and the number of core members and partners interviewed in each wave can be found in Table 6.1 (chapter 6).

3 The Main interview at wave 9

This chapter provides a detailed description of the survey instruments that are used in wave 9 of ELSA. These comprise the main interview, with shorter variants for proxy and institutional interviews; and a self-completion questionnaire. Nurse interviews were carried out at ELSA wave 9 and are discussed in Chapter 4.

3.1 Overview of data collection

The core ELSA questionnaire is administered at each wave by Computer Assisted Personal Interviewing (CAPI) in the participants' home using Blaise interviewing software. A shorter interview is attempted with a proxy informant if the core member is unable to respond because of physical or mental ill health, or cognitive impairment (see section 0). Proxy interviews were also allowed at wave 9 where the respondent was unwilling to respond themselves but agreed that someone else (usually a spouse) could respond on their behalf. A further short version of the main core interview was used for sample members who had moved into an institution (such as a residential or nursing home).

A paper self-completion questionnaire was also given to respondents to complete at the end of their CAPI interview. This core self-completion questionnaire was similar to that included in previous waves. Where interviews are carried out concurrently, the self-completion questionnaires can be filled out by one person while the other completes sections of the main questionnaire which need to be answered in private.

3.2 CAPI questionnaire

The ELSA wave 9 main interview covered a wide range of topics (see Figure 3.1). It was similar to the questionnaire used in previous waves, although every module is reviewed and new topics have been added.

CAPI questionnaire modules

Figure 3.1 provides an overview of the content of the main ELSA interview at wave 9. For further information see Appendix A which has a breakdown of interview content by wave of the survey.

Figure 3.1 Main interview modules wave 9

Household Demographics (HD) – Collected or updated demographic information about everyone living in the household, including gender, age and relationships to each other, and collected or updated information about children living outside the household.

Individual Demographics (ID) – Collected or updated details about respondents' legal marital status, parents' age and cause of death, and number of living children. Includes questions on proximity to where children and grandchildren live.

Health (HE) – Collected or updated self-reported general health, long-standing illness or disability, eyesight, dental health, hearing, specific diagnoses and symptoms, pain, difficulties with daily activities, smoking and ecigarette use, mental health, urinary and bowel incontinence, falls and fractures, self-perceived weight and cancer screening. Questions on balance and dizziness were reintroduced in wave 9. Questions on quality of care for cardiovascular disease, depression, diabetes, falls and osteoarthritis, and questions on sleep disturbance were removed from wave 9.

Social Care (CA) – Topics included the nature of care received, who it was received from, the amount received, payments made for care and short stays in residential/nursing homes. New questions about care received at home that was not provide by family or friend were introduced in wave 9.

Social Participation (SP) – Covered the use of different types of transport.

Work and Pensions (WP) – Collected or updated current work activities, current and past pensions, reasons for job change, health-related job limitations, working beyond the state pension age and state pension deferral, as well as questions about additional payments into a pension. Question on expected retirement age moved from the self-completion questionnaire to the CAPI module.

Income and Assets (IA) – : Assessed the income that respondents received from a variety of sources over the last 12 months: wages, state pensions, private pensions, other annuity income and state benefits; also collected financial and non-financial assets. Routing to questions about lifetime receipt of gifts and inheritances that were included in wave 6 was changed at wave 7 to ensure that the questions were asked of respondents not asked at wave 6.

Housing (HO) – Collected or updated current housing situation (including size and quality), housing-related expenses, adaptations to accommodation for those with physical impairments, ownership of durable goods and cars, consumption including food in and out of home, fuel, durables and clothing. Only one eligible ELSA respondent in the household answered the module. Respondents decided themselves who should answer the questions in this module, but again, it was preferable that the person who answered the Housing module in wave 8 answered this module again in wave 9.

Cognitive Function (CF) – measured different aspects of the respondent's cognitive function, including memory, speed and mental flexibility. Elements included were memory and concentration, word list recall, animal naming, backwards counting from 20, serial 7s, and naming objects and people. The fluid intelligence (number series) task was moved from the interviewer to the nurse visit in wave 8 and remained part of the nurse visit in wave 9.

Expectations (EX) – Measured expectations for the future in a number of dimensions, financial decision-making and relative deprivation. New questions on expectations of working past age 70 and future social care needs were added. Questions on the knowledge of the funding system of paying for care were removed from wave 9.

Psychosocial Health (PS) – Measured how the respondent viewed his or her life across a variety of dimensions. For wave 9, a question about perceived age was added.

Effort and Reward (ER) – Assessed the relationship between effort and reward in relation to voluntary and caring activities and includes questions on care provided to grandchildren.

Final questions and consents (FQ) – Collected any missing demographic information and updated contact details and consents. New questions on citizenship were introduced in wave 9.

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

Measured Weight (MM): weight measurement was moved from the nurse visit to the main interview in wave 8, and remained part of the main interview in wave 9

Core self-completion questionnaire (administered by paper) (SC) – covering quality of life, social participation, religious feelings and behaviour, control at work, life satisfaction, food poverty, time-use questions, social networks and alcohol consumption

Wave 9 CAPI questionnaire changes

This section provides an overview of the main questionnaire changes at wave 9. Overall, four modules were affected: health, expectations, effort and reward and the end question module. Table 3.1 highlights the main changes for each module at wave 9 by listing the new topics introduced, the questions reinstated from earlier waves, and topics that were omitted. Only the major changes are described here, but all changes (including those made to routing) can be found in the wave 9 documentation.

Table 3.1 Questionnaire changes at wave 9

Revised Module	New Topics	Topics reinstated from earlier wave(s)	Topics omitted at wave 9
Health	• *Care received at home that was not provided by family or friend*	• *Balance and dizziness*	• *Sleep disturbance* • *Quality of care in arthritis and joint pain (in hips and knees)* • *Quality of care in diabetes* • *Quality of care in heart disease* • *Quality of care in depression* • *Quality of care in falls*
Expectations	• *Expectations of working past age 70* • *Expected retirement age (moved from self-completion)*		• *Expectations module: knowledge of the funding system of paying for care*

Effort and Reward	• *Care received at home that was not provided by family or friend*		
Psychosocial health		• *Self-perceived age*	
Final questions	• *Citizenship*		
Online dietary questionnaire	• *Introduction of online questionnaire*		

The changes outlined in Table 3.1 are described below:

Health Module (HE)

For wave 9, questions asking about care received at home that was not provided by family or friend and payment for this care have been added. The questions on balance and dizziness have been reinstated.

Questions about any sleep disturbance experienced were removed for wave 9 as were questions about the quality of care for cardiovascular disease, depression, diabetes, falls and osteoarthritis.

Expectations (EX)

New questions on expectations of working past the age of 70. The question about expectation of working to retirement age was moved from the self-completion module to this module.

Questions asking about knowledge of the funding system of paying for care were removed for wave 9.

Psychosocial Health (PS)

Questions on self-perceived age were reinstated.

Online dietary questionnaire

Wave 9 included the introduction of new online dietary questionnaire to be completed in the week following the CAPI interview.

Final Module (FQ)

A new question asking about citizenship / passport was added.

CAPI administration

The ELSA CAPI programme allows flexibility in administering the interview. Respondents could be interviewed individually, or interviewed at the same time (in a single session) using concurrent interviewing techniques, in households with more

than one eligible respondent. In a concurrent session the same block of questions is 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 are 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 measurements module 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);
- Final Questions (FQ); and
- Contact Block (CB)

Wherever possible, modules which form the "private block" were administered with no other household members present. If two respondents were being interviewed concurrently, while 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. For existing sample members, if they were in a single person household they were sent the self-completion questionnaire in advance of the interview. Refreshment sample members were not sent the self-completion questionnaire in advance. If respondents had not completed the self-completion questionnaire before or during the interview, they could complete it after the interview and return the questionnaire by post.

Where households contained two or more eligible individuals one person was nominated as the informant for the household demographics section. 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 3.2.

Figure 3.2 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 interview ended with a request for confirmation or amendment of consent to obtain health and economic data from administrative sources. Participants were asked to provide their National Insurance number and give permission for the ELSA team to link their survey data to official records held by the Department of Work and Pensions (DWP) and Her Majesty's Revenue and Customs (HMRC) (i.e. National Insurance contributions, welfare and benefit receipt, tax credit claims, tax records, savings and pensions).

3.3 Self-completion questionnaire

Respondents were given the core self-completion questionnaire to complete. Where there was only one existing sample member within a household, self-completion questionnaires were sent by post for the sample member to complete in advance. Where more than one existing sample member was in a household, self-completion questionnaires were given at the time of interview, and completed while the other sample member was answering the 'private block' questions in the main questionnaire. Proxy interviewees do not complete self-completion questionnaires. The core self-completion asked about the respondent's quality of life, social participation, religious feelings and behaviour, control at work, life satisfaction, food poverty, time-use questions, social networks and alcohol consumption.

Core self-completion questionnaire changes

The majority of questions remained unchanged from wave 8, but several changes were made to the main self-completion questionnaire in wave 9 as detailed below:

- Questions about time use were reinstated.
- Questions about food poverty were added.
- Questions about religiosity were reinstated.
- Questions about wishing to take part in more social activities were removed.
- Questions about food consumption were removed.

- Questions on subjective social status were removed.
- Questions on the experience and perceptions of ageing were removed.
- Questions about generativity were removed.

3.4 Online dietary questionnaire

Wave 9 also included, for the first time in ELSA, the administration of an Online Dietary Questionnaire for those who completed an ELSA interview in person.

At wave 9 all ELSA participants who completed the main interview in person (i.e. not proxies) were also asked to complete an Online Dietary Questionnaire. Participants were asked to complete the questionnaire on two separate days in the week following the interview. In order to ensure a range of completion days, people were asked to complete the online dietary questionnaire on a week day and a weekend day (allocated randomly by CAPI). On their allocated days, the participant was asked to log in to the questionnaire and record what they ate and drank on the previous day.

3.5 Variants of the main ELSA interview

The main variants of the ELSA interview are discussed in this section. All of these types of main interview are considered to be "productive" interviews, therefore in wave 9, as in wave 8, institutional interviews were eligible for inclusion in the response rate calculations in Chapter 6.

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.

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 and continued at Waves 5 to 9. 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 care workers sometimes fulfilled this role.

Where the respondent lacked mental capacity a consultee declaration form was used by the interviewer to allow a consultee to declare whether the respondent would have wanted to take part if they were able. This had to be completed before a proxy interview could take place for respondents who could not take part because they lacked mental capacity.

Table 3.2 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 in person were given the self-completion questionnaire.

Table 3.2 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
CB	Contact block

All proxy interviews included questions on individual demographics, health, work and pensions and final questions/consents. However, the three modules asterisked in Table 3.2 were asked only in specific circumstances:

- In cases where there was at least one other person in the household eligible for interview, the Household Demographics and Housing modules 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 Income and Assets section. 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 finances. For single people requiring a proxy, the IA section was always asked as part of the proxy interview.

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 9 interview, and the content remains broadly the same for non-proxy and proxy institutional interviews.

Table 3.3 Institutional 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
CB	Contact block

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 which 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 Income and Assets and Housing.

The social care questions introduced at wave 6 were designed for those living in their own homes so were not asked of those living in institutions.

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 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

3.6 Interview timings

There were a total of 8,736 productive interviews in wave 9, including 8,146 full and 36 partial in person interviews. Single person interviews had a mean length of 87.4 minutes, and concurrent interviews with two participants had a mean length of 121 minutes.

4 The Nurse Visit (Health Examination)

4.1 Setting up the nurse visit

A new approach was taken when designing the nurse visit that was to be carried out in wave 9. Unlike in previous waves, where all core members responding to the main interview were eligible for a nurse visit in that wave, across wave 8 and wave 9, two mutually exclusive subsets of members were pre-selected (prior to fieldwork): one to be offered a nurse visit at wave 8 and the other to be offered a nurse visit in wave 9.

The selection was done in two stages. The first stage, prior to wave 8 fieldwork used purposive sampling (within cohort) and prioritised those who had responded to all previous nurse visits from cohorts 1 through to 6 to be issued for a nurse visit at wave 8[14]. This differed from earlier waves where all core members who completed an interview in person were eligible, regardless of previous participation in the nurse visit. The remaining cohort members were flagged for a nurse visit in wave 9, thus ensuring that all cohort members were eligible for a nurse visit in wave 8 or wave 9, conditional on completing the mainstage interview at the wave to which they were eligible for a visit.

We expect the new design of the nurse visits (different eligibility conditions and different fieldwork structure) to be implemented also in future waves of ELSA.

Each element of the nurse visit was entirely voluntary, so it was possible for respondents to agree to some measures and not others. Some of the measures taken at wave 6 were not performed at waves 8 or 9, measures of lung function and balance were removed, participants were not asked to perform chair and leg raises and hair samples were not collected. Weight was measured as part of the main interview not the nurse visit, while height and waist circumference measurements were not taken. Further, the fluid intelligence test was moved from the main interview to the nurse visit and an additional blood sample for PAXgene analysis was taken[15].

The nurse telephoned the respondent in all cases before the visit in order to arrange or confirm the appointment and discuss preparation for the visit. If the respondent was willing, the nurse talked them through the points on the appointment record card highlighting that they should not eat, smoke, drink alcohol or do any vigorous exercise for 30 minutes before the visit. Nurses used this opportunity to establish eligibility for blood samples and fasting blood samples and explained the fasting rules to those eligible (see 4.2).

[14] Cohort 7 was excluded from this first group (presumably) on the basis that the non-response patterns across waves was unknown for this group which had only completed one prior wave

[15] The PAXgene analysis is used in genetic studies to identify causes, diagnosis or treatment of common diseases and factors linked to the ageing process. The blood samples for the PAXgene analysis were collected on tubes designed to stabilise the *in vivo* gene transcription by reducing RNA degradation.

4.2 Consent and eligibility

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[16]. 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 6 nurse visit project instructions.[17] 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 written consent. In total, there were seven different consent forms presented in a booklet that respondents were asked to sign. Respondents were also asked whether they would like to receive a copy of their blood sample results. The signed consent forms covered the following:

- send blood pressure information to GP;
- allow blood sample to be taken;
- send blood sample results to GP;
- send blood sample results to respondents;
- allow remaining blood to be stored for future analysis;
- allow blood sample for PAXgene extraction and storage

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.[17]

4.3 Measures taken during the nurse visit

Figure 4.1 summarises the measures taken in the wave 9 nurse visit.

[16] Blood samples were taken also from non-fasting study participants (namely, from those who were eligible to have blood sample taken but were not eligible to fast).

[17] https://www.ucl.ac.uk/drupal/site_iehc/sites/iehc/files/5050_waves_2-4-6-8_nurse_data_user_guide_v01.pdf

Figure 4.1 Nurse visit measures at wave 9

Blood pressure – pulse and diastolic and systolic blood pressure were taken three times.

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.

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 closed for 30 seconds.

Fluid Intelligence – a set of number series questions used to assess cognitive function as a measure of early cognitive impairment.

Up to five small blood sample tubes 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 4.2. If the respondent had fasted and given consent for PAXgene analysis then all five 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. Up to five vials were drawn, three of these were taken for all people who agreed to a blood sample with further tubes for those who had fasted and those who consented to PAXgene.

Figure 4.2 Blood sample measures at wave 9

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 and LDL cholesterol – HDL cholesterol is 'good' cholesterol which protects against heart disease. LDL is 'bad' cholesterol; increased levels are associated with increased risk of 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.

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) – a low white blood cell count is an indication the body isn't making enough white blood cells and can increase the risk of infections.

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

Vitamin D – Obtained from the diet and from sunshine, Vitamin D is needed for healthy bones.

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

5 Fieldwork procedures

Fieldwork for the ninth wave of ELSA began in July 2018 and finished in July 2019. 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.

This chapter provides background information about the fieldwork procedures employed in wave 9. This includes interviewer and nurse training (Section 5.1); piloting and dress rehearsal stages (Section 5.2); the mainstage fieldwork design (Section 5.3) and fieldwork materials (Section 5.4). Further sections include the follow-up rules (Section 5.5); how deaths were identified (Section 5.6); tracing procedures adopted if respondents could not be contacted (Section 5.7); and methods used to encourage response (Section 5.8).

5.1 Interviewer and nurse training

139 interviewers and 65 nurses worked over the course of wave 9. Before starting work, all interviewers and all new nurses attended a one day in-person interviewer or nurse briefing run by a researcher. The briefings covered all fieldwork procedures including training on how to administer the assessments (walking speed, cognitive function and weight measurement). The briefings also fully explained the documents needed for the study and provided an introduction to all questions within the respective CAPI interview. Interviewers and nurse were also provided with written interviewer or nurse study guidelines to reinforce their learning from the briefing.

5.2 Dress Rehearsal

A separate pilot/dress rehearsal sample has been retained since the start of ELSA that can be returned to at each wave of the study. This sample is only used for pilots and dress rehearsals. Most of the sample comprises respondents who were living in households that participated in the Health Survey for England (2000) and subsequently agreed to be a part of the ELSA pilot sample. As with the main ELSA sample, refreshment samples drawn from HSE dress rehearsal participants were added to the pilot/dress rehearsal sample in waves 3, 6 ,7 and 9.

A wave 9 dress rehearsal was conducted in February and March 2018 to test changes to the main interview questionnaire, and the overall survey process.

The aim of the Wave 9 dress rehearsal was to test new questions or new combinations of questions in the context of the full content of the ELSA questionnaire. The changes to the questionnaire that were included in the Wave 9 dress rehearsal were:

- General changes to the CAPI questionnaire to test flow and length;
- Paper self-completion

- Online dietary questionnaire.

The sample for the Wave 9 dress rehearsal was taken from the ELSA pilot/dress rehearsal panel. Of the 151 households selected to take part, productive interviews were achieved with 162 participants across 112 households.

5.3 Mainstage Fieldwork design

Mainstage fieldwork began in July 2018 and consisted of six tranches of interviews, and a seventh tranche for reissued cases (namely, cases reassigned to a new interviewer for an additional fieldwork tranche, as defined in the *Reissue fieldwork* section below).

Contact procedures

Interviewers made contact with respondents by telephone or face to face to arrange an interview. Face to face contact was always used if a respondent was aged 85 or over or was unproductive at last wave of ELSA, to increase productive interview numbers.

Main fieldwork

Fieldwork for Wave 9 was split into six tranches to balance interviewer workload. The first tranche began in July 2018. The main fieldwork for each tranche lasted 6 weeks. A total of 7,475 households and 9.029 individuals were issued at wave 9. Following this, unproductive interview cases were assessed and reissued in a final seventh tranche where respondents were likely to be persuaded to give an interview.

Reissue fieldwork

Reissued cases included respondents who gave soft refusals (i.e. willing to take part but unable to do so when contacted) and respondents who had not yet been contacted by the interviewer in the regular fieldwork. A total of 45 cases were reissued, resulting in 18 productive interviews.

5.4 Fieldwork materials

Interviewers keep a number of administrative records, such as the Address Record Form (ARF) to enable changes in address and circumstances to be recorded. During the interview, in addition to the CAPI, interviewers used the following materials:

- Show cards.
- Cognitive ability record booklet.
- Timed walk record card.
- Measurement record card (weight).
- A measuring tape and stopwatch (for the timed walk).

- Weighing scales.
- Online dietary leaflet and labels.

Consent forms, a letter for consultees[18], and a declaration form and leaflet for stable contacts and proxies are also used where required.

5.5 Consents

At the end of the interview, new household members joining ELSA were asked whether their data can be linked to records held by the Health and Social Care Information Centre, NHS primary care records, the Department for Work and Pensions (DWP) and HM Revenue and Customs (HMRC).

The consent forms signed by the respondents included details about what they agreed to and on how to withdraw consent, by getting in contact with NatCen Social Research. Respondents who had already consented to data linkage were also given the possibility to withdraw their permission, if they had changed their mind. Respondents are given carbon copies of their consent form, which give an NatCen address they can write to withdraw any of their consent for data linkage.

The consents section was revised for Wave 9. To avoid errors in completion, all four types of consent were on different forms (instead of Health and Economic being asked on the same form). The wording and formatting across all four forms was standardised.

5.6 Fieldwork follow-up rules

Cohorts 1, 3, 4, 6 and 7 Core Members

There were four main reasons why interviewers did **not** follow-up members from Cohorts 1, 3, 4, 6 or 7 at wave 9:

- 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);
- Partners (Core, Young, Old or New) who had separated from their Core Member partner, and had already been interviewed once after 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 9 if they had:

[18] In accordance with the Mental Capacity Act (2005), the consultee is someone who knows the respondent, this could be next of kin, other relative, a close friend or unpaid carer, and can advise on whether the respondent would wish to be involved in the ELSA study and can have the respondent withdrawn from the study at any time without giving any reason.

- not taken part in two or more consecutive waves of ELSA;
- asked not to be contacted again;
- moved from their address at a previous wave and could not subsequently be traced.

It is important to note that the fieldwork response calculations in Chapter 6 are based only on those cases issued to field interviewers at wave 9.

5.7 Deaths

The process of reporting deaths to the survey team is through two methods. All participants who gave their permission in HSE or ELSA are 'flagged' with the Health and Social Care Information Centre (HSCIC) (previously by the National Health Service Central Register (NHSCR) at the Office for National Statistics). 94% of core members have been flagged on this register. 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.

5.8 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.

If the whole household had moved since the wave 8 interview, or a core member who had consented to be re-contacted in future waves had moved away, interviewers were directed to try the following possible routes to trace movers:

- attempt telephone contact with the respondent;
- contact with neighbours/addresses opposite;
- give mover letter to the present occupier;
- contact stable address by phone, visit or letter (via Brentwood Office);
- contact any proxy nominee by phone, visit or letter (via Brentwood office) if
- appropriate.

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.

5.9 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 5.1.

Figure 5.1 Methods of encouraging response in wave 9

Each respondent was sent an advance letter and given an information leaflet. The advance letter offered an incentive payment in the form of a £20 gift card, provided at the end of the ELSA interview. Newsletters with an update on ELSA findings and the research team were given to existing sample members and refreshment sample respondents on the doorstep or at the end of their interview.

There were three advance letters: one for existing sample members who responded at the previous wave, one for existing sample members who did not respond at the last wave, and one for refreshment sample members.

Where possible, respondents were assigned to the same interviewer in wave 9 as they had been in wave 8 or at previous waves.

Interviewers initially made contact by telephone with those who were successfully interviewed at the last wave of ELSA and were under 85. It was felt that these respondents were less likely to refuse at wave 9 and were therefore the best candidates for this method. Interviewers initially made contact by a personal visit with respondents aged 85 and over and respondents unproductive at their last interview. 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.

5.10 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, sections on how ELSA has been used, presentation of the international network of studies on the 50+ population, comments from respondents, an open invitation to share ELSA stories with the research team and an Ask an Interviewer section. A respondent website (www.natcen.ac.uk/elsa) included information about all eight waves to date. Participants were sent the newsletter a few weeks before the start of fieldwork.

6 Response rates at wave 9

This section includes a summary of field response rates at each wave which are based on core members issued at the start of fieldwork. For all response rate measures, respondents were defined as those who gave a full or partial interview either in person or by proxy.

This chapter starts with an overview of achieved interviews at wave 9 (Section 6.1) and then outlines the eligibility criteria used for calculation of the response rates (Section 6.2). The main response rates for each cohort are presented in Sections 6.3 and 6.4, followed by information on self-completion response.

Fieldwork response rates in section 6.3 are based on the total issued sample at wave 9. These do not take into account core members who were not followed up for interview at wave 9 (for example because *all* responding members in the household refused to be re-contacted after their first ELSA interview - see Chapter 5).

Three different fieldwork response rates are presented:

1. **Fieldwork household contact rate |** the proportion of attempted survey units where a contact was made.
2. **Fieldwork cooperation rate |** the proportion of eligible respondents who, having been contacted, agreed to participate in a research study (as opposed to refusing or otherwise indicating inability to participate).
3. **Individual response rate |** the proportion of eligible survey units (individuals) who participated in a research study. For ELSA, 'eligible' means not having been found to be ineligible through death or moving out of Great Britain. Those with outcomes indicating unknown/unconfirmed eligibility (e.g. non-contacts, untraced movers) are assumed to be eligible for the response rate calculation.

Figure 6.1 illustrates the different types of wave 9 cross-sectional conditional response rates and Figure 6.2 illustrates the longitudinal conditional response rate for Cohort 1, both presented in Section 6.4.

Figure 6.1 Types of wave 9 cross-sectional conditional rates

Cohort	Notation	Meaning	Numerator	Denominator
Cross-sectional conditional rates				
Cohort 1	$RR_{8\|1}$	The (cross-sectional) W9 response rate conditional upon W1 response	Responding in W9	Eligible in W9 & respondent in W1
	$RR_{8\|7}$	The (cross-sectional) W9 response rate conditional upon W7 response	Responding in W9	Eligible in W9 & respondent in W7
Cohort 3	$RR_{8\|3}$	The (cross-sectional) W9 response rate conditional upon W3 response	Responding in W9	Eligible in W9 & respondent in W3

	$RR_{8\|7}$	The (cross-sectional) W9 response rate conditional upon W7 response	Responding in W98	Eligible in W9 & respondent in W7
Cohort 4	$RR_{8\|4}$	The (cross-sectional) W9 response rate conditional upon W4 response	Responding in W9	Eligible in W9 & respondent in W4
	$RR_{8\|7}$	The (cross-sectional) W9 response rate conditional upon W7 response	Responding in W9	Eligible in W9 & respondent in W7
Cohort 6	$RR_{8\|6}$	The (cross-sectional) W9 response rate conditional upon W6 response	Responding in W9	Eligible in W9 & respondent in W6
	$RR_{8\|7}$	The (cross-sectional) W8 response rate conditional upon W7 response	Responding in W9	Eligible in W9 & respondent in W7
Cohort 7	$RR_{8\|7}$	The (cross-sectional) W9 response rate conditional upon W7 response	Responding in W9	Eligible in W9 & respondent in W7

Figure 6.2 Longitudinal response rate (wave 9)

Cohort	Notation	Meaning	Numerator	Denominator
Longitudinal conditional rates				
Cohort 1	$RR_{8,7,6,5,4,3,2\|1}$	The (longitudinal) conditional wave 9 response rate	Responding in W2,W3,W4, W5,W6,W7, W8 & W9	Eligible in W1,W2,W3, W4, W5, W6, W7, W8 & W9 and respondent in W1

6.1 Response to main interview

Table 6.1 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 institution[19]. At wave 9, a total of 8,736 interviews were conducted. Of these, 7,289 were with core members (3,660 Cohort 1; 688 Cohort 3; 1,307 Cohort 4; 523 Cohort 6; 212 Cohort 7 and 899 Cohort 9).

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

Table 6.1 Number of respondents at each ELSA wave split by Cohort									
ELSA Wave		Number of completed interviews							
		Core members (CMs)						Partners	CMs & Partners
	Cohort 1	Cohort 3	Cohort 4	Cohort 6	Cohort 7	Cohort 9	Total	Total	Total
	(n)	(n)	(n)	(n)	(n)	(n)	(n)	(n)	(n)
Wave 1	11,391	N/A	N/A	N/A	N/A	N/A	11,391	708	12,099
Wave 2	8,781	N/A	N/A	N/A	N/A	N/A	8,781	652	9,433
Wave 3	7,535	1,275	N/A	N/A	N/A	N/A	8,810	960	9,770
Wave 4	6,623	972	2,291	N/A	N/A	N/A	9,886	1,164	11,050
Wave 5	6,242	936	1,912	N/A	N/A	N/A	9,090	1,184	10,274
Wave 6	5,659	888	1,796	826	N/A	N/A	9,169	1,432	10,601
Wave 7	4,894	787	1,606	661	301	N/A	8,249	1,417	9,666
Wave 8	4,219	723	1,470	582	229	N/A	7,223	1,222	8,445
Wave 9	3,660	688	1,307	523	212	899	7,289	1,447	8,736

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 6.2 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 7,289 interviews with core members across the six cohorts at wave 9.

Table 6.2 Sample type of wave 9 respondents by Cohort							
	Base: all respondents						
Sample type		ELSA Cohort					
	Cohort 1	Cohort 3	Cohort 4	Cohort 6	Cohort 7	Cohort 9	Total
Core member	3,660	688	1,307	523	212	899	7,289
Core partner	77	8	10	19	2	13	129
Younger partner	202	135	61	81	49	151	679
Older partner		67	63	85	48	164	427
New partner	95	43	32	17	4	21	212
Unweighted N	4,034	941	1,473	725	315	1,248	8,736

Table 6.3 shows that around half of core members with a wave 9 interview were from the original Cohort 1 (50%). Nearly a fifth of core member interviews at wave 9 were from Cohort 4 (18%), and around one in ten were from each of Cohort 3 (9%) and Cohort 6 (7%). Cohort 7 accounted for 3% of interviews with Core Members, whereas Cohort 9 did for 12%.

Table 6.3 Core member respondents in wave 9, by type of interview							
Base: core member respondents in wave 9, including those in institutions N: 7,223							
	Cohort 1	**Cohort 3**	**Cohort 4**	**Cohort 6**	**Cohort 7**	**Cohort 9**	**Total Wave 9**
	(n)	**(n)**	**(n)**	**(n)**	**(n)**	**(n)**	**(n)**
Type of interview in wave 8							
Full interview in person	3,440	665	1,260	510	206	865	6,946
Full interview by proxy	154	18	42	12	6	26	258
Partial interview in person	15	4	2	1	0	8	30
Partial interview by proxy	2	0	0	0	0	0	2
Institutional interview in person	9	0	0	0	0	0	9
Institutional interview by proxy	40	1	3	0	0	0	44
Total	*3,660*	*688*	*1,307*	*523*	*212*	899	7,289
% of all interviews with core members	*50%*	*9%*	*18%*	*7%*	*3%*	*12%*	

6.2 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. Table 6.4 shows that 40% of the original core members from Cohort 1 were ineligible by the time of wave 9. The smaller proportion of ineligibles for Cohort 3, 4, 6 and 7 can be explained by the younger age profile of these groups (i.e. fewer deaths).

Table 6.4 Core members ineligible at wave 9 by cohort					
Base: core members ineligible by wave 9					
	Cohort 1	**Cohort 3**	**Cohort 4**	**Cohort 6**	**Cohort 7**
Reason for ineligibility	**(n)**	**(n)**	**(n)**	**(n)**	**(n)**
Deaths	4,423	75	265	14	4
Moves out of Britain	123	18	27	4	2
Total	4,546	93	292	18	6
% of original core members	40%	7%	13%	2%	2%

Unknown eligibility

Eligibility of some core members in wave 9 was not known. Known eligibility means essentially that the core member remained a member of the target population in wave 9 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 core members 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 9 was small. The response rate

calculations set out in this chapter therefore make the assumption that the sub-groups with unknown eligibility were in fact eligible.

6.3 Fieldwork 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 are the fieldwork household contact rate and the fieldwork cooperation rate (see Table 6.5).

The household contact rate is the proportion of attempted households where a contact was made. I.e., in this section, the household contact rate gives the total wave 9 households where contact was made by an interviewer with at least one member of the sample, divided by total eligible households.

The cooperation rate is the proportion of eligible respondents who, having been contacted, agree to participate in a research study (as opposed to refusing or otherwise indicating inability to participate). I.e., in this section, the individual cooperation rate gives the total individual wave 9 respondents, divided by the total (still eligible) individuals contacted by the interviewer. Non-contacts and those untraced are therefore also treated as ineligible in this response rate.

The rates presented in this section include only those core members who were issued to field interviewers at the start of wave 9. It excludes those known to have become ineligible (see Section 6.2) or selectively removed from the issued sample at wave 9 (e.g. due to a prior refusal or through being previously unable to trace).

All response rates presented here derived from the AAPOR (American Association for Public Opinion Research[20]) approach using the standard definitions and method used at NatCen. They have been calculated from a number of sources: outcome codes from fieldwork, sampling re-contact information and mortality updates[21].

[20] http://www.aapor.org/Communications/AAPOR-Journals/Standard-Definitions.aspx

[21] This was information about deaths of respondents who had agreed to have their records linked to the HSCIC register (now NHS Digital). The mortality update provided information about deaths before the start of wave 9 fieldwork which was used to determine the composition of the issued sample.

Table 6.5 Fieldwork response rates by wave[22]										
Type of field response rate		Response rates								
		Wave								
		W1	W2	W3	W4	W5	W6	W7	W8	W9
		%	%	%	%	%	%	%	%	%
Household contact rate	Cohort 1	95	97	97	97	97	98	98	97	98
	Cohort 3	N/A	N/A	83	97	94	97	96	95	97
	Cohort 4	N/A	N/A	N/A	92	98	98	98	97	98
	Cohort 6	N/A	N/A	N/A	N/A	N/A	89	96	91	95
	Cohort 7	N/A	N/A	N/A	N/A	N/A	N/A	85	96	95
	Cohort 9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	84
Fieldwork cooperation rate	Cohort 1	70	84	83	77	80	86	83	86	88
	Cohort 3	N/A	N/A	74	81	81	84	81	85	89
	Cohort 4	N/A	N/A	N/A	69	87	85	79	86	86
	Cohort 6	N/A	N/A	N/A	N/A	N/A	62	83	79	80
	Cohort 7	N/A	N/A	N/A	N/A	N/A	N/A	70	81	80
	Cohort 9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	66

Proportion of eligible core members issued to field at wave 9

Table 6.6 shows the proportion of eligible core members that were issued to the field at wave 9 (i.e. those not known to have died or moved out of Great Britain).

[22] External information from the National Health Service Central Register (now held by the Health and Social Care Information Centre - HSCIC) was matched to non-respondents to identify any deaths that had not been revealed in the course of fieldwork during waves 1-3. Individuals whose outcome showed that their eligibility had not been confirmed during fieldwork were all assumed to be eligible for the response rate calculation. From waves 4 to 6 only information from the HSCIC prior to fieldwork or confirmed by fieldwork were coded as deaths.

Table 6.6 Proportion of eligible core members issued to field at wave 9

Base: all eligible core members

	Cohort 1	Cohort 3	Cohort 4	Cohort 6	Cohort 7
	%	%	%	%	%
Issued to field interviewers at wave 9	69	86	94	99	100.0
Not issued to field interviewers at wave 9	31	14	6	1	-
Total	100	100	100	100	100
Unweighted (N)	*7,734*	*1,033*	*1,927*	*803*	*296*

Each of the fieldwork response rates for wave 9 are described below and presented in Table 6.7. When considering contact and cooperation 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 either in person or by proxy.

Table 6.7 Fieldwork response rates at wave 9 split by Cohort

Base: eligible core members issued to field at wave 7

	Cohort 1	Cohort 3	Cohort 4	Cohort 6	Cohort 7	Cohort 9
Fieldwork response rates	%	%	%	%	%	%
Fieldwork household contact rate	98	97	98	95	95	84
Fieldwork cooperation rate	88	89	86	80	80	66
Individual response rate	86	86	84	77	76	56

Fieldwork household contact rate

The household contact rate is the proportion of attempted survey units (households) where a contact was made. I.e., in this section, the household contact rate gives the total wave 9 households where contact was made by an interviewer with at least one member of the sample, divided by total eligible households. 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 5.8). Over the full fieldwork period a household contact rate of 98% was achieved for Cohort 1, 97% for Cohort 3, 98% for Cohort 4, 95% for Cohort 6, 95% for Cohort 7 and 84 for Cohort 9.

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 9 an individual co-operation rate of 88% was achieved

for Cohort 1 core members, 89% for Cohort 3 core members, 86% for Cohort 4 core members, 80% for Cohort 6 core members, 80% for Cohort 7 core members and 66 for Cohort 9 core members.

Individual response rate

The individual response rate is the proportion of eligible survey units who participate in a research study. For ELSA, 'eligible' means not having been found to be ineligible through death or moving out of Great Britain. Those with outcomes indicating unknown/unconfirmed eligibility (e.g. non-contacts, untraced movers) are assumed to be eligible for the response rate calculation. The individual response rate gives the total individual wave 9 respondents, divided by total individuals who have not been confirmed as ineligible for a wave 9 interview. Response among Cohort 1, Cohort 3 and Cohort 4 was similar (86%, 86% and 84% respectively). The lowest response rate was, as expected, among Cohort 9 (56%), followed by Cohorts 6 and 7 with similar response rates (77% and 76% respectively).

Reasons for non-response

Table 6.8 gives a breakdown of the reasons recorded by interviewers for non-response at wave 9. It is based on contacts issued to the field at the start of wave 9 who were eligible for the response rates. Refusals made up the greatest proportion of non-response for all cohorts, ranging from 58% in Cohort 7 to 78% in Cohort 4. Problems with non-contact and movers were greatest for Cohort 7 (33%) as no other attempt had been made to contact them since their HSE interview which took place sometime in 2011 or 2012. In contrast, core members from the other cohorts had been sent Christmas Cards since their last ELSA interview (thereby providing an opportunity to update address records).

Table 6.8 Reasons for non-response at wave 9 split by Cohort

Base: all non-responding eligible core members issued to field at wave 9

	ELSA Cohort				
	Cohort 1	Cohort 3	Cohort 4	Cohort 6	Cohort 7
	%	%	%	%	%
Refusal	59	69	71	78	73
Moved/non-contact	14	21	13	19	20
Other unproductive[23]	26	9	16	4	6
Unweighted (N)	523	106	226	156	68

[23] This included being ill at home, in hospital, physically or mentally unable to participate, language difficulties, "other" reasons.

6.4 Response to self-completion questionnaire

Self-completion questionnaires were given to all individuals interviewed in person (rather than by proxy). Of the 8,191 individuals (Core Members and partners) interviewed in person, 97.1% agreed to complete a core self-completion interview, and 181 received help from an interviewer to complete the form. The total number of core self-completion forms returned was 7,502, or 91.6% of those completing a main interview in person.

Of the 7,289 Core Members interviewed, 6,985 were interviewed in person and were offered the core self-completion questionnaire, with 6,397 (91.6%) core self-completion questionnaires received from these. Table 6.9 presents the core self-completion response rate for Core Members by cohort.

Table 6.9 Core self-completion response by Cohort

	Base: all eligible core members completing a face-to-face interview at Wave 9						
		ELSA Cohort					
	Cohort 1	**Cohort 3**	**Cohort 4**	**Cohort 6**	**Cohort 7**	**Cohort 9**	**Total**
	%	%	%	%	%	%	%
Received self-completion questionnaire	92.7	94.3	94.1	90.8	87.9	82.9	91.6
Unweighted (n)	*3464*	*669*	*1262*	*511*	*206*	*873*	*6,985*

6.5 Response to online dietary questionnaire

For the first time at wave 9, all those who completed an ELSA interview in person were invited, towards the end of the interview, to complete an Online Dietary Questionnaire on two randomly allocated (by CAPI) days in the week following their interview. Expressed as a proportion of all eligible, 61% of eligible people throughout fieldwork completed at least one diary day.

6.6 Response to wave 9 nurse visit

Core members who completed the main wave 9 interview in person (i.e. not by proxy) and had not had a nurse visit in wave 8 were eligible to have a nurse visit in wave 9. Participants gave their consent to be visited by the nurse at the end of the main interview.

Table 6.10 below shows response to the nurse visit to be greatest amongst Cohort 4 core members (98%) and lowest amongst Cohort 9 members (89%).

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 6.10 Response to nurse visit at wave 9 split by Cohort

Base: all core members eligible for a nurse visit

	ELSA Cohort						
	Cohort 1	**Cohort 3**	**Cohort 4**	**Cohort 6**	**Cohort 7**	**Cohort 9**	**Total**
	%	%	%	%	%	%	%
Productive nurse visit	96	94	98	92	97	89	95
Refusal	3	6	1	4	3	9	4
Non-contact	<1	0	<1	2	0	1	<1
Other unproductive[24]	<1	0	<1	2	0	<1	<1
Unweighted (N)	*921*	*160*	*1106*	*47*	*189*	*783*	*3206*

Table 6.11 shows that 39% of core members who were issued to wave 9 and were still eligible had a nurse visit at wave 9. The level of refusal to the nurse visit invitation was extremely low amongst this group (2%), this was to be expected given that this group were known historically as having high levels of compliance only being eligible for wave 8 nurse visit if they had participated in all previous nurse visits that they had been invited to.

About 6% of core members issued to wave 9 and who remained eligible did not complete a full or partial interview in person at wave 8 and therefore were not invited to do the follow-up nurse visit. There were 4,502 core members issued to wave 8 and who remained eligible were not invited to take part in a wave 8 nurse visit due to not having taken part in all previous nurse visits for which they were eligible.

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

Table 6.11 Response to nurse visit at wave 9		
Base: core members that were issued at wave 9 (and who remained eligible at wave 9)		
	(n)	%
Productive nurse visit	3047	33
Refusal to nurse visit	125	1
Non-contact by nurse	20	<1
Other nurse unproductive[25]	14	<1
No full or partial interview at wave 9	1,401	15
Full or partial interview by proxy so no nurse visit	212	2
Not issued to wave 9 nurse fieldwork	4,482	48
Unweighted (N)	*9,301*	*100*

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

7 Data editing and preparation

This chapter provides brief details about editing and preparation of data that is carried out following the end of data collection, and how the data can be accessed.

7.1 Data preparation

Most data validation of the CAPI surveys is carried out in the field – extensive checks are included in the CAPI program to prompt interviewers to clarify and check data discrepancies directly with the participant in real time. However, all cases are also passed through an in-house edit to identify any further interviewer issues, along with checks on specific elements of the data.

Open text is coded in NatCen's Brentwood data processing unit, and a dataset is produced for Natcen to perform routine checks. These include checking for duplicate respondents, checking routing of questions within each module and checking for missing data. Issues are resolved through programming changes and a revised dataset is then created. Variables are labelled and re-labelled, and disclosive variables are dropped. Core derived variables are created, and cross sectional, self-completion and longitudinal weighting variables are added to the dataset. Administrative variables such as unique ID (idauniq) variables are also added for refreshment sample cases.

Individual collaborator organisations make additional checks to specific modules and the Institute of Fiscal Studies creates two datasets: Financial Derived Variables Relationships and a Pensions Grid.

7.2 Paper self-completions

All paper self-completion questionnaires are passed through an edit to check for any participant routing and coding errors (for example multiple responses to single-code questions). This electronic reconciliation edit carried out by NatCen also checks that the values from the CAPI interview indicating whether or not a person completed a self-completion or consented to link their survey data to administrative records matched the equivalent data in the scanned dataset for each record.

Any mis-matches are reconciled at this point. Survey data such as age, gender, names and outcome codes are also used to reconcile the self-completion and consent data with information collected during the CAPI interview.

7.3 Accessing ELSA data

Once all checks are complete, data has been cleaned and derived variables, weights and other additional variables added, the core dataset, financial derived datasets, user guide and questionnaires are archived at the UK Data Service (https://discover.ukdataservice.ac.uk/catalogue). These can be accessed by any researcher through registering with the UK Data Service and filling out a short form.

Disclosive data, such as geographical variables, are not archived but are held by NatCen, and researchers may apply to access them. An application form can be requested from the ELSA Data Manager and once completed is reviewed by the NatCen Data Release Panel for consideration.

8 Weighting

This chapter describes the weighting strategy used to adjust for non-response at wave 9. The derivation of the main interview weights (two longitudinal weights and the cross-sectional weight) is described in Sections 8.1-8.3. Section 8.4 describes the weighting for those responding to the self-completion questionnaire and Section 8.5 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 "User Guide Waves 1 to 9 available from the UK Data Service.

8.1 Longitudinal and cross-sectional weights introduction

Longitudinal datasets such as ELSA can be analysed longitudinally or as a cross-section. 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 and, as in previous waves, both types of weights have been produced for wave 9 core members. Those with partial and proxy interviews are treated as respondents but those living in institutions do not receive either longitudinal or cross-sectional weights.

For wave 9, two longitudinal weights were created:

- Longitudinal weight (wave 1 base): a longitudinal weight for Cohort 1 core members who have taken part since the beginning of ELSA (wave 1);
- Longitudinal weight (wave 4 base): an additional longitudinal weight for core members (from cohorts 1, 3 and 4) who have taken part every wave since wave 4.

The latter weight was introduced for the first time after wave 7, to increase the base for analysis involving the later waves (wave 4 onwards) only. Both weights build on the corresponding wave 8 longitudinal weights, which in turn were based on previous longitudinal/ attrition weights going back to the first relevant wave (i.e. wave 1 in the case of the original longitudinal weight and wave 4 in the case of the wave 4 base longitudinal weight). The sequential nature of the weighting means that the weights adjust for historical non-response as well as non-response since the last wave.

Cross-sectional weights are defined for all core members living in private households in England who responded to wave 9, including new entrants to the study and people who missed one or more of the preceding waves (whom we shall refer to as wave non-responders).

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

8.2 Longitudinal weights

As described above, two different longitudinal weights are now produced. The purpose of each of these weights is to make those receiving them as representative as possible of people aged 50+ living in England at the time of the reference wave i.e. 2002, in the case of the wave 1 base weight, and 2008, in the case of the wave 4 base weight. As such, those who have subsequently moved to Scotland and Wales (at any point) are still eligible to receive a longitudinal weight.

Longitudinal weights (wave 1 base)

A longitudinal weight was created for the 2,959 Cohort 1 core members who responded to all nine waves of ELSA and have remained living in private households. The purpose of the weight is to make those receiving it as representative as possible of all people who:

- were aged 50+ and living in England in 2002 (when wave 1 was conducted);
- remain living in private households.

These respondents are now aged 66 and over.

For the 3,222 Cohort 1 core members who were eligible for the main interview in wave 9 and responded at all previous waves, response to wave 9 was modelled using logistic regression analysis on a range of household- and individual-level information collected at wave 8 (supplemented by information taken from waves 1–7). The analysis was conducted using the wave 8 longitudinal weight (to ensure that the wave 9 weight did not replicate the adjustments made by the wave 8 weight).

The results showed significant differences between respondents and non-respondents on the following characteristics (after controlling for age (at wave 1) by sex and region which were also included in the final model):

- housing tenure;
- self-reported general health.

Taking the inverse of the estimated probability of response (from the logistic regression model) created a non-response weight for wave 9. This was then trimmed at the 99th percentile and multiplied by the wave 8 longitudinal weight (scaled to an average of 1 afterwards) to produce the wave 9 longitudinal weight. The sequential nature of the weighting means that we have adjusted for non-response to HSE and each of the eight waves of ELSA.

Longitudinal weights (wave 4 base)

A longitudinal weight was created at wave 9 for all core members from cohorts 1, 3 and 4 who were eligible for the main interview in wave 9, and who responded to all of waves 4 to 9. The purpose of the weight is to make those receiving it as representative as possible of all people who:

- were aged 50+ and living in England in 2008 (when wave 4 was conducted);
- remain living in private households.

These respondents are now aged 60 and over.

There were 4,848 such core members with 3,116 coming from Cohort 1, 567 from Cohort 3 and 1165 from Cohort 4. This weight will provide a larger base for longitudinal analyses which utilise data from any subset of waves 4-9 (and do not include waves 1-3).

For the 5,297 core members from cohorts 1, 3 and 4 who were eligible for the main interview in wave 9 and responded at all of waves 4-8, response to wave 9 was modelled using logistic regression analysis on a range of household- and individual-level information collected at wave 8 (supplemented by information taken from waves 1–7). Separate models for were created for each cohort (1, 3 and 4); however, for consistency (and parsimony) characteristics that were predictive of response for any one of the three cohorts were included in all three models.

The analysis was conducted using the wave 8 longitudinal weight (wave 4 base) constructed after wave 8; this weight was based on a sequence of non-response models which adjust for non-response since wave 4.

The results showed significant differences between respondents and non-respondents on the following characteristics (after controlling for age/sex and region which were also included in the final model):

- marital status;
- housing tenure;
- self-reported health status;
- number of people in household;
- NS-SEC.

Taking the inverse of the estimated probability of response (from the logistic regression model) created a non-response weight for wave 9. This was then trimmed at 99th percentile and multiplied by the wave 8 longitudinal weight (wave 4 base), afterwards scaled to have an average of 1 to produce the final wave 9 longitudinal weight (wave 4 base). The sequential nature of the weighting means that we have adjusted for non-response to HSE and each of the eight waves of ELSA.

8.3 Cross-sectional weights

A cross-sectional weight was created for analysis of the full set of core members responding at wave 9. This allows for the inclusion of core members from cohorts 3, 4, 6, 7 and 9 including ‘wave non-responders’ (core members from cohorts 1, 3, 4and 6 who returned to the study at wave 8 after missing one or more previous waves). The aim of the cross-sectional weight is to make the sample representative of people living in private households in England (in 2018). Those living in Scotland or Wales therefore receive a zero cross-sectional weight.

Core members from cohorts 1, 3, 4, 6, 7 and 9 who responded at wave 9 can be described as the combined sample. For weighting purposes, this combined sample was split into two main groups by age (at interview): those aged 67+ and those aged 50-66. These groups cut across cohorts 1 and 4 as shown in Table 8.1 below.

Table 8.1 Core member respondents in England at wave 9

Core member respondents at wave 9 (2018-19) living in England, including proxies but excluding those in institutions

	Age at wave 9 interview	Cohort 1	Cohort 3	Cohort 4	Cohort 6	Cohort 7	Cohort 9
Aged 67+:							
Cohort 1 longitudinal group	67+	2,916					
Cohort 1 wave non-responders		634					
Cohort 4 longitudinal group[26]	67-84			750[27]			
Cohort 4 wave non-responders	67-84			81			
Aged 50-66[28]:							
Cohort 1	62-66	41					
Cohort 3	62-66		639				
Cohort 4	60-66			510[29]			
Cohort 6	56-66				520		
Cohort 7	54-56					210	
Cohort 9	50-57						899
Total		3,591	639	1,341	520	210	899

[26] Note, this base is not the same as wave 4 base longitudinal weight which includes cohorts 1, 3 and 4.
[27] A small number of these were from the second group as their age matched the age of the first group.
[28] Each of the cohort groups below (except for cohort 7) comprises a mix of longitudinal cases and wave non-responders i.e. these two types of case are not split out as they are for those aged 65+.
[29] A small number of these were cohort 3 core members who were not issued until wave 4. As described elsewhere in this report such cases are considered as part of cohort 4.

The cross-sectional weight was calculated using the following steps:

1. A non-response weight was derived for Cohort 3 core members who had responded to all of waves 3–9. This involved analysis of those who had responded to all previous waves (3-8) to adjust for non-response at wave 9.

2. A non-response weight was derived for Cohort 4 core members who had responded to all of waves 4–9. This involved analysis of those who had responded to all previous waves (4-8) to adjust for non-response at wave 9.

3. A non-response weight was derived for Cohort 6 core members who had responded to all of waves 6–9. This involved analysis of those who had responded to waves 6, 7 and 8 to adjust for non-response at wave 9.

4. A non-response weight was derived for Cohort 7 core members who had responded to all of waves 7–9. This involved analysis of those who had responded to waves 7 and 8 to adjust for non-response at wave 9.

5. A non-response weight was derived for Cohort 9 core members to adjust for non-response at wave 9.

6. Population estimates (of highest educational qualification, tenure, ethnicity and marital status) for those aged 67+ (at wave 9 interview)[30] were derived from the longitudinal groups i.e. Cohort 1 core members responding to all nine waves of ELSA and Cohort 4 core members aged 67+ responding to all waves since wave 4.

7. The non-response weights for all core members aged 67+ at wave 9 (i.e. the two groups mentioned above in point 6 *plus* wave non-responders from both cohorts) were then calibrated to these population estimates plus estimates of age/sex and region from 2018 household population estimates.

8. The non-response weights for all core members aged 50-66 (at wave 9) were calibrated to 2018 population estimates of age/sex and region.

9. Finally, the calibration weights from steps 7 and 8 above were combined and scaled so that the average weight was equal to 1.

These steps are discussed in turn.

Non-response weight for Cohort 3

For the 559 Cohort 3 core members eligible for the main interview in wave 8 who responded to (all of) waves 3–8 (and remaining in private households in England), response to wave 9 was modelled on a range of household- and individual-level information collected at wave 8. The analysis was conducted using the non-response weight derived at wave 8 to ensure that the wave 9 weight did not replicate any adjustment made by the wave 8 weight.

[30] The Methods chapter in the main report incorrectly stated that the cut-off was 64 and that age was defined here as at 1st March 2016. In fact, the cut-off age was 65 and age was based on age at wave 8 interview.

The results showed significant differences between respondents and non-respondents on the following characteristics (after controlling for sex and region which were also included in the model):

- highest educational qualification;
- marital status.

Taking the inverse of the estimated probability of response created a non-response weight to adjust for non-response bias between waves 8 and 9 for a total of 524 respondents.

Non-response weights for Cohort 4

For the 1,320 Cohort 4 core members[31] eligible for the main interview in wave 9 who responded to all waves 4–8 (and remaining in private households in England), response to wave 9 was modelled on a range of household- and individual-level information collected at wave 8. The analysis was conducted using the non-response weight derived in wave 8 to ensure that the wave 9 weight did not replicate any adjustment made by the wave 8 weight.

The results showed significant differences between respondents and non-respondents on the following characteristics (after controlling for age/sex and region which were also included in the final model):

- whether they have a long-term limiting illness;
- number of people in household;
- NS-SEC.

Taking the inverse of the estimated probability of response created a non-response weight to adjust for non-response bias between waves 8 and 9 for a total of 1,206 respondents.

Non-response weights for Cohort 6

For the 552 Cohort 6 core members eligible for the main interview in wave 9 (and remaining in private households in England), response to wave 9 was modelled on a range of household- and individual-level information collected at wave 8. The analysis was conducted using the non-response weight derived in wave 8 to ensure that the wave 9 weight did not replicate any adjustment made by the wave 8 weight.

The results showed significant differences between respondents and non-respondents on the following characteristics (after controlling for age/sex and region which were also included in the final model):

- self-reported health status;
- whether covered by private health insurance.

[31] A small number of these were cohort 3 core members who were not issued until wave 4. As described elsewhere in this report such cases are considered to be part of cohort 4.

Taking the inverse of the estimated probability of response created a non-response weight to adjust for non-response bias between waves 8 and 9 for a total of 484 respondents.

Non-response weights for Cohort 7

For the 226 Cohort 7 core members eligible for the main interview in wave 9 (and remaining in private households in England) response to wave 9 was modelled on a range of household- and individual-level information collected at wave 8. The analysis was conducted using the non-response weight derived in wave 8 to ensure that the wave 9 weights did not replicate any adjustment made by the wave 8 weight.

The results showed significant differences between respondents and non-respondents for sex and region only.

Taking the inverse of the estimated probability of response created a non-response weight for the 197 respondents to adjust for non-response bias between waves 8 and 9.

Non-response weights for Cohort 9

A cohort of people born between 1 March 1964 and 29 February 1968 was added to the ELSA sample at wave 9. They were selected from the Health Survey for England 2013, 2014 and 2015 and are collectively referred to as Cohort 9.

Their response to wave 9 was modelled on a range of household and individual-level information collected from HSE, using the HSE personal level weight as input. The results showed significant differences between respondents and non-respondents on the following characteristics (after controlling for sex which was also included in the model):

- housing tenure;
- self-reported health status;
- highest educational qualification;
- whether they have a long-term limiting illness.

Taking the inverse of the estimated probability of response created a non-response weight[32] for the 899 respondents to adjust for potential non-response bias between HSE and ELSA.

Population estimates for those aged 67+

Core members aged 67+ responding at wave 9 belonged to one of three groups:

1. Cohort 1 core members who had taken part in all nine waves of ELSA;
2. Cohort 4 core members who had taken part in (all of) waves 4-9;

[32] Note, this was multiplied by HSE weight.

3. Wave non-responders i.e. core members from cohorts 1 and 4 who had returned to the study at wave 9 after missing one or more previous waves[33].

At wave 3, it was found that the following socio-demographic variables were predictive of wave non-response when compared with response to all waves:

- housing tenure;
- white/non-white ethnicity;
- highest educational qualifications;
- marital status.

To create a representative sample of persons aged 67+, it was necessary to ensure, as far as possible, that the characteristics of the combined sample (of all three groups) matched those of the population. The first two groups already had weights to adjust for non-response at wave 9, previous waves of ELSA and HSE:

- wave 9 longitudinal weight (2,916 Cohort 1 core members);
- cohort 4 non-response weight (750 Cohort 4 core members).

Combining these groups therefore provided a basis from which to estimate the population characteristics of those aged 67+.

Before these estimates could be derived, two adjustments were necessary:

i. the weights of those aged 67–84 (who come from cohorts 1 and 4) were scaled down so that this group were in the correct proportion as compared with those aged 85 and over (who come from Cohort 1 only);
ii. these weights were then calibrated to mid-2018 household population estimates of age/sex and region.

Estimates of housing tenure, white/non-white ethnicity, highest educational qualification and marital status were then derived from the combined groups weighted by the resulting weights (the same characteristics were used as in waves 3–8 for consistency).

Cross-sectional weights for those aged 67+

The non-response weights for *all* core members aged 67+ at wave 9 (i.e. the two groups already combined plus the third group of wave non-responders) were then adjusted using calibration weighting so that the resulting weights, when applied to the three groups combined, provide a sample profile that matches the population estimates on the four socio-demographic characteristics plus estimates of age/sex and region of those aged 67+ (from mid-2018 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

[33] A small number of respondents from each group had moved to Scotland or Wales and were therefore given a zero cross-sectional weight.

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 aged 67+. The pre-calibration weights were as follows:

- the 2916 core members from Cohort 1 and the 750 core members from Cohort 4 were given the weight derived at step i above (i.e. prior to the calibration used to create the population estimates);
- the 634 wave non-responders from Cohort 1 and the 81 wave non-responders from Cohort 4 were given the cross-sectional weight they received for the last wave in which they took part (i.e. prior to wave 8) for example, those who missed wave 8 but took part in wave 7 were given their wave 7 cross-sectional weight.

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 at wave 9 (2018-19) living in England, including proxies but excluding those in institutions

Wave 9 characteristics	Col.2 Target distribution (67+ in England from cohorts 1 & 4 responding to all waves)	Col.3 Combined weighted sample 67+ (pre-calibration)	Col.4 Combined weighted sample 67+ (post-calibration)
	%	%	%
Tenure			
Own outright	79.2	78.6	79.2
Mortgage	4.6	4.7	4.6
Renting	16.2	16.8	16.2
Marital status			
Single, never married	4.2	4.4	4.2
Married, first and only marriage	54.9	54.1	54.9
Remarried	8.6	8.8	8.6
Separated/divorced	10.1	10.3	10.1
Widowed	22.2	22.3	22.2
Ethnicity			
White	97.0	96.8	97.0
Non-white	3.0	3.2	3.0
Educational status			
Degree or equivalent	14.1	13.7	14.1
A level/higher education below degree	20.3	20.0	20.3
O level or other	19.1	18.9	19.1
CSE or other	13.1	13.1	13.1
No qualifications	33.4	34.3	33.4
Base			
Unweighted	*3,666*	*4,381*	*4,381*

Cross-sectional weights for those aged 50-66

Responding core members aged 50-66 at wave 9 came from all cohorts[34]. They were combined, and their non-response weights were adjusted using calibration weighting so that the resulting weights provide a sample profile that matches population estimates of age/sex and region (from mid-2018 household population estimates; see table 8.3) for those aged 50-66.

The pre-calibration weights were as follows:

- core members who responded to all waves to which they were invited were given their respective cohort non-response weight (the derivations of which were described above).
- wave non-responders from cohorts 1, 3, 4, 6 and 7 were given the cross-sectional weight from the last wave at which they took part e.g. anyone who missed wave 8 but took part in wave 7 was given the cross-sectional weight from wave 7.

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

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 groups (50-66 and 67+) 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, is presented in Table 8.4, whilst the unweighted numbers are shown in Table 8.5.

Table 8.3 Household population estimates (mid-2018)

Mid-2018 England household population (aged 50 and over)

Age	Men	Women	Total	Men	Women	Total
				%	%	%
50-53	1,546,988	1,588,775	3,135,763	15.7	14.6	14.6
54-57	1,480,667	1,519,084	2,999,751	15.1	14.0	14.0
58-61	1,296,961	1,336,192	2,633,153	13.2	12.3	12.3
62–66	1,410,200	1,479,011	2,889,211	14.3	13.6	13.6

[34] A small number of these respondents had moved to Scotland or Wales and were therefore given a zero cross-sectional weight.

67–71	1,427,183	1,533,488	2,960,671	14.5	14.1	14.1
72–76	1,082,689	1,204,035	2,286,724	11.0	11.1	11.1
77–81	759,197	910,720	1,669,917	7.7	8.4	8.4
82-86	500,183	678,455	1,178,638	5.1	6.2	6.2
87+	332,617	625,962	958,579	3.4	5.8	5.8
Total	9,836,685	10,875,722	20,712,407	100	100	100

Source: Calculated from ONS, Annual Mid-Year Population Estimates for England and Wales, 2018[35]

Table 8.4 Core member respondents in England at wave 9 by age and sex (weighted)

Core member respondents at wave 9 (2018-19) living in England, including proxies but excluding those in institutions

Age at wave 9 interview	Men	Women	Total	Men	Women	Total
				%	%	%
50-53	538	552	1090	15.7	14.6	15.1
54-57	515	528	1043	15.1	14.0	14.5
58-61	451	464	915	13.2	12.3	12.7
62–66	490	514	1004	14.3	13.6	13.9
67–71	496	533	1029	14.5	14.1	14.3
72–76	376	419	795	11.0	11.1	11.0
77–81	264	317	580	7.7	8.4	8.1
82-86	174	236	410	5.1	6.2	5.7
87+	116	218	333	3.4	5.8	4.6
Weighted N	3,419	3,781	7,200	100	100	100
Unweighted N	3,122	4,078	7,200	100	100	100

[35] ELSA is weighted to the household population in England, excluding those in institutions. As the Office for National Statistics (ONS) no longer produces household population estimates, these are calculated by adjusting the latest ONS mid-year residential population estimates. The adjustment is based on the ratio between the (2011) census residential and household population figures for each age and sex grouping within each region.

Table 8.3 Core member respondents in England at wave 9 by age and sex (unweighted)

Core member respondents at wave 9 (2018-19) living in England, including proxies but excluding those in institutions

Age at wave 9 interview	Men	Women	Total	Men	Women	Total
				%	%	%
50-53	297	421	718	9.5	10.3	10.0
54-57	215	286	501	6.9	7.0	7.0
58-61	164	219	383	5.3	5.4	5.3
62–66	540	677	1217	17.3	16.6	16.9
67–71	607	807	1414	19.4	19.8	19.6
72–76	544	628	1172	17.4	15.4	16.3
77–81	379	473	852	12.1	11.6	11.8
82-86	259	358	617	8.3	8.8	8.6
87+	117	209	326	3.7	5.1	4.5
Total	3,122	4,078	7,200	100	100	100

8.4 Self-completion weights

For the 7,200 core members living in private households in England who completed a full or partial wave 9 main interview, response to the main self-completion questionnaire was modelled on a range of household and individual level information collected from the ELSA wave 9 main interview. The weighting strategy aimed to minimise any bias arising from differential non-response to each self-completion questionnaire. The analyses were conducted on data weighted by the wave 9 cross-sectional weight.

Main self-completion weights

For the 7,200 core members living in private households in England who completed a full or partial wave 9 main interview, response to the main self-completion questionnaire was modelled on a range of household- and individual-level information collected from the ELSA wave 9 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 9 cross-sectional weight.

The results showed significant differences between (core member) respondents to the self-completion questionnaire and non-respondents on the following characteristics:

- age by sex;
- region;
- IMD Quintile
- highest educational qualification;
- white/non-white ethnicity;
- housing tenure;
- self-reported general health;
- whether they have a long-term limiting illness;
- number of people in household;
- whether they have children (and whether they live with them);
- current work/activity status;
- whether they had help with showcards.

A non-response weight for the 6,356 respondents to the self-completion questionnaire was created by taking the inverse of the estimated probability of response. The final self-completion weight was a product of this non-response weight and the wave 9 cross-sectional weight (scaled so that the average weight was equal to 1).

8.5 Nurse and blood weights

Unlike in previous waves where all core members responding to the main interview were eligible for a nurse visit in that wave, across wave 8 and wave 9, two mutually exclusive subsets of members were pre-selected (prior to fieldwork): one to be offered a nurse visit at wave 8 and the other to be offered a nurse visit in wave 9.

The selection was done in two stages. The first stage, prior to wave 8 fieldwork used purposive sampling (within cohort) and prioritised those who had responded to all previous nurse visits from cohorts 1 through to 6 to be issued for a nurse visit at wave 8[36]. The remaining cohort members were flagged for a nurse visit in wave 9, thus ensuring that all cohort members were eligible for a nurse visit in wave 8 or wave 9, conditional on completing the mainstage interview at the wave to which they were eligible for a visit. All respondents from Cohort 9 were flagged as eligible for a nurse visit in wave 9

This change in the sampling approach for Nurse visits had several implications:

- Cohort 7, the youngest of the Wave 8 respondents, could not receive a Nurse visit until wave 9.

[36] Cohort 7 was excluded from this first group on the basis that the non-response patterns across waves was unknown for this group which had only completed one prior wave

- The two subsamples taken from cohorts 1-6 for wave 8 and wave 9 nurse visits were selected on the basis of their response pattern to previous nurse visits which are likely to be correlated with other factors beyond the usual weighting variables used in the standard nurse weighting procedure. This sampling and the absence of cohort 7 from the subgroup eligible for a wave 8 nurse visit means any 'separate' analysis of the wave 8 and wave 9 nurse visits is not possible due to an unknown degree of bias on key outcome measures.
- An approach therefore needed to found which combined the bases for those receiving a nurse visit in wave 8 and wave 9, ensuring that core members receiving a nurse visit in either wave were included, whilst weighting to minimise bias due to non-response to the nursing visit.
- The task was complicated by the two year gap between the waves, as well as by the mismatched base between wave 8 to wave 9 mainstage: members of cohorts 1-6 allocated for a wave 9 nurse visit prior to wave 8 fieldwork may not have completed mainstage wave 9, whereas members of cohorts 1-6 allocated a wave 8 nurse visit may have been allocated and completed a nurse visit at wave 9, but skipped mainstage wave 8.
- Analysis of the combined wave 8 and 9 nurse visits dataset requires that the appropriate wave's mainstage and nurse visit variables (e.g. age) are combined into the one set of variables for analysis, conditional on which wave the nurse visit was completed.

Note that for practical reasons in wave 8 a nurse weight was created treating those respondents who were not selected for a nurse visit in wave 8 as non-respondents. This means that the weighted sample remains unbiased with respect to the measures used to construct the weight. However, the risk of bias with respect to other unmeasured characteristics is somewhat higher than it would have been had everyone been given a chance to respond. This weight covered the 3471 core members completing a nurse visit at wave 8.

Following wave 9, a more robust approach was adopted, leading to a weight covering the full combined base of the wave 8 and wave 9 nurse visits. Recombining the participating members of Cohorts 1-6 ensured that any bias resulting from the initial split of this group by past response pattern was minimised in the new approach. The new combined base of 6493 for wave 8 and wave 9 nurse visits replaces the base of 3471 wave 8 nurse visits described in the last paragraph and covers participation of all cohorts from 1 through to 9.

The process was a great deal more complicated than the approach adopted in previous waves, involving combining and recoding data from across different cohorts and waves, as well as a multi-stage non-response modelling process. This is described in detail in the following sections.

Nurse weights groups

The combined nurse weight cohort for wave 8 and 9 consists of four distinct subgroups, highlighted in the table below.

Table 8.6 Sample Issued for and completed Nurse visits

Group description	Issued for nurse visit	Completed nurse visit
Group 1: w8a issued w8	3,774	3,471
Group 2: w8b issued w9*	2,747	2,233
Group 3: cohorts 1-7 non-w8 but w9 completers	148	92
Group 4: cohort 9	898	697
Total	7,567	6,493

* Group 2 figures only apply to those in that group completing mainstages of wave 8 and wave 9 and issued with a cross-sectional weight at both waves.

The first two groups consist of core members with a cross-sectional weight for wave 8. Group 1 (w8a) is the subgroup of cohort 1-6 members issued for nurse visits in wave 8, based on having completed previous nurse visits. Group 2 (w8b) is the subgroup of cohort 1-6 members issued for nurse visits in wave 9, on the basis of being non-completers in the past, and cohort 7 members (who were all excluded from Group 1). All cases in Group 2 additionally have a cross-section weight at wave 9 as well as wave 8.

Group 3 consists of cohort 1-7 members issued for nurse visits in wave 9 who have a cross-sectional weight at wave 9, but not wave 8. This group can be thought of as wave 8 non-completers.

Group 4 consists of cases in cohort 9 only. All bar one of these cases was issued for nurse visits in wave 9.

Nurse Weight Non-Response Models

Non-response modelling was conducted separately for Group 1, Groups 2 and 3 combined and Group 4. The Group 1 and Group 4 models were more straightforward as involved only one stage of modelling to correct for non-response between those cases issued for and completing the nurse visits within these groups. Modelling for the combined Groups 2 and 3 involved two separate models: one to model the non-

response between mainstages wave 8 and wave 9 (for Group 2) and one to model the non-response between issued nurse cases in wave 9 and those completing nurse visits (for Group 2 and 3).

Each non-response model consisted of a logistic regression (described below) drawing on the full list of weighting variables used in previous rounds of cross-sectional weighting, nurse and blood and self-completion weighting. Keeping the selection of independent variables (IVs) as broad as possible ensured the sources of bias corrected for was comprehensive. Each model used a different input weight:

Potential Independent variables used in nurse visit non-response models

- Age and Sex combined
- Region
- IMD Quintile
- Urban/rural indicator
- Highest level of education
- Tenure
- Marital Status
- Ethnicity
- Self-reported health
- Whether Longstanding and, if so, limiting, illness
- Number of people in household (1,2,3,4+)
- Financial unit type (whether single, separate or joint finances)
- Whether children (and living with or separate)
- Current (working) status
- Whether help required with showcards
- Whether smoke cigarettes at all nowadays (recoded)
- Whether ever smoked cigarettes (recoded)
- Frequency does vigorous sports or activities
- Frequency does moderate sports or activities
- Frequency does mild sports or activities
- Self-reported eyesight (while using lenses, if appropriate)
- Self-reported hearing (while using hearing aid if appropriate)

These are all variables (or composites of variables) from the mainstage of the survey. The Wave 8 versions were used for Group 1 and the Wave 9 versions used for Groups 2-4.

Group 1: Non-Response Model

The sample for this model consisted of members of cohorts 1-6, completing wave 8 mainstage and issued for nurse visits in wave 8. This is the group which selected on the basis of its high response to previous waves nurse visits.

Input weight: Wave 8 cross-sectional weight (>0 for all in group and rescaled to mean of 1)

Dependent variable (DV): Whether completed wave 8 Nurse visit vs Not (base 3471 vs 303)

Independent variables (IVs): Wave 8 mainstage values; the following variables selected as statistically significant to predicting the DV.:

- Region
- Urban/rural indicator
- Highest level of education
- Tenure
- Marital Status
- Ethnicity
- Household total 1,2,3,4+
- Whether children (and living with or separate)
- Current (working) status
- Frequency does moderate sports or activities
- Frequency does mild sports or activities

For cases completing the wave 8 nurse visits, the predicted probability of completing the visit was inverted, trimmed, multiplied by the input weight and rescaled to an average of 1 to give a new composite non-response weight for Group 1.

Group 2: Non-Response Model A

The sample for this model consisted of members of cohorts 1-6, completing wave 8 mainstage who were NOT issued for nurse visits in wave 8[37].

Input weight: Wave 8 cross-sectional weight (>0 for all in group and rescaled to mean of 1)

Dependent variable (DV): Whether completed wave 9 mainstage vs Not (base 2752 vs 607)

Independent variables (IVs): Wave 8 mainstage values; the following variables selected as statistically significant to predicting the DV.:

- Age and Sex combined
- Highest level of education
- Tenure
- Marital Status
- Self-reported health
- Financial unit type (whether single, separate or joint finances)
- Current (working) status

[37] Note that only 5 of these cases were not issued for a nurse visit in wave 9

- Whether help required with showcards
- Whether smoke cigarettes at all nowadays (recoded)
- Frequency does moderate sports or activities
- Self-reported eyesight (while using lenses, if appropriate)

For cases completing wave 9 mainstage, the predicted probability of completing wave 9 was inverted, trimmed, multiplied by the input weight and rescaled to an average of 1 to give a new composite 'Wave 9 mainstage' non-response weight for Group 2.

Group 2 and 3: Non-Response Model B

The sample for this model consisted of members of Group 2 completing wave 9 mainstage who were issued for nurse visits in wave 8; it additionally includes members of Group 3

Input weight: For Group 2, 'Wave 9 mainstage' non-Response weight from Model A (rescaled to mean of 1); For Group 3, Wave 9 cross-sectional weight A (rescaled to mean of 1)

Dependent variable (DV): Whether completed wave 9 Nurse visit vs Not (Group 2 base 2233 vs 514; Group 3 base 92 vs 56)

Independent variables (IVs): Wave 9 mainstage values; the following variables selected as statistically significant to predicting the DV.:

- Age and Sex combined
- Region
- IMD Quintile
- Highest level of education
- Marital Status
- Ethnicity
- Self-reported health
- Household total 1,2,3,4+
- Financial unit type (whether single, separate or joint finances)
- Current (working) status
- Whether smoke cigarettes at all nowadays (recoded)
- Frequency does moderate sports or activities
- Self-reported hearing (while using hearing aid if appropriate)

For cases completing the wave 9 nurse visit, the predicted probability of completing the visit was inverted, trimmed, multiplied by the input weight and rescaled to an average of 1 within each of Group 2 and 3 to give a new composite non-response weight for Groups 2 and 3.

Group 4: Non-Response Model

The sample for this model consisted of members of cohorts 9 who were issued for nurse visits in wave 9.

Input weight: Wave 9 cross-sectional weight (>0 for all in group and rescaled to mean of 1)

Dependent variable (DV): Whether completed wave 9 Nurse visit vs Not (base 697 vs 201)

Independent variables (IVs): Wave 9 mainstage values; the following variables selected as statistically significant to predicting the DV.:

- Age and Sex combined
- Tenure
- Ethnicity
- Financial unit type (whether single, separate or joint finances)
- Whether smoke cigarettes at all nowadays (recoded)
- Whether ever smoked cigarettes (recoded)
- Frequency does vigorous sports or activities
- Frequency does moderate sports or activities

For cases completing the wave 9 nurse visits, the predicted probability of completing the visit was inverted, trimmed, multiplied by the input weight and rescaled to an average of 1 to give a new composite non-response weight for Group 4.

Nurse Weight rescaling and calibration

The non-response weighted data for each of Group 1 to 4 were initially scaled to a mean of one within group and combined into a single sample of 6493 Nurse cases. Prior to calibration the, weights within each group were rescaled to sum to their original number of eligible cases for the nurse visits. For Groups 1, 3 and 4 this only involved rescaling from nurse visit completes to nurse visit issued number of cases. For Group 2 a further rescaling step was needed to up-scale back to the number of cases in Group 2 that completed mainstage wave 8. This rescaling ensured that the distribution of weighted cases across all groups matched that of all cases eligible for the nurse visits at the corresponding mainstage. Without this step, for example, Group 2 (consisting of cases less likely to respond to previous nurse visits) would have been under represented in the calibration step vs Group 1 due to this higher rate of drop out in this group between mainstage wave 8 and wave 9 and then between mainstage wave 9 and the wave 9 nurse visit (only two-thirds of original mainstage wave 8 cases in this group completed a nurse visit vs 92% of wave 8 cases in Group 1).

The rescaled, non-response weighted nurse visit cases were calibrated to ONS Mid-year population esti8matby for 2017[38] by Age within Gender[39] and Region. A comparison was made with the Wave 9 mainstage version of potential weighting variables used (the IVs) and it was found that, after non-response and calibration weighting the mean absolute bias remaining was only 0.4 percentage points with a minimum bias of -1.3 points and maximum bias of +1.4 points[40]. This analysis demonstrates that only minimal bias due to non-response remains in the nurse sample after weighting.

Analysis of Nurse Sample

The Nurse sample is designed to be analysed as a whole and is not designed to be analysed separately for the four Nurse groups in Table 0.6 or separately for waves 8 and 9. In order to ensure a correct analysis, the Wave 8 versions of mainstage and nurse variables should be used for Group 1 and the Wave 9 versions of the these variables should be used for Groups 2 through to 4. The data dictionaries for these, wave 8 and wave 9 variables, will need to be precisely matched so that the correct version of the variable can be written into one integrated set of columns for use in data analysis.

Blood weights

For the 6,493 core members living in private households in England who responded to the nurse visit, response to the blood sample was modelled on a range of household- and individual-level information collected from the ELSA wave 8 and 9 main interview. The weighting strategy aimed to minimise any bias arising from differential non-response and non-random selection process. The analysis was conducted on data weighted by the wave 8 and 9 nurse weight.

The results showed significant differences on the following characteristics between (core member) respondents who provided a useable blood sample and those who did not and/or were not selected to receive one:

- age by sex;
- region;
- IMD Quintile;
- highest educational qualifications;
- housing tenure;
- marital status;
- white/non-white ethnicity;
- self-reported general health;

[38] Mid-point years for waves 8 and 9

[39] Age bands were coded in a consistent manner for all groups, regardless of originating mainstage wave

[40] The minimum and maximum bias corresponded with variables influenced by the very youngest (aged 50-54) age group which was absent from wave 8 which contributed towards the nurse visits

- whether they have a long-term limiting illness;
- whether they have children (and whether they live with them);
- current work/activity status;
- level of participation in mild physical activity;
- level of participation moderate physical activity;
- level of participation in vigorous physical activity;
- self-assessed eyesight condition.

A non-response weight for the 4,347 respondents who provided a useable blood sample was created by taking the inverse of the estimated probability of response. The final blood weight was a product of this non-response weight and the wave 8 and 9 nurse weight (scaled so that the average weight was equal to 1).

The section on nurse weight rescaling and calibration applies equally to the Blood Weights as it does to the Nurse weights. The appropriate copy of the wave 8 or wave 9 variables should be used for this section.

9 References

Banks, J., Batty, G.D., Nazroo, J. and Steptoe, A. (eds) (2018), *The dynamics of ageing: Evidence from the English Longitudinal Study of Ageing 2002-2016 (Wave 8),* London: The Institute for Fiscal Studies. (https://www.ucl.ac.uk/drupal/site_iehc/sites/iehc/files/elsa_-_wave_8_report.pdf)

Banks, J., Batty, G.D., Nazroo, J. and Steptoe, A. (eds) (2016), *The dynamics of ageing: Evidence from the English Longitudinal Study of Ageing 2002-2015 (Wave 7),* London: The Institute for Fiscal Studies. (https://www.ifs.org.uk/uploads/elsa/docs_w7/ELSA%20Wave%207%20report.pdf)

Banks, J., Breeze, E., Lessof, C. and Nazroo, J. (eds) (2006), Retirement, Health and Relationships of the Older Population in England: The 2004 English Longitudinal Study of Ageing, London: The Institute for Fiscal Studies. (http://www.ifs.org.uk//elsa/report06/elsa_w2.pdf)

Banks, J., Breeze, E., Lessof, C. and Nazroo, J. (eds) (2008), Living in the 21st century: older people in England: The 2006 English Longitudinal Study of Ageing, London: The Institute for Fiscal Studies. (http://www.ifs.org.uk/elsa/report08/elsa_w3.pdf).

Banks, J., Lessof,C., Nazroo,J., Rogers,N., Stafford,M. and Steptoe, A (eds) (2010) Financial circumstances, health and well-being of the older population in England: ELSA 2008 (Wave 4). London: The Institute for Fiscal Studies. (https://www.ucl.ac.uk/drupal/site_iehc/sites/iehc/files/elsa_-_wave_4_report.pdf)

Banks, J., Nazroo, J. and Steptoe A. (eds) (2012), The dynamics of ageing: Evidence from the English Longitudinal Study of Ageing 2002-10 (Wave 5), London: The Institute for Fiscal Studies. (https://www.ucl.ac.uk/drupal/site_iehc/sites/iehc/files/elsa_-_wave_5_report.pdf)

Banks, J., Nazroo, J. and Steptoe A. (eds) (2014), The dynamics of ageing: Evidence from the English Longitudinal Study of Ageing 2002-12 (Wave 6), London: The Institute for Fiscal Studies. (https://www.ucl.ac.uk/drupal/site_iehc/sites/iehc/files/elsa_-_wave_6_report.pdf)

Craig, R., Fuller, E., and Mindell, J. (2015), Health Survey for England 2014, Vol.2: Methods and Documentation, Leeds: The Health and Social Care Information Centre. (http://content.digital.nhs.uk/catalogue/PUB19295/HSE2014-Methods-and-docs.pdf)
Craig, R. and Hirani, V. (2010), Health Survey for England 2009, Vol.2: Methodology and Documentation, The Information Centre: London.

(https://files.digital.nhs.uk/publicationimport/pub00xxx/pub00414/heal-surv-heal-life-eng-2009-rep-v3.pdf)

Craig, R. and Mindell, J. (2008), Health Survey for England 2006, Vol.3: Methodology and Documentation, Leeds: The Information Centre . (https://files.digital.nhs.uk/publicationimport/pub01xxx/pub01213/heal-surv-cvd-risk-obes-ad-ch-eng-2006-meth.pdf).

Craig, R. and Mindell, J. (2011), Health Survey for England 2010, Vol.2: Methodology and Documentation, Leeds: The Information Centre. (https://files.digital.nhs.uk/publicationimport/pub03xxx/pub03023/heal-surv-eng-2010-resp-heal-vol2-meth-rep.pdf

Craig, R. and Mindell, J. (2012), Health Survey for England 2011, Vol.2: Methodology and Documentation, Leeds: The Health and Social Care Information Centre. (https://files.digital.nhs.uk/publicationimport/pub09xxx/pub09300/hse2011-methods-and-docs.pdf)

Craig, R. and Mindell, J. (2013), Health Survey for England 2012, Vol.2: Methods and Documentation, Leeds: The Health and Social Care Information Centre. (http://www.content.digital.nhs.uk/catalogue/PUB13218/HSE2012-Methods-and-docs.pdf)

Craig, R. and Mindell, J. (2014), Health Survey for England 2013, Vol.2: Methods and Documentation, Leeds: The Health and Social Care Information Centre. (http://www.content.digital.nhs.uk/catalogue/PUB16076/HSE2013-Methods-and-docs.pdf)

Erens, B. and Primatesta, P. (eds) (1999), Health Survey for England 1998, Vol. 2: Methodology and Documentation, London: The Stationery Office.

Erens, B., Primatesta, P. and Prior, G. (eds) (2001), Health Survey for England. The Health of Minority Ethnic Groups 1999, Vol. 2: Methodology and Documentation, London: The Stationery Office.

Marmot, M., Banks, J., Blundell, R., Lessof, C. and Nazroo, J. (eds) (2003), Health, Wealth and Lifestyles of the Older Population in England: The 2002 English Longitudinal Study of Ageing, London: The Institute for Fiscal Studies (https://www.ucl.ac.uk/drupal/site_iehc/sites/iehc/files/elsa_-_wave_1_report.pdf) .

Neave, A. (2016), Health Survey for England 2015, Methods, Leeds: The Health and Social Care Information Centre. (http://www.content.digital.nhs.uk/catalogue/PUB22610/HSE2015-methods.pdf)

Prior, G., Deverill, C., Malbut, K. and Primatesta, P. (eds) (2003), Health Survey for England 2001, Methodology and Documentation, London: The Stationery Office.

Scholes, S., Taylor, R., Cheshire, H., Cox, K. and Lessof, C. (2008a), Retirement, health and relationships of the Older Population in England: The 2004 English Longitudinal Study of Ageing, Technical Report, London: National Centre for Social Research.
(http://www.ifs.org.uk/elsa/report06/w2_tech.pdf).

Scholes, S., Cox, K. and Lessof, C. (2008b), 'Methodology' in J. Banks, E. Breeze, C. Lessof and J. Nazroo (eds) Living in the 21st century: older people in England: The 2006 English Longitudinal Study of Ageing, London: The Institute for Fiscal Studies.

Scholes, S., Medina, J., Cheshire, H., Cox, K., Hacker, E. and Lessof, C. (2009), Living in the 21st century: older people in England. The 2006 English Longitudinal Study of Ageing, Technical Report, London: National Centre for Social Research.

Sproston, K. and Mindell, J. (2006), Health Survey for England 2004, Vol.2: Methodology and Documentation, London: The Stationery Office.

Sproston, K. and Primatesta, P. (2003), Health Survey for England 2002, Vol.3: Methodology and Documentation, London: The Stationery Office.

Sproston, K. and Primatesta, P. (2004), Health Survey for England 2003, Vol.3 : Methodology and Documentation, London: The Stationery Office.

Taylor, R., Conway, L., Calderwood, L., Lessof, C., Cheshire, H., Cox, K. and Scholes, S. (2007), Health, Wealth and Lifestyles of the Older Population in England: The 2002 English Longitudinal Study of Ageing, Technical Report, London: National Centre for Social Research.
(http://www.ifs.org.uk/elsa/report03/w1_tech.pdf).

Ward, K., et al (2009). ELSA Wave 3: Life History Interview. A user guide to the data. Version 1.
(http://doc.ukdataservice.ac.uk/doc/5050/mrdoc/pdf/5050_Wave_3_Life_History_Documentation.pdf)

10 Appendix A Key Survey Measures By Wave

Appendix Table A.1: Demographic data at each wave of ELSA

	Wave 0	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6	Wave 7	Wave 8	Wave 9
Household composition										
Household membership	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Changes in household membership		✔	✔	✔	✔	✔	✔	✔	✔	✔
Living parents, siblings, children, and grandchildren	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Marital status	✔	✔	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)
Ethnic group	✔	✔	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)
Country of birth	✔	✔	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)
Educational qualifications	✔	✔	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)
Age completed full-time education		✔	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)
Occupation of main carer when respondent aged 14 yr		✔	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)
Proximity to children									✔	✔
Citizenship										✔

Note: Cells in parentheses (✔) only updated if circumstances change

Appendix Table A.2: Content of the economics data at each wave of ELSA

	Wave 0	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6	Wave 7	Wave 8	Wave 9
Household Income										
Earnings		✔	✔	✔	✔	✔	✔	✔	✔	✔
State benefits (by source and recipient)		✔	✔	✔	✔	✔	✔	✔	✔	✔
Private pensions		✔	✔	✔	✔	✔	✔	✔	✔	✔
Asset income (by asset category)		✔	✔	✔	✔	✔	✔	✔	✔	✔
Other income (including receipt of lump sums)		✔	✔	✔	✔	✔	✔	✔	✔	✔
Financial assets (12 categories)		✔	✔	✔	✔	✔	✔	✔	✔	✔
Physical assets (5 categories)		✔	✔	✔	✔	✔	✔	✔	✔	✔
Business wealth		✔	✔	✔	✔	✔	✔	✔	✔	✔
Debt (3 categories)		✔	✔	✔	✔	✔	✔	✔	✔	✔
Housing wealth and mortgage debt (including equity release and home reversion plans)		✔	✔	✔	✔	✔	✔	✔	✔	✔
Lifetime inheritances and gifts							✔	✔	✔	✔
Life insurance		✔	✔	✔	✔	✔	✔	✔	✔	✔
Current plan details		✔	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)
Date joined plan		✔	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)
Current contributions		✔	✔	✔	✔	✔	✔	✔	✔	✔
Self-reported accrued pension wealth		✔	✔	✔	✔	✔	✔	✔	✔	✔
Past pension details (up to 3 past pensions)		✔	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)
Plan names		✔	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)
State pension statements				✔						
Knowledge of female state pension age				✔	✔	✔	✔	✔	✔	✔

	Wave 0	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6	Wave 7	Wave 8	Wave 9
State pension deferral					✔	✔	✔	✔	✔	✔
End to compulsory annuitisation									✔	✔
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		✔	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)
Compulsory retirement ages			✔	✔	✔	✔	✔	✔	✔	✔
Health limiting ability to work			✔	✔	✔	✔	✔	✔	✔	✔
Desired/offered/requested workplace adaptations			✔	✔	✔	✔	✔	✔	✔	✔
Housing (rent and mortgage payments)	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Satisfaction with housing and area						✔	✔	✔	✔	✔
Vehicle ownership		✔	✔	✔	✔	✔	✔	✔	✔	✔
Durable ownership		✔	✔	✔	✔	✔	✔	✔	✔	✔
Durable purchases			✔	✔	✔	✔	✔	✔	✔	✔
Food in, food out		✔	✔	✔	✔	✔	✔	✔	✔	✔
Fuel expenditures			✔	✔	✔	✔	✔	✔	✔	✔
Health insurance contributions		✔	✔	✔	✔	✔	✔	✔	✔	✔
Leisure			✔		✔	✔	✔	✔	✔	✔
Clothing			✔	✔	✔	✔	✔	✔	✔	✔
Transfers (incl. charitable giving and Child Trust Funds)			✔		✔	✔	✔	✔	✔	✔
Mortality		✔	✔	✔	✔	✔	✔	✔	✔	✔

	Wave 0	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6	Wave 7	Wave 8	Wave 9
Employment		✔	✔	✔	✔	✔	✔	✔	✔	✔
Works past age 70										✔
Care received at home										✔
Bequest and inheritances		✔	✔	✔	✔	✔	✔	✔	✔	✔
Health limit ability to work		✔	✔	✔	✔	✔	✔	✔	✔	✔
Income adequacy		✔	✔	✔	✔	✔	✔	✔	✔	✔
Movement into nursing home			✔				✔	✔	✔	✔
House value		✔	✔	✔	✔	✔	✔	✔	✔	✔
Moving house			✔							
Public and private pension income			✔	✔	✔	✔	✔	✔	✔	✔
Self-reported financial planning period		✔	✔							
Perceived financial position relative to neighbours/friends/colleagues			✔	✔	✔	✔				
Future housing and care needs							✔	✔	✔	✔
Short stays in residential/nursing homes									✔	✔
Risk module (subgroup)						✔				

Note: Cells in parentheses (✔) only updated if circumstances change
Note: Cells in square brackets [✔] only collected for new sample members or people who have not responded before

Appendix Table A.3: Measures of health, disability, and health behaviour at each wave of ELSA

	Wave 0	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6	Wave 7	Wave 8	Wave 9
Physical Health										
Self-rated general health; (Limiting) long-standing illness	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Mobility: difficulties walking ¼ mile & symptoms if try		✔	✔	✔	✔	✔	✔	✔	✔	✔
Eyesight and hearing – self-reported health and difficulties. Whether had glaucoma/diabetic eye disease/cataract/macular degeneration, Cataract surgery		✔	✔	✔	✔	✔	✔	✔	✔	✔
Dental health – self reported health and difficulties				✔	✔	✔		✔		✔
If age 65+ years, whether blood pressure checked in last year		✔	✔	✔	✔	✔	✔	✔	✔	✔
Physician diagnosed conditions: Ischaemic heart disease, stroke, diabetes, raised cholesterol, chronic lung disease, asthma, arthritis, osteoporosis, cancer, Parkinson's disease, Alzheimer, dementia.		✔	✔	✔	✔	✔	✔	✔	✔	✔
Quality of care indicators; Hearing Problems			✔					✔		
Quality of care indicators; Hypertension			✔	✔	✔					
Quality of care indicators; Coronary Heart Disease			✔					✔	✔	
Quality of care indicators; Diabetes			✔	✔	✔	✔	✔		✔	
Quality of care indicators; Stroke		✔	✔	✔	✔	✔	✔	✔	✔	✔
Quality of care indicators; Arthritis			✔	✔	✔	✔	✔		✔	
Quality of care indicators; Osteoporosis			✔			✔	✔	✔	✔	✔
Quality of care indicators; Depression			✔		✔				✔	
Quality of care indicators; Urinary incontinence			✔							
Quality of care indicators; Smoking			✔			✔	✔			
Falls and resulting fractures if age 60+y		✔	✔	✔	✔	✔	✔	✔	✔	✔
Hip and knee replacements received		✔	✔	✔	✔	✔	✔	✔	✔	✔
Pain: overall rating (mild/mod/severe) and for back, hip,		✔	✔	✔	✔	✔	✔	✔	✔	

	Wave 0	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6	Wave 7	Wave 8	Wave 9
knee.										
Balance and dizziness		✔	✔		✔		✔			✔
Quality of care indicators; falls and resulting fractures			✔		✔				✔	
Quality of care indicators; hip and knee replacements		✔	✔	✔	✔	✔	✔	✔	✔	✔
Quality of care indicators; pain			✔	✔					✔	
Sleep disturbance					✔		✔		✔	
Diagnostic symptom assessments: Rose Angina, MRC Respiratory Questionnaire;	✔	✔	✔	✔	✔	✔				
Edinburgh Claudication Questionnaire				✔		✔	✔			
Disabilities: Mobility problems, ADLS and IADLS listed. Aids used, Sources of help, Who pays Age 65+y: whether use meals on wheels, day centres, lunch clubs		✔	✔	✔	✔	✔	✔	✔	✔	✔
Urinary incontinence	✔	✔	✔	✔	✔	✔	✔	✔	✔ (SC)	✔ (SC
Menopause					✔	✔	✔		✔	✔
Cancer screening participation						✔	✔	✔	✔	✔
Polypharmacy							✔		✔	✔
Hear-check test								✔		
Sense of taste and smell									✔	✔
Perceived weight									✔	✔
Health preferences and attitudes to risk									✔ (SC)	
Health behaviours										
Smoking history	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Alcohol consumption: usual frequency, heaviest consumption day last week	✔	✔	✔ (SC)	✔ (SC)	✔ (SC)	✔ (SC)	✔ (SC)	✔ (SC)	✔ (SC)	✔ (SC
Physical activity: frequency do vigorous/moderate/mild exercise,	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔

	Wave 0	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6	Wave 7	Wave 8	Wave 9
Whether job sedentary or physically active										
Consumption of fruit and vegetables				✔ (SC)	✔ (SC)	✔ (SC)	✔ (SC)	✔ (SC)	✔ (SC)	
Mental health										
Psychiatric and emotional problems		✔	✔	✔	✔	✔	✔	✔	✔	✔
General Health Questionnaire (GHQ-12)	✔	✔		✔						Menta healt
CES-D depression scale		✔	✔	✔	✔	✔	✔	✔	✔	✔
Sexual health										
Attitudes to sex							✔ (SC)		✔ (SC)	✔
Current sexual activities and experiences							✔ (SC)		✔ (SC)	Sexua healt
Sexual partners							✔ (SC)		✔ (SC)	
Lifetime desires and experiences							✔ (SC)		✔ (SC)	
Physical examination and performance data (NV)										
Height and weight; waist and hip	✔		✔		✔		✔		✔ *weight only* (MI)	
Blood pressure	✔		✔		✔		✔		✔	Physic examina and performa data (N
Lung function	✔		✔		✔		✔			✔ *weight o* (MI)
Chair stands; Balance; Grip strength;			✔		✔		✔		✔ *grip only*	✔

	Wave 0	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6	Wave 7	Wave 8	Wave 9
Walking speed performance test (≥60 years) (MI)		✔	✔	✔	✔	✔	✔	✔	✔	
Blood assays (NV)										
Triglycerides	✔		✔		✔		✔		✔	✔
Total and DHL-cholesterol	✔		✔		✔		✔		✔	**Blood assays (**
C-reactive protein, fibrinogen	✔		✔		✔		✔		✔	✔
Haemoglobin and ferritin	✔		✔		✔		✔		✔	✔
White blood cell count					✔		✔		✔	✔
Fasting lipids, glucose, glycated haemoglobin			✔		✔		✔		✔	✔
Cortisol (from saliva).			✔		✔					✔
IgE / DHM IgE	✔									✔
IGF-1					✔		✔		✔	
DHEAS					✔					
Vitamin D							✔		✔	✔
DNA extraction and storage			✔		**(✔)**		**(✔)**		**(✔)**	
Cortisol (from hair)							✔			✔
RNA Paxgene tubes									✔	**(✔)**
										✔

Note: Cells in square brackets [✔] only collected for new sample members or people who have not responded before

+ Questions on aids and sources of help changed in Wave 6.

Appendix Table A.4: Measures of cognitive function at each wave of ELSA

	Wave 0	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6	Wave 7	Wave 8	Wave 9
Memory										
Self-rated memory		✔	✔	✔	✔			✔	✔	✔
Orientation in time		✔	✔	✔	✔	✔	✔	✔	✔	✔
Word-list learning (verbal learning and recall)		✔	✔	✔	✔	✔	✔	✔	✔	✔
Prospective memory		✔	✔	✔	✔	✔			✔	
Fluid intelligence (number series)										
Number series							✔ (MI)		✔ (NV)	✔ (NV)
Executive function										
Word-finding (verbal fluency)		✔	✔	✔	✔	✔		✔	✔	✔
Letter cancellation (accuracy and speed of mental processing)		✔	✔	✔	✔	✔				
Backwards counting								✔	✔	✔
Serial 7s								✔	✔	✔
Object naming								✔	✔	✔
Basic cognitive skills/abilities										
Numerical ability		✔			✔		(✔)	(✔)	✔	
Literacy			✔			✔	(✔)	(✔)	✔	
Other variables										
Quality of cognitive interview (interviewer's assessment)		✔	✔	✔	✔	✔	✔	✔	✔	✔
Proxy interview of cognitive functioning – IQCODE scale			✔	✔	✔	✔	✔	✔	✔	✔

Note: Cells in parentheses [✔[]) only collected for new sample members or people who have not responded before

Appendix Table A.5: Psychosocial measures at each wave of ELSA

	Wave 0	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6	Wave 7	Wave 8	Wave 9
Social and civic participation										
Informal care giving		✔	✔	✔	✔	✔	✔	✔	✔	✔
Volunteering		✔	✔	✔	✔	✔	✔	✔	✔	✔
Provision of unpaid help					✔	✔	✔	✔	✔	✔
Civic, social and cultural participation (SC)		✔	✔	✔	✔	✔	✔	✔	✔	✔
Accessing local amenities and services (SC)		✔	✔		✔	✔	✔	✔	✔	✔
TV watching (SC)					✔	✔	✔	✔	✔	✔
Social networks (SC)		✔	✔	✔	✔	✔	✔	✔	✔	✔
Social support (SC)	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Social isolation/loneliness (SC)			✔	✔	✔	✔	✔	✔	✔	✔
Transport		✔	✔	✔	✔	✔	✔	✔	✔	✔
Social capital		✔		✔						
Perceived discrimination (SC)						✔				
Religiosity (SC)						✔				✔
Digital inclusion (SC)							✔	✔	✔	✔
Neighbourhood perceptions (SC)		✔		✔				✔		
Time spent caring for grandchildren									✔	✔
Psychosocial factors										
Control and demand		✔	✔	✔	✔	✔	✔ (MI)	✔	✔ (NV)	
Effort-reward balance			✔	✔	✔	✔	✔	✔	✔	
Subjective social status (SC)		✔	✔	✔	✔	✔	✔	✔	✔	✔
Relative deprivation and perceived financial difficulties			✔	✔	✔					
Ages at which middle age ends and old age begins		✔		✔				✔	✔	
Self-perceived and desired ages			✔ (SC)		✔			✔ (SC)	✔ (SC)	✔

Experience and perceptions of ageing (SC)			✔					✔	✔	
Altruism					✔					
Sense of collectiveness					✔					
Pet ownership						✔				
Experiences of being mentored									✔	
Generativity (passing skills/experience to younger generations)									✔ (SC)	
Psychological and social well-being										
Quality of life (CASP-19) (SC)		✔	✔	✔	✔	✔	✔	✔	✔	✔
Satisfaction With Life Scale-SWLS (Diener) (SC)			✔	✔	✔	✔	✔	✔	✔	✔
Ryff well-being scale* (SC)			✔							
Positive affect (SC)						✔				
Personality (SC)						✔				
Perceived wellbeing yesterday (SC)							✔	✔	✔	✔
Time use and effect (SC)							✔	✔		✔ time use only
ONS harmonised 4 questions on wellbeing (SC)							✔	✔	✔	✔

* TV watching included as part of the wellbeing time use and affect questions

** only self-perceived age, not desired age