Living in the 21st century: older people in England

The 2006 English Longitudinal Study of Ageing

WAVE 3

Edited by:
James Banks
Elizabeth Breeze
Carli Lessof
James Nazroo

with an introduction by
Michael Marmot

UCL NatCen National Centre for Social Research IFS

ELSA

Living in the 21st century: older people in England

THE 2006 ENGLISH LONGITUDINAL STUDY OF AGEING (WAVE 3)

July 2008

James Banks
Matt Barnes
David Blane
Elizabeth Breeze
Noriko Cable
Kate Cox
Panayotes Demakakos
Cesar de Oliveira
Carl Emmerson
Edlira Gjonça
Meena Kumari
Iain A. Lang
Carli Lessof
Michael Marmot
Alastair Muriel
James Nazroo
Gopalakrishnan Netuveli
Shaun Scholes
Gemma Tetlow
Wojtek Tomaszewski
Paola Zaninotto

Editors:
James Banks, Elizabeth Breeze, Carli Lessof and James Nazroo

The Institute for Fiscal Studies
7 Ridgmount Street
London WC1E 7AE

Published by

The Institute for Fiscal Studies
7 Ridgmount Street
London WC1E 7AE
Tel: +44-20-7291 4800
Fax: +44-20-7323 4780
Email: mailbox@ifs.org.uk
Internet: www.ifs.org.uk

The design and collection of the English Longitudinal Study of Ageing was carried out as a collaboration between the Department of Epidemiology and Public Health at University College London, the Institute for Fiscal Studies, the National Centre for Social Research, the School of Social Sciences at the University of Manchester, and the Department of Psychiatry at the University of Cambridge.

ISBN: 978-1-903274-54-5

Printed by
Patersons, Tunbridge Wells
21 Chapman Way
Tunbridge Wells
Kent TN2 3EF

Contents

Figures

Tables

1. Introduction

Michael Marmot *University College London*

Elizabeth Breeze *University College London*

ELSA is growing up. The third wave of the English Longitudinal Study of Ageing (ELSA) means that we now have a four-year follow-up period on a sample of the English population aged 50 and over at the first wave. In addition, there are earlier data coming from the original Health Survey for England (HSE) from which the ELSA sample of participants was drawn. The report from the first wave of ELSA showed how marked is the variability in older people's social and economic circumstances, physical and mental functioning, and health (Marmot et al., 2003). The myth of older age as uniformly characterised by decline and dependency is contradicted by the evidence of vigorous and active nonagenarians.

The report after the second wave of ELSA showed, in considerable detail, how most of the salient domains of people's lives varied according to their wealth (Banks et al., 2006). We used wealth as a socio-economic measure. The analyses in that report made use of a key feature of ELSA – its accurate assessment of wealth including pension wealth. Mortality, ill health, social isolation and loneliness all differed, in a graded way, with people's wealth: less wealth was associated with being sicker, less functional and more isolated.

This third wave now allows two interrelated activities making use of ELSA's special strengths – exploring how the various areas of people's lives interact and using longitudinal data to sort out the order in which things happen.

For the latter, longitudinal, analyses, ELSA is still young. The Health and Retirement Study (HRS) in the US, which provided a model for ELSA, continues to provide rich information on the trajectories of older people after 16 years of regular surveying. A feature of ELSA and HRS, and now of the numerous other ageing studies being conducted in different countries, is that people enrolled at the beginning of the study are followed over time. This allows identification of how changed circumstances in one domain affect subsequent change in others – economic fortunes, social functioning, health, and physical and mental functioning.

Both the longitudinal nature of ELSA and its multidisciplinarity make it a key study for providing understanding relevant to policy. The government has produced a new set of public service agreements (PSAs). PSA 17 is entitled *Tackle Poverty and Promote Greater Independence and Wellbeing in Later Life*. It sets out five key aims for people at older ages:

- making a contribution to society, in particular through employment;
- material well-being, in particular the need to continue tackling pensioner poverty;
- the level of health experienced in later life;

- satisfaction with home and neighbourhood including, for example, the impact of factors such as access to services, transport and crime, and social contacts; and
- the ability to maintain independent living, while being supported with health and care services where needed.

Data and analyses from ELSA are relevant to each of these aims.

Employment

One, but not the only, way to measure contribution to society at later life is continuation in employment at ages 50–69. In ELSA, we have looked at what predicts being in employment at wave 3 and changes in employment over the four-year period from wave 1 to wave 3.

Expectations are related to outcomes.

- As successive cohorts of people in their 50s and early 60s have increased their employment rates in recent years, so too have expectations of continuing to be in paid work for some years yet. Self-reported chances of being in paid work at older ages from wave 1 have proved to be strongly correlated with subsequent outcomes.

Partner's employment is important …

- Individuals are less likely to leave full-time work if their partner is working. And those who do leave full-time work when their partner is working are more likely to move into part-time work than to quit altogether.
- Both men and women are more likely to continue working beyond State Pension Age if their partner is working, whether their partner is under or over State Pension Age.

… as are physical health, …

- The onset of major health conditions, such as heart attacks, lung disease and cancer, is associated with a higher likelihood of leaving full-time work and, on leaving full-time work, of quitting altogether rather than moving into part-time work.

… type of pension, …

- Men, but not women, who are members of defined benefit pension schemes are more likely than those who are members of defined contribution pension schemes to leave full-time work, other things being equal.

… and education and previous work experience.

- People with least education are least likely to be in employment over State Pension Age, after allowing for health and other circumstances.
- Longer time in a particular job increases the chance of leaving full-time paid work and decreases the chance that, having left full-time work, the move is to part-time work rather than stopping paid work completely.

- Individuals are much more likely to return to work at older ages if they have only been out of work for a short period of time.

The onset of deteriorations in health that limit the ability to work:

- Work disability is by no means a permanent state of affairs. Over one-quarter of those reporting a health-related work disability in 2004 reported no work disability two years later.[1] But 'recovery' from work disability is not random. Those who are working, those who have no major health conditions and those at the top of the wealth distribution are most likely to recover.

- Amongst those working and not reporting a health-related work disability in wave 2, subsequent onset of work disability over the following two years is higher for men, for part-time workers and for those at the bottom of the wealth distribution.

Material well-being and pensioner poverty

Reaching State Pension Age does not, in itself, lead to poverty. Rather,

Poverty of income is related to being single, …

- Single individuals are more likely to be in income poverty (less than 60% of the median family income) than people in couples, with women who are divorced, separated or widowed having the highest risk of income poverty.

… low level of pensions …

- Those estimated to have accumulated relatively low levels of state and private pension rights are found to have a much greater risk of being in income poverty.

… and being out of the labour force.

- Those who move out of the labour force and those whose partner moves out of the labour force between 2002–03 and 2006–07 are more likely to move into income poverty in this period and less likely to move out of it.

Wealth has increased.

- Large increases in total wealth occurred between 2002–03 and 2006–07, with these increases being seen right across the distribution of wealth in 2002–03. The median nominal increase in total wealth over this four-year period was 39%. This has been caused by large increases in house prices boosting housing wealth: the median nominal increase in non-housing wealth was just 6%.

- The distribution of change in non-housing wealth over this period provides little evidence that those experiencing large increases in their housing wealth chose to save less in other forms as a result.

[1] This estimate may be an overestimate since there was greater loss to the sample of working people with work disability in wave 1 than of those without.

Level of health

Longitudinal studies are the best way to determine what influences the onset of ill health and disability and what shortens healthy life expectancy. This will be an important contribution of ELSA, but the follow-up period of ELSA is still too short to yield a great deal of analysis. That said, much of importance to health at older ages has emerged.

Weight and waist circumference have increased …

- Between wave 0 (the Health Survey for England, from which the ELSA sample was chosen) and wave 2, there was an increase in waist circumference among people aged under 75 at wave 1, while Body Mass Index (BMI) increased for the youngest men and for women in their 50s and 60s. We are watching the obesity epidemic develop in real time.

… and is causing problems, …

- Higher BMI and/or waist circumference is associated with relatively large increases in prevalences of back pain, shortness of breath, difficulties with walking, arthritis and (in women) depression; with lower quality of life; with increased likelihood of having cardiovascular disease; and with increased risk of death.

… but don't go too far in the other direction.

- Being underweight is associated with increased risk of death in men but not women.
- Small waist circumference is associated with the greatest decrease in walking speed over a four-year period for men.

Mortality is not random: it is better to be wealthy, …

- There is a clear and graded relation between wealth at wave 1 and subsequent mortality risk – the more wealth, the lower the risk of dying.

… to not live alone …

- Men and women not living with a partner have higher mortality risk than those who are living with a partner (married or not). Contrary to the rumour that marriage is good for men and not for women, ELSA shows that the mortality advantage of being married appears to extend to women as well as men.

… and to continue to follow advice.

- Smoking and physical inactivity are associated with increased mortality risk.
- Occasional alcohol consumption, but not daily drinking, is associated with lower mortality risk than that seen among those who never drink alcohol.

Health is more than staying alive.

- There are clear and substantial socio-economic gradients in loss of physical functioning as measured by slow walking speed or by difficulties with activities of daily living. The gradients were found both for personal wealth and for neighbourhood deprivation.

- As expected, both physical and mental ill health are important predictors of non-participation in leisure activities.
- Healthy life expectancy will be an important focus of policy for the future. Different measures of 'healthy' life expectancy give somewhat different results. ELSA will be in a position to make judgements on the utility of different measures.

Quality of life

ELSA has a number of measures of quality of life – prominent among them are the CASP-19 (C=control, A=autonomy, S=self-realisation, P=pleasure) and the GHQ-12 (General Health Questionnaire) which we use as a measure of well-being.

Quality of life and well-being – more ill effects of being alone, poor and unwell:

- Those individuals who are divorced, separated or widowed are found, on average, to report lower levels of well-being (measured using the GHQ-12 scale) than other individuals.
- This is also true of those reporting difficulties with physical functioning (an indicator of poor health).
- Women are found to report higher levels of quality of life (measured using the CASP-19 scale) than men, for a given marital status.
- Both improved self-reported well-being and increased self-reported quality of life are found to be associated with increased income.

Some people are more resilient than others.

There is increasing interest in people's ability to resist adversity and flourish under it. Put differently, why does adversity not affect all people equally? As usual, to turn a concept into something that can be measured and analysed takes developmental work. This report shows results of that work. The concept of resilience was put into practice by examining circumstances that commonly lead to depression and then identifying people who came through these events without development of depressive symptoms.

The coherence of the measure was shown by:

- Resilient older people are more satisfied with their lives and have a better quality of life.
- They expect to live longer.

Future research will aim to explore why some people are more resilient than others and whether conscious social policy could foster resilience.

Independent living

Much of the concern with the ability of older people to live independently has been with their physical and mental abilities to function and with the existence of services to meet the needs of those with severe limitations. ELSA has much to say on this topic and has analysed activities of daily living (ADLs) and instrumental activities of daily living (IADLs). Please see Chapter 3 of this report.

Another important aspect of functioning at older ages is remaining an active member of society, not only to contribute, but also to receive the benefits of social inclusion. We examined the converse, labelling it social detachment and measuring it as disadvantage on three of six indicators of social participation – contacts with other people, social support, civic/political involvement, participation in culture, participation in recreational activities/hobbies and participation in leisure.

Social detachment is relatively uncommon, but many are at risk, …

- One-in-ten older people experienced social detachment at least once across three biennial observations. In half of these, it persisted across at least two of the three waves.
- Approximately half of older people were at risk of social detachment (disadvantaged on at least one of the six indicators of participation).

… and it matters.

- The longer the duration of social detachment, the worse the quality of life (as measured by CASP-19) and other measures of well-being.

Isolated in the family sphere, isolated in others, …

- Not living with a partner was associated with increased risk of persistent social detachment, even if living with their children or other people.

… having low education, …

- Those with a low level of education had a risk of social detachment that was more than twice that of people with high education.

… fewer material resources, …

- Older people on lower incomes (bottom 60% of the distribution), those suffering from material deprivation and those living in poor housing were markedly more likely to be affected by longer-lasting social detachment.

… lack of access …

- Older people who lacked access to various services, transport, financial products or modern communication technologies faced an increased risk of prolonged social detachment. In each case, the odds were one-and-a-half to two times higher than for people who had access.

… and poor health.

- The odds of being persistently detached were three times higher for those reporting poor health than for those reporting excellent health.

There is likely to be a two-way relation between social detachment and poor health: each increases the likelihood of the other. The relative contribution of social detachment for development of poor health, and of poor health for social detachment – and the policy implications of each – will become clearer in subsequent waves of ELSA.

Methods

Chapter 9 gives information on the fieldwork methods, response rates and content of the ELSA interview. A brief summary of the design is given here.

The original ELSA sample was drawn from households previously responding to the Health Survey for England (HSE) in the years 1998, 1999 and 2001 (Marmot et al., 2003). Individuals were eligible for interview if they were born before 1 March 1952, had been living in a responding HSE household and were, at the time of the ELSA 2002–03 interview, still living in a private residential address in England. In addition, partners under the age of 50 years, and new partners who had moved into the household since HSE, were also given a full interview. All those who were recruited for the first wave or have since become partners of such people are known as Cohort 1. People eligible from HSE who took part in ELSA wave 1 are designated as core members. In the second wave, which took place between June 2004 and July 2005, the core members and their partners were eligible for further interview, provided they were still alive and had not refused any further contact after the first interview. In the third wave, the aim was to supplement the original cohort with people born between 1 March 1952 and 29 February 1956 so that the ELSA sample would again cover people aged 50 and over. The sources for the new recruits were the 2001–2004 HSE years. As before, people 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 in a private residential address in England. Partners were also interviewed. These people form Cohort 3. See Chapter 9, pages 282 and 299 for an explanation of a shortfall among this cohort and the way this has been handled in weighting. Wave 3 interviews took place between April 2006 and July 2007. The median time lapse between waves 1 and 3 for Cohort 1 core members was 49 months (interquartile range 48–51 months, minimum time lapse 38 months, maximum 63 months).

In waves 1 and 3, there was a face-to-face interview and a self-completion form. In wave 2, there was also a nurse visit, as there is in wave 4, which is in progress at the time of publication. Broad topics covered in every wave include household composition, employment and pension details, housing circumstances, income and wealth, self-reported diseases and symptoms, tests of cognitive performance and of gait speed, health behaviours, social contacts and selected activities, and a measure of quality of life. The main innovation for wave 3 was assignment of self-completion forms containing vignettes to subsamples of participants. The concept of these vignettes is described in Chapter 9, page 286. The main idea behind them is to assess to what extent differing distributions of self-rated health among different subgroups can be explained by differing thresholds as to what constitutes mild or moderate or severe problems with health. These have been used in Chapter 2 on Extending Working Lives and there is scope for a range of uses – for example, in understanding social gradients in health or in making international comparisons (our sister studies the Health and Retirement Study in the US and the Survey of Health, Ageing and Retirement in Europe have also used vignettes in their studies).

In this report, the intention is to show some of the ways in which ELSA data can be used to look at current policy issues. This report does not claim to be exhaustive in the analyses that have been done but to showcase a variety of approaches that can be taken and data that can be used. The authors were given a free hand in approaching their topic in the way they considered most appropriate. Although there are parts of the report where the intention is to look at prevalences and distributions (for example, of wealth in Chapter 4), for the most part the focus is on relationships between different parts of people's lives over time. For example, Chapter 2 examines the predictors of staying in work, Chapter 3 the factors that are associated with greater or less likelihood of participation in leisure activities, Chapter 5 the characteristics that seem to make people more vulnerable to being socially detached from society and Chapter 8 the factors that increase risk of death in the four-year period after wave 1.

In wave 3, the use of dependent interviewing continued; with this approach, participants are reminded of responses given at the most recent interview and asked to update the information (for example, on job undertaken, pension scheme membership, diagnosed chronic diseases). Where a sample member is too sick or cognitively impaired to respond directly to questions themselves, a person whom they have previously nominated as their proxy is asked to provide information but is not asked to second-guess the more subjective information such as attitudes, perceptions of ageing or expectations of the future.

In 2007 a life-history interview also took place, capturing information on lifetime family circumstances, place of residence, and employment, and also information on major health events and other life events that could have an impact on the later years of life. Although this report was written too soon to use this life-history data, we believe it will greatly increase the opportunities for taking a lifetime perspective on ageing.

The ELSA data are deposited in the Economic and Social Data Service Archive (www.esds.ac.uk/longitudinal) for use by academics, policymakers and others with an interest in ageing. During the writing of this report, a second version of the main data from wave 3 was prepared. This second version was used for the analyses in Chapters 2–4; otherwise, the first version was used. For the purposes of the analyses here, the differences between the two versions were minor.

Reporting conventions

The analyses in this report use information from the core members of ELSA. Except for mortality analyses, measures of change apply to those who took part in either two or three waves of fieldwork. For most of the analyses, proxy interviews have been excluded, mainly because a much reduced set of information is available for these people. The numbers included in analyses vary considerably as most of the analyses refer to subgroups of those taking part: 7,047 core members took part directly in all three waves (i.e. did a complete or partial interview and were not proxies) and were not in long-term care at any wave; 7,344 took part in waves 1 and 3 directly and were not in long-term care at either wave. The new recruits are included in analyses about employment and work disability in Chapter 2 and in analyses of changing income and wealth distributions in Chapter 4, and will strengthen the scope for analyses of changes at the younger end of the age spectrum.

The longitudinal weight available for analyses is described in Chapter 9. This has been used for most of the more descriptive longitudinal analyses unless the weighting made no substantive difference. A cross-sectional weight has also been created but is not used in the report.

Statistics in cells with between 30 and 49 observations are indicated by the use of square brackets. Statistics that would be based on fewer than 30 observations are omitted from the tables; the number eligible is given but a dash is placed in the cell where the statistic would otherwise be placed.

Acknowledgements

ELSA is a large multi-centre and multidisciplinary study that would not have been possible without the efforts and dedication of a great number of people. The study is managed by a small committee chaired by Professor Sir Michael Marmot and made up of James Banks, Richard Blundell, Elizabeth Breeze, Kate Cox, Carli Lessof and James Nazroo. The past inputs of Hayley Cheshire and Bob Erens to this committee are gratefully acknowledged.

We would like to express our gratitude for the support we have received from a number of sources.

The people who matter most to us are our participants. They have given generously of their time on up to five occasions already and most have agreed to be recontacted. We hope that they find participation in the study interesting and that they will help us to track through the changes that happen as people age. From time to time, we send out newsletters to participants and hope that these begin to show the value of the study.

The institutions primarily involved in running the study are University College London (UCL), the Institute for Fiscal Studies (IFS) and the National Centre for Social Research (NatCen). Colleagues at the Universities of Manchester and Cambridge are also lead researchers on the study. We have close cooperation with colleagues at the above institutions who are not part of the main ELSA team and with researchers at the Peninsula Medical School in Exeter, the University of East Anglia and Imperial College. The study has involved a great many individuals in each of these institutions, some of whom are reflected in the authorship of chapters in this report. Others, including over three hundred dedicated interviewers, are unnamed here, but have been crucial to the success of the study and are very much appreciated. With regard to this report, particular thanks are due to Judith Payne and Anne Rickard for assiduous copy-editing and preparation of the final manuscript and to Emma Hyman for guiding the report through the final stages of publication.

The research group has been carefully advised by two bodies:

- First, consultants to the study, who have provided specialist advice. These are Orazio Attanasio, Mel Bartley, David Blane, Axel Börsch-Supan, Richard Disney, Paul Higgs, Mike Hurd, Roger Jowell, Costas Meghir, David Melzer, Jim Smith, Beth Soldo, Mike Wadsworth, Bob Wallace and Bob Willis.

- Second, members of the advisory group to the study. The group is chaired by Baroness Sally Greengross, and its members are Michael Bury, Emily Grundy, Ruth Hancock, Sarah Harper, Tom Kirkwood, Ian Philp, Tom Ross, Jacqui Smith, Anthea Tinker, Christina Victor and Alan Walker.

Finally, the study would not be possible without the support of funders. Funding for the first four waves of ELSA has been provided by the US Institute on Aging, under the stewardship of Richard Suzman, and several UK government departments. The departments that contributed to the third wave of data collection are: Communities and Local Government; Department for Environment, Food and Rural Affairs; Department of Health; Department for Transport; Department for Work and Pensions; Her Majesty's Revenue and Customs; and the Office for National Statistics. This UK government funding, and our interactions with departments' representatives, have been coordinated by the Office for National Statistics through the longitudinal data strategy and we are grateful for its role in the development of the study. We are particularly grateful to Jill Barelli, Emma-Jane Cooper-Green and Samantha Xavier, who did most of the coordinating work during this period. Members of the UK funding departments provided helpful comments on drafts of this report, but the views expressed in this report are those of the authors and do not necessarily reflect those of the funding organisations.

References

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: Institute for Fiscal Studies.

Marmot, M., Banks, J., Blundell, R., Lessof, C. and Nazroo, J. (eds) (2003) *Health, Wealth and Lifestyles of the Older Population in England: The 2002 English Longitudinal Study of Ageing*, London: Institute for Fiscal Studies.

Summary

Chapter 2
Extending working lives

- Employment at older ages has been increasing in recent years. Younger cohorts have higher employment rates at each age than their predecessors.
  - Most of this increase seems to have come from increases in full-time work rather than increased prevalence of part-time working.
  - Later cohorts are not only more likely to be in work in their 50s and early 60s than previous cohorts were, but also more likely to expect to continue to work at older ages.
  - Self-reported chances of remaining in work are strongly correlated with subsequent outcomes. This suggests that higher expectations of remaining in work amongst the later cohorts could well translate into higher employment rates at older ages in the future.
- One policy change that would be expected to encourage greater labour market participation beyond age 60 is the increase in the female State Pension Age from 60 to 65. However, the evidence here suggests that knowledge of this change is low amongst those who will be affected, though those who were working in 2006 were somewhat better informed than those not working.
- There is evidence that men, in particular, respond to the financial incentives for retirement provided in their private pensions. Analysis in this chapter shows that men (though not women) who are members of defined benefit pension schemes are more likely to quit full-time work than those who are members of defined contribution schemes.
- Pre-existing health conditions are not significantly associated with subsequent movements out of work. This is perhaps not surprising given that these individuals were working in spite of their health condition in the first place. However, the onset of new major health conditions is associated with a greater probability of leaving full-time work and a lower probability of 'phasing' retirement.
- There is evidence of complementarities in leisure amongst couples.
  - Individuals with working partners are significantly less likely to leave full-time work than those with non-working partners.
  - However, men whose partner then subsequently retires are much more likely to also leave full-time work.
  - Those individuals of working age but out of work are more likely to return to work if their partner is working than if their partner is not working.
  - Both men and women are more likely to be working after State Pension Age if their partner is working, regardless of the age of the partner.

- Those who re-enter work are much more likely to have only been out of work for a relatively short period of time. This is particularly true for men. Those who have been out of work for a long time are very unlikely to start working again.
- Work disability:
  - Amongst those working and not reporting a work disability, onset of work disability is higher for men, for part-time workers, for those with pre-existing major or minor health conditions, for those with the onset of a major condition and for those at the bottom of the wealth distribution.
  - Work disability is by no means a permanent state of affairs. Over one-quarter of those reporting a work disability in 2004 reported no work disability two years later. But 'recovery' from work disability is not random. Those who are working, those who have no major health conditions and those at the top of the wealth distribution are most likely to experience only transitory work disabilities.
  - Whilst it is true that work disability increases with age, even at older ages the proportions reporting that the degree to which their health limits ability to work is either severe or extreme are very low. Amongst those aged 70+, two-thirds say that they are either not limited or only mildly limited in the type or amount of work they could do.
  - There are strong patterns in individuals' subjective assessments of work disability. Different socio-economic groups, and those with different health statuses, assess situations differently in terms of people's ability to work. However, these reporting differences do not explain the socio-economic differences in work disability found above.

Chapter 3
Physical functioning in a community context

- Lower levels of personal wealth and higher levels of neighbourhood deprivation were both associated with increased risks of developing age-related impairments over a four-year period (gait speed, activities of daily living [ADLs], instrumental activities of daily living [IADLs], motor skills or mobility difficulties); negative feelings about the neighbourhood (social capital) had a smaller association that was not independent of wealth and neighbourhood deprivation. These findings were independent of educational level, aspects of health and smoking.
- Poorer personal relationships with family members were associated with onset of difficulties with mobility; those with no children were as likely to experience the onset of motor skill difficulties as those who described their relationship with their children as poor.
- Quality of personal relationships was more strongly associated with onset of motor skill or mobility problems (e.g. climbing stairs, bending or stretching) than with onset of ADLs and IADLs.

- A history of difficulties with ADLs or IADLs over the four-year period was strongly associated with poorer perceptions of general health and mental health.
- There was a clear gradient in participation in six leisure activities at wave 3 according to history of difficulties; those who never reported difficulties with ADLs or IADLs were most likely to take part, those with these difficulties at the beginning and end of the period were least likely to take part and those free of difficulties at wave 1 or wave 3 formed intermediate groups.
- In multivariate models other aspects of health were shown to contribute to the relative lack of participation, notably poor vision, general health and, for women, depressive symptoms. Independent associations of difficulties with participation in activities were relatively few but were clear in relation to taking a holiday abroad (women), having a hobby, and taking a holiday in the UK (men only).
- At wave 3 people scored worst on the control and autonomy dimension of the CASP-19 quality of life scale if they had a continued history of having difficulties with both ADLs and IADLs. Even those who only experienced difficulties with motor skills scored worse than those with minimal difficulties of any kind.
- In 2006–07, help with difficulties came overwhelmingly from informal sources, particularly the respondent's spouse. However, substantial proportions of women aged 85 years and older with difficulties mentioned help from formal sources, and this may reflect both more severe difficulties and the lack of a spouse to provide support. Among those with functioning impairment, women were more likely than men to receive help from children, except for helping people aged 85 and over with respect to shopping and work around the house (children being a source of help for about half in this age group who had difficulties with these tasks).
- People who drove vehicles to which they had free access were unlikely to use other means of transport regularly. This group tended to be richer and better educated. Other means of transport considered were public transport, lifts and taxis; use of one of these was positively associated with use of the others. Those who had reported difficulties with ADLs and IADLs both in 2002–03 and four years later were least likely to be drivers and most likely never to use public transport. Having difficulty with an IADL at wave 3 was associated with greater likelihood of taking a lift at least once a week whereas having any kind of difficulty was associated with greater use of taxis compared to those who did not have difficulty, but generally use of taxis was infrequent. This suggests that transport options for those with difficulties need to be kept under review to facilitate getting out of the home.

Chapter 4
Financial resources & well-being

- Single individuals are more likely to be in income poverty than those in couples, with women who are divorced, separated or widowed having the highest risk of income poverty. Those estimated to have accumulated relatively low levels of state and private pension rights and (conditional on other observed characteristics) those who are aged below the State Pension Age are found to have a much greater risk of being in income poverty. It appears to be factors associated with old age (such as not being in the labour force and widowhood) which are significantly associated with an increased risk of income poverty – not age in itself.

- Women who are divorced, separated or widowed, and women who become so, are both found to be more likely to move into income poverty between 2002–03 and 2006–07. This is also true of those who move out of the labour force, those whose partner moves out of the labour force and those who have accumulated relatively low levels of state and private pension rights. Conversely, reaching the State Pension Age is, conditional on other observed characteristics, associated with a lower chance of moving into income poverty.

- Large increases in total wealth occurred between 2002–03 and 2006–07, with these increases being seen right across the distribution of wealth in 2002–03. The median nominal increase in total wealth over this four-year period was 39%. This has been caused by large increases in house prices boosting housing wealth: the median nominal increase in non-housing wealth was just 6%. The distribution of growth in non-housing wealth over this period is very similar among those with and those without housing wealth, suggesting little evidence of those experiencing large increases in their housing wealth choosing to save less in other forms as a result.

- One-in-nine respondents aged 50 or over in 2006–07 had estates worth more than the Inheritance Tax threshold. Over the period from 2002–03 to 2006–07, more estates appear to have moved above the Inheritance Tax threshold. However, given that the driver of the increase in wealth over this period was growth in house prices, whether or not this pattern will continue going forwards might depend heavily on the future path of house prices.

- Those individuals who are divorced, separated or widowed are found, on average, to report lower levels of well-being (measured using the GHQ-12 scale) than other individuals. This is also true of those reporting difficulties with physical functioning (an indicator of poor health). Women are found to report higher levels of quality of life (measured using the CASP-19 scale) than men (for a given marital status). Both improved self-reported well-being and increased self-reported quality of life are found to be associated with increased income.

Chapter 5
Investigating the dynamics of social detachment in older age

- Approximately half of older people were at risk of social detachment (disadvantaged on at least one of the six indicators of participation) and around 7% showed signs of social detachment (disadvantaged on at least three of the six indicators of participation) at a given point in time.
- One in ten (10%) older people experienced social detachment at least once across three biennial observations. Half of them (4.5% of all older people) experienced persistent social detachment – detached in at least two of the three waves.
- The duration of social detachment does matter: quality of life (as measured by CASP-19, the government's indicator of subjective well-being) consistently reduces with the duration of social detachment. Other measures of well-being also decrease the longer social detachment lasts.
- The characteristics most strongly associated with a longer duration of social detachment were those related to family composition, specifically not living with a partner. Older people living alone, those living with their children only (i.e. without a partner) and those living with other people but not with partner or children were at risk of longer-lasting social detachment (the odds 3.5 to 8 times higher than for people living with their partner).
- Other demographic characteristics that increase the odds of sustained social detachment include having a low level of education (the odds for those with CSE education or lower are 2.5 times higher than those with a high level of education) and being male (the odds 1.5 times higher than for females).
- General health also had an independent association with persistent social detachment. The odds of being persistently detached were three times higher for those reporting poor health than for those reporting excellent health.
- Material resources were significantly related to the risk of persistent social detachment. Older people on low income, those suffering from material deprivation and those living in poor housing were markedly more likely to be affected by longer-lasting social detachment.
- Also, older people who lacked access to various services, transport, financial products or modern communication technologies faced an increased risk of prolonged social detachment (in each case the odds were 1.5 to 2 times higher than for people who had access).
- Age itself has been found not to have an independent effect on the persistence of social detachment. The effect of age disappears when family type is controlled for; this is partly because the oldest people (aged 80 years and over) tend to live alone more frequently.

Chapter 6
Resilience in older age: a depression-related approach

- Resilience, the ability of people to resist adversity and flourish under it, existed irrespective of the way it was measured.
- Resilient older people were more satisfied with their lives and had a better quality of life than non-resilient older people.
- Resilient older people expected to live longer than their non-resilient counterparts.
- Age and socio-economic status did not seem to be much related to resilience but further exploration on this issue is needed.
- Sex, marital status and social support were related to resilience cross-sectionally but not longitudinally. Further evaluation of these factors as correlates of resilience is required.

Chapter 7
Anthropometric measures and health

- In men aged 50 to 55 and women aged 50 to 67 (at wave 1), BMI increased significantly between wave 0 and wave 2. BMI in women changed more over time than men’s BMI. In men and women aged 50 to 74 (at wave 1), mean waist circumference increased significantly between wave 0 and wave 2.
- Increases in prevalence of moderate or severe back pain over a four-year period were associated with obesity and high waist circumference (at wave 0) among men and women but also with being overweight or having medium waist circumference among women.
- Neither BMI nor waist circumference reported at wave 0 was related to the prevalence rates of those who have fallen and had serious injuries occurring in any of the subsequent waves of data collection.
- Increased prevalence of reported shortness of breath over the four-year period was found among people who were either overweight or obese or had a high waist circumference at wave 0.
- Men and women who were obese or had high waist circumference at wave 0 had the highest increase over time (wave 1 to wave 3) in the prevalence of arthritis.
- Among overweight men and women and obese women, mean walking speed decreased significantly from wave 1 to wave 3. Men with low waist circumference and women with medium waist circumference had the greatest decrease in mean walking speed over four years.
- Greater waist circumference at wave 0 was related to higher odds of having cardiovascular disease at wave 3 in both men and women. These effects were independent of all covariates examined.

- Men and women who were obese or overweight at wave 0 had significantly lower quality of life scores than normal weight people in any of the subsequent waves. Increased waist circumference (at wave 0) was related to lower quality of life scores at wave 3 in women only.
- Normal weight and overweight men and obese women had a greater increase over time in the prevalence rates of depression.
- Greater waist circumference is associated with increased risk of death in men and women. Being underweight is associated with increased risk of death in men but not women.

Chapter 8
Mortality and healthy life expectancy

- Risk of death was higher for men than women for all ages studied here. In a multivariate analysis adjusting for demographic, behavioural and socio-economic factors, men aged 50 and over had on average an 83% higher risk of dying (hazard ratio 1.83, 95% confidence intervals [CI] 1.59–2.11).
- Risk of death was lower for those living with a partner (married or not) than those living without a partner, and for those who were married compared with those who were not. In a multivariate analysis those who were widowed had a 39% greater risk, those who were separated or divorced a 62% greater risk and those who had never married a 76% greater risk, compared with those currently married.
- The incidence of mortality was strongly patterned by the three socio-economic indicators examined here: level of qualifications, occupational class and wealth. In bivariate analyses stratified by age and sex:
    - There were more deaths among those without qualifications and fewer among those with a degree or higher qualification, compared with those with an ‘intermediate’ level of qualification.
    - Those in routine and manual occupations had a higher risk of death than those in intermediate occupations, while those in managerial and professional occupations had a lower risk.
    - Risk of mortality by wealth was similarly graded, with those in the richest wealth quintile having the lowest risk and those in the poorest wealth quintile having the highest risk.
- In multivariate analyses, where all three socio-economic measures (qualifications, occupational class and wealth) were included in a joint model, together with demographic and lifestyle measures, wealth was the only socio-economic measure that predicted risk of mortality. This may be because wealth is a more accurate marker of socio-economic position at older ages than the other measures, or because the effects of education and occupational class operate through wealth.
- The three lifestyle factors examined, physical activity, smoking and drinking alcohol, were all associated with risk of mortality in multivariate analyses accounting for demographic and socio-economic effects:

  - Those who were physically inactive had twice the risk of death compared with those who had the highest level of physical activity (hazard ratio 2.01, 95% CI 1.56–2.59).
  - Compared with those who had never smoked, ex-smokers had a 20% greater risk of mortality and current smokers had a 74% greater risk of mortality.
  - Compared with those who never drink alcohol and those who drink daily, occasional drinkers had a reduced risk of mortality (hazard ratio 0.79, 95% CI 0.67–0.92, in comparison with those who never drink alcohol).
  - Although these analyses are longitudinal, the interpretation of the strength of these associations should be made cautiously, because behaviours may change after the onset of disease, but before mortality.
- Analysis of deaths by the month of year in which they occur shows the expected excess occurring in the winter months of December to March compared with other months (8.5% of deaths in those months were excess ‘winter’ deaths). An unusual peak of deaths occurred in the month of October and if these deaths are excluded from the analysis, the estimate of excess winter mortality increases to 14.7% of deaths occurring in the period December to March, which is 5.9% of all deaths.
- The excess of deaths in winter months was not clearly patterned by age, cohabiting status, central heating, quality of accommodation or socio-economic position.
- Three estimates of life spent in good health were used: life expectancy with excellent or good health (rather than fair or poor health); life expectancy without a limiting illness; and healthy life expectancy, estimated using measures of mobility, activities of daily living and instrumental activities of daily living:
  - For all three measures, at older ages an increasing proportion of life expectancy is spent without good health. For example, men aged 50–54 are estimated to spend 21% of their remaining life with a disability, compared with 36% for men aged 75–79, while for women in the same age groups the figures are 27% and 46%, respectively.
  - The three measures used give different estimates of the proportion of life to be spent unwell or disabled. For example, men aged 50–54 are estimated to spend 8.2 years with fair or poor self-rated health, 10.3 years with a limiting long-standing illness and 6 years with a disability. This is not surprising, because they represent different dimensions of health, but this sensitivity to the measure used is important for policy.

2. Extending working lives

James Banks *Institute for Fiscal Studies and University College London*

Gemma Tetlow *Institute for Fiscal Studies and University College London*

The analysis in this chapter shows that:

- Employment at older ages has been increasing in recent years. Younger cohorts have higher employment rates at each age than their predecessors.
    - Most of this increase seems to have come from increases in full-time work rather than increased prevalence of part-time working.
    - Later cohorts are not only more likely to be in work in their 50s and early 60s than previous cohorts were, but also more likely to expect to continue to work at older ages.
    - Self-reported chances of remaining in work are strongly correlated with subsequent outcomes. This suggests that higher expectations of remaining in work amongst the later cohorts could well translate into higher employment rates at older ages in the future.
- One policy change that would be expected to encourage greater labour market participation beyond age 60 is the increase in the female State Pension Age from 60 to 65. However, the evidence here suggests that knowledge of this change is low amongst those who will be affected, though those who were working in 2006 were somewhat better informed than those not working.
- There is evidence that men, in particular, respond to the financial incentives for retirement provided in their private pensions. Analysis in this chapter shows that men (though not women) who are members of defined benefit pension schemes are more likely to quit full-time work than those who are members of defined contribution schemes.
- Pre-existing health conditions are not significantly associated with subsequent movements out of work. This is perhaps not surprising given that these individuals were working in spite of their health condition in the first place. However, the onset of new major health conditions is associated with a greater probability of leaving full-time work and a lower probability of 'phasing' retirement.
- There is evidence of complementarities in leisure amongst couples.
    - Individuals with working partners are significantly less likely to leave full-time work than those with non-working partners.
    - However, men whose partner then subsequently retires are much more likely to also leave full-time work.

- Those individuals of working age but out of work are more likely to return to work if their partner is working than if their partner is not working.
- Both men and women are more likely to be working after State Pension Age if their partner is working, regardless of the age of the partner.

- Those who re-enter work are much more likely to have only been out of work for a relatively short period of time. This is particularly true for men. Those who have been out of work for a long time are very unlikely to start working again.
- Work disability:
    - Amongst those working and not reporting a work disability, onset of work disability is higher for men, for part-time workers, for those with pre-existing major or minor health conditions, for those with the onset of a major condition and for those at the bottom of the wealth distribution.
    - Work disability is by no means a permanent state of affairs. Over one-quarter of those reporting a work disability in 2004 reported no work disability two years later. But 'recovery' from work disability is not random. Those who are working, those who have no major health conditions and those at the top of the wealth distribution are most likely to experience only transitory work disabilities.
    - Whilst it is true that work disability increases with age, even at older ages the proportions reporting that the degree to which their health limits ability to work is either severe or extreme are very low. Amongst those aged 70+, two-thirds say that they are either not limited or only mildly limited in the type or amount of work they could do.
    - There are strong patterns in individuals' subjective assessments of work disability. Different socio-economic groups, and those with different health statuses, assess situations differently in terms of people's ability to work. However, these reporting differences do not explain the socio-economic differences in work disability found above.

2.1 Introduction

Increasing life expectancies, the post-war 'baby-boom' generation reaching retirement age and declining birth rates mean that the UK, in common with other developed economies, faces the prospect of a rapidly growing aged population relative to the working-age population over the next few decades. However, it is well known that it is the economic dependency ratio – the ratio of economically inactive to economically active individuals in the population – rather than the old-age dependency ratio that plays a more central role in determining an economy's ability to deal with the pressures of population ageing. As such, the participation of older working-age adults in the paid labour market has become a policy issue of central importance. The government's commitment to Public Service Agreement 17 (to 'tackle poverty and promote greater independence and well-being in later life') explicitly recognises the employment rate of those aged between 50 and 69 as one of the key indicators of progress against this target.[1]

The drivers of employment at older ages are complex. Important factors influencing participation in paid work at older ages include the financial incentives in both public and private pension schemes, wage opportunities and preferences for work. Wage opportunities and preferences for work may both be affected by health and physical and cognitive functioning because these may impact on an individual's mental and physical ability to do certain types of work. Understanding how policy can best support working at older ages requires an understanding of how these various factors affect the employment decisions of older workers and how they react to the incentives and constraints they currently face. With many policies aimed at improving the provision of retirement income and increasing participation in the labour market by older individuals coming into force over the next few years, now is a good time to take stock of what existing evidence from ELSA can tell us about patterns of work at older ages. This chapter sets out the key longitudinal patterns in work at older ages and the way these patterns link to health and functioning, job type and pension arrangements, socio-economic position and family circumstances.

Three elements of the ELSA data are particularly important in understanding work patterns for older working-age adults, and each of these is brought out in what follows. First, and crucially, ELSA is a longitudinal study and hence allows us to track trajectories over time, look at movements into and out of work with age, and control more successfully for unobserved differences between individuals (although, in this last dimension, the ELSA sample is still somewhat limited by covering only a relatively short period of time). Second, the detailed information on specific health conditions and subjective assessments of work disability (both of an individual's own situation and of hypothetical individuals) allow us to investigate the links between health and work in some detail. Finally, ELSA data are internationally comparable, which allows us to look at how outcomes in England compare with outcomes in other countries, where the various social and economic institutions may produce different incentives to remain in, or to leave, paid work.

Section 2.2 presents the evidence from ELSA on how the cross-sectional employment rates and expectations of future working amongst those aged 50 and over in wave 3 compare with what was observed amongst those aged 50 and over in wave 1. Sections 2.3 and 2.4 use the panel element of the ELSA survey to examine the factors correlated with subsequent employment trajectories for those who were working or not working initially. Section 2.3 looks at the extent to which financial incentives, health, and socio-economic and family circumstances are associated with withdrawal from full-time work and, amongst those who leave full-time work, who it is that moves out of work entirely and who experiences a more gradual withdrawal from work (in other

[1] See annex C of HM Treasury (2007).

words, moving first into part-time work). Section 2.4 looks at the factors associated with returns to work at older ages and Section 2.5 looks specifically at the characteristics of those who remain in work beyond the State Pension Age (SPA).

One major factor that affects individuals' ability to work at older ages is their health. Section 2.6 therefore examines in greater detail the issue of work disability at older ages and looks at transitions in work disability and employment between 2004 and 2006. The section also considers whether the patterns observed in the data are affected by the nature of subjective reporting differences across individuals of different types. Section 2.7 concludes.

2.2 Cohort differences in working and expectations of working

Between the late 1960s and the mid-1990s, employment rates of older men declined in the UK – a pattern also seen in many other European countries and in the US (see Gruber and Wise [2007]). Since the mid-1990s, however, employment rates of older men in the UK have increased and this, coupled with higher labour market participation amongst later cohorts of women, means that employment rates of those aged over 50 have increased markedly over the last decade. This is a pattern not seen more generally in the population, with employment rates at younger ages not having increased as sharply over the same period (see, for example, Office for National Statistics [2007]). These patterns of employment rates for older individuals can also clearly be seen in the ELSA sample when comparing the wave 1 and wave 3 cross-sections. Table 2.1 shows that employment rates amongst men in the ELSA sample aged between 50 and 69 were higher in wave 3 than in wave 1 and that this is true within each five-year age group. The same is true for women aged between 50 and 64. These differences are statistically significant only for men and women aged between 50 and 64. Most of the increase in employment has come from increased participation in full-time work (that is, people working at least 30 hours a week) rather than from increased prevalence of part-time working amongst this age group. Employment rates amongst those over the SPA are discussed in more detail in Section 2.5.

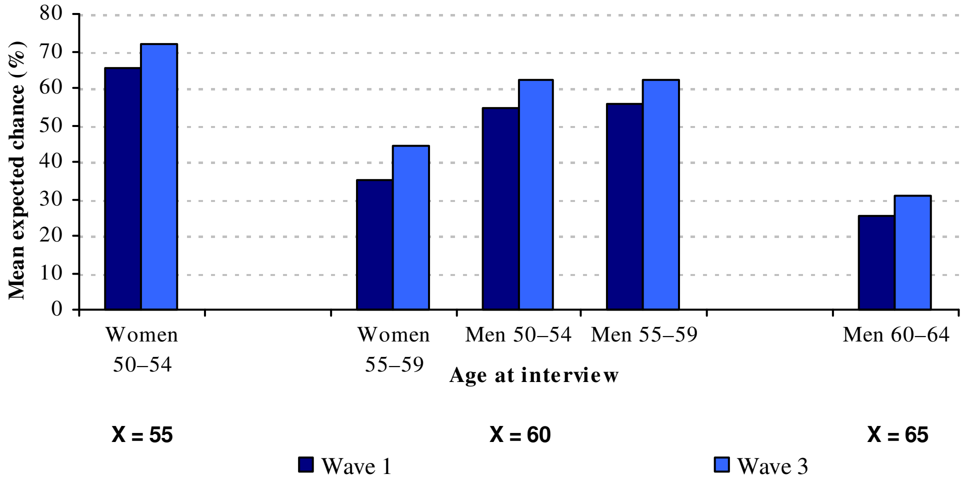
Notes to Table 2.1: Unweighted. Excludes some individuals who did not report hours worked.
[a] The omission from the wave 3 sample frame of those born between 1 March 1952 and 28 February 1953 means that the employment rates reported for those aged between 50 and 54 in wave 3 are not directly comparable to the figures for wave 1. The omission of this group introduces three patterns of bias into the figures in this table. First, reported employment rates amongst those aged 50–54 are biased upwards (due to the omission of some of the oldest potential members of this group). Second, the average employment rates reported for all those aged under SPA are biased downwards – this is because the 50- to 54-year-old age group, who have on average the highest employment rate, is weighted less heavily in this aggregate statistic because the sample size in this age group is smaller. Third, the average employment rate across all age groups is also downwardly biased, for the same reason.

Table 2.1. Percentage in full-time and part-time paid work, wave 1 and wave 3, by age at interview and sex

	Wave 1 (2002–03)			Wave 3 (2006–07)			Wave 1	Wave 3
	Full-time	Part-time	All	Full-time	Part-time	All	sample size	sample size
	%	%	%	%	%	%		
Men	33.7	6.5	40.2	36.3[a]	7.2[a]	43.5[a]	5,127	4,154
50–54	78.7	4.6	83.4	82.3[a]	4.4[a]	86.7[a]	883	678
55–59	65.5	7.3	72.8	69.4	8.0	77.4	1,003	827
60–64	37.2	9.9	47.1	44.7	11.5	56.2	790	705
65–69	6.9	8.9	15.8	7.1	11.1	18.2	797	566
70–74	2.8	7.3	10.1	3.2	6.3	9.5	672	536
75–79	2.0	2.8	4.8	1.0	5.4	6.4	497	391
80+	0.0	1.0	1.0	0.0	1.1	1.1	485	451
All men under SPA	61.5	7.2	68.7	65.5[a]	8.0[a]	73.5[a]	2,676	2,210
All men over SPA	3.4	5.7	9.1	3.1	6.3	9.5	2,451	1,944
Women	15.6	15.4	31.0	17.7[a]	16.6[a]	34.3[a]	6,166	5,099
50–54	45.0	29.6	74.6	48.8[a]	30.0[a]	78.8[a]	1,068	929
55–59	32.1	28.3	60.4	34.6	31.1	65.6	1,156	940
60–64	9.4	19.9	29.3	13.7	22.0	35.7	869	765
65–69	2.3	10.3	12.6	1.8	10.2	12.0	906	650
70–74	0.4	3.8	4.2	0.7	4.9	5.6	795	609
75–79	0.3	1.3	1.7	0.8	1.0	1.7	595	525
80+	0.1	0.3	0.4	0.0	0.6	0.6	777	681
All women under SPA	38.3	28.9	67.2	41.6[a]	30.6[a]	72.2[a]	2,224	1,869
All women over SPA	2.8	7.8	10.5	3.9	8.5	12.3	3,942	3,230
All	23.8	11.3	35.2	26.1[a]	12.4[a]	38.4[a]	11,293	9,253
50–54	60.3	18.3	78.6	62.9[a]	19.2[a]	82.1[a]	1,951	1,607
55–59	47.6	18.5	66.1	50.9	20.3	71.1	2,159	1,767
60–64	22.7	15.1	37.8	28.6	16.9	45.5	1,659	1,470
65–69	4.5	9.6	14.1	4.3	10.6	14.9	1,703	1,216
70–74	1.5	5.4	6.9	1.8	5.6	7.4	1,467	1,145
75–79	1.1	2.0	3.1	0.9	2.8	3.7	1,092	916
80+	0.1	0.6	0.6	0.0	0.8	0.8	1,262	1,132
All under SPA	51.0	17.0	68.0	54.5[a]	18.3[a]	72.9[a]	4,900	4,079
All over SPA	3.0	7.0	10.0	3.6	7.7	11.2	6,393	5,174

Notes: See previous page.

Figure 2.1. Expectations of being in paid work after age X, wave 1 and wave 3, by age at interview and sex



Notes: Unweighted. Excludes those individuals who did not give a valid response to questions about expectations of working in future. The omission from the wave 3 sample of those born between 1 March 1952 and 28 February 1953 means that the 'Women 50–54' and 'Men 50–54' groups exclude those who were approximately age 54 at the time of the wave 3 interview.

Whilst these trends across time and between cohorts are also evident in other data, such as the Labour Force Survey,[2] one of the strengths of ELSA is that it allows an examination of how these trends are associated with individuals' expectations. The differences in employment rates across the earlier and later cohorts have also been accompanied by differences in expected chances of continuing to be in employment at older ages. All respondents to ELSA aged under the SPA are asked what the chances are that they will be in work after they reach some age which is slightly above their current age. It is worth noting that for women aged between 55 and 59 and men aged between 60 and 64, this question asks about the chances that they will be working after reaching SPA. Figure 2.1 shows that, compared with the individuals of a particular age who were interviewed in wave 1, those of the same age interviewed in wave 3 (who were therefore born approximately four years later) on average reported significantly higher chances of being in paid work at older ages. For example, women aged between 55 and 59 in wave 1 reported on average a 35.3% chance of being in paid work after age 60, compared with an average reported chance of 44.2% for women aged between 55 and 59 who were interviewed in wave 3. The differences in mean expected chance between waves 1 and 3 shown in Figure 2.1 are statistically significant for all the groups.

Whether or not these higher reported expectations of remaining in work will actually translate into higher employment rates amongst future older individuals depends on the extent to which these expectations turn out to be correlated with outcomes. It is not, of course, yet known whether those

[2] See, for example, Office for National Statistics (2007).

interviewed in 2006–07 are right about their future chances of continuing to work, and these individuals could be subject to a variety of unanticipated events over the next few years that may change their plans for retirement. However, one can draw some inference about the relationship between expectations and outcomes from the employment outcomes of those who were interviewed in wave 1 and then followed up in wave 3.

In wave 1, four groups of respondents were asked to estimate what the chance was of their being in work after an age which they then 'crossed over' before they were interviewed again in wave 3. Table 2.2 shows the percentage of these groups who were in employment in wave 3 by their self-reported chances in wave 1 of being in paid work at age 55 (for women aged 51–54 in wave 1), age 60 (for men and women aged 56–59) or age 65 (for men aged 61–64). In wave 3, nearly three-in-five of those men who had been aged between 56 and 59 in wave 1 were actually in work. However, this proportion is much higher (about four-in-five) amongst those who in wave 1 reported more than a 60% chance of being in work beyond age 60 and much lower (only about one-in-nine) amongst those who had reported in wave 1 that there was no chance they would be in work after age 60. Similar patterns can be seen for the other groups. This suggests that expectations of working are strongly correlated with subsequent outcomes and so the higher expectations of working reported by the younger cohorts in ELSA (see Figure 2.1) may well translate into higher employment rates as they age than have been seen amongst their predecessors.

Table 2.2. Percentage in paid work in wave 3, by age in wave 1, sex and self-reported expectation in wave 1 of working at age 55/60/65

Participants in wave 1 who reach age 55/60/65, excluding proxies

	Men		**Women**		**All**
Age at wave 1:	56–59	61–64	51–54	56–59	56–59
	%	%	%	%	%
Chance of working after 55/60/65:					
0%	11.2	4.6	15.9	9.7	10.2
1–39%	34.4	22.1	45.2	33.3	34.0
40–60%	63.2	[36.1]	60.3	45.7	54.3
61–99%	83.1	[48.9]	87.8	67.3	76.5
100%	80.1	[52.2]	89.6	72.1	77.1
All	*58.0*	*20.4*	*69.5*	*36.5*	*46.6*
Sample size	521	416	701	594	1,115
Mean chance reported in wave 1 of being in work after age 55/60/65	*56.9*	*26.8*	*66.3*	*36.0*	*45.8*

Notes: Unweighted. Chance of working after age 55 shown for women aged 51–54 in wave 1, chance of working after age 60 shown for men and women aged 56–59 in wave 1 and chance of working after age 65 shown for men aged 61–64 in wave 1. Excludes those who did not report a chance of working in later life.

Knowledge of changes to the State Pension Age for women

One reason why the younger women in ELSA might expect to work for longer than the earlier cohorts of women is that they will be affected by the increase in the female SPA that will be phased in for those born between 6 April 1950 and 5 April 1955. Currently, the age at which a woman can start drawing her state pension is 60; this will increase for those born after 5 April 1950. Therefore, those women aged approximately 56 or under at the time of their 2006–07 interview may report higher chances of remaining in work at older ages because they know they will have to wait longer than older cohorts did before they can start drawing their state pension. However, factoring this into their work expectations requires that women are aware of the way in which they will be affected.

New questions included in the 2006–07 questionnaire probed the degree to which women were aware of the changes to the female SPA. Amongst those who will still have a SPA of 60 (that is, those born before 6 April 1950), knowledge of the true SPA is very high – four-in-five of these women knew that they would reach the SPA at 60 (see Table 2.3) and this proportion does not seem to vary according to whether women are working or not. The remainder of this age group either did not know what their SPA was or thought, incorrectly, that they would be affected by the increase in the female SPA. However, only about a third of those who will have a SPA of somewhere between 60 and 65 knew how they would be affected. This proportion is significantly higher (39.8%) amongst those who were in paid work than amongst those who were not working (of whom just 21.1% knew how they would be affected).[3] One-in-three of those born between 6 April 1950 and 5 April 1955 thought that their SPA would still be 60, about one-in-six thought that their SPA would be increasing all the way to 65 and a further one-in-seven had no idea what their SPA would be.

For women born during this five-year period, working out exactly what their SPA will be is quite complicated – women born a month apart have SPAs that are a month different. So it is perhaps not so surprising that there is some uncertainty amongst this group about their true SPA. However, knowledge of the SPA does not seem to be much higher amongst those born after 5 April 1955, for all of whom the SPA will simply be 65. More women in this group either think their SPA will still be 60 or have no idea at all what it will be (43.4%) than actually know correctly that their SPA will be 65 (39.3%). As for the slightly older group, knowledge of the actual SPA is significantly higher amongst women who are in paid work than for those who are not: 42.9% of women in this age group who were in paid work know that their SPA will be 65, compared with just 26.5% of those not in paid work. Meanwhile, only 20.6% of those in paid work still think that their SPA will be 60, compared with 40.8% of those not in paid work. These findings are in line with other evidence on the knowledge of SPA changes amongst the women who will and will not be affected (Murphy, 2004).

[3] These differences are predominantly offset by a correspondingly lower (higher) proportion of those in paid work (not in paid work) thinking that they will still be able to draw a state pension from age 60.

Table 2.3. Women's self-reported State Pension Age, by actual State Pension Age and work status

Women aged under SPA in wave 3

	Self-reported State Pension Age: Don't know	60	Between 60 and 65	65	Sample size
	%	%	%	%	
Actual State Pension Age:					
Age 60	6.5	79.7	9.3	4.6	679
Of which:					
Working	6.7	79.2	9.5	4.6	432
Not working	6.1	80.6	8.9	4.5	247
Between 60 and 65	14.5	33.6	35.4	16.5	732
Of which:					
Working	13.9	30.3	39.8	16.0	561
Not working	16.4	44.4	21.1	18.1	171
Age 65	18.3	25.1	17.4	39.3	219
Of which:					
Working	17.1	20.6	19.4	42.9	170
Not working	[22.5]	[40.8]	[10.2]	[26.5]	49

Notes: Unweighted. Those with a SPA of 60 were aged between 56 and 59 when interviewed in wave 3; those with a SPA between 60 and 65 were aged between 51 and 57; those with a SPA of 65 were aged between 50 and 52. As discussed elsewhere, the wave 3 refreshment sample omitted those born between 1 March 1952 and 28 February 1953. These individuals have a SPA of between 62 and 63 – consequently, the 'Between 60 and 65' group shown in this table is not representative of all women whose SPA is between 60 and 65. However, given that this entire group is heterogeneous in terms of number of years away from SPA and degree to which they are affected by the SPA change, it is unclear that the omission of the one-year cohort results in a particular negative or positive bias to the distribution of reported knowledge shown here.

The analysis above shows that there are therefore some women who may be expecting to receive a state pension earlier than they actually will and who may therefore be underestimating the extent to which they will need to continue working.[4] However, there is also another (albeit smaller) group who seem to be expecting to receive their state pension later than they actually will. This group may therefore be overestimating the extent to which they will need to continue working.

The value of longitudinal data in this context is that these women, who were and were not aware of changes being made to the SPA, will be followed through later working life and into retirement. Future waves will allow an examination of whether knowledge of the female SPA increases as women get

[4] The higher SPA also means that women will continue to be able to accrue additional entitlement to state pension income after they reach age 60. Therefore, women who have not accrued full entitlement to state pensions by the age of 60 will experience a greater reward to working beyond 60, as well as potentially greater need to, than the cohorts who have a SPA of 60.

closer to retirement age, though of course all the women interviewed here are already no more than 15 years younger than SPA. Using future waves of the survey, researchers will also be able to examine whether or not (other things being equal) the outcomes for those with greater awareness differ from those for women with less awareness of these changes.

2.3 Why and how do older workers stop working?

A number of factors are likely to be important in determining when people choose to stop working. Knowing what factors influence individuals when they make decisions about work at older ages is important for assessing which policies might be most effective in encouraging older individuals to remain in or return to work. Furthermore, it is useful for predicting how older individuals will respond to changes that have already begun, such as reduced morbidity in younger old age, the changing generosity of state pensions and the greater labour force attachment of later cohorts of women.

Previous work using evidence from the UK and elsewhere suggests that, amongst other things, financial incentives, family and socio-economic circumstances, and health are all important in determining exactly when older people stop working (see, for example, Disney, Meghir and Whitehouse [1994] and Disney, Emmerson and Wakefield [2006]). With three waves of ELSA data, we have now observed individuals' work status over a four-year period and have sufficient observations of individuals moving between full-time work, part-time work and not working to begin to say something about what circumstances and events are associated with withdrawal from the labour market as people get older and (equally as important when considering the issue of extending working lives) what factors are associated with returning to work at older ages and remaining in work beyond the SPA. The latter are explored in Sections 2.4 and 2.5. The analyses in this section and Section 2.4 use as the baseline those who were observed in wave 1 in a particular state (specifically, working full-time for the analysis in this section and not working for the analysis in Section 2.4) and who were observed again in either or both of waves 2 and 3. The analyses in these two sections do not weight the data, as the multivariate specifications, in any case, control for the factors for which weights would seek to correct.

For the interested reader, Box 2.1 provides a brief description of the construction of some of the outcome measures and covariates included in the multivariate analysis presented in Sections 2.3–2.6 (focusing on those whose definition may not be immediately apparent). Those readers simply wishing to focus on the significant messages emerging from the analysis may skip this and move straight to the text surrounding the following tables.

Box 2.1. Outcomes and covariates

'Phased' retirement

We define individuals as having a 'phased' retirement if in either wave 2 or wave 3 they are observed to work part-time (having worked full-time in wave 1). To the extent that individuals have had part-time jobs between waves that we do not observe, this measure will be an underestimate of the number of individuals who have actually 'phased' their withdrawal from work. However, the number of respondents (at both waves 2 and 3) who reported having had another job between interviews, which was different from the one they were doing when last interviewed, is small. There may, of course, be some further individuals who reduced their hours while remaining in the same job. Further analysis of 'phased' retirement, including looking in more detail at the length of time individuals spend in part-time jobs, should be possible in the future using data from the ELSA retrospective interview.

BMI

We estimate wave 1 (or 'baseline') BMI by using a linear interpolation between the observed BMI at HSE and in wave 2 (accounting for differences in the length of time between the HSE and wave 2 interviews). In cases where an individual was not observed at either HSE or wave 2, we use the one available measure of BMI as 'baseline' BMI. Where change in BMI is controlled for, this is defined as the change between wave 1 and wave 2.

Education

We distinguish three categories of educational attainment. Low education refers to individuals who completed only the compulsory level of schooling (this varies slightly by age, due to historic changes in legislation). High education refers to those who remained in full-time education beyond age 18. Mid education covers all those not falling into the first two categories.

Pension types

We control for membership of and receipt from certain types of private pension schemes. Defined benefit (DB) pensions are those from which the pension ultimately received depends on some function of the tenure in the scheme and final salary. Defined contribution (DC) pensions are those from which the pension ultimately received depends on the value of contributions paid into the fund and the investment return on the fund.

Health

We focus in this chapter on doctor-diagnosed health conditions. Where sample sizes and incidence of health conditions are sufficiently large, we control for various types of conditions (such as cardiovascular disease [CVD], arthritis and osteoporosis) separately. In other cases, we simply include an indicator for having any doctor-diagnosed condition. We define having a condition as ever having reported the condition during an ELSA (or HSE) interview.

Self-reported work disability

Section 2.6 examines the issue of self-reported work disability. The measure used is yes/no responses to the question 'Do you have any health problem or disability that limits the kind or amount of paid work you could do, should you want to?'.

Work disability vignettes

To assess the potential impact on self-reported work disability of differences in individuals' subjective assessment of work disability, 'anchoring vignettes' were introduced into the self-completion questionnaire for a random third of the ELSA sample at wave 3. Individuals were presented with scenarios about hypothetical people and asked to give an assessment of the degree to which the individual described is limited in the kind or amount of work that he or she can do. The response options are: not limited, mildly limited, moderately limited, severely limited and extremely limited.

Factors associated with leaving full-time work

Emmerson and Tetlow (2006) show that (without controlling for any other factors) of those who were in full-time work in wave 1, women and older individuals were more likely to move into part-time work or out of work altogether over the following two years than men or younger individuals. Table 2.4 presents multivariate analysis of characteristics associated with movements out of full-time work[5] over the four-year period between wave 1 and wave 3. Two alternative specifications are shown – the left-hand panel includes only those characteristics measured in wave 1, while the right-hand panel includes in addition certain changes in status between wave 1 and wave 3. For example, one of the changes controlled for is whether an individual's partner left work over this four-year period. These changes are likely to be jointly determined with the change in work status. For instance, the finding that those who experience the onset of a major health condition are more likely to have left full-time work (odds ratio of 2.307 in the fourth column) could reflect individuals leaving work in response to a deterioration in their health, but it could equally suggest causation in the other direction.

Table 2.4. Multivariate analysis of factors associated with leaving full-time work between wave 1 and wave 3

All aged under SPA working at least 30 hours per week in wave 1

	Baseline controls only		**Including changes in status between wave 1 and wave 3**	
	Odds ratio	p-value	Odds ratio	p-value
Women 50–54	**2.853**	<0.001	**3.253**	<0.001
Men 55–59	**1.805**	0.001	**1.645**	0.004
Women 55–59	**2.781**	0.001	**3.115**	0.001
Men 60–64	**5.732**	<0.001	**4.779**	<0.001
Reached SPA	**3.312**	<0.001	**3.334**	<0.001
Physically active job	0.893	0.42	0.902	0.47
Job tenure	**1.018**	0.002	**1.015**	0.008
Self-employed (women)	1.829	0.068	1.775	0.087
Self-employed (men)	0.930	0.73	0.976	0.91
Low education	1.093	0.60	1.045	0.80
Mid education	0.926	0.63	0.918	0.60
Couple	1.490	0.086	1.631	0.039
DB pension (women)	1.163	0.50	1.169	0.50
DB pension (men)	**2.236**	<0.001	**2.227**	<0.001

Continues

[5] In this chapter, we define full-time work as being at least 30 hours a week. This is in contrast to the Census, which will define those working exactly 30 hours a week as being part-time rather than full-time.

Table 2.4 continued

	Baseline controls only		Including changes in status between wave 1 and wave 3	
	Odds ratio	p-value	Odds ratio	p-value
Past private pension (women)	0.913	0.81	0.844	0.66
Past private pension (men)	**2.366**	<0.001	**2.471**	<0.001
No private pension	1.211	0.35	1.174	0.44
Lowest wealth	0.704	0.16	0.714	0.18
Quintile 2	0.812	0.26	0.816	0.28
Quintile 4	1.128	0.47	1.144	0.43
Highest wealth	1.152	0.43	1.243	0.23
Mild CVD	1.152	0.26	1.113	0.42
Severe CVD	1.101	0.79	1.255	0.53
Arthritis / Osteoporosis	1.002	0.99	0.974	0.87
Asthma / Lung disease	1.073	0.70	1.150	0.45
Psychiatric problem	1.495	0.068	1.472	0.082
Other health condition	0.891	0.75	0.922	0.83
Underweight (BMI<20)	1.101	0.83	1.084	0.86
Overweight (BMI 25–29.9)	0.945	0.70	0.934	0.64
Obese (BMI 30+)	0.899	0.53	0.942	0.73
Partner working in wave 1	**0.658**	0.014	**0.506**	<0.001
Partner's age difference	1.020	0.21	1.011	0.50
Partner over SPA	0.619	0.072	0.615	0.072
Partner has a doctor-diagnosed health condition	0.866	0.29	0.823	0.17
Onset of major health condition			**2.307**	0.001
Onset of minor health condition			1.085	0.65
Change in BMI			0.972	0.62
Partner experiences onset of major health condition			1.055	0.86
Partner experiences onset of minor health condition			1.005	0.98
Partner retires (women)			1.345	0.31
Partner retires (men)			**3.038**	<0.001

Notes: Sample size = 1,634. Unweighted. Reference group is single men aged 50–54, sedentary job, not self-employed, with a defined contribution pension, middle wealth quintile, no health problems, normal weight (BMI between 20 and 24.9), and no health changes between 2002 and 2006. Minor health conditions comprise hypertension, diabetes and arthritis (although arthritis can be very serious in some cases, we have classified it here as a minor condition). Major health conditions comprise angina, heart attack, congestive heart failure, stroke, lung disease and cancer. Mild cardiovascular disease (CVD) covers hypertension, heart murmurs, abnormal heart rhythm and diabetes. Severe CVD covers heart attack, congestive heart failure and stroke. Odds ratios that are statistically significantly different from 1 at the 5% significance level are shown in bold. The bottom wealth quintile comprises those with total net benefit-unit non-pension wealth up to £15,000 (in 2002–03 prices); quintile 2 is £15,000–£92,000; quintile 3 is £92,000–£165,000; quintile 4 is £165,000–£292,000; quintile 5 is over £292,000.

In this multivariate analysis, and subsequent multivariate analyses in this chapter, where we found significant differences between men and women, we have included interaction terms between the characteristic and the sex of the individual – these interactions are indicated in the tables by the word 'women' or 'men' (as applicable) in parentheses after the variable name. All other potential interaction terms have been excluded.

The figures shown in the second and fourth columns of Table 2.4 are odds ratios relative to the reference group, which is single men aged between 50 and 54, with a high level of education, employed in a sedentary job, with a defined contribution pension, in the middle wealth quintile, with no health problems, of normal weight (Body Mass Index [BMI] between 20 and 24.9) and (for the fourth column) with no change in health or BMI between 2002 and 2006. So, for example, the figure of 2.853 in the first row of the second column indicates that women aged between 50 and 54 were nearly three times as likely as men of the same age to leave full-time work over the four-year period. The figures in the third and fifth columns show the p-values for these odds ratios. Odds ratios that are statistically significantly different from 1 at the 5% significance level are shown in bold in Table 2.4. This convention also applies to other tables in this chapter where odds ratios are presented.

Even after controlling for other characteristics, the higher likelihood of moving out of paid work for women and those who are older, which was found by Emmerson and Tetlow (2006), remains. When controlling only for characteristics measured in wave 1, women aged between 50 and 54 are found to be 2.9 times as likely as men of the same age to leave full-time work (and start working either part-time or not at all). Meanwhile, men aged between 60 and 64 are nearly six times as likely as men 10 years younger to do so.

As has been explored in more detail by Banks, Emmerson and Tetlow (2007), pension arrangements are significantly associated with exits from full-time work, particularly for men. Men with defined benefit pensions are more likely than men with defined contribution pensions (and those with no private pension) to leave full-time work. Banks, Emmerson and Tetlow (2007) show that individuals (particularly those in good health) respond to the financial incentives provided by state and private pensions, some of which provide strong incentives to retire at particular ages. That reaching the SPA is a strong predictor of exit from full-time work is likely to reflect both the financial incentives provided by receipt of the state pension and also social norms around SPA as an indicator of the appropriate age to retire.

Self-employed women are found to be more likely than employees to quit full-time work. However, controlling for other characteristics, self-employed men are no more likely to do so. This could reflect differences in the type of self-employment that men and women are engaged in and the type of work that self-employed women do compared with female employees.

Conditional on being in full-time work in 2002, pre-existing health conditions are not associated with a higher likelihood of leaving paid work. Furthermore, those who are overweight or obese are no more likely to leave full-time work – this is despite the fact that, in Chapter 7, Zaninotto, de Oliveira and Kumari show (unconditionally) that high BMI in wave 0 is associated with significantly greater onset of back pain and shortness of breath between waves

1 and 3, which might be expected to make working more difficult. However, those who experienced the onset of a major health condition between wave 1 and wave 3 were more than twice as likely to leave full-time work over that period. This is also consistent with the analysis of Chapter 3. As will be discussed in more detail in Section 2.6, the onset of major conditions is strongly associated with an increased likelihood of reporting having a work disability as well as with leaving work. However, the onset of minor conditions is not associated with an increase in reported work disability (see Section 2.6) or with an increased likelihood of leaving full-time work (see Table 2.4). There is also no significant relationship between partner's health or changes in partner's health and leaving full-time work. This was investigated separately for men and women but neither are found to be more likely to leave work if their partner becomes ill. This may reflect the offsetting demands of having an ill spouse: potentially, household income will have fallen and medical costs increased, requiring the individual to work more; on the other hand, there may be pressure to reduce hours of work in order to take on caring responsibilities.

We find here that simple indicators of changes in partner's health are not associated with changes in full-time working. We do not attempt to investigate further the issue of caring responsibilities (either caring for partners or caring for other dependent adults) and work patterns. Such considerations are likely to form an important part of the explanation for changes in work patterns at older ages, at least for some individuals. However, given the complex and conflicting pressures that dependent adults are likely to place on a family's time and resources, this issue is difficult to investigate without a more specific hypothesis about health and the demand for caring. Hence we leave this as a topic for future research focused specifically on this issue.

There is, however, evidence of complementarities in leisure within couples. Those who had a partner who was working in wave 1 and remained in work were significantly less likely to leave full-time work than those whose partner was not working. However, men whose partner retired between wave 1 and wave 3 were more likely to leave work than those whose partner had not originally been working. This suggests that partners tend to retire together. Further indications of this are provided in Section 2.4 (which shows that those with a working partner are also more likely to return to work) and were also found by Banks, Blundell and Casanova (2007), who show that men are more likely to retire when their wives reach the SPA in the UK than in the US.

Factors associated with 'phased' retirement

In recent years, part-time working has become more prevalent, though (as Table 2.1 shows) it remains far more common amongst women than amongst men. However, the proportion of workers working part-time as opposed to full-time increases with age, and beyond age 65 part-time work is more prevalent than full-time work for both men and women. Recent changes to legislation have attempted to make it easier for older workers to withdraw more gradually from paid work – notably the ability, since October 2006, for individuals to continue to work for an employer whilst being paid an occupational pension by that same employer.

Enabling older individuals to gradually reduce their hours of work may allow them to continue working for longer than would be the case if they were required to continue working full-time. It could therefore be a useful instrument in increasing the employment rate of older individuals. We now present some preliminary analysis of those who left full-time work between wave 1 and wave 3, to see what factors are associated with experiencing a 'phased' retirement. That is, we conduct a multivariate analysis of the factors associated with moving into part-time work prior to stopping paid work altogether as opposed to moving straight from full-time work to not working at all. In a similar way to Table 2.4, Table 2.5 presents odds ratios for whether an individual experienced a 'phased' retirement, conditional on them having left full-time work between wave 1 and wave 3. These are the odds of a particular group having a 'phased' retirement expressed relative to the odds amongst the reference group – single men aged between 50 and 54, with a high level of education, employed in a sedentary job, with a defined contribution pension, in the middle wealth quintile, with no health problems, of normal weight (BMI between 20 and 24.9) and (for the fourth column) with no change in health or BMI between 2002 and 2006. Odds ratios that are statistically significantly different from 1 at the 5% significance level are shown in bold in Table 2.5. The left-hand panel presents odds ratios controlling only for characteristics measured at wave 1; the right-hand panel additionally includes some measures of other changes that occurred between waves 1 and 3. As mentioned earlier, these latter characteristics are more likely to be jointly determined with the change in work status.

Table 2.5. Multivariate analysis of factors associated with 'phased' retirement

All aged 50 to SPA who left full-time work between wave 1 and wave 3

	Baseline controls only		**Including changes in status between wave 1 and wave 3**	
	Odds ratio	p-value	Odds ratio	p-value
Women 50–54	**4.100**	0.001	**2.462**	0.039
Men 55–59	1.014	0.97	0.984	0.96
Women 55–59	1.385	0.52	0.855	0.77
Men 60–64	1.149	0.77	1.202	0.71
Reached SPA	0.994	0.99	0.975	0.95
Physically active job (women)	2.004	0.11	1.934	0.14
Physically active job (men)	0.633	0.11	0.698	0.23
Job tenure	**0.972**	0.002	**0.974**	0.005
Self-employed	**1.792**	0.048	1.813	0.051
Low education	0.887	0.68	0.920	0.78
Mid education	0.783	0.36	0.781	0.37
Couple	1.376	0.40	1.297	0.51
DB pension	0.661	0.11	0.660	0.125
Past private pension	1.033	0.92	1.053	0.88
No private pension	0.950	0.88	1.056	0.87

Continues

Table 2.5 continued

	Baseline controls only		**Including changes in status between wave 1 and wave 3**	
	Odds ratio	p-value	Odds ratio	p-value
Lowest wealth	1.618	0.26	1.528	0.33
Quintile 2	0.777	0.45	0.743	0.39
Quintile 4	**2.285**	0.004	**2.143**	0.010
Highest wealth	1.508	0.17	1.389	0.29
Mild CVD (women)	1.232	0.54	1.614	0.19
Mild CVD (men)	0.661	0.12	0.614	0.089
Severe CVD	0.403	0.17	0.377	0.14
Arthritis / Osteoporosis	0.956	0.86	1.091	0.74
Asthma / Lung disease	0.548	0.059	**0.474**	0.026
Psychiatric problem	1.330	0.42	1.346	0.43
Other health condition	0.535	0.32	0.563	0.36
Underweight (BMI<20)	2.626	0.20	2.390	0.27
Overweight (BMI 25–29.9)	0.938	0.79	0.914	0.73
Obese (BMI 30+) (women)	**0.392**	0.025	**0.310**	0.008
Obese (BMI 30+) (men)	0.961	0.91	0.965	0.92
Partner working in wave 1	1.464	0.16	**1.906**	0.031
Partner's age difference	1.000	0.99	1.006	0.83
Partner over SPA	0.821	0.61	0.723	0.41
Partner has a doctor-diagnosed health condition	0.863	0.53	0.878	0.59
Onset of major health condition			**0.336**	0.009
Onset of minor health condition (women)			**4.002**	0.012
Onset of minor health condition (men)			0.606	0.22
Change in BMI (women)			1.295	0.076
Change in BMI (men)			0.766	0.074
Partner experiences onset of major health condition			1.748	0.23
Partner experiences onset of minor health condition			0.720	0.32
Partner retires between waves 1 and 3			0.584	0.062

Notes: Sample size = 551. Reference group and other notes as Table 2.4.

In keeping with the observation that (in cross-section) more women than men work part-time, Table 2.5 shows that women aged between 50 and 54 are more than four times as likely to phase their retirement as men of the same age. Emmerson and Tetlow (2006) found that, unconditionally, women aged 55–59 are more likely than men of the same age to phase their retirement. However, once we control for other characteristics in Table 2.5, we find no evidence that the likelihood of a ‘phased’ retirement is any greater for women than for men in this age group.

Longer job tenure, perhaps reflecting that the job an individual was doing was their ‘career’ job, is associated with a lower probability of having a ‘phased’ retirement. This is a finding that may well, in the future, be affected by changes in policy that have now come into force. During the period covered by the first three waves of ELSA (2002 to 2006), individuals were not allowed to work for an employer who was paying them a pension. As mentioned above, this legislation was changed in October 2006. A key question will be whether, in future waves of ELSA, patterns of ‘phased’ retirement change as it becomes increasingly possible for individuals to cut back on hours of work whilst remaining with the same firm and drawing an occupational pension to supplement their earnings. The self-employed, who are likely already to have the greatest degree of control over the number of hours they work, are much more likely (about 1.8 times as likely as employees) to phase their retirement rather than leave paid work totally.

Virtually none of the health conditions considered in Table 2.5 (with the exception of asthma and lung disease) is significantly associated with being more or less likely to phase retirement, and nor is BMI amongst men. Amongst women, those who are obese are found to be less likely to phase their retirement. That most of the health conditions are not significantly related to gradual retirement is perhaps not surprising since all these individuals were working full-time in wave 1 in spite of these pre-existing health conditions. Therefore, in the absence of significant deteriorations in their health, it is not surprising that these individuals seem to behave in a similar way to initially completely healthy full-time workers. As we see in the right-hand panel of Table 2.5, however, just as the onset of a major health condition was found (in Table 2.4) to be significantly associated with moving out of full-time work, it is also associated with being more likely to quit work altogether rather than move into part-time work. Amongst women, however, ‘phased’ retirement is significantly positively related to the onset of minor health conditions (such as hypertension).

2.4 Why do older people go back to work?

With nearly four-in-ten men and nearly half of women aged between 50 and 69 out of work, encouraging and enabling individuals to go back to work will be as important as encouraging those in work to stay in work in the drive to raise employment rates amongst this age group. This section examines the factors associated with returning to work prior to SPA, while the next section examines the factors associated with working beyond the SPA.

Table 2.6 presents multivariate analysis of the factors associated with individuals entering work in their 50s and early 60s. Two alternative specifications are presented. The left-hand panel includes only covariates measured at wave 1. The right-hand panel includes the baseline characteristics plus measures of other changes that occurred between waves 1 and 3, which (as discussed above) are more likely to be jointly determined with the change in work status.

Table 2.6. Multivariate analysis of factors associated with returning to work between wave 1 and wave 3

All aged under SPA not working in wave 1

	Baseline controls only		**Including changes in status between wave 1 and wave 3**	
	Odds ratio	p-value	Odds ratio	p-value
Women 50–54	**0.247**	0.035	**0.249**	0.040
Men 55–59	0.865	0.72	0.900	0.80
Women 55–59	**0.223**	0.042	**0.230**	0.050
Men 60–64	0.609	0.38	0.584	0.35
Reached SPA	0.739	0.49	0.754	0.52
Low education	0.796	0.53	0.859	0.68
Mid education	0.980	0.95	1.021	0.95
Couple (women)	1.664	0.36	1.893	0.27
Couple (men)	0.521	0.19	0.674	0.44
Receiving private pension income	0.881	0.65	1.009	0.97
Lowest wealth	2.457	0.056	**2.685**	0.038
Quintile 2	2.249	0.074	2.322	0.067
Quintile 4	1.666	0.25	1.578	0.31
Highest wealth	1.521	0.34	1.478	0.38
Has a doctor-diagnosed health condition	0.863	0.56	0.813	0.43
Underweight (BMI<20)	0.289	0.26	0.295	0.27
Overweight (BMI 25–29.9)	1.278	0.40	1.157	0.62
Obese (BMI 30+)	0.859	0.64	0.843	0.61
Partner working in wave 1	**3.135**	<0.001	**3.319**	<0.001
Partner's age difference	1.008	0.79	1.009	0.78
Partner over SPA (women)	0.726	0.66	0.721	0.65
Partner over SPA (men)	2.472	0.073	2.477	0.077
Partner has a doctor-diagnosed health condition	0.825	0.47	0.758	0.32
Never worked	0.455	0.33	0.442	0.32
Years since last worked (women)	**0.912**	0.002	**0.914**	0.002
Years since last worked (men)	**0.757**	<0.001	**0.745**	<0.001
Partner retires between waves 1 and 3			0.854	0.64
Partner experiences onset of a doctor-diagnosed health condition			0.626	0.21
Change in BMI (women)			1.077	0.60
Change in BMI (men)			**0.657**	0.023
Onset of a doctor-diagnosed health condition			0.743	0.36

Notes: See next page.

Notes to Table 2.6: Sample size = 927. Unweighted. Reference group is single men aged 50–54, high education, not receiving private pension income, middle wealth quintile, no health problems, normal weight (BMI between 20 and 24.9), zero years since last worked, no health changes between 2002 and 2006 and no change in individual's BMI. Other notes as Table 2.4.

As with Tables 2.4 and 2.5, the figures in the second and fourth columns show the odds ratios. The p-values of these odds ratios are given in the third and fifth columns. The explanatory variables included in this multivariate analysis are slightly different from those used in Section 2.3. We control here for receipt of private pension income rather than current membership of private pension schemes. Also, we control for the length of time since the individual reported that they were last in work or whether they have ever worked before.

What is clear from Table 2.6 is that very few observable characteristics are significantly associated with returning to work. Controlling only for baseline characteristics (left-hand panel), we see that women are significantly less likely than men to return to work.[6] However, conditional on other characteristics (such as the length of time since they last worked), older men are no less likely than younger men to return to work.

Those whose partners work are three times as likely as those without a partner to start working. As mentioned above, this may reflect the complementarities of leisure within couples. However, there is no significant evidence that a partner retiring between waves 1 and 3 is associated with a lower chance of returning to work.

Emmerson and Tetlow (2006) found that there was some evidence of an inverse-U shape in returns to work across the wealth distribution (particularly for men). This result holds for returns to work over a two-year period and did not control for other factors. However, Table 2.6 shows that once various other factors are controlled for, and transitions are assessed over a four-year period, the inverse-U shape by wealth disappears. In fact, if anything, there is some evidence that those in the bottom two quintiles of the wealth distribution are more likely to return to work than those in the third quintile.[7]

One factor that is highly predictive of returns to work is the length of time since the individual was last in paid work. Each additional year that has passed since they last worked is associated with women being 8.8%, and men 24.3%, less likely to return to work. In other words, the majority of those who return to work at older ages are those who have been out of work for a very short time. One explanation of this could be that human capital deteriorates the longer an individual is out of work and so returning to work becomes more difficult over time. Of course, another explanation is that those who have been out of work a very short time consist of a larger proportion of individuals who

[6] Women aged between 55 and 59 are not only statistically significantly less likely to return to work than men aged between 50 and 54 (i.e. the reference group) but also statistically significantly less likely to return to work than men aged between 55 and 59.

[7] In an alternative specification, not presented here, we omitted the controls for years since last worked (which in the specification in Table 2.6 are highly significant predictors of not returning to work). There was then found to be no statistically significant gradient in returns to work by wealth, suggesting that those at the bottom of the wealth distribution have on average been out of work for longer than those further up the wealth distribution.

are actively seeking employment, whilst those who have been out of work for longer are the self-selected sample of individuals who are not actively seeking employment.

2.5 Who works beyond the State Pension Age and why?

Reaching the SPA provides financial incentives to stop working. At this age, individuals are able to start receiving their state pension. If individuals are credit-constrained prior to reaching SPA (that is, if they are unable to run down their savings or borrow against wealth tied up in state pensions prior to reaching SPA), then they may have to work in order to finance their pre-SPA consumption but, upon hitting the SPA, this may no longer be necessary. In addition, upon reaching the SPA, individuals no longer accrue additional entitlement to state pensions through paying National Insurance contributions. However, in addition to financial incentives to retire at the SPA, there are also social norms suggesting that the SPA is the appropriate time to retire. As we saw above, reaching the SPA is a strong predictor of exits from work, and untangling to what extent each of these factors (financial incentives and social norms) is driving this relationship is extremely difficult. However, examining the group of individuals who remain in work after the SPA can give some insight into which groups need or prefer so much to work that they go against these financial incentives and social norms.

Employment rates are low amongst those aged 65–69, fall even further after age 70 and drop almost to zero beyond age 80, as shown in Table 2.1. Pooling the three waves of ELSA data collected so far allows us to exploit more observations of individuals working beyond the SPA in order to examine their characteristics. Once again, the analysis in this section does not weight the data since the multivariate specification controls, in any case, for most of the factors for which cross-sectional weights would seek to control.

Table 2.7 presents multivariate analysis of the characteristics associated with working beyond the SPA for those aged over the SPA in each of the waves of ELSA data.[8] The second column reports the odds ratios, where odds of being in work are expressed relative to the odds for the reference group – never-married men aged between 65 and 69 with high education and no health problems, observed in wave 1. Indicators are included for which wave of ELSA the individual's work status was observed in. The odds ratios for these are given at the bottom of Table 2.7 and show that, as we saw in Table 2.1, employment rates are significantly higher in wave 3 than in wave 1.[9]

[8] Standard errors are estimated by clustering at the individual level.

[9] The employment rate for wave 3 is also statistically significantly different from that for wave 2 at the 10% level of significance.

Table 2.7. Multivariate analysis of characteristics associated with employment amongst those aged over the State Pension Age

All aged over SPA, pooled cross-sections from ELSA waves 1–3

	Odds ratio	**p-value**
Women 60–64	1.775	0.156
Women 65–69	0.720	0.414
Men 70–74	**0.633**	<0.001
Women 70–74	**0.326**	0.006
Men 75–79	**0.433**	<0.001
Women 75–79	**0.135**	<0.001
Men 80+	**0.103**	<0.001
Women 80+	**0.044**	<0.001
Divorced women	**2.817**	<0.001
Divorced men	1.784	0.117
Widowed women	1.240	0.453
Widowed men	0.720	0.403
Low education	**0.619**	<0.001
Mid education	0.803	0.068
Mild CVD	**0.726**	<0.001
Severe CVD	**0.381**	<0.001
Arthritis / Osteoporosis	**0.690**	0.008
Asthma / Lung disease	**0.579**	<0.001
Psychiatric problem	**0.758**	0.010
Other health condition	**0.679**	0.008
Partner has a doctor-diagnosed health condition, all waves	1.025	0.810
Partner under SPA and working (women)	**4.791**	<0.001
Partner under SPA and not working (women)	1.339	0.347
Partner over SPA and working (women)	**5.424**	<0.001
Partner over SPA and not working (women)	0.877	0.654
Partner under SPA and working (men)	**5.196**	<0.001
Partner under SPA and not working (men)	1.272	0.551
Partner over SPA and working (men)	**6.763**	<0.001
Partner over SPA and not working (men)	1.003	0.993
Wave 2 (2004–05)	1.085	0.112
Wave 3 (2006–07)	**1.182**	0.005

Notes: Sample size = 16,570. Reference group is never-married men aged 65–69, with high education, no health problems, observed in wave 1.

The other variables controlled for in this analysis are indicators of age and sex, education, doctor-diagnosed health conditions, family type, and partner's health and work status (where relevant). Specifically, for single individuals we include indicators of whether they were never married, are divorced or are widowed; for couples we include full interactions between the sex of the individual, their partner's work status and whether their partner is above or below SPA. The reference group is those who have never been married.

Of those over the SPA, the group whose members are most likely to be in paid work, other things being equal, is women aged between 60 and 64. However, their odds of being in work are not statistically significantly different from those for the reference group (men aged between 65 and 69), though they are statistically significantly higher than the odds for women aged between 65 and 69. Although Table 2.1 shows that, unconditionally, employment rates are lower amongst women aged between 65 and 69 (at 12.0%) than amongst men of the same age (at 18.2%), once we control for other factors in Table 2.7 it can be seen that the likelihood of working for women aged between 65 and 69 is not statistically significantly different from that for men of the same age. In other words, the differences in the raw employment rates for these groups are explained by other observable characteristics.

Educational attainment is strongly related to employment at these older ages. Those with only minimum educational attainment are about 40% less likely to be in paid work than those who have high education qualifications. This may well reflect the types of jobs available to individuals with higher qualifications compared with the jobs open to those with only minimal qualifications. Health also seems to play an important role in determining work status amongst this age group. Those without any health problems are far more likely to be in work – those with severe cardiovascular conditions are less than half as likely to be in work as those without such conditions. BMI is not controlled for in the specification as it was not measured in wave 3.

Family structure also seems to be strongly related to work status. Individuals in couples are far more likely to be in work if their partner is also working. This is equally true for men and women and regardless of whether the individual's partner is aged above or below the SPA. Amongst single people, the one group for whom employment rates are significantly higher is divorced women – they are nearly three times as likely to be in work as those who have never been married.

2.6 Work disability

Understanding the effect that an individual's health has on his or her ability to work, and how such effects differ across the population and across job types, is central to an understanding of the policy options for extending working lives.[10] In the ELSA wave 2 interview (2004–05), all individuals, regardless of their age and whether or not they were working, were asked the 'standard' self-reported work disability question, i.e. whether their health limited the type or amount of work that they could do. As part of the core interview, the

[10] Of course, labour market outcomes are a consequence of both demand for and supply of labour – ability and willingness to work need to be analysed in the context of the wage offers available to individuals. A full analysis would therefore need to account for the demand for labour by firms and any effect that changing health with age may have on individuals' productivity and hence the distribution of wage offers they receive. But such an analysis would typically need more structure, combined with data from employees and employers, and/or more information on labour market search activity, in addition to the information analysed here. Nevertheless, understanding the jointly evolving dynamics of health, work disability and employment outcomes is a valuable exercise in its own right.

question was repeated at wave 3 and it will continue to be repeated in future waves. In addition, in 2006 a random third of the wave 3 sample were given a module of questions based around a set of 'anchoring vignettes'. These latter questions aim to aid understanding of individual differences in the perception and reporting of common health conditions in terms of their effects on ability to work. In what follows, we begin by looking at work disability and employment dynamics in the whole sample, i.e. changes over the two-year period between 2004–05 and 2006–07. We then move on to consider some brief cross-sectional analysis from the wave 3 vignette subsample that allows a more detailed understanding of the nature of differences in subjective work disability across individuals and the degree to which these may be affecting the results of our previous analysis.

Work disability and employment dynamics

Analysis of the ELSA wave 2 data revealed high rates of self-reported work disability in all age groups of the ELSA sample, particularly amongst the lowest wealth groups (Emmerson and Tetlow, 2006). But work disability is not a permanent condition, nor are its consequences always the same in terms of whether individuals do any paid work.[11] Table 2.8 presents summary evidence from the ELSA sample on transitions in work disability and employment. Looking initially at all those who report a work disability at wave 2, 28.9% report no work disability two years later, compared with an 'onset' rate of 15.7% amongst the (bigger) group of those with no work disability initially. But such statistics are not the whole story, particularly since they are statistics relating to all age and employment status groups.

Table 2.8. Work disability and employment status in wave 3, by status in wave 2

	2006 status:					**N**
	Not work disabled		**Work disabled**			
	Working	Not working	Working	Not working		
	%	%	%	%		
2004 status:						
Not work disabled	35.7	48.6	2.4	13.3	100%	4,849
Of which:						
Working	79.5	12.6	5.2	2.8	100%	2,078
Not working	2.9	75.6	0.3	21.2	100%	2,771
Work disabled	5.7	23.2	5.2	65.9	100%	2,274
Of which:						
Working	39.6	10.6	33.5	16.4	100%	293
Not working	0.7	25.1	1.0	73.3	100%	1,981

[11] For some international evidence on this, see Banks et al. (2007) or Kapteyn, Smith and van Soest (2008), with the latter making particular reference to the role of changes in pain in driving changes in work disability.

Table 2.8 also reports the basic evidence on transitions split by whether individuals were working or not in each of the two waves. The probability that the wave 2 work disability was only temporary is almost twice as high for those who were working (despite their work disability) at wave 2 than for those who were not (50.2% as opposed to 25.8%) – of course, this may reflect, to some extent, the fact that those who were working (in spite of having a work disability) were on average less severely work disabled than those who had a work disability and were not working. Similarly, the onset rate is only just over a third as high amongst those working at wave 2 as amongst those not working (7.9% as opposed to 21.5%). But many of these differences may be driven by other factors that differ between the four groups. To investigate this, we first look at transition rates by key subgroups – sex, age and wealth – and then carry out a simple multivariate analysis.[12]

Table 2.9. Work disability and employment status in wave 3, by sex and status in wave 2

	2006 status:					**N**
	Not work disabled		**Work disabled**			
	Working	Not working	Working	Not working		
	%	%	%	%		
2004 status:						
Not work disabled, working						
Female	79.1	14.0	4.1	2.8	100%	986
Male	79.7	11.4	6.1	2.8	100%	1,092
Not work disabled, not working						
Female	2.6	76.2	0.2	21.0	100%	1,666
Male	3.2	74.8	0.5	21.5	100%	1,105
Work disabled, working						
Female	41.3	10.0	31.3	17.5	100%	160
Male	37.6	11.3	36.1	15.0	100%	133
Work disabled, not working						
Female	0.2	25.3	0.7	73.8	100%	1,138
Male	1.3	24.8	1.4	72.5	100%	843

[12] Since about 80% of the sample are followed between 2004–05 and 2006–07, a full analysis would want to account for the possible effects of differential attrition on the measured transitions. Initial investigations of the data suggest that there is indeed a higher attrition rate from the study amongst those reporting a work disability at wave 2. Whilst they are also more likely to die between waves, this does not account for the whole of the difference: 85% of those reporting no work disability and working in 2004 are either successfully followed up or known to have died, compared with only 80% for those who were work disabled and not working (with the other two groups having a rate of around 82.5%). For the analysis in this chapter, we will use the sample present in both waves, which is equivalent to proceeding under the assumption that the distribution of outcomes for the group that are not successfully followed is the same as that for those respondents that remain in the study.

Table 2.10. Work disability and employment status in wave 3, by age band and status in wave 2

	2006 status:					N
	Not work disabled		**Work disabled**			
	Working	Not working	Working	Not working		
	%	%	%	%		
2004 status:						
Not work disabled, working						
52–54	88.5	5.1	4.9	1.6	100%	452
55–59	83.2	8.9	6.0	1.9	100%	942
60–64	73.3	18.0	4.6	4.1	100%	438
65–69	57.3	35.3	3.3	4.0	100%	150
70+	62.5	24.0	4.2	9.4	100%	96
Not work disabled, not working						
52–54	23.8	60.3	1.6	14.3	100%	63
55–59	9.9	72.8	1.5	15.8	100%	202
60–64	4.0	81.5	0.7	13.8	100%	427
65–69	2.0	80.2	0.2	17.6	100%	658
70+	1.0	72.8	0.1	26.1	100%	1,421
Work disabled, working						
52–54	[41.3]	[0.0]	[52.2]	[6.5]	100%	46
55–59	48.3	4.8	33.1	13.8	100%	145
60–64	32.3	17.7	27.4	22.6	100%	62
65–69	[12.9]	[32.3]	[25.8]	[29.0]	100%	31
70+	–	–	–	–	100%	9
Work disabled, not working						
52–54	5.7	8.6	2.9	82.9	100%	70
55–59	0.4	16.4	3.3	80.0	100%	275
60–64	0.7	21.0	1.7	76.6	100%	291
65–69	0.6	26.5	0.3	72.6	100%	317
70+	0.4	29.3	0.3	70.0	100%	1,028

Table 2.9 presents the same analysis as Table 2.8 but with groups split by sex. Very few differences emerge across the two groups, at least when not controlling for other factors. This is a theme that runs throughout the analysis in this section – whilst there are occasionally differences between men and women, these tend to be in the fractions originally observed in each group at wave 2, not in the distribution of outcomes at wave 3 for each group. Nevertheless, we still control for sex in the models that follow in order to allow for any possible effects.

Table 2.10 presents a simple breakdown of these transition probabilities by five-year age band and it is here that strong differences start to emerge. Some of the systematic differences are, of course, due to well-known factors. The fall with age of the fraction continuing in work even without an onset of disability is just demonstrating the increased likelihood of retirement with age, for example. The sharp fall in re-entry rates with age amongst those with no work disability in either wave is just further evidence of the results discussed in Section 2.4. But a number of other features are worth mentioning:

- The probability of an onset of disability amongst those working at wave 2 does not vary with age.
- The differences between workers and non-workers are greater than the differences across age groups, reflecting the degree of heterogeneity in the population and the degree to which 'work' is an indicator of such differences regardless of age. As an example, the probability of onset of disability amongst non-working 52- to 59-year-olds is greater than the probability of onset of work disability amongst those working aged 65+.
- Amongst those whose work disability is temporary, only very few re-enter the labour market and, for those in work, the probability of staying in work falls with age.

Table 2.11. Work disability and employment status in wave 3, by quintile of total non-pension wealth and status in wave 2

	2006 status:					**N**
	Not work disabled		**Work disabled**			
	Working	Not working	Working	Not working		
	%	%	%	%		
2004 status:						
Not work disabled, working						
Poorest	76.3	10.1	7.6	6.1	100%	198
2	79.7	9.6	7.5	3.2	100%	374
3	80.6	11.9	5.3	2.3	100%	438
4	80.2	12.5	4.5	2.7	100%	511
Richest	78.8	16.2	3.2	1.8	100%	557
Not work disabled, not working						
Poorest	2.8	68.3	0.0	28.8	100%	458
2	1.7	73.4	0.4	24.5	100%	477
3	2.3	73.9	0.4	23.4	100%	560
4	3.2	76.3	0.3	20.2	100%	594
Richest	3.8	83.0	0.4	12.8	100%	682
Work disabled, working						
Poorest	[39.6]	[6.3]	[39.6]	[14.6]	100%	48
2	33.3	11.1	33.3	22.2	100%	63
3	38.5	7.7	32.3	21.5	100%	65
4	50.0	15.0	26.7	8.3	100%	60
Richest	36.8	12.3	36.8	14.0	100%	57
Work disabled, not working						
Poorest	0.3	19.1	0.6	80.0	100%	618
2	0.6	25.0	0.2	74.2	100%	476
3	0.9	26.2	1.4	71.6	100%	348
4	1.0	27.2	1.6	70.3	100%	313
Richest	0.9	37.2	2.2	59.7	100%	226

Finally before we turn to multivariate models, Table 2.11 presents a similar analysis by wealth levels. Much like the differences by sex, the main patterns are somewhat constant across wealth quintiles once we look within groups defined by work status and work disability. The exception to this is a relatively higher rate of 'recovery' from work disability (i.e. a higher likelihood of previous work disability being temporary) towards the top of the wealth distribution.

Given the small sample sizes in some of these groups, and the presence of multiple potentially confounding differences across individuals, we finish this part of the analysis by running some very simple multivariate models to summarise these transitions and their statistical significance.

Tables 2.12a and 2.12b look at the onset of disability amongst those who were working and had no work disability in 2004. Table 2.12a looks simply at the likelihood of work disability onset, whilst Table 2.12b looks at the likelihood of a work disability onset coupled with a labour market exit. In both cases, odds ratios from simple logistic models are presented, where the models control for sex, education, marital status, summary work characteristics, age, wealth levels and summary health measures. Further characteristics (such as the health or employment status of the individual's partner) were investigated and found not to be statistically significant; these characteristics are thus excluded from the models presented here.

Striking patterns emerge in the model for the onset of work disability in Table 2.12a. Onset is substantially more likely for those at the bottom of the wealth distribution and for those either with pre-existing major or minor health conditions (as defined in the Note to Table 2.4) or who experience the onset of a major condition. There is some, albeit less statistically significant, evidence of increased likelihood of onset of work disability for men and those in manual

Table 2.12a. Onset of work disability between waves 2 and 3

Variable	Odds ratio	p-value
Male	1.439	0.060
High education	0.769	0.184
Married	1.298	0.226
Manual job	1.381	0.081
Full-time	**0.653**	0.029
Age 65–69 at wave 2	0.985	0.943
Poorest wealth quintile	**2.316**	0.005
Wealth quintile 2	1.572	0.085
Wealth quintile 3	1.234	0.424
Wealth quintile 4	1.212	0.449
Major condition in 2004	1.838	0.056
Onset of major condition, 2004–06	**3.096**	<0.001
Minor condition in 2004	**1.900**	<0.001
Onset of minor condition, 2004–06	1.285	0.366

Notes: Sample is individuals aged 52–69, working and not work-disabled in 2004 (N=2,065). Reference group is female, A levels or lower education, single, working part-time in a non-manual job in 2004, age less than 65, top wealth quintile, no major or minor health conditions in 2004 and no onsets between 2004 and 2006.

Table 2.12b. Onset of work disability and labour market exit between waves 2 and 3

Variable	Odds ratio	p-value
Male	0.878	0.705
High education	0.869	0.686
Married	1.369	0.409
Manual job	1.606	0.140
Full-time	0.551	0.076
Age 65–69 at wave 2	1.847	0.053
Poorest wealth quintile	**3.460**	0.015
Wealth quintile 2	1.768	0.256
Wealth quintile 3	1.460	0.441
Wealth quintile 4	1.837	0.182
Major condition in 2004	**3.285**	0.012
Onset of major condition, 2004–06	**6.162**	<0.001
Minor condition in 2004	1.922	0.051
Onset of minor condition, 2004–06	1.903	0.151

Notes: Sample is individuals aged 52–69, working and not work-disabled in 2004 with full work information in both waves (N=1,956). Reference group is female, A levels or lower education, single, working part-time in a non-manual job in 2004, age less than 65, top wealth quintile, no major or minor health conditions in 2004 and no onsets between 2004 and 2006.

jobs, and lower rates of onset for those with higher education. Finally, the odds ratio for whether the individual was originally in full-time work warrants some discussion. It should be remembered that the model looks at work disability onsets *within* the sample of people working in 2004. Hence those in full-time work in 2004 have a reduced risk of subsequent work disability relative to the reference group (which is those in part-time work in 2004), suggesting some evidence of gradual retirement amongst those with declining health and ability to work.

In the model of a joint work disability onset and labour market exit in Table 2.12b, it is apparent that fewer variables significantly predict this more specific outcome. Whilst men were more likely to have an onset of work disability, they are no more likely to have an onset and stop work, suggesting, anecdotally at least, that they are more likely to continue work if they do have an onset of work disability.[13] Low wealth and poor health remain significant, suggesting a strong role for each in labour market outcomes as well as in disability.

Turning to the other type of transitions (those out of work disability), Table 2.13 provides a simple model to look at the issue of temporary versus ‘permanent’ disability (with the latter being defined as a disability in 2004 that persisted at least until 2006). Once again, some very strong patterns emerge in the data. Lower wealth groups have substantially reduced probabilities of their work disability being temporary, as do those with poor health. On the other

[13] Ideally, one would want to estimate the model in two stages – with a model for an onset of work disability, and a subsequent model for labour market exit conditional on a work disability onset. With only a single two-year transition, we do not yet have sufficient sample size to estimate the second stage of such a model with any real degree of precision.

hand, those who are working in 2004 (whilst still reporting a work disability) are much more likely to report no work disability two years later, with the results particularly strong for those in full-time work, who are over four times more likely to report no work disability in 2006 than those who were not working originally.

Table 2.13. Odds ratios for no work disability in wave 3 conditional on having a work disability in wave 2

Variable	Odds ratio	p-value
Male	0.817	0.157
High education	0.955	0.783
Married	0.833	0.237
Manual job	1.279	0.262
Full-time at wave 2	**4.242**	<0.001
Part-time at wave 2	**1.847**	0.003
Age 65–69 at wave 2	1.117	0.462
Poorest wealth quintile	**0.397**	<0.001
Wealth quintile 2	**0.543**	0.005
Wealth quintile 3	**0.529**	0.005
Wealth quintile 4	0.763	0.216
Major condition in 2004	**0.558**	0.001
Onset of major condition, 2004–06	**0.576**	0.016
Minor condition in 2004	**0.555**	<0.001
Onset of minor condition, 2004–06	0.942	0.808

Notes: Sample is individuals aged 52–69 in 2004 reporting work disability with full work disability information in both waves (N=1,262). Reference group is female, A levels or lower education, single, age less than 65, top wealth quintile, not working in 2004, no major or minor health conditions in 2004 and no onsets between 2004 and 2006.

Table 2.14. Odds ratios for return to work amongst those not working and reporting a work disability in wave 2

Variable	Odds ratio	p-value
Male	2.272	0.051
High education	1.589	0.312
Married	0.766	0.574
Age 65–69 at wave 2	0.850	0.721
Poorest wealth quintile	0.667	0.575
Wealth quintile 2	0.497	0.367
Wealth quintile 3	1.647	0.427
Wealth quintile 4	1.623	0.434
Major condition in 2004	0.238	0.056
Onset of major condition, 2004–06	0.634	0.472
Minor condition in 2004	0.711	0.456
Onset of minor condition, 2004–06	0.254	0.205

Notes: Sample is individuals aged 52–69 in 2004 reporting work disability but not working in 2004 with full work and work disability information in both waves (N=968). Reference group is female, A levels or lower education, single, age less than 65, top wealth quintile, no major or minor health conditions in 2004 and no onsets between 2004 and 2006.

Finally, in Table 2.14 we present a model of the subsequent labour market activity of those who were not working and reported having a work disability in 2004. This model, of course, includes those whose work disability turned out to be temporary, so the effect of recovery from work disability on return to work can be assessed. As we found in Section 2.4 amongst *all* those out of work, what is striking in this model is how little evidence there is of significant predictors of return to work in this (initially work-disabled) group. Only two odds ratios are significantly different from 1: men are 2.3 times more likely to re-enter the labour market than women, and those with a major health condition are about four times less likely than those with no health conditions to return to work.

The example models above are meant only as an illustration of the value of longitudinal data in documenting changes in health, disability and employment. A full longitudinal analysis of joint transitions in work disability and employment outcomes would need to use a more structural model to link two-year changes and control for the initial state in which people are observed.[14] Such an analysis will be possible once further longitudinal observations are made (since at present there is only one observation of a two-year change for each individual as the work disability questions were not included in the wave 1 ELSA instrument); estimation of such a model represents an important avenue for future research.

Nevertheless, a number of themes emerge even from the more reduced-form evidence above. Work disability is far from a permanent state of affairs and there are many transitions in disability status, only some of which are associated with labour market status changes. The persistence of work disability is highly correlated with individual characteristics, as is onset of work disability. Individuals with differing employment statuses and job types also have different onset and recovery rates. Taken together, these findings suggest two things. First, work disability is a complex phenomenon that depends not only on an individual's health and functioning but also on the types of jobs they have (or expect to have) as well as other socio-economic factors. Second, a simple discrete classification of the population into work-disabled or not work-disabled is unlikely to be adequate to understand fully all the various dynamic processes; since recovery rates are systematically different for different groups, a measure of the intensity of work disability may be more powerful in explaining future trajectories.[15] With this in mind, the analysis of the next subsection looks at a special module of questions introduced in the wave 3 ELSA instrument to investigate these issues.

[14] One example of such a model can be found in Banks et al. (2007), who use data from the European Community Household Panel and the US Panel Study of Income Dynamics to look at international differences in work disability and employment dynamics.

[15] This is relevant if one is interested in understanding causal links between trajectories for health and work. If one is simply interested in predicting future recovery from disability, however, the models in this section have shown that controlling for current disability and current work status can capture the main patterns in the data.

The reporting of work disability

Since work disability is a self-reported phenomenon (and disability more generally can be thought to be the product of both individual circumstances and environmental factors), there is a concern that some of the observed differences between individuals in rates of work disability may simply be due to differences in respondents' reporting styles. This issue arises with many studies using self-reported scales and has led to the development of the so-called 'anchoring vignette' methodology whereby respondents are asked to assess the status of a set of hypothetical example individuals. Under the assumption that individuals assess third parties using the same response behaviour as they use when they assess themselves, differences observed between individuals in their assessment of these common hypothetical situations (or 'vignettes') can be used to control for the effects of differences in reporting behaviour in the kind of models specified in the previous subsection.[16]

When considering work disability, further consideration also needs to be given to the fact that individuals may report their circumstances differently when given a simple yes/no choice as opposed to being able to describe their disability using a scale of intensity.[17] The analysis of the previous subsection could neither control for, nor investigate, issues to do with the potential variation in severity in work disability in the population.

In 2006, one third of the ELSA sample (allocated randomly) was given a short module of questions containing a set of work disability vignettes. In addition, a work disability question was included which allowed respondents to report the extent to which they had a health condition that limited the type or extent of work they could do on a five-point scale (not limited, mildly limited, moderately limited, severely limited, extremely limited), as opposed to giving a simple yes/no answer. In what follows, we provide some preliminary analysis of these data to illustrate the main issues and the extent to which they may affect our interpretation of the findings in the previous subsection.

We begin by documenting the differences between work disability as measured with the simple two-point scale of work disability used above and the more nuanced five-point scale included in the self-completion questionnaire. Since individuals in the vignette sample were asked both questions at different points in the interview, we can cross-tabulate the responses directly. Table 2.15 shows that almost one-quarter of those who said they had no work disability when asked to give a simple yes/no answer revealed some degree of limitation when asked using the five-point scale, with the vast majority of that group saying they were mildly limited. In addition, if one looks amongst the group of people responding 'Yes' to the two-point scale, one can see great diversity in the intensity of work disability, with one-

---

[16] This methodology was originally developed for the understanding of political attitudes (see King et al. [2004]), but it has recently been applied to health and work disability (see Kapteyn, Smith and van Soest [2007]).

[17] For descriptive evidence on the different implications of using various response scales in measuring work disability in the US, the UK and the Netherlands, see Banks et al. (2005).

quarter reporting their disability as 'mild' and a further quarter reporting 'severe' or 'extreme' limitation.

There are no strong differences in these patterns between men and women, but Table 2.16 investigates how these two different scales generate a different picture of work disability across the age and wealth distributions. Whilst the broad message of the two questions is overwhelmingly similar – disability varies systematically by age and wealth – the five-point scale reveals that much variation is missed by a two-point scale. The differences across the age and wealth distributions in work disability measured by whether individuals say they are not limited when given the five-point scale is much greater than those when using the two-point scale. And most of the differences in disability across age groups are accounted for by mild or moderate disability.

Table 2.15. Intensity of work limitation, by response to two-point scale work disability question

Degree of work limitation (five-point scale)	Whether respondent reports a work disability (two-point scale)		
	No	Yes	All
Not limited	74.2	9.2	53.7
Mildly limited	19.3	25.1	21.1
Moderately limited	5.3	37.5	15.4
Severely limited	1.1	21.5	7.5
Extremely limited	0.2	6.7	2.3
	100%	100%	100%
N	1,657	762	2,419

Table 2.16. Distribution of responses to two-point and five-point scales for work disability, by age and wealth quintile

	Two-point scale			Five-point scale					
	No	Yes		Not limited	Mild	Moderate	Severe	Extreme	
Age:									
50–54	80.8	19.2	100%	70.2	14.6	7.6	5.4	2.2	100%
55–59	76.8	23.2	100%	67.7	11.9	11.5	7.7	1.2	100%
60–64	71.5	28.5	100%	60.1	17.6	12.1	8.2	1.9	100%
65–69	64.8	35.2	100%	51.3	23.0	17.3	6.3	2.1	100%
70+	57.8	42.2	100%	35.2	30.7	22.3	8.6	3.2	100%
Wealth:									
Poorest	48.7	51.4	100%	33.8	23.7	23.7	13.1	5.9	100%
2	62.4	37.6	100%	46.1	19.9	17.9	11.6	4.5	100%
3	71.9	28.1	100%	57.5	19.6	16.4	5.9	0.6	100%
4	74.2	25.8	100%	61.1	20.7	12.3	4.9	1.0	100%
Richest	81.6	18.4	100%	66.6	21.6	8.1	3.4	0.2	100%

Note: Wealth quintile is net total non-pension wealth quintile in 2006.

Table 2.17. Responses to anchoring vignette: example

	How much is Geoffrey limited in the kind or amount of work he could do?					
	Not limited	Mildly limited	Moderately limited	Severely limited	Extremely limited	Total
All	11.0	47.9	38.2	2.7	0.3	100%
Male	12.4	47.6	37.0	2.7	0.3	100%
Female	8.6	48.5	40.2	2.6	0.1	100%
Age:						
50–54	12.2	51.5	33.1	2.7	0.5	100%
55–59	13.1	49.5	34.6	2.2	0.6	100%
60–64	10.4	46.6	40.1	2.7	0.2	100%
65–69	10.5	49.3	37.6	2.7	0.0	100%
70+	9.7	45.4	41.9	3.0	0.0	100%
Wealth:						
Poorest	11.3	41.2	42.8	4.1	0.7	100%
2	11.0	41.4	43.9	3.4	0.5	100%
3	8.5	48.6	40.7	2.2	0.0	100%
4	10.0	51.0	35.7	3.3	0.0	100%
Richest	15.2	55.7	28.3	0.6	0.2	100%

To assess the degree to which this might be due to different response patterns (and differences in what people think of as ‘mild’ etc.), we can look at the extent of reporting differences in the population when presented with vignettes for work disability. The full set of vignette questions contains nine different questions describing different people and their health. In each case, respondents are asked to assess the degree to which the hypothetical person is limited in their ability to work, using the same five-point scale as above. For example:

> Geoffrey suffers from back pain that causes stiffness in his back especially at work but it is relieved with low doses of medication. He does not have any pains other than this generalised discomfort. How much is Geoffrey limited in the kind or amount of work he could do?
> [Not limited, Mildly, Moderately, Severely, Extremely]

Table 2.17 shows how answers to this question differ across sex, age and wealth bands. Older individuals assess Geoffrey’s situation as more disabling, as do poorer individuals.

Of course, differences in response patterns across groups should not be taken as evidence that some groups are ‘wrong’ in their assessment of disability whereas others are ‘right’. Indeed, there is a real sense in which disability is a subjective concept, and as such it is ‘perceived’ disabilities that matter in terms of individual choices (over whether to search for a job or whether to seek modifications in their work environment from their employer, for example). To the extent that these perceived disabilities may depend on the types of jobs individuals see themselves as having, or the way in which they view their health and lifestyle, then it may be precisely the group-specific subjective disability rates that are important for policy analysis. Nevertheless, it is interesting to ask how much of the differences in own work disability observed between groups could be explained by differences in reporting patterns of the type documented in Table 2.17.

Table 2.18 reports estimates from three simple cross-sectional models of work disability. The first uses the simple two-point scale of work disability analysed in the previous subsection. The second creates a two-point scale from the five-point question using only those who say they are 'not limited' as the non-work-disabled group. The third creates a similar scale but also including those who say they are mildly limited in the non-disabled group. Each model has two variants, one of which controls for respondents' vignette reporting behaviour and one of which does not.[18] The analysis shows a number of important features. First, the broad pattern of work disability is unaffected by use of the two-point scale or either of the two scales constructed from the five-point question. Second, whilst controlling for vignette responses adds considerably to the models' ability to fit the data, inclusion does not eradicate the role of the other control variables. That is, whilst response patterns do differ across groups and are important in explaining work disability responses, they are not responsible for the differences across the age and wealth distributions that are observed in the ELSA sample.

Table 2.18. Multivariate analysis of self-reported work disability, with and without vignette controls for response behaviour

	(1) Two-point scale				**(2) Five-point scale, 0 vs 1–4**				**(3) Five-point scale, 0/1 vs 2–4**			
	Odds	p-value	Odds	p-value	Odds	p-value	Odds	p-value	Odds	p-value	Odds	p-value
Male	1.022	0.827	0.972	0.778	1.043	0.653	0.952	0.607	0.947	0.607	0.887	0.269
55–59	**0.447**	<0.001	**0.440**	<0.001	**0.374**	<0.001	**0.489**	<0.001	**0.434**	<0.001	**0.422**	<0.001
65–69	0.818	0.116	0.818	0.121	**0.650**	<0.001	**0.637**	<0.001	0.774	0.063	**0.758**	0.050
70+	1.119	0.399	1.103	0.467	0.928	0.552	0.866	0.265	0.933	0.630	0.898	0.466
High educ.	0.803	0.076	0.835	0.151	**0.682**	0.001	**0.685**	0.001	0.815	0.134	0.848	0.237
Poorest	**4.408**	<0.001	**4.168**	<0.001	**3.325**	<0.001	**2.750**	<0.001	**5.023**	<0.001	**4.764**	<0.001
Quintile 2	**2.570**	<0.001	**2.446**	<0.001	**2.094**	<0.001	**2.072**	<0.001	**3.647**	<0.001	**3.454**	<0.001
Quintile 3	**1.661**	0.001	**1.592**	0.003	**1.307**	0.048	1.123	0.399	**2.089**	<0.001	**2.012**	<0.001
Quintile 4	**1.535**	0.006	**1.466**	0.015	1.206	0.161	1.131	0.362	**1.626**	0.007	**1.517**	0.024
Vignette controls	No		Yes		No		Yes		No		Yes	
Pseudo R^2	0.059		0.080		0.061		0.078		0.067		0.103	

Notes: Sample is all those interviewed at both wave 2 and wave 3 with vignette supplement at wave 3 (N=2,419). Reference group is female, aged 60–64, less than high education and top wealth quintile. Panel (1) uses the simple yes/no two-point scale. Panel (2) uses a discrete measure of work disability taking the value 1 if the respondent reports mild or greater on the five-point scale and 0 otherwise. Panel (3) uses a discrete measure of work disability taking value 1 if the respondent reports moderate or greater on the five-point scale and 0 otherwise.

[18] There are many possible ways to control for reporting differences, with the most common being to use the vignettes to estimate how the cut-points between mild and moderate, or moderate and severe, for example, depend on individual characteristics, and then use adjusted cut-points to place everybody's self-reports onto the same benchmark scale. Since we are only interested in one particular question, in this much simpler analysis we simply add dummy variables to capture individuals' categorical responses to each of the nine vignette questions. Estimation of a full model for reporting behaviour (both for work disability and for subjective health, where the questionnaire also included a module of vignettes) would be a natural direction for future research using the ELSA data.

Our analysis of the reporting of work disability has only been preliminary and should be viewed as only providing background context in which to assess the previous findings. Much further work needs to be done using the vignette methodology in order to assess fully the nature, and impact, of respondent differences in reporting styles. Some of this work will also be targeted towards international comparisons, since work disability vignettes have now been included in a number of ageing studies around the world. But the fact that respondent reporting does not underpin the socio-economic differences in work disability observed in the full ELSA sample is an important point to bear in mind. Similarly, however, the extra information contained in a more nuanced measure of work disability that allows respondents to report the severity of their work limitation may well provide important information for the future. This will be particularly so when researchers and policymakers alike are considering issues relating to the difference between permanent and transitory disability and those relating to employment transitions.

2.7 Conclusions

Trajectories of employment in later life are inherently complex, being both causes and consequences of trajectories in many other dimensions, such as health, functioning and disability, financial circumstances and family situations. Longitudinal analysis provides the best hope for robust evidence on the nature of these relationships, and the younger parts of the ELSA sample, as they move towards State Pension Age and through the early years of their retirement, provide important new evidence in this respect. But a fully robust analysis would require both a structural interpretation of the data and, typically, a long time-series of observations on individuals with which to estimate such a structure. Our goal in this chapter has been less ambitious: we have simply shown some of the key dynamic patterns that are emerging in the relationship between employment transitions, work disability and other factors. Even these simple patterns illustrate the power of analysis based on longitudinal data with sufficient sample size to investigate small and therefore fairly similar groups of older individuals.

The analysis in this chapter has shown that there are systematic patterns in movements out of full-time work across groups of the population and that such movements appear to be predicted in advance by individuals. In addition, whilst ‘phased’ or gradual retirement is still perhaps not as common as it is sometimes perceived to be, there are socio-economic differences in the degree to which individuals can and do use part-time work to ease the transition out of full-time work. Employment rates have been rising in recent years, and respondents’ expectations suggest that this may continue to be the case in the future. However, the particular circumstances surrounding the changing State Pension Age for women seem to be a cause of some confusion. Also, there is a strong and systematic relationship between wealth, employment and work disability, and this relationship is made more acute when one allows for both the temporary versus permanent nature of work disability and a more nuanced understanding of the degree to which individuals are limited in their ability to work. Such differences are not, however, primarily driven by differences in the understanding or reporting of work disability across wealth groups.

Our analysis has only considered transitions between 2002 and 2006. As further longitudinal data on the same individuals become available, our understanding of employment dynamics and outcomes at older ages can only be enhanced. In particular, the ability to follow new younger cohorts, split according to their prior expectations of future work and knowledge of state pension arrangements, in comparison with their older counterparts will yield significant research insights.

The analysis of employment dynamics of older workers will be a key policy issue for many years to come and, as such, the continuing analysis of the longitudinal relationships emerging in the ELSA study must be prioritised. Our analysis has only touched on the links between the various dimensions of life before the State Pension Age – employment, financial circumstances, health and family. As more transitions are observed in future years, we will be able to learn much more about these links and interrelationships.

Acknowledgements

The authors are grateful to the Economic and Social Research Council for funding through the ESRC Centre for the Microeconomic Analysis of Public Policy at IFS (grant number RES-544-28-5001). They would also like to thank Carl Emmerson for useful comments. Responsibility for interpretation of the data, as well as for any errors, is the authors' alone.

References

Banks, J., Blundell, R. and Casanova, M. (2007), 'The dynamics of retirement behaviour in couples: reduced form evidence from England and the US', manuscript.

Banks, J., Emmerson, C. and Tetlow, G. (2007), 'Healthy retirement or unhealthy inactivity? How important are financial incentives in explaining retirement', manuscript.

Banks, J., Kapteyn, A., Smith, J.P. and van Soest, A. (2005), 'Work disability is a pain in the ****, especially in England, The Netherlands, and the United States', NBER Working Paper no. 11558; forthcoming in D. Cutler and D. Wise (eds), *Health in Older Ages: The Causes and Consequences of Declining Disability among the Elderly*, Chicago: Chicago University Press.

Banks, J., Kapteyn, A., Smith, J.P. and van Soest, A. (2007), 'Labor market status and transitions during the pre-retirement years: learning from international differences', NBER Working Paper no. 13536.

Disney, R., Emmerson, C. and Wakefield, M. (2006), 'Ill-health and retirement in Britain: a panel data-based analysis', *Journal of Health Economics*, vol. 25, pp. 621–649.

Disney, R., Meghir, C. and Whitehouse, E. (1994), 'Retirement behaviour in Britain', *Fiscal Studies*, vol. 15, no. 1, pp. 24–43.

Emmerson, C. and Tetlow, G. (2006), 'Labour market transitions', in J. Banks, E. Breeze, C. Lessof and J. Nazroo (eds), *Retirement, Health and Relationships of the Older Population in England: The 2004 English Longitudinal Study of Ageing*, London: Institute for Fiscal Studies.

Gruber, J. and Wise, D.A. (2007), *Social Security Programs and Retirement around the World: Fiscal Implications of Reform*, Chicago: National Bureau of Economic Research.

HM Treasury (2007), *Pre-Budget Report and Comprehensive Spending Review 2007*, London: The Stationery Office.

Kapteyn, A., Smith, J.P. and van Soest, A. (2007), 'Vignettes and self-reports of work disability in the United States and the Netherlands', *American Economic Review*, vol. 97, pp. 461–473.

Kapteyn, A., Smith, J.P. and van Soest, A. (2008), 'Dynamics of work disability and pain', *Journal of Health Economics*, vol. 27, pp. 496–509.

King, G., Murray, C., Salomon, J. and Tandon, A. (2004), 'Enhancing the validity and cross-cultural comparability of measurement in survey research', *American Political Science Review*, vol. 98, pp. 191–207.

Murphy, C. (2004), *Public Awareness of State Pension Age Equalisation*, DWP Research Report no. 221, Leeds: Corporate Document Services.

Office for National Statistics (2007), *Annual Abstract of Statistics*, Houndmills: Palgrave Macmillan.

3. Physical functioning in a community context

Elizabeth Breeze *University College London*

Iain A. Lang *Peninsula Medical School*

The analysis in this chapter shows that:

- Lower levels of personal wealth and higher levels of neighbourhood deprivation were both associated with increased risks of developing age-related impairments over a four-year period (gait speed, activities of daily living [ADLs], instrumental activities of daily living [IADLs], motor skills or mobility difficulties); negative feelings about the neighbourhood (social capital) had a smaller association that was not independent of wealth and neighbourhood deprivation. These findings were independent of educational level, aspects of health and smoking.
- Poorer personal relationships with family members were associated with onset of difficulties with mobility; those with no children were as likely to experience the onset of motor skill difficulties as those who described their relationship with their children as poor.
- Quality of personal relationships was more strongly associated with onset of motor skill or mobility problems (e.g. climbing stairs, bending or stretching) than with onset of ADLs and IADLs.
- A history of difficulties with ADLs or IADLs over the four-year period was strongly associated with poorer perceptions of general health and mental health.
- There was a clear gradient in participation in six leisure activities at wave 3 according to history of difficulties; those who never reported difficulties with ADLs or IADLs were most likely to take part, those with these difficulties at the beginning and end of the period were least likely to take part and those free of difficulties at wave 1 or wave 3 formed intermediate groups.
- In multivariate models other aspects of health were shown to contribute to the relative lack of participation, notably poor vision, general health and, for women, depressive symptoms. Independent associations of difficulties with participation in activities were relatively few but were clear in relation to taking a holiday abroad (women), having a hobby, and taking a holiday in the UK (men only).
- At wave 3 people scored worst on the control and autonomy dimension of the CASP-19 quality of life scale if they had a continued history of having difficulties with both ADLs and IADLs. Even those who only experienced difficulties with motor skills scored worse than those with minimal difficulties of any kind.

- In 2006–07, help with difficulties came overwhelmingly from informal sources, particularly the respondent's spouse. However, substantial proportions of women aged 85 years and older with difficulties mentioned help from formal sources, and this may reflect both more severe difficulties and the lack of a spouse to provide support. Among those with functioning impairment, women were more likely than men to receive help from children, except for helping people aged 85 and over with respect to shopping and work around the house (children being a source of help for about half in this age group who had difficulties with these tasks).
- People who drove vehicles to which they had free access were unlikely to use other means of transport regularly. This group tended to be richer and better educated. Other means of transport considered were public transport, lifts and taxis; use of one of these was positively associated with use of the others. Those who had reported difficulties with ADLs and IADLs both in 2002–03 and four years later were least likely to be drivers and most likely never to use public transport. Having difficulty with an IADL at wave 3 was associated with greater likelihood of taking a lift at least once a week whereas having any kind of difficulty was associated with greater use of taxis compared to those who did not have difficulty, but generally use of taxis was infrequent. This suggests that transport options for those with difficulties need to be kept under review to facilitate getting out of the home.

3.1 Introduction

The ability to remain independent, in the sense of maintaining choice and control over their activities, is an important goal for individuals and the centre of various policy initiatives by the UK government (Office for Disability Issues, 2008). Difficulties with physical actions that are part of everyday life for most people may pose a threat to that independence but the social model of disability suggests it is not impairment (e.g. having a defective limb or organ) that leads to loss of independence but society that fails to facilitate that choice and control. Saad Nagi was one of the first to identify the importance of the environment for the roles people could perform (e.g. staying in work) despite their physical condition (Nagi, 1976). The US Institute of Medicine (Pope and Tarlov, 1991) defines disability in terms of 'the attributes and interactions of the individual and the environment' (p. 82), highlighting the interaction of individual factors with physical and social environments.

More recently, The Disability Rights Commission (2002) defined independent living as given below and this is now used as the working definition by the Office for Disability Issues:[1]

> All disabled people having the same choice, control and freedom as any other citizen – at home, at work, and as members of the community. This does not necessarily mean disabled people 'doing everything for themselves', but it does mean that any practical assistance people need should be based on their own choices and aspirations.

[1] http://www.officefordisability.gov.uk/working/independentliving.asp (Accessed 1 June 2008).

In this chapter four sets of objectives are addressed. The first objective examines whether personal or environmental material and social factors are predictors of onset of difficulties between the first wave in 2002–03 and the third wave four years later (Section 3.3). An objective measure of mobility known as gait speed is used and set alongside self-reported difficulties. The latter are categorised into those pertaining to activities of daily living (ADLs), instrumental activities of daily living (IADLs) and motor skills or strength, here sometimes termed mobility for ease of reference (see Section 3.2 for details). The potential predictors include the person's social and socio-economic circumstances: family wealth, neighbourhood deprivation, neighbourhood social capital and quality of relationship with family and friends.

The second objective, covered in Section 3.4, is to look at evidence for possible effects of difficulties with functioning on activities related to active engagement in society and social life. People are categorised according to their pattern of self-reported difficulties with physical function over the three waves of ELSA. Members of these groups are compared with respect to selected activities. If one group is less likely to undertake these activities than another, it is assumed that this is at least in part due to reduced ability to fulfil their choices and hence reduced independence.

The third objective (Section 3.5) is to see whether sources of help for difficulties vary according to the type of difficulty and to assess how often formal sources of help are used. This section refers to data collected in 2006–07.

Finally, the fourth objective (Section 3.6) focuses on correlates of various forms of transport use, included here because independence often relies on having transport. This section again used data collected in 2006–07.

Analyses refer to subsets of wave 1 core members; those who were interviewed by proxy at any time or were in a care institution are excluded from all analyses.

3.2 Measures of physical functioning

Each wave of ELSA has included questions about respondents' ability to carry out everyday tasks. These self-reports of physical functioning are divided into three types: activities of daily living (ADLs), instrumental activities of daily living (IADLs) and motor skills or strength.

The original scale of ADLs was developed by Katz and colleagues (Katz et al., 1963) who described them as 'activities which people perform habitually and universally' (p. 94). The activities covered in ELSA are: dressing, including putting on shoes and socks; walking across a room; bathing or showering; eating, such as cutting up food; getting in or out of bed; and using the toilet, including getting up or down.

IADLs are everyday tasks involving a mix of cognitive and physical competences. The list used in ELSA comes from one developed and validated by Lawton and Brody (1969) to reflect what they termed 'instrumental self-care'. They are: preparing a hot meal; shopping for groceries; making telephone calls; taking medications; doing work around the house or garden; and managing money, such as paying bills or keeping track of expenses. An additional activity introduced into the US Health and Retirement Survey referred to using a map to figure out how to get around in a strange place (Fonda and Herzog, 2004); this activity has not been used in this chapter because it did not group consistently with the other IADLs.

Problems with motor skills and strength may be potential precursors to restrictions on participation. Respondents in ELSA are asked about ten items referring to movements involving the upper and/or lower limbs, most of which require a degree of muscle strength but a few of which are more to do with dexterity and flexibility. The ten items are: walking 100 yards; getting up from a chair after sitting for long periods; climbing several flights of stairs without resting; climbing one flight of stairs without resting; stooping, kneeling or crouching; pulling or pushing large objects like a living-room chair; lifting or carrying weights over 10 pounds, like a heavy bag of groceries; reaching or extending arms above shoulder level; sitting for about two hours; and picking up a small coin from a table.

Box 3.1. Physical functioning questions

Because of a physical or health problem, do you have difficulty doing any of the activities on this card? Exclude any difficulties that you expect to last less than three months.

INTERVIEWER: PROBE – 'What others?' … Code all that apply.
01 Walking 100 yards
02 Sitting for about two hours
03 Getting up from a chair after sitting for long periods
04 Climbing several flights of stairs without resting
05 Climbing one flight of stairs without resting
06 Stooping, kneeling or crouching
07 Reaching or extending arms above shoulder level (either arm)
08 Pulling or pushing large objects like a living-room chair
09 Lifting or carrying weights over 10 pounds, like a heavy bag of groceries
10 Picking up a 5p coin from a table
96 None of these

Here are a few more everyday activities. Please tell me if you have any difficulty with these because of a physical, mental, emotional or memory problem. Again exclude any difficulties you expect to last less than three months.

INTERVIEWER: PROBE – 'What others?' … Code all that apply.
01 Dressing, including putting on shoes and socks
02 Walking across a room
03 Bathing or showering
04 Eating, such as cutting up food
05 Getting in or out of bed
06 Using the toilet, including getting up or down
07 Using a map to figure out how to get around in a strange place
08 Preparing a hot meal
09 Shopping for groceries
10 Making telephone calls
11 Taking medications
12 Doing work around the house or garden
13 Managing money, such as paying bills and keeping track of expenses
96 None of these

The Katz and Lawton-Brody lists are widely used for professional assessments of the needs of older people. The questions in ELSA represent simplified versions and do not differentiate particular facets of these activities or the degree of challenge they cause; although the respondents are not asked whether they wish to do these activities, the mobility ones and ADLs, at least, are likely to be part of most people's lives. The ELSA questions are aimed at the milder end of limitations, asking about difficulties rather than dependence on others or complete inability to do something, but they are worded in a way intended to capture difficulties that, although they may not be permanent, last long enough to be considered chronic. The wordings of the questions are given in Box 3.1.

In this chapter the analyses focus on these three main groups of physical limitations. People with difficulty in only one motor skill have been included with those who have none, since there tends to be fluctuation over time in reporting a single item and it was considered that the limitations incurred by a single motor skill problem would be relatively minor.

As well as learning about the problems respondents report it is valuable to assess their physical function objectively. There can be differences between self-reports and the results of performance tests (Hoeymans et al., 1996; Sayers et al., 2004) and assessing both self-reported and measured difficulties allows us to combine an objective measure of poor performance with an indication of how everyday mobility is affected.(Reuben et al., 2004).

In addition to providing self-reports of physical functioning difficulties ELSA respondents aged 60 years and over are timed walking an eight-foot distance so that their gait speed can be calculated. Respondents do not undertake the test if they refuse, if they or the interviewer feel that attempting the test would be unsafe or if questions are being answered on their behalf by someone else (a proxy interview). Respondents are asked to walk (not race) to the other end of the course at their usual speed, just as if they were walking down the street to the shops, and to walk all the way past the other end of the tape before stopping. The interviewer times how long they take to get to the other end and then times them again walking in the other direction. The average of the two times is used for analysis.

Walking becomes difficult in the presence of breathlessness, sarcopenia, dizziness and other problems and individual gait speed gives an assessment of physical mobility that is particularly sensitive to variation at the slower end of the scale. Studies from the US have shown that impaired mobility is predictive of future disability, nursing-home entry and mortality (Guralnik et al., 1994). Tests of physical function may be used in clinical assessments of older people (Guralnik and Ferrucci, 2003; Studenski et al., 2003) and can help identify individuals with pre-clinical limitations who are at increased risk of developing disabilities (Cesari et al., 2005; Melzer et al., 2006; Steel et al., 2004).

In the rest of this chapter methods for specific analyses are given in the relevant sections. The analyses were carried out on core ELSA members who took part in all three waves, had not yet moved into long-term care and responded to the questions on physical functioning. Gait speed tests were only completed by people aged 60 years and over at wave 1 so analyses involving gait speed are restricted to that subgroup. Analyses of sources of help for physical functioning limitations refer to people aged 55 and over at the beginning of March 2006 and those on transport use to people aged 65 and over; both these analyses use wave 3 data.

There are three main statistical methods of analysis: logistic regression (used to look at predictors of a binary outcome such as whether someone developed an impairment or not); linear regression (for analyses of characteristics associated with a continuous outcome such as score on social support or quality of life scale); and age standardisation. Age standardisation reduces the inflation or deflation of apparent differences in outcome across groups that may simply result from one group being older than another. This means that the percentages given are not the percentages one would observe directly in the sample but are those one would observe if the age distribution in each functioning group was the same as that for all men in the analysis sample and similarly for women. When statistical tests have been carried out, a p-value of less than 0.05 has been considered statistically significant but interpretation also takes into account the size of the parameter – i.e. how practically important the association between two factors appears to be. For all the longitudinal models, analyses were run with and without weighting and on the whole this did not make a major difference to the findings. Results in Section 3.3 are presented unweighted and those in Section 3.4 weighted. The same weight was used in Sections 3.5 and 3.6 as this was confined to people who had taken part in waves 1 and wave 3 and this differed little from the population who had taken part in all three waves.

3.3 Predictors of onset of impairment

Methods and measures

This section focuses on how a person's social and socio-economic environment predicts their physical functioning over time. Many aspects of health vary according to an individual's socio-economic circumstances, as well as the socio-economic circumstances of the household or neighbourhood in which he or she lives (Adler and Ostrove, 1999; Diez Roux, 2001; Marmot and Wilkinson, 1999). Within the social environment, the effects of personal relationships on the physical and emotional health of older people have been explored previously but have concentrated on the extent and quantity of relationships (Bisschop et al., 2003; Lang and Carstensen, 1994; Vaillant et al., 1998) rather than perceptions of relationship quality.

The first part of this section focuses on three aspects of socio-economic status, one related to household circumstances and two related to the neighbourhoods in which people live. The second part of the section looks at a more intimate aspect of older people's social context – the way they view their relationships with friends and family.

ELSA is unusual in having a comprehensive measure of family wealth; the measure used here includes financial, physical and housing wealth but not pension wealth. Wealth is split by quintiles but because wealth tends to decline once people move into retirement and beyond and tends to be different in men and women these quintiles were calculated specific to sex and five-year age groups and then combined.

The types of neighbourhood in which people live affect their health and well-being (Blackman, 2006) and older people may be at heightened risk from the negative health effects of living in deprived neighbourhoods (Browning and Cagney, 2002; Wight et al., 2008). Mental health (Aneshensel et al., 2007; Walters et al., 2004) and physical function (Balfour and Kaplan, 2002; Schootman et al., 2006) have been found to be poorer in older people living in deprived neighbourhoods and previous findings using ELSA data have shown that, even after individual differences in socio-economic status and health behaviours are taken into account, older people in deprived neighbourhoods have poorer cognitive function (Lang et al., 2008a) and are more likely to develop mobility problems.(Lang et al., 2008b).

The Index of Multiple Deprivation (IMD) 2004 combines seven dimensions of deprivation measured at the level of the lower layer super output area (LSOA), a statistical unit introduced in the 2001 Census which contains approximately 1,500 individuals. The dimensions are: income deprivation; employment deprivation; health deprivation and disability; education, skills and training deprivation; barriers to housing and services; living environment deprivation; and crime. Details of the theoretical and practical implementation of the IMD measure, including its reliability and validity, have been published (Office of the Deputy Prime Minister, 2004). For this analysis IMD scores were divided into quintiles.

Social capital has been defined in more than one way. For example, Robert Putnam has written about a form of social capital based on individuals' levels of engagement with formal and informal organisations (Putnam, 2000). The measure used in ELSA is a different one and is based on people's perceptions of the neighbourhoods in which they live, taking account of trust, mutual

Box 3.2. Statements used to assess neighbourhood social capital

'I really feel part of this area/I feel that I don't belong in this area'

'Vandalism and graffiti are a big problem in this area/There is no problem with vandalism and graffiti in this area'

'I often feel lonely living in this area/I have never felt lonely living in this area'

'Most people in this area can be trusted/Most people in this area can't be trusted'

'People would be afraid to walk alone in this area after dark/People feel safe walking alone in this area after dark'

'Most people in this area are friendly/Most people in this area are unfriendly'

'People in this area will take advantage of you/People in this area will always treat you fairly'

'This area is kept very clean/This area is always full of litter and rubbish'

'If you were in trouble there are lots of people in this area who would help you/If you were in trouble, there is nobody in this area who would help you' assistance and petty crime. Neighbourhood social capital has been shown to be linked to health outcomes such as mortality (Subramanian, Lochner and Kawachi, 2003) and access to primary care (Prentice, 2006).

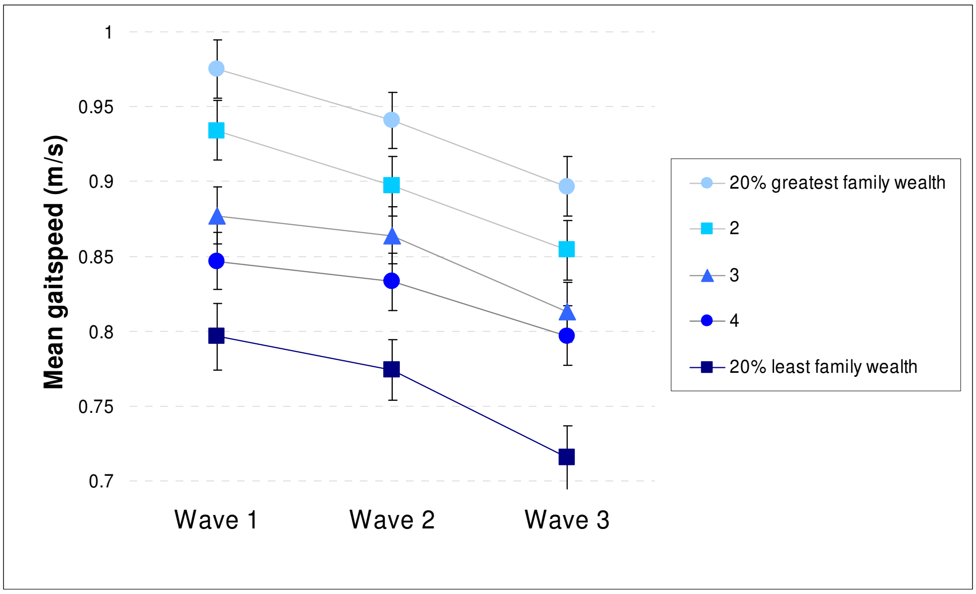
Neighbourhood social capital was measured in the self-completion section of ELSA wave 1. Respondents were presented with the following nine pairs of contrasting statements (see Box 3.2) and asked to indicate which are closer to how they feel about their local area.

Each statement was scored from 1 (most positive about the local neighbourhood) to 7 (least positive). For this analysis the summed scores were divided into five approximately equal categories.[2]

Physical function outcomes in relation to socio-economic factors

To take into account both existing levels of function and decline over time we looked at both baseline gait speed and change in gait speed between waves 1 and 3. Figure 3.1 shows the relationship between mean gait speed at successive waves and quintiles of wealth at wave 1. There is a clear negative relationship between wealth and gait speed that is consistent across waves. Furthermore, it appears that the decline in gait speed we would expect to see over time, as people age, is most marked in those in the lowest wealth group.

Figure 3.1. Mean gait speed at wave 1 and subsequently, by household wealth at wave 1 divided by quintiles



[2] The score ranges for the categories were 9–15, 16–20, 21–25, 26–31, 32–63, with lower scores indicating more positive relationships.

To assess more formally how decline in gait speed is influenced by socio-economic circumstances regression models were used. The models were adjusted for: age, sex, level of education, Body Mass Index (BMI) category, cigarette smoking, alcohol consumption and self-reported health. The rationale for making these adjustments is that these are all factors known to be associated both with socio-economic status and with mobility – adjusting for them allows us to assess the extent to which intermediate factors are responsible for any associations between socio-economic status and gait speed. The outcomes of these models are presented in Tables 3A.1 and 3A.2, which show the relationships between gait speed and wealth and between gait speed and neighbourhood deprivation.

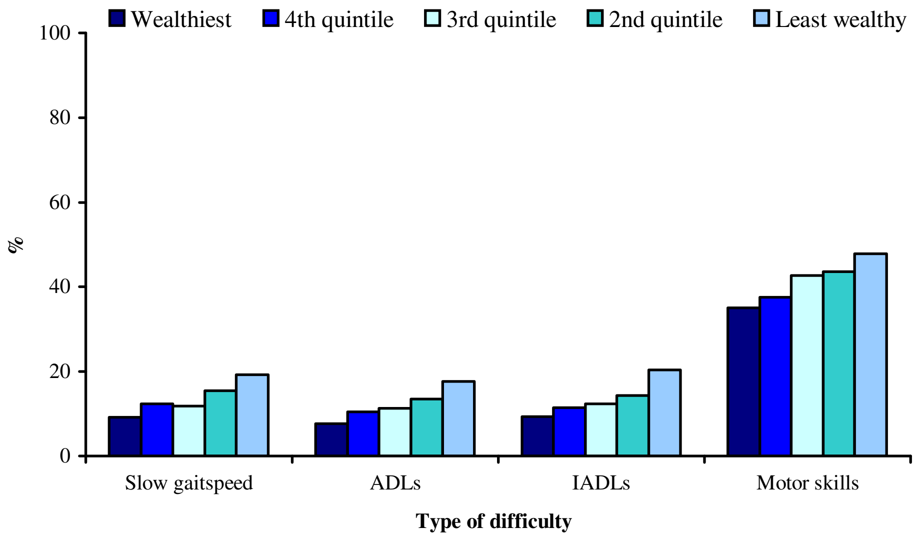
For each of the socio-economic variables these models confirm there is a relationship with both baseline gait speed and with decline in gait speed. When both these socio-economic variables were included in the same model and social capital added in there was no statistically significant relationship with social capital but marked relationships with both wealth and neighbourhood deprivation persisted (results not shown). This suggests individual and neighbourhood socio-economic effects have an independent effect on the physical functioning of older people and is in keeping with similar findings from earlier waves of ELSA (Lang et al., 2008b).

In the ELSA wave 2 report results were presented in relation to having a gait speed of 0.5 metres per second or slower, a level approximately similar to what is needed to move around safely outdoors, including getting over a road in the time allowed by the crossing signal (Melzer et al., 2006). In the next set of analyses here we assess decline in gait speed by assessing the likelihood of moving into this slow gait speed group – that is, of having a gait speed of faster than 0.5 m/s at wave 1 but slower than that, or being unable to complete the gait speed test, at wave 3.[3]

These outcomes are presented alongside outcomes of models looking at the likelihood of reporting one or more ADL problems at wave 3 (among those who did not have them at wave 1), of reporting one or more IADL problems at wave 3 (among those who did not have them at wave 1) and of reporting two or more motor skill problems (among those with one or no problems at wave 1 – see comments above). We assessed these outcomes in relation to household wealth, neighbourhood deprivation and neighbourhood social capital. To show the magnitude of the incidence results are first presented for unadjusted models in Figure 3.2 and in Tables 3A.3 to 3A.5. The incidences by wealth quintile and neighbourhood deprivation were very similar. Tables 3.1 to 3.3 show the odds ratios for these outcomes adjusted for the effects of age, sex, level of education, BMI category, cigarette smoking, alcohol consumption and self-reported health.

[3] 'Unable to complete' refers to those who reported they could not walk, who were too ill to complete the test or for whom the interviewer thought it would be unsafe to attempt the test.

Figure 3.2. Incidence of impaired physical function by wave 3 in relation to wave 1 household wealth



Notes: unadjusted , unweighted. Based on those without the difficulty at wave 1. 3,532 cases included for gait speed, 6,112 for incident ADLs, 6,119 for incident IADLs and 4,570 for incident motor skill problems.

Table 3.1. Incident impaired physical function in relation to wealth – adjusted models

Respondents who answered questions on functioning in waves 1–3 and without the relevant difficulty at wave 1

	Incident slow gait speed	Incident ADLs	Incident IADLs	Incident motor skills problems
	Odds ratios (95% confidence intervals)			
Wealth split by quintiles				
Wealthiest	1.00	1.00	1.00	1.00
4	1.39 (0.94, 2.04)	1.29 (0.95, 1.75)	1.20 (0.09, 1.59)	1.07 (0.88, 1.31)
3	1.35 (0.92, 1.99)	1.36 (1.00, 1.85)	1.13 (0.85, 1.51)	1.27 (1.04, 1.56)
2	1.64 (1.11, 2.41)	1.41 (1.04, 1.92)	1.22 (0.92, 1.63)	1.30 (1.05, 1.60)
Least wealthy	2.24 (1.51, 3.32)	1.83 (1.34, 2.50)	1.75 (1.32, 2.34)	1.36 (1.08, 1.71)
p for trend	<0.001	<0.001	<0.001	0.002
Unweighted N	*3,203*	*5,428*	*5,441*	*4,137*

Notes: ADLs = activities of daily living; IADLs = instrumental activities of daily living. Slow gait speed = being in slowest 25% or being unable to complete the gait speed test. Splitting of wealth into quintiles was specific to sex and age in 5-year bands. Models were adjusted for age, sex, level of education, BMI category, cigarette smoking, alcohol consumption and self-reported health.

Table 3.2. Incident impaired physical function in relation to neighbourhood deprivation – adjusted models

Respondents who answered questions on functioning in waves 1–3

	Incident slow gait speed	Incident ADLs	Incident IADLs	Incident motor skills problems
	Odds ratios (95% confidence intervals)			
IMD 2004 split by quintiles				
Least deprived	1.00	1.00	1.00	1.00
4	0.97 (0.69, 1.36)	1.43 (1.10, 1.88)	1.01 (0.78, 1.30)	1.16 (0.97, 1.40)
3	0.96 (0.67, 1.37)	1.10 (0.82, 1.47)	0.96 (0.73, 1.25)	1.30 (1.07, 1.57)
2	1.69 (1.20, 2.39)	1.66 (1.25, 2.22)	1.42 (1.09, 1.85)	1.38 (1.13, 1.70)
Most deprived	1.68 (1.16, 2.45)	1.65 (1.21, 2.25)	1.49 (1.12, 2.00)	1.31 (1.02, 1.68)
p for trend	<0.001	0.001	0.006	0.032
Unweighted N	*3,222*	*5,482*	*5,495*	*4,182*

Notes: See Table 3.1.

Table 3.3. Incident impaired physical function in relation to neighbourhood social capital – adjusted models

Respondents who responded to questions on functioning in waves 1–3

	Incident slow gait speed	Incident ADLs	Incident IADLs	Incident motor skills problems
	Odds ratios (95% confidence intervals)			
Neighbourhood social capital split by quintiles				
Highest	1.00	1.00	1.00	1.00
4	1.01 (0.68, 1.49)	0.80 (0.58, 1.11)	0.85 (0.63, 1.16)	0.96 (0.78, 1.21)
3	1.04 (0.72, 1.52)	0.94 (0.69, 1.27)	0.94 (0.71, 1.26)	1.11 (0.94, 1.44)
2	1.01 (0.68, 1.50)	1.21 (0.90, 1.62)	1.08 (0.81, 1.44)	1.14 (0.99, 1.53)
Lowest	1.26 (0.86, 1.85)	1.34 (1.00, 1.81)	1.37 (1.03, 1.83)	1.27 (1.14, 1.77)
p for trend	0.303	0.004	0.009	0.013
Unweighted N	*2,871*	*4,927*	*4,963*	*3,782*

Notes: See Table 3.1.

The results indicate associations between all of the exposures and outcomes examined, but the relationships with wealth and neighbourhood deprivation appear stronger than those with neighbourhood social capital and the latter was no longer significant when included in a model with wealth and neighbourhood deprivation. It is also noteworthy that onset of IADLs or slow gait speed among people in the third and fourth quintiles of deprivation (less deprived) were no greater than those among the fifth (wealthiest) quintile. For each exposure there is a more moderate relationship with incident motor skill problems than with the other outcomes. There is strong evidence here for a relationship between aspects of socio-economic circumstances and incident impaired physical function.

Physical function outcomes in relation to relationship quality

As part of the self-completion part of ELSA wave 1, respondents were asked whether or not they had a partner ('Do you have a husband, wife or partner with whom you live?'). Those who said they had a partner were then asked to respond to six questions on how they felt about their partner, to which possible answers were 'A lot', 'Some', 'A little' and 'Not at all'. Questions asked were:

- How much do they really understand the way you feel about things?
- How much can you rely on them if you have a serious problem?
- How much can you open up to them if you need to talk about your worries?
- How much do they criticise you?
- How much do they let you down when you are counting on them?
- How much do they get on your nerves?

Responses to each question were scored from 1 (for the most positive responses) to 4 (for the least positive responses) and summed to give a score from 6 to 24, which was then divided into five approximately equal groups.[4] A sixth category was added for those who reported they did not have a partner.

Corresponding sets of questions were asked about respondents' children, families and friends and the responses summed and categorised using the same method as for partners. Percentages of respondents reporting different levels of relationship quality, by relationship type and sex, are presented in Table 3A.6.

There was no clear overall pattern of association between quality of relationships at wave 1 and incident physical function problems during the following four years although a number of relationship types were associated with poorer outcomes. As for socio-economic status, outcomes of these analyses are shown in unadjusted models (Tables 3A.7–3A.10) to give an indication of the magnitude of incidence and in adjusted models to show whether associations were independent of other factors (Table 3.4).

In adjusted models, there were weak or no associations between onset of difficulties and quality of relationships. P-values show that observed differences in likelihood of developing slow gait speed or ADL difficulties could have arisen by chance; i.e. there is no evidence that those who had a low-quality relationship with a partner, or who did not have a partner, were more likely to develop slow gait speed or ADL difficulties than those with a partner and good relationship quality. For all except the wider family the associations were stronger with motor skills than with problems with ADLs or IADLs or with impaired gait speed. For motor skills both those who did not have children and those who had poor relationships with their children at wave 1 appeared to be at increased risk of onset of problems with motor skills by wave 3. The same was true, to a lesser extent, for relationships with friends and onset of problems with motor skills. For example, compared to those who

[4] As the scores were unevenly distributed the groups could not be constructed to be of exactly equal size.

Table 3.4. Incident impaired physical function in relation to quality of relationship with (a) partner, (b) children, (c) other family members and (d) friends – adjusted models

Respondents who answered questions on functioning in waves 1–3 and without the relevant difficulty at wave 1

Quality of relationship with:	Incident slow gait speed	Incident ADLs	Incident IADLs	Incident motor skills problems
	Odds ratios (95% confidence intervals)			
Partner				
Best	1.00	1.00	1.00	1.00
2	0.68 (0.36,1.30)	1.09 (0.68,1.78)	1.03 (0.65,1.64)	1.09 (0.79,1.49)
3	0.72 (0.41,1.26)	1.02 (0.66,1.59)	1.08 (0.71,1.65)	1.24 (0.93,1.66)
4	1.18 (0.66,2.11)	1.28 (0.80,2.04)	0.87 (0.44,1.38)	1.47 (1.08,2.01)
Worst	1.04 (0.57,1.89)	1.24 (0.78,1.98)	1.43 (0.93,2.22)	1.39 (1.01,1.91)
No partner	1.27 (0.75,2.14)	1.33 (0.87,2.05)	1.43 (0.95,2.13)	1.32 (0.99,1.78)
p for trend	0.198	0.161	0.101	0.004
Children				
Best	1.00	1.00	1.00	1.00
2	1.18 (0.77,1.83)	1.00 (0.69,1.45)	1.14 (0.79,1.65)	1.16 (0.87,1.55)
3	0.73 (0.49,1.11)	0.94 (0.67,1.32)	1.06 (0.76,1.47)	1.26 (0.97,1.63)
4	1.06 (0.69,1.64)	0.98 (0.69,1.40)	1.05 (0.74,1.50)	1.48 (1.14,1.94)
Worst	1.26 (0.81,1.96)	0.88 (0.61,1.26)	1.44 (1.02,2.03)	1.73 (1.32,2.28)
No children	1.48 (0.95,2.29)	1.44 (1.00,2.06)	1.77 (1.24,2.52)	1.63 (1.21,2.18)
p for trend	0.379	0.442	0.057	<0.001
Other family				
Best	1.00	1.00	1.00	1.00
2	0.68 (0.45,1.04)	0.99 (0.71,1.38)	0.93 (0.69,1.26)	1.09 (0.86,1.40)
3	0.84 (0.56,1.27)	0.87 (0.62,1.22)	0.76 (0.55,1.05)	1.19 (0.93,1.52)
4	0.92 (0.60,1.41)	0.99 (0.70,1.40)	0.75 (0.54,1.05)	1.12 (0.87,1.44)
Worst	1.06 (0.72,1.56)	1.01 (0.74,1.40)	0.97 (0.72,1.30)	1.22 (0.96,1.55)
No family	0.92 (0.58,1.47)	1.20 (0.82,1.76)	0.87 (0.60,1.27)	1.15 (0.84,1.57)
p for trend	0.399	0.844	0.604	0.110
Friends				
Best	1.00	1.00	1.00	1.00
2	0.70 (0.45,1.10)	0.74 (0.52,1.04)	1.00 (0.69,1.43)	1.06 (0.80,1.40)
3	0.78 (0.51,1.21)	0.79 (0.56,1.12)	1.19 (0.84,1.70)	1.23 (0.94,1.61)
4	0.73 (0.46,1.14)	0.77 (0.54,1.10)	1.10 (0.76,1.59)	1.38 (1.04,1.81)
Worst	0.86 (0.54,1.35)	0.80 (0.56,1.15)	1.20 (0.83,1.73)	1.30 (0.98,1.72)
No friends	0.95 (0.53,1.71)	0.76 (0.47,1.23)	1.23 (0.76,2.00)	1.66 (1.09,2.52)
p for trend	0.879	0.563	0.215	0.007
Unweighted N				
Partner	*3,027*	*5,116*	*5,155*	*3,918*
Children	*2,990*	*5,074*	*5,114*	*3,888*
Other family	*2,772*	*4,817*	*4,832*	*3,693*
Friends	*2,776*	*4,840*	*4,853*	*3,723*

Notes: See Table 3.1.

reported good relationships with their children, those who reported the worst relationships with their children were significantly more likely to have experienced incident motor skills problems (OR 1.73, 95% CI 1.32 to 2.28), as were those who had no children (OR 1.63, 95% CI 1.21 to 2.18). Those who had no children were no more likely to experience incident motor skills problems than those who did have children but reported poor relationships with them (OR 0.94, 95% CI 0.74 to 1.20; result not shown in table). It is unclear why incident mobility problems seemed to be more associated with relationship quality than incident ADL and IADL problems. There may be some interplay between quality of relationship and quality of help-giving which needs to be explored further.

In models including all four types of relationship no clear overall picture emerged in relation to the different outcomes but the most consistent associations were with quality of relationships with partner and children. Previous research has suggested marital status has different effects on mortality in men and women (Johnson et al., 2000) but we found no interactions between quality of relationships (of any type) and sex in relationship to our outcomes of interest.

3.4 History of reported difficulties in physical function over four years and independence

Methods

The three forms of self-reported activity covered in this chapter can be seen as part of a hierarchy with the motor skills as least limiting and difficulties with ADLs most limiting. A classification was developed intended to show the range from remaining without problems with these activities throughout the three waves of interview to reporting both ADL and IADL difficulties at every wave. To show every combination of functioning limitations across the waves would have been complex and instead four ‘middle’ groups were created which were defined according to a combination of whether they ever reported difficulties with ADLs or IADLs and whether at the last point they felt free of such difficulties or not. The categories created are given in Box 3.3.

Box 3.3. History of self-reported difficulties with physical functioning

1	Minimal difficulty	At each wave difficulty with at most one motor skill reported
2	Motor skill difficulties only	Reported difficulty with two or more motor skills in at least one wave but never difficulties with ADLs or IADLs
3	Net decrement in difficulties	Reported difficulties with one or more ADLs and/or IADLs at wave 1 and/or wave 2 but not at wave 3 (may have reported difficulties with motor skills)
4	Net increment in difficulties	Reported difficulties with one or more ADLs and/or IADLs at wave 3 but not at wave 1
5	Mixed history of ADLs/IADLs	Reported difficulties with one or more ADLs and/or IADLs at both waves 1 and 3 but across the waves varied in whether this was ADLs only, IADLs only or both (could be neither in wave 2)
6	Maximal difficulty	At each wave difficulties with at least one ADL and at least one IADL reported

Demographic features and health by history of difficulties in physical functioning

Retention in the sample according to pattern of reported difficulties at wave 1 is shown in Table 3A.11. The categories are approximate – e.g. deaths up to the end of 2006 for those who did not take part in wave 3 are used to give an idea of whether those with various types of difficulty at wave 1 were more likely to die before wave 3. It can be seen that the main reason for differential retention in the analysis sample is death; in particular those who had difficulties with IADLs at wave 1 were most likely to die.

Table 3A.12 describes the characteristics of cohort members in these six categories. The minimal-difficulty group was considerably younger than the others with a median age of 63 at the first wave, around 11 years younger than the oldest female group and 8 years younger than the oldest male group. There was more variation in median age among women than among men, possibly reflecting the greater variation in age of women in the sample as a whole. The minimal-difficulty group comprises about half the men and a third of the women who took part in all three waves. Their relative dominance in the sample is probably exaggerated compared to the general population, in part because they are more likely to remain in the study.

Consistent with the age differences, women with a history of ADL or IADL difficulties were more likely to be widowed and less likely to be married (43% of the maximal group were widowed compared with 18% of the minimal). Among men the contrasts were smaller but were still clear for widowhood; the percentage in the maximal group who had never married was particularly small, perhaps because single men with difficulties in ADLs or IADLs would be in long-term care and also probably disproportionately lost to contact in the study. Women with difficulties in ADLs or IADLs at wave 3 (categories 4, 5 and 6) were most likely to live alone and men with minimal difficulties or motor skill difficulties only least likely to live alone.

Table 3A.13 shows perceptions of general health and reporting of depressive symptoms at waves 1 and 3 by history of difficulties. General health is dichotomised into very good or good against fair, bad or very bad. An abbreviated form of the CES-D scale (Steffick, 2000) was used to assess depressive symptoms with those with at least four of the eight symptoms taken as possibly having depression.[5] Around four out of five of those with minimal functional difficulties throughout reported good or very good general health both in 2002–03 and four years later whereas three out of four of those with ADL and IADL problems throughout reported fair to very bad health on both occasions. Patterns of general health reporting follow those of physical functioning. Those who had an increment in reported difficulties were most likely to consider their general health good or very good at wave 1 but switch to a worse rating at wave 3.

[5] There is no universally agreed cut-off used with the CES-D8; four or more symptoms is considered to be closest to the cut-off used in the full CES-D20 to indicate clinical depression but for some purposes a cut-off of three or more is considered to indicate sufficient symptoms to be of concern.

Although not as striking as the patterns for general health, there were gradients across the six categories in the percentages with less than four depressive symptoms in either wave (in favour of the minimal category) and in the percentages possibly depressed in both waves (being greatest for the maximal category). In both cases these gradients were steeper for women than for men and a particularly high percentage of women in the maximal history group reported four or more symptoms in both waves. By wave 3, there was a steep gradient between self-reported problems with vision and the history of difficulties with physical functioning; there was a shallower gradient among categories 2–6 with respect to problems with hearing but the minimal history group stood out as being much less likely to have hearing problems than the rest.

Indicators of independence and history of difficulties in physical functioning

Measures and methods

The focus of this section is the way in which people take an active part or interest in society. The analyses are confined to activities outside paid work as Chapter 2 on 'Extended Working Lives' looks in some detail at work disability and employment.

With respect to leisure time, the activities covered are considered either to keep the mind stimulated and/or to provide social contact. Having a hobby was voted as a necessity by 78% of adult respondents in the Omnibus Studies used to define poverty for the 1999 Breadline Britain Study (Gordon et al., 2000). This study identified poverty as involving not only limited financial resources but also involuntary lack of at least two of the items or services considered essential to life. Reading newspapers is taken as an indicator of taking a proactive interest in what is happening in the world around. Other activities take people out of the home, such as having day trips or outings, and eating away from home. These (and hobbies) may also be social activities and other research has indicated that social participation slows cognitive decline (Zunzunegui et al., 2003). A holiday away from home without relatives at least once a year was also considered essential by 56% in the Omnibus Studies (Gordon et al., 2000). ELSA does not distinguish between who accompanied the survey member on holiday but does distinguish between holidays in the UK and abroad.

The activities measured in ELSA are:

- Reading a daily newspaper
- Having a hobby or pastime
- Taking a holiday in the UK in the last 12 months
- Taking a holiday abroad in the last 12 months
- Going on a day trip or outing in the last 12 months
- Frequency of eating out of the house

The first five of these activities are part of a list of activities in the self-completion booklet and have been included in each wave. Frequency of eating out of the house was asked by the interviewer in wave 1 and shifted to the self-completion at wave 2, where it has since remained. The numbers available for analysis are reduced further because of the self-completion; again it was those with IADL difficulties at wave 1 who were least likely to answer the questions. This is likely to mean that differences in participation according to history of physical functioning are underestimated.

In order to get out and about, one often needs transport. As described in a government report on transport for older people (Knight et al., p. 11):

> accessible transport facilitates social and community participation, social interaction, leisure, entertainment and improves quality of life.

There are therefore concerns about ensuring that transport facilities cater for people who are not rich or have mobility difficulties or visual impairments. Giving up a car brings its own challenges, as stated in a report from the Department for Transport (2001, p. 5):

> The main implications of no longer having access to a car are reductions in the choice of destinations, flexibility and spontaneity of travel and the psychological impact associated with the loss of independence.

Two measures of transport availability or use have been included: first, the use of a car whenever needed, whether driver or passenger; second, use of public transport.

Contact with friends at least three times a week is used as the main indicator of independence in terms of social relationships. This includes any form of contact (in person, mail, internet, telephone). A score was derived to denote quality of relationships (see Section 3.3 for details of the questions). For the purposes of these analyses, scores were derived giving first positive and then negative scores as a percentage of the maximum possible for that person, given that not everyone has a spouse, children, etc.

For the categorical variables (e.g. reads a paper or not), variables were created that combined the information from waves 1 and 3 to show whether a respondent was doing the activity in both waves, one only or neither. Age-standardised tabulations were produced, weighted by the wave 3 longitudinal weight. These tabulations show whether groups with different histories are varied in their participation in activities, having allowed for different age profiles of the groups. However, differences do not mean that the history of physical function is of itself responsible for variation in participation. Controlled experiments provide the best evidence of cause but are not appropriate here. Instead, multivariable analyses were undertaken to see if participation profiles vary by history of functioning because of other factors that also differ according to history; e.g. if those with more difficulties are also poorer, their lack of wealth rather than their physical difficulties may be explaining participation. First, participation at wave 1 was modelled against health at wave 1 and also against marital status at wave 1, educational qualifications and wealth quintile. Knowing that wave 3 participation was likely to be highly correlated with wave 1 participation, the second step was to model wave 3 participation with wave 1 participation as a predictor and then see what other factors, notably history of physical functioning, were associated with wave 3 participation over and above their participation four years earlier. A series of models were run, starting with wave 1 participation, age, marital status and history of physical functioning, then adding baseline health factors in a second model and finally adding baseline socio-economic factors in a third model. If the history of physical functioning is significantly associated with wave 3 participation in the first model but not in the third, this means that the other factors (health and/or socio-economic factors) are more likely to be the determining factors in participation than the physical functioning itself. Because the wave 1 participation is included in all the models at the second step, the parameters for the other factors are showing whether or not they operated to reinforce or change prior behaviour.

The socio-economic factors used here are non-pension wealth quintiles and highest educational qualification. Educational qualifications have been divided into: degree level or above; A-level or higher but not degree; GCSE or O-level; CSE or foreign qualifications; no qualification.

The health factors are:

- general health (fair/bad/very bad against very good/good);
- whether vision impaired (rated own eyesight, if necessary using lenses, as fair or poor on a 5-point scale or reported registered blind or self-rated long sight (recognising a friend across the road) or short sight (reading a paper) as fair or poor;
- whether hearing impaired (rated own hearing, if necessary using a hearing aid, as fair or poor or had difficulty with conversation if there was background noise);
- whether experienced urinary incontinence (losing an amount of urine beyond one's control during the previous 12 months);
- whether often troubled by pain and, if so, whether this pain was mild, moderate or severe;
- whether experienced four or more depressive symptoms from the CES-D8 scale.

Participation in leisure activities

Tables 3A.14 and 3A.15 show the age-adjusted, weighted percentages of people taking part in the activity in wave 1 and/or wave 3 or neither. The most common activity was having a hobby and the least common holidaying abroad, perhaps reflecting the resources needed to undertake it (whether financial, transport or social support). For all six activities there was a gradient with people in the minimal and mobility categories (1 and 2) being most likely to do an activity at either time, the groups who had experienced a net decrement or increment the next most likely and the ones who had experience of difficulties with ADLs and/or IADLs both in 2002–03 and four years later being least likely to do so. In addition, by wave 3, the female maximal group were markedly less likely to participate in most activities than even those in category 5 whereas for men there were only substantial differences for having a hobby and having a holiday in the UK. On the other hand the female groups with minimal difficulties and those who had at most experienced motor skill problems were very similar but there were substantial differences in wave 3 participation for men with respect to having a hobby (85% against 77%), taking a holiday overseas (54% against 50%) and in having an outing (71% against 62%). The middle categories were remarkably alike, although one might have expected differences in the percentages participating in wave 3 and not wave 1 for those in category 4 – this expected pattern is only clear for men with respect to having a holiday abroad.

Models were run to explore which circumstances tended to correlate with undertaking an activity at wave 1 (not shown). In addition the history of physical difficulties was included to see if there might already be indications of lesser participation among those who were going to show more of a history of difficulties. All the variables were in the same model, so are only reported below if they were statistically significantly associated with participation after adjusting for the other factors. These models showed that participation was generally least likely if the person had no qualifications but also significantly lower compared to people with higher education for those with the minimum level of qualification. Contrary to this, those with lower education were more likely to read a paper than those with higher education. There was a steep positive gradient relating taking a holiday abroad with wealth; the least wealthy were also least likely to take holidays in the UK or to eat out often; this was also true among men for having a hobby or having an outing.

Age was *positively* correlated with reading a paper (older people being more likely to do so), and negatively correlated with taking a holiday abroad and with going on outings. Associations with marital status depended on the activity. Widowed men and all women without partners were less likely to read a paper than those with partners. Divorced or separated people and single men were less likely than people with partners at home to have had an outing in the year before wave 1, all formerly married women were less likely to have had a holiday in the UK and all men without a partner were less likely to have taken a holiday in the UK or abroad. Marital status was not associated with having a hobby or eating out.

All the activities were correlated with at least one health factor. Having four or more depressive symptoms was associated with lower likelihood of having a hobby, holiday, outing or eating outside the home for women and of having a hobby for men. Among men, impaired vision was accompanied by reduced likelihood of reading a paper, having a hobby or eating out at least once a month, whereas among women it was just associated with the last of these. General poor health was associated only with lower percentages of people having a hobby or taking a holiday abroad or with men having an outing. Poor hearing was only associated with lesser likelihood of women taking a holiday abroad. Women who already reported difficulties with an ADL or IADL at wave 1 (categories 3, 5 and 6) were less likely to have had a holiday abroad than those in the minimal category. Also, men with a history of ADL or IADL difficulties at both waves were less likely to have an outing or to eat out. The one anomaly was that men who went on to experience at most some difficulties with motor skills were less likely to have an outing even at wave 1. No immediate explanation for this is apparent.

Figure 3.3a–l shows the odds ratios for participation in various activities at wave 3 for the three models. For example, after adjusting for participation at wave 1, age and marital status, the odds of reading a paper for men in category

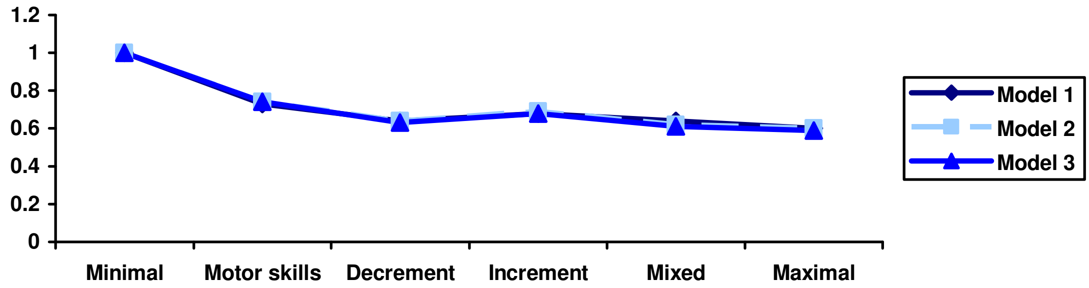
3 (reported difficulty with ADL or IADL in wave 1 not wave 3) were 0.6 of those with a minimal history of difficulties. (See Chapter 5, Box 5.3 for an explanation of odds ratios.) The points that are arrowed are those for which the difference between the group concerned and the group with a minimal history is statistically significant at the 5% level in model 3.[6] A downward sloping line from left to right indicates that increasing history of difficulties with physical function is associated with a decreasing chance of participating at wave 3. Values above 1.0 indicate greater likelihood of participation than the minimal difficulty group and values below 1.0 a lower likelihood.

Initial patterns (model 1) were generally similar for men and women but there were stronger associations for men than for women with respect to having a hobby and having a holiday in the UK.

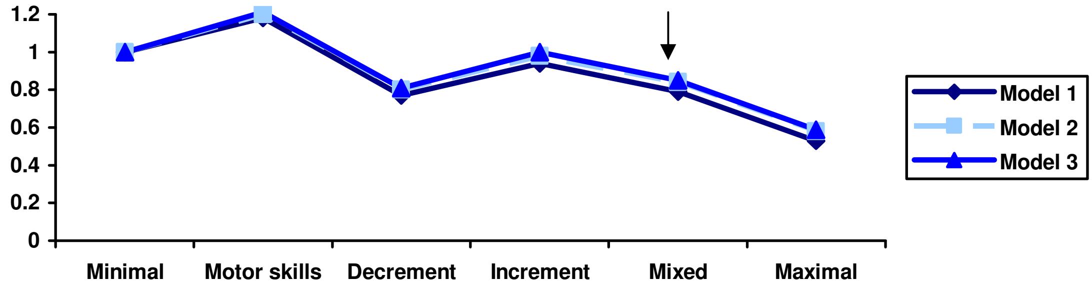
Figure 3.3. Odds ratios for undertaking leisure activities at wave 3, by history of physical functioning

Respondents who had physical function measurements in all three waves and answered questions on leisure activities

a) Reading a paper: men

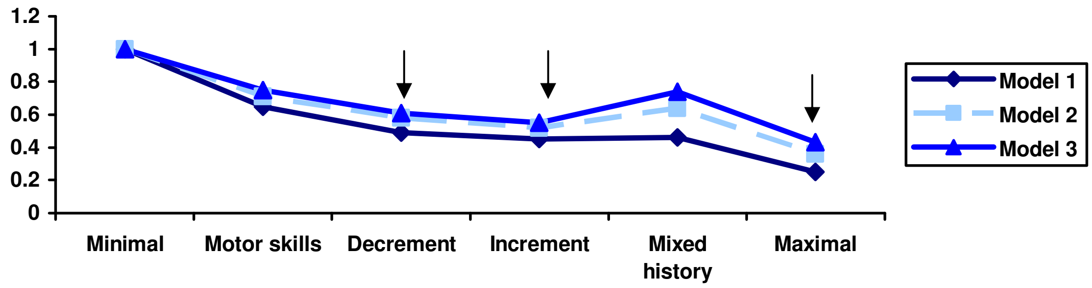


b) Reading a paper: women

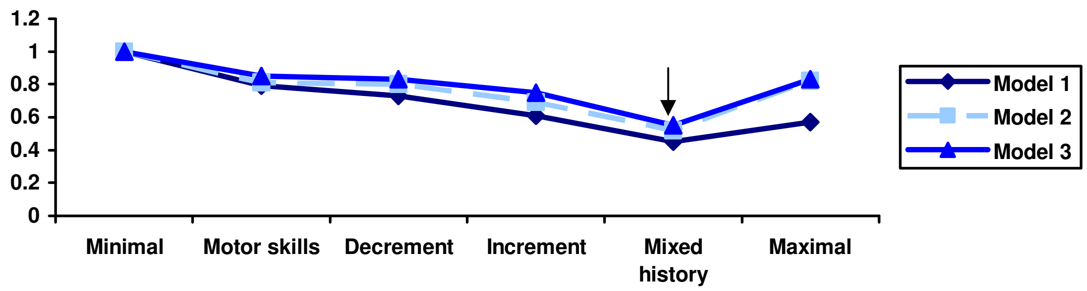


[6] In some cases a single category has a significantly lower chance of participating but the general association between the history of functioning and the activity was too weak to be statistically significant.

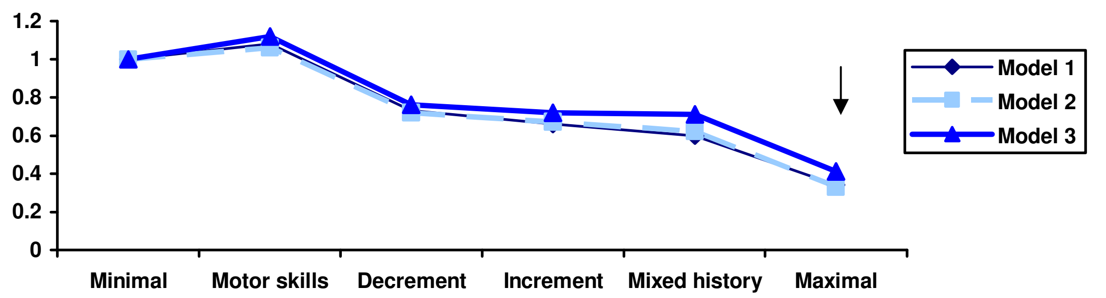
c) Having a hobby or pastime: men



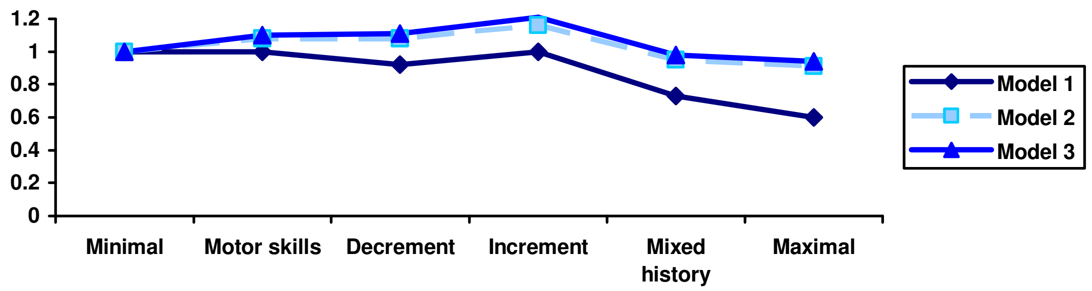
d) Having a hobby or pastime: women



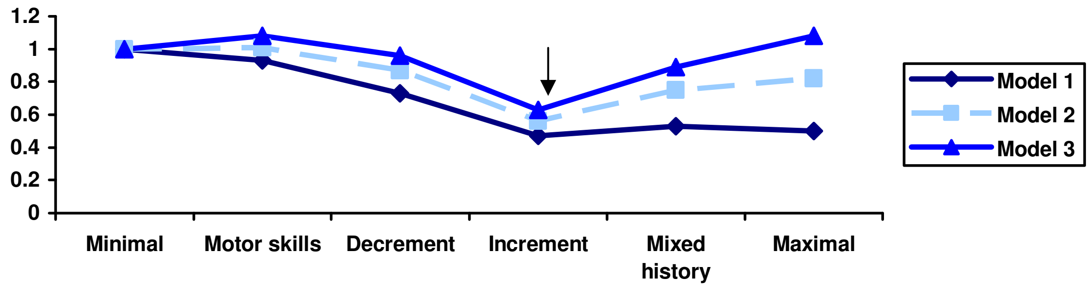
e) Taking a holiday in the UK in previous 12 months: men



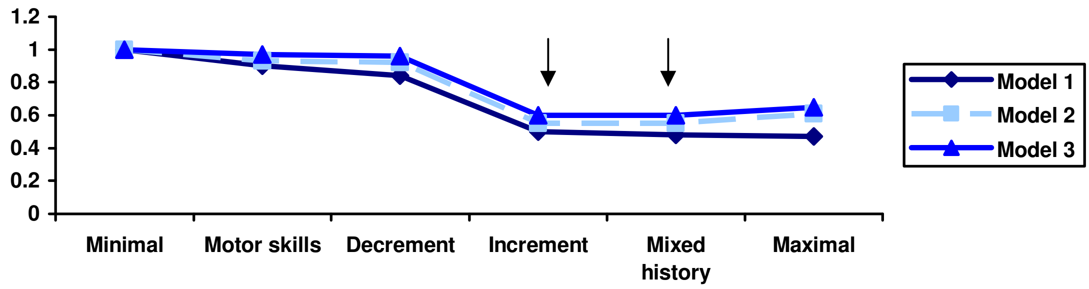
f) Taking a holiday in the UK in previous 12 months: women



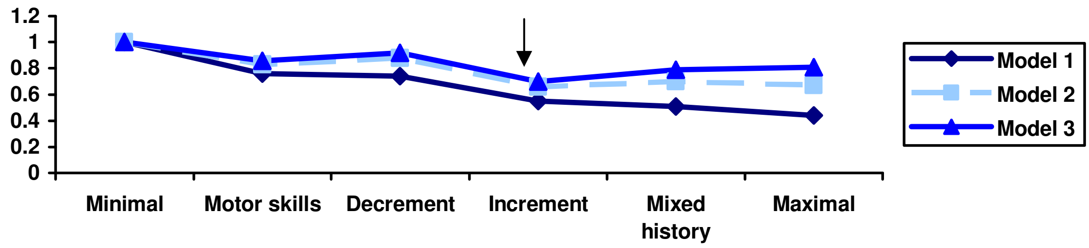
g) Taking a holiday abroad in previous 12 months: men



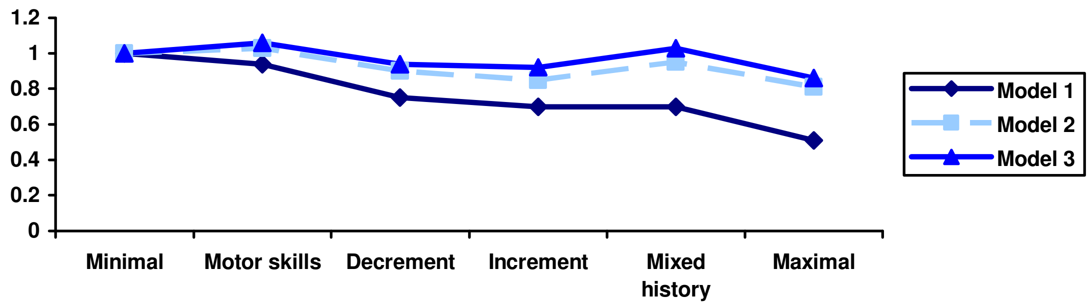
h) Taking a holiday abroad in previous 12 months: women



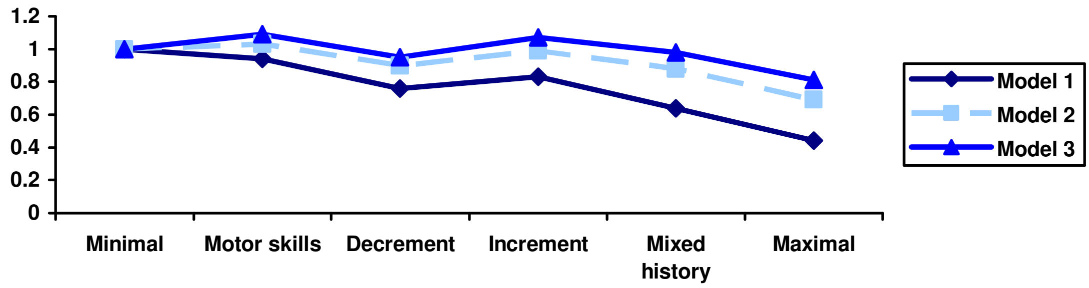
i) Taking an outing in previous 12 months: men



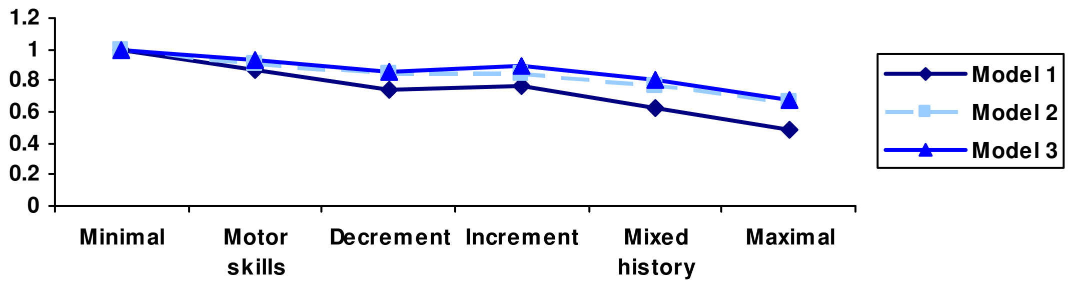
j) Taking an outing in previous 12 months: women



k) Eating out of the home at least once a month: men



l) Eating out of the home at least once a month: women



Notes: 2,587 men and 3,220 women were included in the analyses. Model 1 adjusted for age, marital status and participation at wave 1. Model 2 additionally adjusted for wave 1 health factors: general health, vision, hearing, pain, depression, incontinence. Model 3 additionally adjusted for wealth and education qualification measured at wave 1.

These models show that, given participation at wave 1, further history of physical functioning does not make as much difference of itself as one might expect. In the initial models the groups which were experiencing ADL and/or IADL difficulties at wave 3 (categories 4–6) are seen to be less likely to do most of the six activities, in accordance with the tables discussed earlier. For paper reading this was restricted to the maximal history group for women and to three middle groups for men (categories 3–5). While women with motor skill difficulties only or with a decrement in activities were not substantially less likely to do these six activities in wave 3 than women with a minimal history (conditioned on whether they undertook them in wave 1), men with motor skill difficulties or with a decrement in functioning difficulties were less likely than those with minimal history to have a hobby by wave 3 and those with a decrement in difficulty were also less likely to take a holiday in the UK before wave 3 or to have an outing.

Adjusting for health factors accounts for some of the differences that exist in the first model – the only exception being in reading a newspaper. Among men and women health factors fully accounted for categories 5 and 6 being less likely to have an outing or to eat out at least once a month. Health factors also fully accounted for differentials by history of physical functioning with respect to women and holidaying in the UK. Wealth and education further attenuated the associations for men with respect to holidaying abroad but the association between functioning and this activity was already borderline.

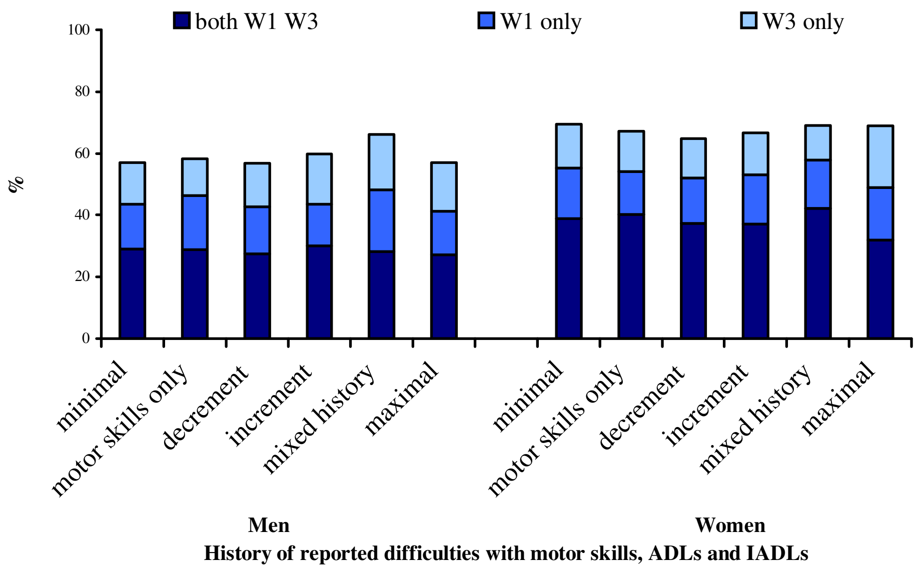
In the final models, there were still statistically significant associations between history of physical functioning and having a hobby for both men and women, with reading a paper and holidaying abroad for women, and with holidaying in the UK for men. Those who had a maximal history of difficulties were less likely than those with a minimal difficulty to read a paper (women), have a hobby (men) or take a holiday in the UK (men); those with a mixed history were less likely to take a holiday abroad (women) and those who experienced ADL and/or IADL difficulty at wave 3 but not wave 1 were less likely to have a hobby (men), take a holiday in the UK (men) or have a holiday abroad (men and women). The group with maximal difficulty is not singled out in every outcome but it should be remembered that those with ADL or IADL difficulties at wave 1 were already less likely to do some activities at that stage, and participation at wave 3 is correlated with that at wave 1.

The health factors that featured most in this attenuation were poor vision (for all except reading a paper) and, for women only, depression (with respect to having a hobby, going on holiday in the UK or taking an outing). Wealth and education were significantly associated with all the activities except reading a paper but, once health was accounted for, were not major confounders. It was seen in Table 3A.13 that there were marked differences in history of general health according to history of physical functioning. General health at wave 1 appeared to play a role in participation in being one of the health factors that attenuated associations between history of physical functioning and participation but, being correlated with wealth and education as well, it was not possible to disentangle how much of the contribution of general health was due to adequacy or otherwise of educational and material resources.

Social contact

There were no substantial differences by history of physical functioning over whether frequent contact was maintained with friends (Figure 3.4). As seen in Table 3A.16, there were some differences with respect to the quality of relationships but these were not major. History of physical functioning difficulties did not appear to play a part in positive aspects of relationships for men but played some part for women who had an increment in difficulties or a mixed history – for example those with mixed history had positive relationship scores 3 percentage points lower than those with minimal history, the median percentage for all women being 85.4%. For negative aspects of relationships, there was an uneven pattern for men but most groups had worse (higher scores) than the group with minimal history whereas for women it was again those with ADL or IADL difficulties at wave 3 who had worse scores. The groups with a maximal history of physical functioning difficulties had a score around 4 percentage points lower than the minimal group, the overall medians being just under 40%. Adjusting for health and socio-economic factors attenuated the associations but did not remove them entirely for men with respect to negative scores or for women with respect to positive ones. Nevertheless in the context of the overall median scores these differences were small.

Figure 3.4. Percentage who reported contacting friends at least three times a week at waves 1 or 3 or both, by sex and history of reported difficulties with motor skills, ADLs and IADLs



Note: Weighted age-standardised percentages.

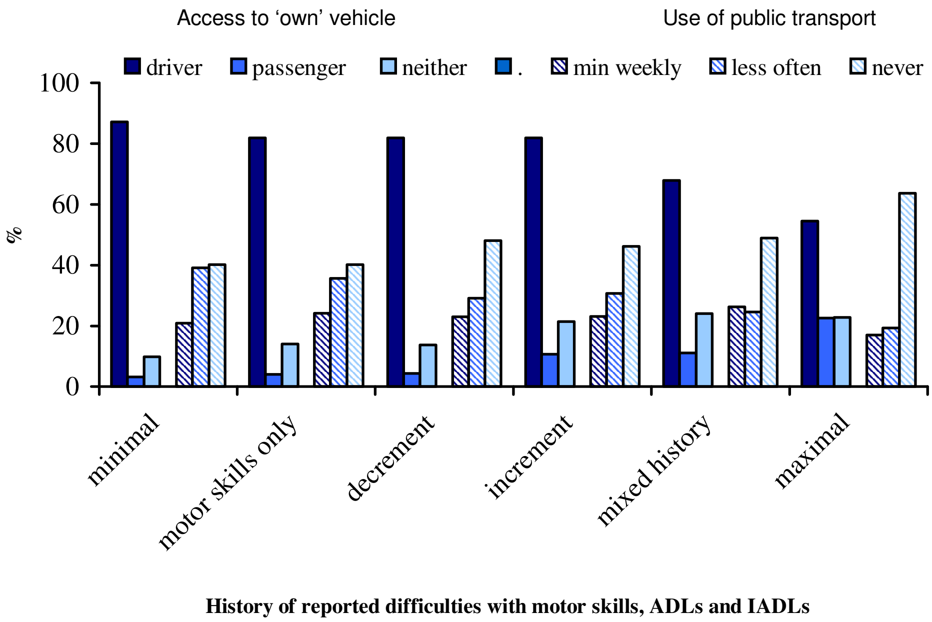
The factors that attenuated the parameters for history of physical support with respect to negative support scores were primarily depression and incontinence and, for men, poor vision. For positive support scores, no individual health item was significantly associated with the wave 3 score in the full model but, nevertheless, joint addition of all the health items did attenuate the associations between history of functioning and positive support score.

Transport

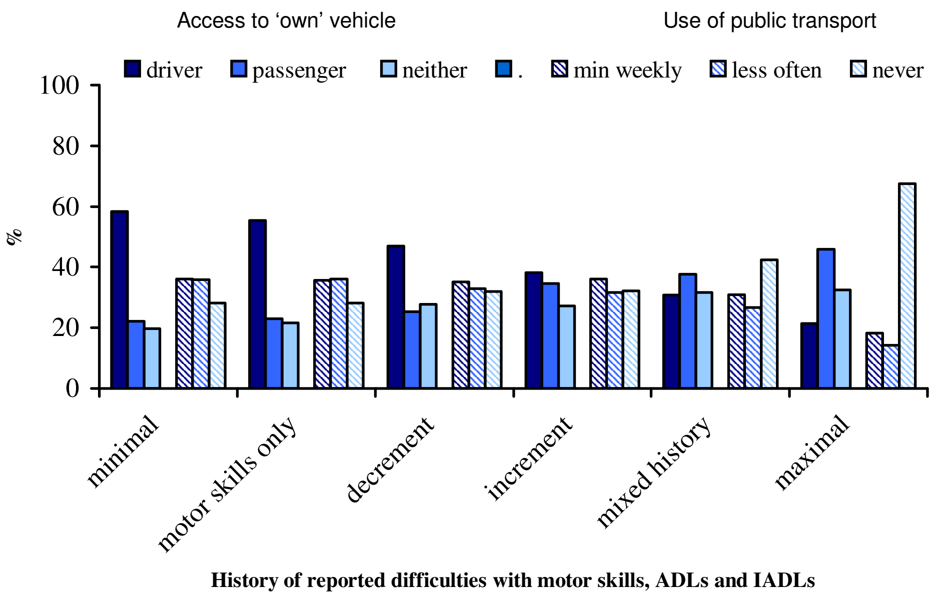
Figures 3.5a and b show the age-standardised weighted percentages of respondents who, at wave 3, had access to a vehicle whenever they wanted and whether this was as driver or passenger. The figure also shows their frequency of use of public transport, according to history of reported physical function difficulties. Men were far more likely than women to be drivers of a household vehicle and less likely to use public transport at least once a week. Not surprisingly, men who reported ADL and/or IADL difficulties in 2002–03 and four years later were less likely to be drivers than other groups but they did not compensate for this by being more likely to use public transport frequently, presumably because of difficulties of using it. There was less of a gradation for women than for men in use of public transport by status with respect to car access. However, as for men, those in the maximal difficulty category also did not compensate for being non-drivers by being notably more likely to use public transport. Indeed, for both men and women, those in category 6 were most likely to be never-users of public transport, over half never using it.

Figure 3.5. Percentage reporting access to a car as driver or passenger and frequency of use of public transport at wave 3, by sex and history of reported difficulties with motor skills, ADLs and IADLs

a) Men



b) Women



Note: Weighted age-standardised percentages.

Most men and women had access to a vehicle at both waves (84% and 71%, respectively). Whereas around 4% of men in physical functioning categories 1–4 only had access at wave 1, 8% of those with mixed history and 12% of those with maximal history had stopped having access.[7] For women the equivalent figures were 8 to 10% and 14%. At wave 1 they were not asked if

[7] This percentage is based on everyone in the group, not just those who had access in wave 1.

they drove the car themselves so change in this could not be assessed. Nevertheless loss of access in itself is likely to make participation in various activities more difficult.

Quality of life and history of difficulties in physical functioning

The CASP-19 instrument contains four dimensions, which give it its name: Control, Autonomy, Self-realisation and Pleasure (Hyde et al., 2003). In the context of independence it was considered appropriate to look separately at the score for a combined control and autonomy scale. This uses six items as listed below; the items are coded such that the scale has a range of 0 to 18 with higher score meaning greater sense of autonomy and control. This scale has been shown to reflect a natural grouping of answers when a method known as confirmatory factor analysis was used (Wiggins et al., 2007).

Box 3.4. Items in control and autonomy scale from CASP-19

Each item has four options: often, sometimes, not often, never

Shortage of money stops me from doing what I really want to do

My age prevents me from doing the things I would like to do

I feel that what happens to me is out of my control

I feel left out of things

I can do the things I want to do

I feel that I can please myself what I do

Scores at wave 3 were initially regressed on wave 1 scores, age, marital status and the functioning category. Table 3A.17 shows that people with minimal history of difficulties with physical functioning had the best scores and even those who experienced difficulties with motor skills but not with ADLs or IADLs had slightly worse scores than them. People with difficulties with one of these at wave 3 were worse off than those without and the group with maximal difficulty (category 6) scored worst of all. For women the difference was nearly 3 points compared to the overall median score of 12. Adjustment for health and socio-economic factors reduced the differences across groups but did not remove them and all the confidence intervals for the differences still excluded one (meaning that there was only a small chance that this difference arose from random factors to do with sample selection).

At a cross-sectional level the wave 1 CASP scores were correlated with several factors (not shown). Negative associations ($p<0.05$) were found with: marital status (being formerly married for men or divorced or separated for women); vision and hearing problems; increasing severity of pain; fair to very bad general health; and decreasing wealth. In addition women with some urinary incontinence also had a lower mean control and autonomy score than those without. For education there was an anomalous finding of higher sense of control among women who had low-level or foreign qualifications, but this only appeared after including health factors and wealth in the model so it suggests that these women were doing well given that they were more likely to be disadvantaged in other respects. Those with a difficulty with ADL or IADL at wave 1 had lower mean scores already but also the minimal difficulty group already had some advantage over those who went on to have a history of difficulties with motor skills only (men mean score 0.64 lower and women 0.45 lower than those with minimal history) and over those who did not report ADL or IADL difficulty at wave 1 but did at wave 3 (men 0.68 difference, women 0.66).

For wave 3 scores, depression was the health factor which attenuated the scores most when added in (i.e. depression was negatively associated with the CASP score and positively associated with more history of functioning difficulties) but poor vision also played a part. Lesser wealth was associated with worse score in the final model but was not a confounder for the association between history of physical functioning and the control and autonomy score.

3.5 Sources of help for those with physical functioning difficulties

In wave 3 new questions were introduced that separated out the sources of help for different types of difficulties. Six types of difficulties were involved:

- Moving around the house (walking across the room, getting in and out of bed, or using the toilet)[8]
- Dressing and bathing
- Eating or preparing a hot meal
- Shopping or doing work around the house or garden
- Telephoning or managing money
- Taking medication

These analyses refer to people aged 55 and over at the third wave, and exclude the new, younger, recruits at wave 3 who were least likely to have these difficulties.

Overall a quarter of men and nearly a third of women fell into at least one of these categories (see Table 3A.18). The proportions of those reporting difficulty were higher at older ages and prevalence among those aged 85 or over was markedly greater than among people aged 75–84 years old. The most common problems were with dressing or washing (18% of men and 20% of women) and shopping or doing work around the house (15% of men and 22% of women). Within age groups, differences by sex were not marked except that women were more likely than men to report difficulties with shopping or doing work around the house or garden.

Respondents who reported difficulty with any of the motor skills, ADLs or IADLs were asked: ‘Thinking about the activities that you have problems

[8] In the interview climbing several flights of stairs was included in this group but for this report it was decided to omit this and focus on the activities that were considered to be more potentially limiting, i.e. the ADLs and IADLs.

with, does anyone ever help with these activities (including your partner or others in the household)?' Those who responded affirmatively to this general question were asked further about sources of help for whichever set(s) of difficulties applied to them. Summing up the sources of help it can be seen that three out of five men and three out of four women with one of the difficulties listed in Table 3A.18 had help with at least one task. For men there was a clear age gradient: greater likelihood of help with greater age. For women the gradient was not so clear but the relatively small group of people aged 85 and over was most likely to receive help.[9]

Respondents were given a list of 18 sources of help. Eleven of these referred to relatives and one to friends or neighbours. Possible sources of help involving a statutory authority were home help or care arranged by social services or a nurse. Additional formal sources were care by a professional from a voluntary organisation and home help or care arranged privately. There was also an 'other' category.

These sources of help have been divided into formal and informal and, within informal, into spouse, children or other relatives. Friends and neighbours are included in the total for informal help. The formal group was not further subdivided because of small numbers. The 'other' group was omitted from both the formal and informal subtotals but was included in calculations of percentages receiving any help or no help. For the more common sets of difficulties receipt of help is shown subdivided by age.

Over half of those who had difficulty with dressing or bathing did not report help with those functions (Table 3A.20) and just over a third of those who reported difficulties with moving round the house (Table 3A.19). Over a quarter of men and one sixth of women did not report help with shopping or work around the house and garden (Table 3A.21). For the less common difficulties that mainly affected the oldest people, involving food or telephoning/money, a fifth to a quarter of men and women experiencing the respective difficulties did not receive help (Table 3A.22) and less than one in five of the small number of women needing help with medication did not receive help (but as taking medication inappropriately can be damaging, even this figure is worrying).

Except for women aged 75 years and over, a spouse or partner was the most common source of help (Tables 3A.20–22). These older women were predominantly widowed so many did not have that source of help available. For men the exception to spouses being the most common source of help is found among those aged 85 or more who had difficulty with shopping or work around the house and garden. Again, this age group was most likely to be without a partner.

Around a fifth of men and nearly a third of women who had difficulties with shopping or work around the house or garden or who had difficulties moving round the house received help from children but only 5% of men and 12% of women who had difficulties with dressing and bathing received such help

[9] This is the group for whom attrition was above average and it is plausible that those who remained in the sample were those who needed less help or, if they needed it, were more likely to receive it.

(Tables 3A.19–21). This suggests that children may have been less likely to help with more intimate tasks but, as the first group of activities included both intimate and less intimate activities, we cannot be sure of this. Children were prominent as sources of help for men and women aged 85 years and over who had difficulties with various functions (although the frequency and form of help is not known). Women and men aged 85 and over who had difficulties with shopping or work around the house and garden were most likely to receive help from children, as were the small numbers of women who had difficulties with telephoning or managing money but these were mostly elderly women who were likely to be widows. Small numbers prohibited separating out whether the older people receiving help from children for tasks in the home were more likely to be living with children. In general women were more likely to receive help from children than men even in the younger groups where help from spouse was common for women. Further analyses, not done here, could link this to frequency of contact with children.

Formal sources of help were most common among the older groups and particularly among the oldest women (Tables 3A.19–22). For example, only 3% of the youngest women, aged 54–64, who had difficulties with bathing or dressing were receiving help from formal sources but 31% of women aged 85 and over who were in this position received such help (Table 3A.20). Although smaller percentages of men than of women received formal help, the oldest ones were more likely to use this source than younger ones, at least for the activities where numbers allowed age comparisons. They did not get involved in helping with telephoning or managing money even though half or more of those who had these difficulties were aged 75 or over.

3.6 Transport use at wave 3

Some aspects of transport use have already been mentioned in the context of difficulties in physical function. In this section the analyses extend to other characteristics that may be associated with transport use. In these cross-sectional analyses, it should be borne in mind that those who are excluded from transport on account of poverty or illness are probably under-represented because of attrition to the study.

Five types of transport are included: driving a vehicle to which the respondent has access whenever needed (shortened to driver of ‘own’ car),[10] public transport, a lift from someone outside the household, taxi, and community transport (either door-to-door local minibus or transport provided by a hospital or day centre). In general, public transport is used more often than lifts, lifts more often than taxis, and taxis more often than community public transport. Frequency of use of the car or van to which respondents have access was not asked.

For each type of transport other than use of ‘own’ vehicle a category of ‘more frequent’ use was defined differently. For public transport, ‘more frequent’

[10] The vehicle may not be owned by the respondent or their partner but it is presumed that, because the question refers to access whenever wanted, the vehicle will normally belong to the household.

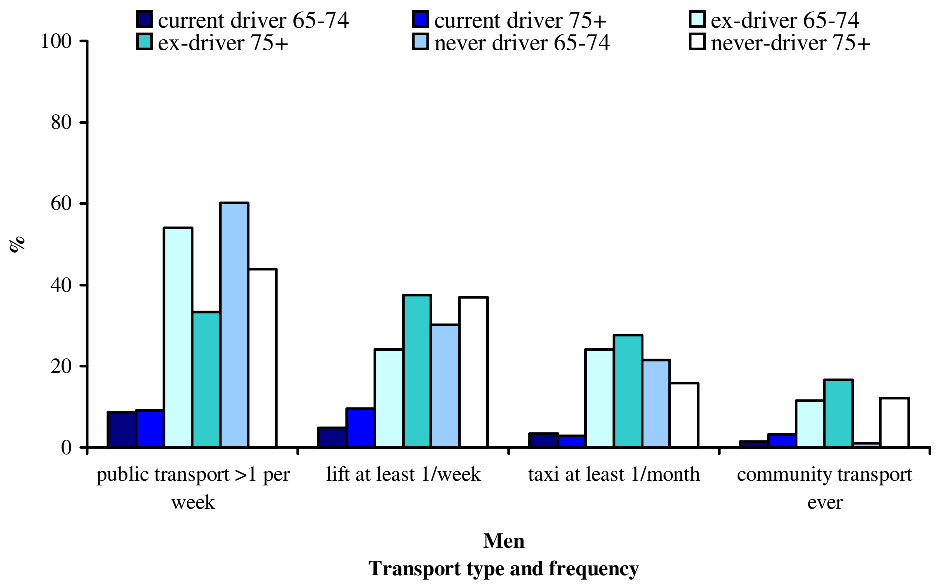
was defined as more than once a week (about 17% of respondents aged 65 and over and 35% of public transport users); for lifts 'more frequent' refers to those taking a lift at least once a week (about 22% of respondents and 44% of users); for taxis the division was made at once a month (about 11% of respondents and 31% of users); and so few used community transport that all users were included (8% of respondents).

The analysis was carried out for two age groups: 65–74-year-olds and those aged 75 years and above. This was done in the expectation that patterns of transport use could be noticeably different between the two groups. As can be seen in Figure 3.6a and b, current drivers were less likely to use the other means of transport 'frequently'. Among men aged 65–74 years old use of public transport or a lift relatively 'frequently' was successively more likely for ex-drivers and never-drivers than for current drivers. Among older men, ex-drivers and never-drivers were equally likely to use lifts. In general never-drivers were less likely to use taxis than ex-drivers. For community transport there was no clear pattern. Age differences were greatest with respect to use of public transport by male non-drivers. The patterns for women were similar in many ways but the age differences in public transport use were smaller and younger ex-drivers were less likely to use taxis at least once a month than either never-drivers in the same age group or older ex-drivers.

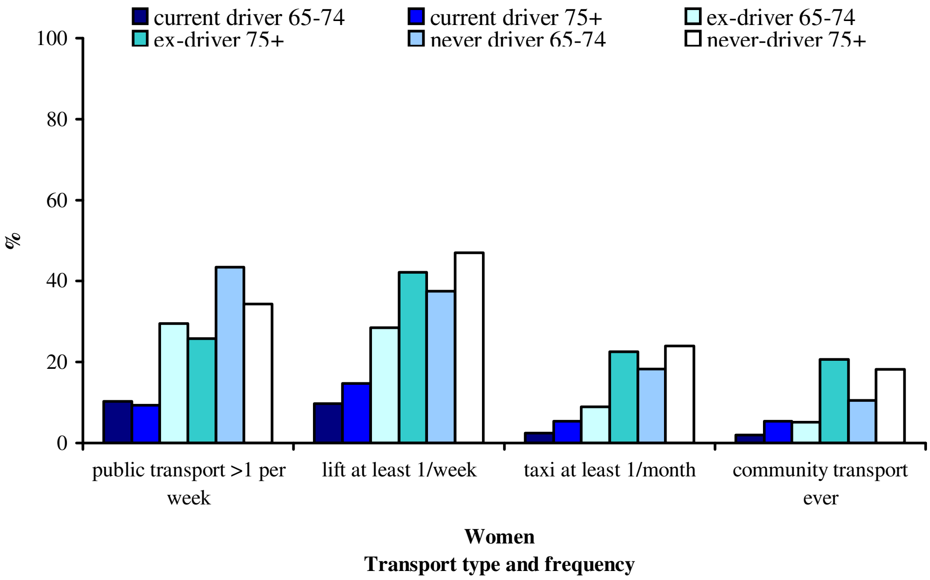
These results do not take into account health which could account for many of the contrasts and there is no information on how long ago respondents stopped driving.

Figure 3.6. Use of transport at wave 3 by sex, age and whether respondent has ever been a driver: people aged 65 years and over

a) Men



b) Women



Logistic regression models were run to learn more about the characteristics of those who drove their 'own' car or used the other means of transport with the frequencies listed above. The factors included in these models were of the same kind as those used in models in Section 3.5 but refer to the situation at wave 3 (Tables 3A.23 and 3A.24).

The first model looks at the relative odds of driving one's 'own' vehicle compared to the odds of not doing this (i.e. either being a passenger or not having access to a vehicle). Women were much less likely to be driving their 'own' vehicle than men (OR 0.15, 95% CI 0.13, 0.19) and driving decreased with age, the drop-off with increasing age becoming steeper at older ages.[11] People who lived with someone other than their spouse were also less likely to drive (possibly because they were living with family or fitter siblings who did the driving if there was a vehicle accessible). Several health factors appeared to reduce the chance of being a driver: having poor vision, often troubled by moderate or severe pain, fair to poor general health. Also those who reported difficulties with ADLs or IADLs at the beginning and end of the four-year period covered in this chapter had only about half the odds of driving a car compared with those who had a minimal history, even after allowing for all the other factors. There were steep gradients with wealth and education, suggesting that material resources were important; education may be acting as a proxy for the kind of environment in which people grew up such that some groups did not expect to centre their activities round use of a car.

It was hypothesised that use of other means of transport would be influenced by whether the person was a driver or had access to a vehicle whenever they wanted. Also, the use of one form of transport may be interlinked with the use of another. The models for use of public transport, taking lifts and use of a taxi all included terms for being a driver and the use of the other means considered here. The following analyses focus little on use of community transport as it

[11] A quadratic age term fitted better than just a linear one.

was low and, we suggest, might be more affected by variability in availability (not measured in ELSA) than the other means.

An immediate striking feature of the models for use of public transport, a lift or a taxi is that using one was associated with greater use of another. Also, as seen in Figure 3.6, current drivers of their 'own' vehicle were much less likely to use these forms than people who were not. We tested for interactions between sex and being a driver, thinking that driving is a male culture in older generations. For use of public transport and lifts there were interactions ($p = 0.018$ and 0.041, respectively), such that being a passenger in one's 'own' car boosted the chances of using public transport or a lift more for men than women and not having access to a car also boosted the chances of taking a lift more for men than for women. The immediate thought is that this reflects living circumstances but this finding has already taken account of whether the respondent lived with a partner, with someone else or lived alone. There is not space in this chapter to pursue the reason for this difference between men and women but it may connect to contact with children and provision of lifts from them (remembering that women were more likely to be helped by children except for the very elderly with respect to shopping and work around the house).

Women were less likely than men to use public transport frequently if they were passengers in their 'own' car but they were more likely than men to use lifts or taxis if they were drivers or without access to a car. Use of public transport decreased with age with the decline getting steeper at older ages but neither 'frequent' taxi nor lift usage was correlated with age in these models that took into account health and socio-economic characteristics as well.

People were less likely to use public transport frequently if they had moderate or severe pain, experienced urinary incontinence or reported difficulties with IADLs. On the other hand those in all four wealth quintiles other than the richest were more likely to use this form of transport frequently than the richest. For education there was an unexpected result of those with A-level or above but not a degree being least likely to use public transport, given their health and wealth and car availability. The only health factor associated with a lift was greater use by those reporting IADL difficulties only; all the groups reporting any type of difficulty in physical functioning were about twice as likely to use a taxi as those with at most one motor skill difficulty but there was relatively little variation across these groups (again those reporting IADL difficulties only being marginally the most likely to use a taxi). Some socio-economic patterns were unexpected with the poorest being most likely to use taxis once other factors were taken into account and only the third and fourth wealth quintiles having higher odds of using a lift than the richest. However, it should be remembered that the frequency of taxi use was at least once a month so the expense may not have been very large over the year as a whole.

3.7 Conclusions

Impaired physical functioning can have a major impact on people's lives. Efforts to minimise that impact have implications for the official and informal resources devoted to facilitating participation in society and also for attitudes about ageing. The two main themes of this chapter are non-medical predictors of onset of impairments and participation in society when one has those impairments. The UK government set itself a number of targets in the 2008 pre-budget spending review, known as Public Service Agreements (PSA). The topic of this chapter has relevance to PSA 15 (HM Government, 2007a), which prioritises '[tackling] barriers which are due to gender, disability, or age that limit people's choice and control over their lives' (p. 3).

Section 3.3, on non-medical predictors of onset of impairments, shows that access to material resources through personal wealth or neighbourhood assets has a marked association, particularly with the onset of ADLs and IADLs. In Chapter 2 it was also shown that people in the lowest wealth quintile were most likely to have onset of work disability between 2004 and 2006. This does not prove cause, since there may be early life circumstances that facilitate both accumulation of wealth and prevention of difficulties. Information from the life history interview that took place after wave 3 may help to cast light on this. Nonetheless, one possibility is that preventing progression to the more limiting impairments requires the provision of material resources, which would be consistent with the PSA 17 priority of tackling pensioner poverty (HM Government, 2007b).

Social capital was associated with onset of difficulties but this association disappeared when adjusted for material resources and levels of neighbourhood deprivation. Further research could look into whether social capital may be changed by the onset of difficulties even if poor social capital does not precede the onset of difficulties. As shown in Chapter 4 of this report, housing assets predominate in wealth; national statistics show that a third of older people live in hazardous housing and this may be part of the explanation for onset of difficulties. This is one of the reasons cited by government for its strategy for choice in housing to enable people to live in circumstances that help them to remain independent (Communities and Local Government, 2008). A possible explanation for the onset of difficulties being more common in deprived neighbourhoods may be a shortage of facilities that presents both physical and psychological barriers to walking and keeping fit and strong. If so, there could be benefits from ensuring that older people are part of safe, supportive and sustainable communities. The idea of 'lifetime neighbourhoods' may be one way to tackle this issue (Communities and Local Government, 2008) and to ensure that older people are satisfied not only with their homes but with their neighbourhoods, as set out in PSA 17 (HM Government, 2007b).

In contrast to wealth, having good relationships with friends and family was more strongly associated with the onset of difficulties with motor skills than with ADLs or IADLs. One possible explanation for this is that psychological support may be important in helping people to cope and find ways of maximising their potential as well as in preventing or delaying the first difficulties that arise.

In the second part of the chapter the reality of participation in various aspects of society was examined, comparing groups with differing histories of difficulties with motor skills, activities of daily living or instrumental activities of daily living. It is clear that a history of physical impairment is accompanied by a greater chance of a history of self-perceived poor general health. Policies to prevent social exclusion and unnecessary restrictions on freedom of choice need to allow for the additional barriers people may face from poor general health or cognitive impairments. In this chapter we have not analysed cognitive impairments but further analyses should explore this as the functions, particularly IADLs, involve some cognitive as well as physical function. It has been shown that cognitive performance predicts changes in physical performance (Lee et al., 2005) and that some physical performance (e.g. gait speed) predicts changes in cognitive performance (Inzitari et al., 2007). The combination may be more directly implicated in the maintenance of independence.

This chapter reminds us that many older people are engaged in leisure activities. There are other indicators of independence that were not explored here. Voluntary activity was covered briefly in wave 1 but fuller questions at later waves should enable the associations between physical functioning and active engagement in society to be explored. Another possibility is to look at membership, especially active membership, of organisations.

There was a general association between history of participating in various leisure activities and history of difficulties with physical functioning. Those with difficulties in ADLs or IADLs at both the beginning and end of the follow-up period were least likely to take part in activities. Nevertheless the categorisation of history of functioning did not discriminate as well as anticipated. For example those who reported difficulties with ADLs or IADLs at wave 1 and not four years later did not on the whole show the expected pattern of change in participation. There were a few indications that men who had a clear increment in impairment (category 4) were more likely than other groups to report hobbies, holidays abroad or outings at the earlier period and not the later one (after taking account of their participation at wave 1).

Multivariate analysis showed that other health problems experienced at wave 1, notably depressive symptoms, poor vision and poor general health, accounted for some of the differentials in participation by history of physical functioning that were seen initially. Wealth and educational attainment did not further attenuate relationships but they did play a part in that they were strongly correlated with participation in some of the activities at wave 1 and wave 3 activity was influenced by wave 1 activity. Those without qualifications were less likely to take part at either wave 1 or wave 3. It seems likely that a lifetime experience will influence what happens in older ages when physical impairment develops. Age by itself was not predictive of having a hobby, having a holiday in the UK or eating out at wave 1 but was predictive of stopping participation during the four-year period.

Although the role of physical functioning in leisure activities at wave 3 was less immediate than the initial descriptions suggested, there were still some associations after adjusting for socio-demographic information and health. There were still statistically significant associations between history of physical functioning and having a hobby for both men and women, with reading a paper and holidaying abroad for women and with holidaying in the UK for men. Those who had a maximal history of difficulties were less likely than those with a minimal difficulty to read a paper (women), have a hobby (men) or take a holiday in the UK (men); those with a mixed history were less likely to take a holiday abroad (women) and those who experienced ADL and/or IADL difficulty at wave 3 but not wave 1 were less likely to have a hobby (men), take a holiday in the UK (men) or have a holiday abroad (men and women). There is a great variety of hobbies and we do not know what specific hobbies or pastimes were followed by our respondents but this finding suggests that offering some options that are easier to accomplish in the face of difficulties may be worthwhile as well as further research into the barriers against taking holidays.

Even if physical impairment per se had a lesser role than expected, health appeared to influence activities. We acknowledge that not everyone who is independent would choose to undertake the activities reported in this chapter but there does seem to be scope for improvement in which the community, family and friends have a role. This is another area in which moving towards lifetime neighbourhoods may help (Harding, 2007).

In terms of social relationships the likelihood of being in touch with friends at least three times a week was not affected by the history of self-reported physical functioning. There was some evidence that those with ADL and/or IADL difficulties had worse relationships with their social contacts than those without but the differences were small compared with the mean overall score. It seems likely that relationships were not strongly affected by this history – although there may have been differences in the balance between spouse, children, other family and friends that were not explored here. The findings in both parts of this chapter suggest that the influence of social relationships on both functioning and participation is complex but worthy of further exploration.

Independence is about control and autonomy. For those with ADL and/or IADL difficulties both in 2002–03 and four years later, the mean combined control and autonomy score had dropped significantly by wave 3 compared to the group which did not experience any difficulties. Even having difficulties with motor skills showed a slight disadvantage in autonomy score. On the whole it was people with difficulties with ADLs and IADLs who appeared less independent (even if this was due to comorbidity) but lower CASP scores for those who only experienced difficulties with motor skills suggests they too were vulnerable.

For the people in the ELSA cohort informal help (especially from a spouse) predominated over formal help with specific sets of ADLs or IADLs but those aged 85 and over were most likely to receive formal help for a given set, consistent with greater proportions of widows and widowers and, possibly, greater frailty. Women were more likely to be helped by their children than men, perhaps reflecting closer contact generally (not explored here) but the oldest old were more likely to be helped by children than younger people, perhaps because there was not a spouse who could provide help (either the person was widowed or the spouse also had impairments). Children were more likely to give help for shopping and work around the house than for bathing and dressing, perhaps because the latter is more intimate and requires daily attendance in the home. Relatives other than spouse or children were not frequently mentioned as sources of help. As more information accumulates on this topic in ELSA it should become possible to assess sources of help in relation to the respondent's personal circumstances other than their sex and age. It is beyond the scope of this chapter to explore this and further research is needed into the links between sources and forms of help, feelings of control and autonomy and subsequent developments in physical functioning. Government strategy is to put people more in control and give choices; there are schemes in place for giving control over formal care, e.g. by providing individuals with budgets to purchase the care of their choice (Department of Health, 2005). Less work has been done on how to maximise control over informal care while making that care rewarding for the carers too. At the time of writing the government strategy on caring was under review.

In relation to transport use and history of physical functioning the lower likelihood of frequent public transport use and lower chances of being a driver of one's 'own' vehicle if experiencing a history of ADL or IADL difficulties suggests that these people are constrained in their outings unless they can afford taxis or other voluntary services are made more conveniently available.

The second set of analyses on transport (Section 3.6) shows that drivers are much less likely to use other forms of transport than passengers in their 'own' vehicles or those without access to their 'own' vehicle. Also, people who use one form of alternative transport are more likely to use another. Wealth was strongly positively associated with driving and fairly strongly negatively associated with use of other forms of transport, with the exception that the least wealthy were no more likely to take lifts than the most wealthy, possibly because friends or family did not have cars either. Having least wealth increased the likelihood of using a taxi at least once a month. At first sight this seems counter-intuitive but it would be consistent with lack of alternatives and it is noteworthy that frequency of taxi use tended to be low.

Various health problems and physical impairment appeared, not surprisingly, to lower the chances of using public transport frequently. Clearly, free local public transport is insufficient to enable or encourage all non-drivers to use public transport; low-level buses may help but the information in ELSA was insufficiently detailed to assess this. The frequency and availability of services are also likely to play a role,[12] as may the availability of toilets and other facilities at the destination. Although lifts in private cars could be a cheap alternative for people, it is noticeable that women were more likely to take lifts at least once a week than men; as with help received this may reflect more contact with family and the reasons for it need further exploration. There could also be motivational differences. Being a non-driver boosted the likelihood in men of taking a lift more than it did in women, perhaps indicating that only when 'needs must' did they either seek or respond to such opportunities.

One weakness of the study is that in two years, physical functioning can improve as well as decline and some transitions will be missed (Hardy and Gill, 2004) so individual histories may be more mixed than we were able to capture. Despite this, our categorisation showed a clear trend towards undertaking activities at both periods for men, and women who reported difficulties with ADLs and IADLs in all three waves were most likely to give

[12] ELSA includes some questions on reasons for not using public transport often. These have not been analysed here due to lack of space.

negative answers to participation at both these times, suggesting that their experience of difficulty was truly more chronic than for other people.

This chapter has shown that the socio-economic and social environments are relevant to the onset of limitations in physical functioning, whether perceived or measured. The exact role of the social environment is still unclear. Rather than being a direct cause of change in physical functioning this environment may make it harder to cope with impairment; the impact of a deprived neighbourhood may be greater in those who already have some health and functioning problems than those without. These additional complexities have not been explored here but it is clear that people who have developed difficulties with activities of daily living (such as washing or dressing) or with instrumental activities of daily living (such as shopping or managing money) participate less in leisure activities than those without. They are also less likely to be car drivers and to use some other major forms of transport, which may indicate a barrier to the other activities. Having less wealth is in turn a barrier to transport use, as is being alone or without a partner, to a lesser extent. Whereas it is people with ADLs and IADLs who participate least, partly because of comorbidities and life histories, difficulties with mobility or motor skills can be a precursor to these and it is noteworthy that social relationships were more strongly associated with onset of the former or latter and feelings of control autonomy were also lowered once difficulties with motor skills had developed. In light of this, intervention as early as possible should be considered to facilitate independence, and steps to ensure individuals have access to both adequate material resources and supportive relationships are needed.

Acknowledgements

Our thanks to Dr Jack Guralnik of the National Institute on Ageing and Professor James Banks of the Institute for Fiscal Studies for comments on early drafts and to members of the Office for National Statistics and the Department for Work and Pensions in providing guidance on disability and independence policy.

References

Adler, N.E. and Ostrove, J.M. (1999), ‘Socioeconomic status and health: what we know and what we don’t’, *Annals of New York Academy of Sciences*, vol. 896, pp. 3–15.

Aneshensel, C.S., Wight, R.G., Miller-Martinez, D., Botticello, A.L., Karlamangla, A.S. and Seeman, T.E. (2007), ‘Urban neighborhoods and depressive symptoms among older adults’, *Journals of Gerontology - Series B Psychological Sciences and Social Sciences*, vol. 62, no. 1, pp. S52–S59.

Balfour, J.L. and Kaplan, G.J. (2002), ‘Neighborhood environment and loss of physical function in older adults: evidence from the Alameda County Study, *American Journal of Epidemiology*, vol. 155, no. 6, pp. 507–515.

Bisschop, M.I., Kriegsman, D.M.W., van Tilburg, T.G., Penninx, B.W.J.H., van Eijk, J.T. and Deeg, D.J.H. (2003), ‘The influence of differing social ties on decline in physical functioning among older people with and without chronic diseases: the longitudinal aging study Amsterdam’, *Aging - Clinical and Experimental Research*, vol. 15, no. 2, pp. 164–173.

Blackman, T. (2006), *Placing Health. Neighbourhood Renewal, Health Improvement and Complexity*, Bristol: The Policy Press.

Browning, C.R. and Cagney, K.A. (2002), 'Neighborhood structural disadvantage, collective efficacy, and self-rated physical health in an urban setting', *Journal of Health and Social Behavior*, vol. 43, no. 4, pp. 383–399.

Cesari, M., Kritchevsky, S.B., Penninx, B.W.J.H., Nicklas, B.J., Simonsick, E.M., Newman, A.B., Tylavsky, F.A., Brach, J.S., Satterfield, S., Bauer, D.C., Visser, M., Rubin, S.M., Harris, T.B. and Pahor, M. (2005), 'Prognostic value of usual gait speed in well-functioning older people – results from the Health, Aging and Body Composition Study', *Journal of the American Geriatrics Society*, vol. 53, no. 10, pp. 1675–1680.

Communities and Local Government (2008), *Lifetime Homes, Lifetime Neighbourhoods: A National Strategy for Housing in an Ageing Society*, London: Department for Work and Pensions (http://www.communities.gov.uk/documents/housing/pdf/lifetimehomes.pdf).

Department of Health (2005), *Independence, Wellbeing, and Choice*, London: Department of Health (http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4106477).

Department for Transport (2001), *Older People: Their Transport Needs and Requirements*, London: Department for Transport (http://www.dft.gov.uk/pdf/pgr/inclusion/older/olderpeopletheirtransportnee3260).

Diez Roux, A.V. (2001), 'Investigating neighborhood and area effects on health', *American Journal of Public Health*, vol. 91, no. 11, pp. 1783–1789.

Disability Rights Commission (2002), Policy statement on social care and independent living (http://www.officefordisability.gov.uk/working/independentliving.asp).

Fonda, S. and Herzog, A. R. (2004), *Documentation of Physical Functioning Measures in the Health and Retirement Study and the Asset and Health Dynamics among the Oldest Old Study.* HRS Documentation Report DR-008. Michigan: Survey Research Centre, University of Michigan (http://hrsonline.isr.umich.edu/docs/userg/dr-008.pdf).

Gordon, D., Adelman, L., Ashworth, K., Bradshaw, J., Levitas, R., Middleton, S., Pantazis, C., Patsios, D., Payne, S., Townsend, P. and Williams, J. (2000), *Poverty and Social Exclusion in Britain*. York: Joseph Rowntree Foundation.

Guralnik, J.M. and Ferrucci, L. (2003), 'Assessing the building blocks of function: utilizing measures of functional limitation', *American Journal of Preventive Medicine*, vol. 25, pp. 112–121.

Guralnik, J.M., Simonsick, E.M., Ferrucci, L., Glynn, R.J., Berkman, L.F., Blazer, D.G., Scherr, P.A. and Wallace, R.B. (1994), 'A short physical performance battery assessing lower extremity function: association with self-reported disability and prediction of mortality and nursing home admission, *Journal of Gerontology*, vol. 49, pp. M85–M94.

Harding, E. (2007), *Towards Lifetime Neighbourhoods: Designing Sustainable Communities for All – a Discussion Paper*. London: Department for Communities and Local Government.

Hardy, S.E. and Gill, T.M. (2004), 'Recovery from disability for community-dwelling older persons', *Journal of the American Medical Association*, vol. 291, no. 13, pp. 1596–1602.

HM Government (2007a), PSA Delivery Agreement 15, 'Address the disadvantage that individuals experience because of their gender, race, disability, age, sexual orientation, religion or belief', Norwich: HMSO (http://www.hm-treasury.gov.uk/media/E/8/pbr_csr07_psa15.pdf).

HM Government (2007b), PSA Delivery Agreement 17, 'Tackle poverty and promote greater independence and wellbeing in later life', Norwich: HMSO (http://www.hm-treasury.gov.uk/media/0/0/pbr_csr07_psa17.pdf).

Hoeymans, N., Feskens, E.J., van den Vos, G.A.M. and Kromhout, D. (1996), 'Measuring functional status: cross-sectional and longitudinal associations between performance and self-report (Zutphen Elderly Study 1990–1993)', *Journal of Clinical Epidemiology*, vol. 49, pp. 1103–1110.

Hyde, M., Wiggins, R.D., Higgs, P. and Blane, D.B. (2003), 'A measure of quality of life in early old age: the theory, development and properties of a needs satisfaction model (CASP-19)', *Aging Mental Health*, vol. 7, no. 3, pp. 186–194.

Inzitari, M., Newman, A.B., Yaffe, K., Boudreau, R., de Rekeneire, N., Shorr, R., Harris, T.B. and Rosano, C. (2007), 'Gait speed predicts decline in attention and psychomotor speed in older adults: the health aging and body composition study', *Neuroepidemiology*, vol. 29, no. 3–4, pp. 156–162.

Johnson, N.J., Backlund, E., Sorlie, P.D. and Loveless, C.A. (2000), 'Marital status and mortality: The National Longitudinal Mortality Study', *Annals of Epidemiology*, vol. 10, pp. 224–238.

Katz, S., Ford, A.B., Moskowitz, R.E., Jackson, B.A. and Jaffee, M.W. (1963), 'Studies of illness in the aged. The index of ADL: a standardized measure of biological and psychosocial function', *Journal of the American Medical Association*, vol. 185, pp. 914–919.

Knight, T., Dixon, J., Warrener, M. and Webster, S. (2007), *Understanding the Travel Needs, Behaviour, and Aspirations of People in Later Life.* London: The Department for Transport.

Lang, F.R. and Carstensen, L.L. (1994), 'Close emotional relationship in late life: further support for proactive aging in the social domain', *Psychology and Aging*, vol. 9, no. 2, pp. 315–324.

Lang, I.A., Llewellyn, D.J., Langa, K.M., Wallace, R.B., Huppert, F.A. and Melzer, D. (2008a), 'Neighborhood deprivation, individual socioeconomic status, and cognitive function in older people: analyses from the English Longitudinal Study of Ageing', *Journal of the American Geriatrics Society*, vol. 56, no. 2, pp. 191–198.

Lang, I.A., Llewellyn, D.J., Langa, K.M., Wallace, R.B. and Melzer, D. (2008b), 'Neighbourhood deprivation and incident mobility disability in older adults', *Age and Ageing*, e-print ahead of publication.

Lawton, M.P. and Brody, E. (1969), 'Assessment of older people: self-maintaining and instrumental activities of daily living', *The Gerontologist*, vol. 9, pp. 179–186.

Lee, Y., Kim, J.H., Lee, K.J., Han, G. and Kim, J.L. (2005), 'Association of cognitive status with functional limitation and disability in older adults', *Aging Clinical and Experimental Research*, vol. 17, no. 1, pp. 20–28.

Marmot, M. and Wilkinson, R. (1999), *Social Determinants of Health*, Oxford: Oxford University Press.

Melzer, D., Gardener, E., Lang, I.A., McWilliams, B. and Guralnik, J.M. (2006), 'Measured physical performance', in J. Banks, E. Breeze, C. Lessof and J. Nazroo (eds), *Retirement, Health and Relationships of the Older Population in England: The 2004 English Longitudinal Study Of Ageing (Wave 2)*, London: Institute for Fiscal Studies, pp. 165–178.

Nagi, S.Z. (1976), 'An epidemiology of disability among adults in the United States', *Milbank Memorial Fund Quarterly, Health and Society*, vol. 54, no. 4, pp. 439–467.

Office for Disability Issues (2008), 'Independent living strategy. A cross-government strategy about independent living for disabled people', London: Office for Disability Issues (http://www.officefordisability.gov.uk/docs/ilr-executive-report.pdf).

Office of the Deputy Prime Minister (2004), *The English Indices of Deprivation 2004* (revised), London: ODPM Publications.

Pope, A. and Tarlov, A. (1991), *Disability in America: Toward a National Agenda for Prevention*, Washington, DC: National Academy Press.

Prentice, J.C. (2006), 'Neighborhood effects on primary care access in Los Angeles', *Social Science and Medicine*, vol. 62, no. 5, pp. 1291–1303.

Putnam, R.D. (2000), *Bowling Alone: The Collapse and Revival of American Community*, New York: Touchstone.

Reuben, D.B., Seeman, T.E., Hirsch, S.H., Keeler, E., Hayes, R.P., Bowman, L., Sewall, A., Wallace, R.B. and Guralnik, J.M. (2004), 'Refining the categorization of physical functional status: the added value of combining self-reported and performance-based measures', *Journals of Gerontology Series A – Biological Sciences and Medical Sciences*, vol. 59, pp. 1056–1061.

Sayers, S.P., Brach, J.S., Newman, A.B., Heeren, T.C., Guralnik, J.M. and Fielding, R.A. (2004), 'Use of self-report to predict ability to walk 400 meters in mobility-limited older adults', *Journal of the American Geriatric Society*, vol. 52, pp. 2099–2103.

Schootman, M., Andresen, E.M., Wolinsky, F.D., Malmstrom, T.K., Miller, J.P. and Miller, D.K. (2006), 'Neighborhood conditions and risk of incident lower-body functional limitations among middle-aged African Americans', *American Journal of Epidemiology*, vol. 163, no. 5, pp. 450–458.

Steel, N., Huppert, F.A., McWilliams, B. and Melzer, D. (2004), 'Physical and cognitive function', in M. Marmot, J. Banks, R. Blundell, C. Lessof and J. Nazroo (eds), *Health, Wealth and Lifestyles of the Older Population in England: The 2002 English Longitudinal Study Of Ageing*, London: Institute of Fiscal Studies, pp. 249–271.

Steffick, D. (2000), *Documentation of the Affective Functioning Measures in the Health and Retirement Study*. Ann Arbor, MI: Institute of Social Research, University of Michigan.

Studenski, S., Perera, S., Wallace, D., Chandler, J.M., Duncan, P.W., Rooney, E., Fox, M. and Guralnik, J.M. (2003), 'Physical performance in the clinical setting', *Journal of the American Geriatric Society*, vol. 51, pp. 314–322.

Subramanian, S.V., Lochner, K.A. and Kawachi, I. (2003), 'Neighborhood differences in social capital: a compositional artifact or a contextual construct?', *Health and Place*, vol. 9, no. 1, pp. 33–44.

Vaillant, G.E., Meyer, S.E., Mukamal, K. and Soldz, S. (1998), 'Are social supports in late midlife a cause or a result of successful physical ageing?', *Psychological Medicine*, vol. 28, no. 5, pp. 1159–1168.

Walters, K., Breeze, E., Wilkinson, P., Price, G.M., Bulpitt, C.J. and Fletcher, A. (2004), 'Local area deprivation and urban–rural differences in anxiety and depression among people older than 75 years in Britain', *American Journal of Public Health*, vol. 94, no. 10, pp. 1768–1774.

Wiggins, R.D., Netuveli, G., Hyde, M., Higgs, P. and Blane, D.B. (2007), 'The evaluation of a self-enumerated scale of quality of life (CASP-19) in the context of research on ageing: a combination of exploratory and confirmatory approaches', *Social Indicators Research*, *Online*, DOI 10.1007/211205-007-0-9220-5.

Wight, R.G., Cummings, J.R., Miller-Martinez, D., Karlamangla, A.S., Seeman, T.E. and Aneshensel, C.S. (2008), 'A multilevel analysis of urban neighborhood socioeconomic disadvantage and health in late life', *Social Science and Medicine*, vol. 66, no. 4, pp. 862–872.

Zunzunegui, M.V., Alvarado, B.E., del Ser, T. and Otero, A. (2003), 'Social networks, social integration, and social engagement determine cognitive decline in community dwelling Spanish older adults', *Journals of Gerontology – Series B Psychological Sciences and Social Sciences*, vol. 58, no. 2, pp. S93–S100.

Appendix 3A
Tables on physical functioning

Table 3A.1. Baseline gait speed and change in gait speed in relation to wealth – adjusted models

Respondents who completed the gait speed test in waves 1 and 3 (aged 60 and over)

	Wave 1 gait speed	Decline in gait speed, adjusted for wave 1 gait speed
Wealth split by quintiles	Mean change in gait speed, m/s (95% confidence interval)	
Wealthiest	0.000	0.000
4	–0.017 (–0.041, 0.007)	0.022 (0.000, 0.044)
3	–0.053 (–0.077, –0.029)	0.027 (0.005, 0.049)
2	–0.069 (–0.093, –0.044)	0.017 (0.000, 0.040)
Least wealthy	–0.088 (–0.115, –0.062)	0.058 (0.033, 0.083)
Unweighted N	*3,633*	*3,316*

Notes: Values reflect differences in gait speed in m/s. Splitting of wealth by quintiles was specific to sex and age in 5-year bands. Models were adjusted for age, sex, level of education, BMI category, cigarette smoking, alcohol consumption and self-reported health.

Table 3A.2. Baseline gait speed and change in gait speed in relation to neighbourhood deprivation – adjusted models

Respondents who completed the gait speed test in waves 1 and 3 (aged 60 and over)

	Wave 1 gait speed	Decline in gait speed, adjusted for wave 1 gait speed
IMD 2004 score split by quintiles	Mean change in gait speed, m/s (95% confidence interval)	
Least deprived	0.000	0.000
4	–0.020 (–0.039, –0.002)	–0.008 (0.012, –0.028)
3	–0.043 (–0.062, –0.024)	0.000 (0.020, –0.020)
2	–0.059 (–0.079, –0.039)	0.031 (0.053, 0.008)
Most deprived	–0.081 (–0.103, –0.060)	0.031 (0.056, 0.005)
Unweighted N	*5,383*	*3,334*

Notes: Values reflect differences in gait speed in m/s. Models were adjusted for age, sex, level of education, BMI category, cigarette smoking, alcohol consumption and self-reported health.

Table 3A.3. Incidence of impaired physical function by wave 3 in relation to wave 1 household wealth – unadjusted models

Respondents who answered questions on functioning in waves 1–3

	Incident slow gait speed	Incident ADLs	Incident IADLs	Incident motor skills problems
Wealth split by quintiles	Percentage of individuals (95% confidence interval)			
Wealthiest	9.2 (7.2, 11.3)	7.7 (6.3, 9.2)	9.3 (7.8, 10.9)	35.0 (32.1, 37.8)
4	12.3 (9.9, 14.7)	10.5 (8.8, 12.1)	11.4 (9.7, 13.2)	37.5 (34.5, 40.4)
3	11.9 (9.6, 14.2)	11.3 (9.5, 13.0)	12.3 (9.5, 13.0)	42.7 (39.6, 45.9)
2	15.5 (12.7, 18.1)	13.5 (11.6, 15.5)	14.4 (12.4, 16.4)	43.6 (40.2, 46.9)
Least wealthy	19.3 (16.1, 22.5)	17.6 (15.3, 19.9)	20.4 (17.9, 22.9)	47.8 (44.1, 51.6)
Unweighted N	*3,532*	*6,112*	*6,119*	*4,570*

Notes: ADLs = activities of daily living; IADLs = instrumental activities of daily living. Slow gait speed = gait speed of <0.5m/s or being unable to complete the gait speed test.

Table 3A.4. Incidence of impaired physical function by wave 3 in relation to wave 1 neighbourhood deprivation – unadjusted models

Respondents who answered questions on functioning in waves 1–3

	Incident slow gait speed	Incident ADLs	Incident IADLs	Incident motor skills problems
IMD 2004 split by quintiles	Percentage of individuals (95% confidence interval)			
Least deprived	10.3 (8.4, 12.4)	7.6 (6.3, 8.9)	9.9 (8.5, 11.3)	34.7 (32.0, 37.3)
4	11.4 (9.3, 13.5)	11.5 (10.0, 13.1)	10.8 (9.3, 12.4)	39.8 (37.0, 42.6)
3	12.2 (9.8, 14.5)	10.8 (9.2, 12.5)	12.0 (10.3, 13.7)	43.5 (40.3, 46.6)
2	17.6 (14.5, 20.6)	13.8 (11.8, 15.8)	15.3 (13.2, 17.4)	43.4 (40.0, 46.9)
Most deprived	19.6 (15.8, 23.4)	17.1 (14.4, 19.8)	20.4 (17.5, 23.4)	47.8 (43.4, 52.5)
Unweighted N	*3,553*	*6,501*	*6,503*	*4,621*

Notes: See Table 3A.3.

Table 3A.5. Incidence of impaired physical function by wave 3 in relation to neighbourhood social capital – unadjusted models

Respondents who answered questions on functioning in waves 1–3

	Incident slow gait speed	Incident ADLs	Incident IADLs	Incident motor skills problems
Neighbourhood social capital split by quintiles	Percentage of individuals (95% confidence interval)			
Highest	12.1 (10.1, 14.0)	12.4 (9.8, 15.0)	13.2 (11.2, 15.2)	40.0 (36.6, 43.4)
2	8.0 (6.4, 9.6)	11.8 (9.3, 14.3)	10.0 (8.3, 11.8)	36.2 (32.9, 39.5)
3	9.4 (7.8, 11.0)	12.0 (9.6, 14.3)	10.8 (9.1, 12.5)	40.0 (36.8, 43.1)
4	12.2 (10.3, 14.0)	11.8 (9.2, 14.4)	11.8 (10.0, 13.6)	41.6 (38.3, 44.9)
Lowest	12.9 (11.0, 14.9)	14.6 (11.7, 17.5)	14.1 (12.1, 16.1)	41.4 (37.9, 44.9)
Unweighted N	*3,164*	*5,844*	*5,881*	*4,171*

Notes: See Table 3A.3.

Table 3A.6. Number and percentage of respondents reporting different levels of relationship quality, by relationship type and sex

Respondents who returned self-completion questionnaire in wave 1 and responded to questions on functioning in waves 1–3

	Partner		Children	
	Men	Women	Men	Women
Relationship quality	Number (percentage of respondents)			
Best	295 (6.6)	402 (7.4)	395 (9.0)	707 (13.2)
2	710 (15.9)	455 (8.4)	457 (10.4)	750 (14.0)
3	1,338 (29.9)	1,027 (19.0)	1,036 (23.5)	1,321 (24.7)
4	686 (15.3)	709 (13.1)	844 (19.1)	953 (17.8)
Worst	543 (12.1)	824 (15.3)	1,039 (23.6)	966 (18.0)
None	901 (20.1)	1,986 (36.8)	640 (14.5)	660 (12.3)
Unweighted N	*4,473*	*5,403*	*4,411*	*5,357*
	Family		**Friends**	
	Men	Women	Men	Women
Relationship quality	Number (percentage of respondents)			
Best	473 (11.3)	921 (18.3)	239 (5.7)	682 (13.5)
2	738 (17.7)	992 (19.7)	618 (14.6)	1,237 (24.5)
3	753 (18.0)	902 (17.9)	947 (22.4)	1,196 (23.7)
4	697 (16.7)	745 (14.8)	974 (23.0)	922 (18.3)
Worst	1,090 (26.1)	1,075 (21.4)	1,149 (27.2)	770 (15.3)
None	431 (10.3)	392 (7.8)	305 (7.2)	239 (4.7)
***Unweighted* N**	*4,182*	*5,027*	*4,232*	*5,046*

Note: Percentages may not sum to 100 because of rounding.

Table 3A.7. Incident impaired physical function by wave 3 in relation to quality of relationship with partner – unadjusted models

Respondents who answered questions on functioning in waves 1–3

	Incident slow gait speed	**Incident ADLs**	**Incident IADLs**	**Incident motor skills problems**
Quality of relationship with partner	Percentage of individuals (95% confidence interval)			
Best	11.0 (6.8, 15.1)	8.0 (5.4, 10.6)	9.1 (6.4, 11.8)	33.2 (28.0, 38.4)
2	6.6 (4.2, 9.0)	9.3 (7.3, 11.4)	9.5 (7.5, 11.6)	34.3 (30.5, 38.1)
3	8.0 (6.1, 9.9)	8.7 (7.3, 10.1)	9.4 (8.0, 10.8)	36.4 (33.7, 39.2)
4	12.4 (9.4, 15.5)	10.4 (8.4, 12.4)	8.6 (6.8, 10.5)	43.2 (39.4, 47.0)
Worst	12.0 (8.8, 15.3)	11.5 (9.4, 13.6)	13.2 (11.0, 15.5)	42.1 (38.0, 46.1)
No partner	20.0 (17.6, 22.3)	16.4 (14.5, 18.3)	20.0 (17.9, 21.9)	48.3 (45.3, 51.4)
Unweighted N	*3,335*	*6,062*	*6,099*	*4,321*

Notes: See Table 3A.3.

Table 3A.8. Incident impaired physical function by wave 3 in relation to quality of relationship with children – unadjusted models

Respondents who answered questions on functioning in waves 1–3

	Incident slow gait speed	Incident ADLs	Incident IADLs	Incident motor skills problems
Quality of relationship with children	Percentage of individuals (95% confidence interval)			
Best	14.4 (11.0, 17.9)	11.5 (8.9, 14.1)	13.3 (10.6, 16.0)	38.5 (33.9, 43.1)
2	13.9 (10.7, 17.0)	12.1 (9.7, 14.4)	12.6 (10.2, 15.1)	39.4 (35.2, 43.6)
3	9.3 (7.4, 11.3)	10.9 (9.2, 12.5)	11.9 (10.2, 13.6)	39.3 (36.3, 42.3)
4	11.7 (9.1, 14.2)	9.9 (8.2, 11.6)	10.2 (8.5, 11.9)	40.3 (37.0, 43.5)
Worst	13.3 (10.4, 16.1)	10.0 (8.3, 11.6)	11.9 (10.1, 13.7)	42.3 (39.0, 45.6)
No children	18.8 (15.0, 22.7)	14.7 (12.2, 17.1)	15.9 (13.4, 18.5)	43.0 (38.8, 47.2)
Unweighted N	*3,289*	*6,010*	*6,050*	*4,283*

Notes: See Table 3A.3.

Table 3A.9. Incident impaired physical function by wave 3 in relation to quality of relationship with family – unadjusted models

Respondents who answered questions on functioning in waves 1–3

	Incident slow gait speed	Incident ADLs	Incident IADLs	Incident motor skills problems
Quality of relationship with family	Percentage of individuals (95% confidence interval)			
Best	16.8 (13.5, 20.1)	11.8 (9.5, 14.0)	14.9 (12.5, 17.4)	40.7 (36.7, 44.7)
2	10.3 (7.8, 12.7)	10.6 (8.8, 12.4)	12.0 (10.2, 14.0)	40.0 (36.7, 43.4)
3	11.0 (8.4, 13.6)	8.7 (7.0, 10.3)	9.1 (7.5, 10.8)	38.8 (35.5, 42.1)
4	12.3 (9.4, 15.2)	10.7 (8.7, 12.7)	10.2 (8.3, 12.1)	39.1 (35.3, 42.8)
Worst	12.4 (9.8, 14.9)	10.8 (9.1, 12.5)	12.4 (10.7, 14.2)	39.7 (36.5, 42.9)
No family	14.2 (10.3, 18.2)	16.9 (13.3, 20.4)	14.9 (11.5, 18.3)	44.8 (39.2, 50.4)
Unweighted N	*3,047*	*5,717*	*5,730*	*4,066*

Notes: See Table 3A.3.

Table 3A.10. Incident impaired physical function by wave 3 in relation to quality of relationship with friends – unadjusted models

Respondents who answered questions on functioning in waves 1–3

	Incident slow gait speed	Incident ADLs	Incident IADLs	Incident motor skills problems
Quality of relationship with friends	Percentage of individuals (95% confidence interval)			
Best	16.1 (12.0, 20.1)	12.6 (9.9, 15.3)	11.3 (8.6, 13.9)	37.8 (33.0, 42.6)
2	11.9 (9.4, 14.3)	10.1 (8.4, 11.8)	11.6 (9.7, 13.4)	38.4 (35.1, 41.6)
3	11.7 (9.4, 14.1)	10.2 (8.6, 11.7)	11.8 (10.1, 13.5)	39.4 (36.3, 42.4)
4	11.1 (8.7, 13.6)	10.4 (8.6, 12.1)	11.0 (9.2, 12.8)	41.5 (38.3, 44.5)
Worst	12.5 (9.7, 15.2)	11.3 (9.4, 13.1)	12.2 (10.3, 14.1)	39.4 (36.0, 42.7)
No friends	19.4 (13.4, 25.4)	17.7 (12.9, 22.4)	19.8 (14.7, 24.8)	52.4 (44.8, 60.0)
Unweighted N	*3,058*	*5,752*	*5,762*	*4,107*

Notes: See Table 3A.3.

Table 3A.11. Reasons for exclusion of wave 1 respondents from analysis by history of physical functioning

Core members at wave 1 who were not interviewed by proxy

	% died by end 2006	% not known if died[a]	% in wave 3 but incomplete[b]	% other loss[c]	% retained	N at wave 1
Difficulties reported at wave 1 (2002–03)						
Maximum difficulty with one motor skill	3.4	2.1	3.4	24.5	66.6	6,273
Motor skill difficulties only	6.0	2.3	3.6	23.4	64.7	1,899
Difficulties with IADLs, not with ADLs	15.4	2.5	5.0	24.4	52.6	716
Difficulties with ADLs, not with IADLs	8.6	2.5	4.4	23.7	60.8	848
Difficulties with both ADLs and IADLs	15.4	2.3	6.1	26.4	49.8	1,483
Total[d]	6.6	2.2	4.0	24.5	62.6	11,233

Notes: [a]These are people who did not consent to linkage to deaths information and did not take part in wave 3. [b]People for whom there is wave 3 information but they only took part by proxy or gave insufficient information to be included. [c]Other loss includes people who did not take part in wave 3 because of emigration, refusal, not traced. [d]The total includes 14 who did not answer the question at wave 1.

Table 3A.12. Characteristics of sample members at wave 3 according to history of reports of difficulties with physical functioning

Respondents who answered questions on functioning in waves 1–3

	Classification according to which categories of difficulty were reported						
	Minimal difficulty	**Motor skills only**	**Decrement in difficulties**	**Increment in difficulties**	**Mixed history**	**Maximal difficulty**	**All**
Category	1	2	3	4	5	6	
Men							
Median age (IQR)	63 (58,71)	69 (61,79)	70 (63,77)	71 (62,79)	71 (63,79)	70 (61,79)	67 (60,74)
Legal marital status	%	%	%	%	%	%	%
Married/Civil partner	77.0	75.7	71.8	70.1	66.4	73.9	74.3
Widowed	7.8	10.8	12.7	11.9	16.3	15.4	10.4
Divorced/ Separated	8.6	7.5	11.0	10.6	9.4	9.9	9.1
Single	6.7	6.0	4.4	7.3	7.9	0.8	6.3
Living alone (%)	15.7	17.9	23.0	23.5	27.8	21.8	19.2
Women							
Median age (IQR)	63 (58,69)	66 (60,74)	69 (61,78)	72 (64,80)	74 (64,82)	72.5 (62, 81)	67 (60,76)
Legal marital status	%	%	%	%	%	%	%
Married/Civil partner	68.7	61.0	53.0	45.5	41.6	36.5	56.8
Widowed	17.8	23.5	31.5	38.8	37.8	43.0	27.4
Divorced/ Separated	9.8	10.8	11.4	10.8	14.7	13.6	11.2
Single	3.8	4.7	4.1	4.9	5.9	7.0	4.6
Living alone (%)	22.5	30.6	38.9	45.1	48.9	46.0	33.9
Unweighted N							
Men	*1,575*	*434*	*363*	*334*	*305*	*121*	*3,132*
Women	*1,334*	*935*	*490*	*440*	*484*	*222*	*3,905*

Notes: The categories are mutually exclusive. Category 1 covers those who never reported difficulty with more than one motor skill; Category 2 comprises people who reported difficulties with two or more motor skills at least once but never with ADLs or IADLs; Category 3 comprises people who did not report difficulties with IADL or ADL at wave 3 but had done for at least one of these categories at wave 1 and/or wave 2; Category 4 comprises people who did not report any difficulties with ADL or IADL at wave 1 but did at wave 3; Category 5 covers those with a mixed history but reporting difficulties with at least one ADL and/or IADL at wave 1 and at wave 3; Category 6 covers those who individually reported difficulties both with ADLs and IADLs at every wave. Percentages may not add up due to rounding.

Table 3A.13. Self-reported health and depressive symptoms at waves 1 and 3 according to history of reports of difficulties with physical functioning

Respondents who answered questions on functioning in waves 1–3

	Classification according to which categories of difficulty were reported						
	Minimal difficulty	**Motor skills only**	**Decrement in difficulties**	**Increment in difficulties**	**Mixed history**	**Maximal difficulty**	**All**
Category	1	2	3	4	5	6	
Men							
Self-reported health	%	%	%	%	%	%	%
Good/very good both waves	80.6	55.9	42.9	28.0	17.2	2.6	57.5
Good/very good wave 1 only	10.2	17.0	17.0	32.8	14.3	10.9	14.8
Good/very good wave 3 only	5.2	10.8	10.2	8.0	10.7	9.6	7.6
Fair/very bad both waves	4.1	16.3	29.9	31.1	57.8	76.8	20.1
CES-D depression scale	%	%	%	%	%	%	%
0–3 symptoms both waves	91.6	85.3	78.5	68.5	62.6	53.2	82.3
0–3 symptoms wave 1 only	3.9	5.4	6.9	14.6	11.1	15.6	6.8
0–3 symptoms wave 3 only	3.5	5.4	9.0	7.7	13.6	12.4	6.2
4–8 symptoms both waves	1.0	4.0	5.6	9.2	12.7	18.9	4.7
Self-reported vision problems[a]	13.8	17.0	20.7	31.2	31.4	41.7	19.9
Self-reported hearing problems[b]	40.8	56.0	58.1	57.7	66.9	64.2	50.4
Women							
Self-reported health	%	%	%	%	%	%	%
Good/very good both waves	87.1	63.8	44.2	33.9	19.4	6.3	57.9
Good/very good wave 1 only	5.0	16.3	17.7	30.4	19.1	10.3	14.0
Good/very good wave 3 only	5.3	9.0	14.1	5.8	12.6	7.1	8.3
Fair/very bad both waves	2.6	10.8	24.0	29.8	48.9	76.4	19.8
CES-D depression scale	%	%	%	%	%	%	%
0–3 symptoms both waves	87.7	76.6	67.7	64.6	49.5	31.4	72.5
0–3 symptoms wave 1 only	3.9	8.1	11.0	14.2	15.6	13.8	8.8
0–3 symptoms wave 3 only	6.2	10.8	11.2	7.7	16.1	15.3	9.7
4–8 symptoms both waves	2.2	4.4	10.0	13.5	18.8	39.5	8.9
Self-reported vision problems[a]	12.6	19.8	23.5	30.3	34.9	45.4	22.1
Self-reported hearing problems[b]	26.8	41.0	41.2	44.2	49.6	55.9	38.2
Unweighted N[c]							
Men	*1,572*	*434*	*362*	*334*	*303*	*121*	*3,126*
Women	*1,331*	*933*	*488*	*440*	*483*	*222*	*3,897*

Notes: See next page.

Notes to Table 3A.13: See explanation of categories at Table 3A.12. Numbers may not add to 100 because of rounding. Percentages weighted by wave 3 longitudinal weight and age-standardised (standard = total sample of men and women). [a]At wave 3 reported that eyesight fair or poor or was registered blind or that eyesight for seeing at a distance fair or poor or that eyesight for seeing things up close fair or poor (eyesight when using lenses, if appropriate). [b]At wave 3 reported that hearing fair or poor or that difficult to follow a conversation if there is background noise (hearing when using an aid, if appropriate). [c]Bases for different items differ slightly owing to missing values.

Table 3A.14. Prevalence of participation in leisure activities by history of physical functioning: men

Respondents who answered questions on functioning in waves 1–3 and the questions on activities

	History of physical functioning						
	Minimal difficulty	**Motor skills only**	**Decrement in difficulties**	**Increment in difficulties**	**Mixed history**	**Maximal difficulty**	**All**
Category	1	2	3	4	5	6	
Reading paper	%	%	%	%	%	%	%
Waves 1 and 3	66.3	59.0	62.8	61.3	59.4	53.4	63.2
Wave 1 only	6.5	10.8	9.5	8.8	8.4	8.4	7.9
Wave 3 only	7.4	9.7	5.9	5.9	4.7	8.1	7.2
Neither	19.8	20.5	21.9	24.0	27.4	30.0	21.7
Hobby	%	%	%	%	%	%	%
Waves 1 and 3	78.0	71.2	67.3	64.6	61.6	38.9	71.3
Wave 1 only	8.4	11.8	11.9	16.2	12.5	17.3	10.8
Wave 3 only	6.8	6.2	6.2	7.2	8.3	10.2	7.0
Neither	6.8	10.7	14.5	12.0	17.6	33.6	10.9
Holiday in the UK[a]	%	%	%	%	%	%	%
Waves 1 and 3	50.2	48.2	41.3	40.4	30.3	23.4	44.9
Wave 1 only	17.6	13.0	18.0	17.4	16.7	14.9	16.8
Wave 3 only	12.0	12.9	10.7	9.7	11.6	5.6	11.4
Neither	20.2	25.8	30.0	32.5	41.4	56.1	26.9
Holiday abroad[a]	%	%	%	%	%	%	%
Waves 1 and 3	44.8	39.0	33.3	25.3	22.6	17.0	37.4
Wave 1 only	11.1	11.8	14.1	19.5	13.0	13.5	12.7
Wave 3 only	9.3	10.7	11.7	9.8	10.4	14.3	10.1
Neither	34.8	38.5	40.9	45.4	54.0	55.2	39.8
Having outing[a]	%	%	%	%	%	%	%
Waves 1 and 3	63.0	53.2	52.5	46.3	34.6	26.8	54.5
Wave 1 only	16.3	17.4	19.2	23.6	20.7	20.8	18.2
Wave 3 only	7.6	8.6	8.8	8.9	13.9	14.9	8.9
Neither	13.1	20.7	19.5	21.2	30.8	37.6	18.4
Eating outside the home[b]	%	%	%	%	%	%	%
Waves 1 and 3	50.0	47.6	37.8	45.7	26.9	19.6	44.6
Wave 1 only	16.6	16.3	21.6	17.3	16.3	25.4	17.5
Wave 3 only	9.2	9.8	10.6	7.3	12.4	11.8	9.6
Neither	24.2	26.3	30.1	29.7	44.4	43.1	28.3
N unweighted	*1,353*	*364*	*298*	*276*	*243*	*100*	*2,634*
N eating out	*1,391*	*371*	*303*	*272*	*243*	*90*	*2,670*

Notes: See Notes to Table 3A.15.

Table 3A.15. Prevalence of participation in leisure activities by history of physical functioning: women

Respondents who answered questions on functioning in waves 1–3 and the questions on activities

	History of physical functioning						
	Minimal difficulty	**Motor skills only**	**Decrement in difficulties**	**Increment in difficulties**	**Mixed history**	**Maximal difficulty**	**All**
Category	1	2	3	4	5	6	
Reading paper	%	%	%	%	%	%	%
Waves 1 and 3	59.2	61.9	54.3	56.7	47.5	44.2	57.0
Wave 1 only	11.9	7.9	12.5	8.7	14.2	15.0	11.1
Wave 3 only	8.1	7.3	7.4	5.2	9.7	5.3	7.5
Neither	20.8	22.9	25.8	29.4	28.6	35.4	24.4
Hobby	%	%	%	%	%	%	%
Waves 1 and 3	75.6	71.3	66.9	66.2	54.5	59.5	69.4
Wave 1 only	9.3	11.6	12.7	13.7	19.3	11.0	11.9
Wave 3 only	6.3	7.0	8.5	7.1	9.3	8.7	7.3
Neither	8.8	10.0	11.9	13.0	16.9	20.8	11.4
Holiday in the UK[a]	%	%	%	%	%	%	%
Waves 1 and 3	49.6	45.7	41.4	42.2	34.9	27.9	44.2
Wave 1 only	17.0	17.2	15.1	16.1	20.9	15.1	17.1
Wave 3 only	11.0	12.7	12.8	14.3	13.5	10.8	12.2
Neither	22.4	24.4	30.6	27.4	30.7	46.2	26.5
Holiday abroad[a]	%	%	%	%	%	%	%
Waves 1 and 3	43.5	37.6	29.5	31.0	21.7	12.6	35.2
Wave 1 only	13.5	13.9	12.9	17.8	14.0	9.2	13.8
Wave 3 only	9.3	10.8	13.0	7.3	9.0	10.1	9.9
Neither	33.7	37.7	44.5	43.9	55.3	68.2	41.1
Having outing[a]	%	%	%	%	%	%	%
Waves 1 and 3	64.4	59.5	50.4	51.8	49.5	31.1	56.9
Wave 1 only	15.3	16.4	18.7	19.6	14.6	16.6	16.4
Wave 3 only	7.8	10.5	12.9	11.2	9.0	15.3	9.9
Neither	12.4	13.6	18.0	17.4	26.9	37.0	16.7
Eating outside the home[b]	%	%	%	%	%	%	%
Waves 1 and 3	51.2	47.8	42.8	40.2	34.3	26.5	45.2
Wave 1 only	16.4	15.9	16.5	17.0	16.4	16.1	16.3
Wave 3 only	10.4	10.2	10.4	10.8	12.0	10.0	10.5
Neither	22.0	26.1	30.3	32.0	37.2	47.4	27.9
N unweighted	*1,177*	*814*	*397*	*360*	*371*	*172*	*3,291*
N eating out	*1,195*	*817*	*411*	*357*	*371*	*168*	*3,319*

Notes: Percentages may not add to 100 due to rounding. Percentages are age-standardised and weighted by wave 3 longitudinal weight – see Note to Table 3A.13. [a]At least once in the 12 months before interview. [b]At least once a month.

Table 3A.16. Positive and negative aspects of social relationships, by history of reports of difficulties with physical functioning: percentage of maximum possible score at wave 3, by sex

Respondents who answered questions on functioning in waves 1–3 and those on relationships in wave 3

	Adjusted for age and marital status		Also adjusted for age, health and socio-economic factors[a]	
	Coefficient	Confidence interval	Coefficient	Confidence interval
Men (n=2,195)				
Positive aspects score[b]				
Minimal difficulty	Reference group		Reference group	
Motor skills only	–0.82	–2.03, +0.40	–0.67	–1.90, +0.56
Decrement in difficulties	+0.01	–1.30, +1.31	+0.29	–1.09, +1.68
Increment in difficulties	+0.69	–0.85, +2.23	+0.91	–0.71, +2.54
Mixed history	–1.02	–2.53, +0.48	–0.43	–2.15, +1.30
Maximal difficulty	–3.27	–5.97, –0.58	–2.87	–5.82, +0.79
		P=0.08[c]		P=0.17[c]
Wave 1 score	+0.62	+0.58, +0.66	+0.61	+0.58, +0.65
		P<0.001		P<0.001
Negative aspects score[b]				
Minimal difficulty	Reference group		Reference group	
Motor skills only	+2.49	+1.27, +3.70	+2.24	+0.97, +3.50
Decrement in difficulties	+1.68	+0.37, +2.99	+1.02	–0.34, +2.37
Increment in difficulties	+2.40	+0.94, +3.85	+1.68	+0.19, +3.17
Mixed history	+2.79	+1.14, +4.43	+1.42	–0.38, +3.21
Maximal difficulty	+4.54	+1.88, +7.19	+2.97	+0.16, +5.77
		P<0.001[c]		P=0.007[c]
Wave 1 score	+0.56	+0.52, +0.61	+0.55	+0.50, +0.60
		P<0.001		P<0.001
Women (n=2,663)				
Positive aspects score[b]				
Minimal difficulty	Reference group		Reference group	
Motor skills only	–1.44	–2.35, –0.51	–1.22	–2.14, –0.29
Decrement in difficulties	–0.85	–2.13, +0.42	–0.42	–1.75, +0.92
Increment in difficulties	–2.12	–3.49, –0.75	–1.78	–3.18, –0.38
Mixed history	–3.09	–4.58, –1.60	–2.32	–3.95, –0.69
Maximal difficulty	–2.29	–4.71, +0.14	–1.08	–3.67, +1.52
		P<0.001[c]		P=0.019[c]
Wave 1 score	+0.62	+0.597, +0.671	+0.60	+0.55, +0.64
		P<0.001		P<0.001
Negative aspects score[b]				
Minimal difficulty	Reference group		Reference group	
Motor skills only	+0.63	–0.28, +1.54	+0.24	–0.66, +1.16
Decrement in difficulties	–0.10	–1.38, +1.19	–0.77	–2.17, +0.62
Increment in difficulties	+2.02	+0.67, +3.38	+1.44	+0.03, +2.85
Mixed history	+1.92	+0.52, +3.31	+0.78	–0.82, +2.38
Maximal difficulty	+3.99	+1.88, +6.10	+2.30	–0.03, +4.64
		P<0.001[c]		P=0.067[c]
Wave 1 score	0.570	0.52, 0.61	0.56	0.52, 0.60
		P<0.001		P<0.001

Notes: See next page.

Notes to Table 3A.16: [a]Adjusted for the following additional wave 1 factors: marital status (partner in household, widowed, legally divorced or separated, single), general health, presence of pain, urinary incontinence, poor vision, poor hearing, presence of depression, educational qualification, wealth quintile. [b]Score range 0–100, higher meaning more positive or more negative, respectively. At wave 3, the median and inter-quartile range of positive scores for men were 81.2 (72.9, 89.6) and the equivalent negative scores were 39.6 (33.3, 47.9). For women, the median and inter-quartile range of positive scores were 85.4 (75.0, 93.8) and the equivalent negative scores were 39.6 (33.3, 47.9). [c]P-values for heterogeneity.

Table 3A.17. Score for control and autonomy component of the CASP-19 quality of life measure at wave 3, by history of reports of difficulties with physical functioning, by sex

Respondents who answered questions on functioning in waves 1–3 and the self-completion form in wave 3

	Adjusted for age and marital status[a]		**Also adjusted for age, health and socio-economic factors[b]**	
	Coefficient	Confidence interval	Coefficient	Confidence interval
Men (n=2,964)				
Minimal difficulty	Reference group		Reference group	
Motor skills only	–0.82	–1.32, –0.32	–0.80	–1.31, –0.30
Decrement in difficulties	–0.72	–1.32, –0.12	–0.65	–1.25, –0.04
Increment in difficulties	–1.89	–2.48, –1.29	–1.79	–2.39, –1.19
Mixed history	–1.54	–2.23, –0.85	–1.36	–2.05, –0.66
Maximal difficulty	–2.37	–3.34, –1.39	–2.07	–3.03, –1.11
		$P<0.001$[d]		$P<0.001$[d]
Wave 1 score[c]	+0.36	+0.31, +0.41	+0.34	+0.29, +0.39
		$P<0.001$		$P<0.001$
Women (n=3,606)				
Minimal difficulty	Reference group		Reference group	
Motor skills only	–1.00	–1.39, –0.62	–0.61	–0.84, –0.38
Decrement in difficulties	–1.49	–2.02, –0.96	–0.79	–1.10, –0.47
Increment in difficulties	–2.33	–2.87, –1.78	–1.92	–2.27, –1.58
Mixed history	–2.26	–2.83, –1.69	–1.53	–1.91, –1.15
Maximal difficulty	–2.93	–3.65, –2.20	–2.45	–2.97, –1.95
		$P<0.001$[d]		$P<0.001$[d]
Wave 1 score[c]	+0.38	+0.34, +0.43	+0.39	+0.35, +0.43
		$P<0.001$		$P<0.001$

Notes: [a]Whether had partner in household, otherwise whether widowed, divorced or separated or never-married. [b]Adjusted for the following additional wave 1 factors: general health, presence of pain, urinary incontinence, poor vision, poor hearing, presence of depression, educational qualification, wealth quintile. [c]Score range 0–18, higher meaning more control and autonomy. At wave 3, the medians and inter-quartile ranges of scores were 12 (9, 14) for men and 12 (8, 14) for women. [d]P-values for heterogeneity.

Table 3A.18. Difficulty reported with groups of physical functions at wave 3, by sex and age at wave 3

Respondents who took part in wave 3 and answered relevant questions (aged 55 and over)

	Age at wave 3				All
	55–64	65–74	75–84	85 and over	
Men					
Percentage had difficulty with:					
Moving around the house[a]	6.9	6.9	9.3	14.6	7.7
Dressing or washing[b]	13.0	18.8	24.8	40.6	18.3
Eating or preparing meals[c]	3.2	3.0	7.5	14.7	4.5
Shopping or doing work around the house[d]	11.4	11.7	21.0	42.4	14.8
Telephoning or managing money[e]	3.6	3.0	7.0	17.7	4.7
Taking medication[f]	1.5	0.8	2.6	4.2	1.6
At least one of these	19.5	23.3	35.1	58.2	25.4
Had help with at least one task	51.9	56.3	67.8	74.2	59.7
Women					
Percentage had difficulty with:					
Moving around the house[a]	7.7	9.3	11.3	20.3	10.0
Dressing or washing[b]	13.0	19.2	27.1	41.2	20.3
Eating or preparing meals[c]	3.5	5.9	7.6	20.6	6.5
Shopping or doing work around the house[d]	14.0	19.3	30.1	55.5	22.5
Telephoning or managing money[e]	2.0	3.5	5.4	18.7	4.6
Taking medication[f]	1.0	1.6	1.7	6.1	1.8
At least one of these	20.0	28.7	41.0	65.1	30.9
Had help with at least one task	71.8	67.6	73.8	87.4	74.0
Unweighted N					
Men	*1,334*	*1,000*	*613*	*146*	*3,093*
Women	*1,597*	*1,172*	*817*	*270*	*3,856*
At least one of these[g]					
Men	*244*	*228*	*206*	*84*	*762*
Women	*309*	*329*	*334*	*177*	*1,149*

Notes: weighted by wave 3 longitudinal weight. [a]Difficulty with walking across a room or with getting in and out of bed or with using the toilet, including getting up and down. [b]Difficulty with eating, such as cutting up food or with preparing a hot meal. [c]Difficulty with dressing, including putting on shoes and socks, or with bathing or showering. [d]Difficulty with shopping for groceries or with doing work around the house or garden. [e]Difficulty with making telephone calls or with managing money, such as paying bills and keeping track of expenses. [f]Difficulty with taking medications. [g]Base for % who had help with at least one task.

Table 3A.19. Sources of help with moving around the house[a] at wave 3, by sex and age at wave 3

Respondents reporting difficulties of the relevant type at wave 3

	Age at wave 3				All
	55–64	65–74	75–84	85 and over	
Men					
Percentage who reported help from:[b]					
Spouse or partner	55.1	51.3	50.5	–	49.8
Any child or child in law[c]	13.4	21.1	16.1	–	18.0
Other relatives	2.4	4.9	3.3	–	3.4
Informal source incl. family, neighbours and friends	58.4	63.6	62.9	–	60.5
Formal source incl. statutory/voluntary services / paid help	1.9	4.3	11.8	–	6.3
None of these	41.6	32.0	33.5	–	37.0
Women					
Percentage who reported help from:[b]					
Spouse or partner	41.8	36.9	13.5	0.0	26.3
Any child or child in law[c]	34.4	28.4	22.3	38.1	30.4
Other relatives	5.1	7.4	13.4	15.7	9.6
Informal source incl. family, neighbours and friends	62.5	59.6	42.8	53.6	55.2
Formal source incl. statutory/voluntary services / paid help	6.6	16.0	15.9	48.0	18.4
None of these	35.4	36.9	47.0	24.9	37.0
Unweighted N					
Men	*84*	*67*	*50*	*22*	*223*
Women	*119*	*102*	*94*	*54*	*369*

Notes: [a]Difficulty with walking across a room or with getting in and out of bed or with using the toilet, including getting up and down. [b]Percentages may sum to more than 100 because people can receive help from multiple sources; informal source includes the previous three categories. 'Other' is omitted from the categories because it is not known if the carer was informal or formal and numbers were small. 'None of these' means no informal, formal or other. [c]Respondents are left to interpret who to include here, but theoretically can include adopted, step and foster children.

Table 3A.20. Sources of help with dressing and bathing at wave 3, by sex and age at wave 3

Respondents reporting difficulties of the relevant type at wave 3

	Age at wave 3				All
	55–64	65–74	75–84	85 and over	
Men					
Percentage who reported help from:[a]					
Spouse or partner	38.2	38.7	41.6	22.7	37.7
Any child or child in law[b]	2.6	5.5	4.6	10.5	4.8
Other relatives	0	0	0	0	0
Informal source incl. family, neighbours and friends	39.3	43.1	44.3	33.1	41.2
Formal source incl. statutory/voluntary services / paid help	1.0	2.7	4.7	13.3	3.8
None of these	60.0	54.7	53.0	54.8	56.0
Women					
Percentage who reported help from:[a]					
Spouse or partner	35.2	33.9	14.8	3.8	23.5
Any child or child in law[b]	11.2	9.7	9.0	23.1	12.1
Other relatives	1.6	0.8	4.0	3.3	2.4
Informal source incl. family, neighbours and friends	45.4	42.4	27.6	33.7	37.3
Formal source incl. statutory/voluntary services / paid help	3.1	6.7	9.5	30.6	10.6
None of these	52.6	51.0	62.8	37.4	52.7
Unweighted N					
Men	*165*	*182*	*143*	*59*	*549*
Women	*203*	*219*	*218*	*111*	*751*

Notes: [a]Percentages may add up to more than 100 because people can receive help from multiple sources; informal source includes the previous three categories. ‘Other’ is omitted from the categories (but taken account of for ‘none’) because it is not known if the carer was informal or formal – numbers were small. [b]Respondents are left to interpret who to include here, but theoretically can include adopted, step and foster children.

Table 3A.21. Sources of help reported with shopping or work around the house and garden at wave 3, by sex and age at wave 3

Respondents reporting difficulties of the relevant type at wave 3

	Age at wave 3				All
	55–64	65–74	75–84	85 and over	
Men					
Percentage who reported help from:[a]					
Spouse or partner	47.1	45.5	39.7	14.0	40.3
Any child or child in law[b]	19.0	18.4	22.5	41.9	22.8
Other relatives	1.1	3.0	6.7	4.8	3.6
Informal source incl. family, neighbours and friends	61.7	63.5	68.4	65.0	64.4
Formal source incl. statutory/voluntary services / paid help	1.3	5.0	5.2	16.9	5.4
None of these	36.9	30.0	23.9	16.3	28.9
Women					
Percentage who reported help from:[a]					
Spouse or partner	50.0	40.7	16.3	6.1	28.7
Any child or child in law[b]	34.0	27.1	35.7	47.9	35.6
Other relatives	5.3	3.4	10.5	10.1	7.4
Informal source incl. family, neighbours and friends	78.7	70.2	66.6	69.0	71.0
Formal source incl. statutory/voluntary services / paid help	4.3	8.9	17.6	29.9	14.6
None of these	16.9	19.9	15.8	7.0	15.3
Unweighted N					
Men	*139*	*113*	*122*	*61*	*435*
Women	*217*	*218*	*246*	*150*	*831*

Notes: [a]Percentages may add up to more than 100 because people can receive help from multiple sources; informal source includes the previous three categories. 'Other' is omitted from the categories (but taken account of for 'none') because it is not known if the carer was informal or formal – numbers were small. [b]Respondents are left to interpret who to include here, but theoretically can include adopted, step and foster children.

Table 3A.22. Sources of help reported with (i) eating or preparing meals, (ii) telephoning or managing money and (iii) taking medication at wave 3, by sex

Respondents reporting difficulties of the relevant type at wave 3

	Eating or preparing meals	Telephoning or managing money	Taking medication
Men			
Percentage who reported help from:[a]			
Spouse or partner	59.9	54.2	[79.1]
Any child or child in law[b]	16.0	14.2	[7.6]
Other relatives	0	4.6	[0.0]
Informal source incl. family, neighbours and friends	74.6	71.5	[92.5]
Formal source incl. statutory/voluntary services / paid help	5.4	1.2	[4.4]
None of these	16.4	26.6	[5.4]
Women			
Percentage who reported help from:[a]			
Spouse or partner	34.8	21.3	33.9
Any child or child in law[b]	28.5	42.7	34.9
Other relatives	6.6	5.0	2.5
Informal source incl. family, neighbours and friends	54.5	71.2	73.4
Formal source incl. statutory/voluntary services / paid help	16.7	3.8	11.0
None of these	18.2	23.4	16.7
Unweighted N			
Men	*129*	*134*	*44*
Women	*224*	*155*	*59*

Notes: [a]Percentages may add up to more than 100 because people can receive help from multiple sources; informal source includes the previous three categories. ‘Other’ is omitted from the categories (but taken account of for ‘none’) because it is not known if the carer was informal or formal – numbers were small. [b]Respondents are left to interpret who to include here, but theoretically can include adopted, step and foster children.

Table 3A.23. Factors associated with being a driver of a vehicle to which a respondent has access or with frequent use of public transport at wave 3

Respondents aged 65 years and over at wave 3

	Drives vehicle to which has access			**Using public transport more than once a week**		
Circumstances at wave 3	Odds ratio	Confidence interval	p-value	Odds ratio	Confidence interval	p-value
		(n=3,923)			(n=3,917)	
Women (reference: men)	0.15	0.13, 0.19				
Women (reference: men)						
• if driver				1.10	0.83, 1.47	0.020
• if passenger				0.52	0.34, 0.80	
• if no access to car				0.91	0.67, 1.23	
Living with partner (reference)	1.00			1.00		
Living alone	1.09	0.90, 1.33		1.34	1.06, 1.69	
Living with other, not partner	0.64	0.42, 0.98	0.046	1.07	0.69, 1.67	0.049
Other transport		Omitted			Omitted	
Driver (reference)				1.00		
Passenger						
• if male				7.59	4.75, 12.11	<0.001
• if female				5.49	3.06, 9.82	
No access to vehicle						
• if male				11.70	8.15, 16.79	<0.001
• if female				9.65	6.84, 13.61	
Uses lift at least weekly (reference: not)				1.27	1.02, 1.60	0.037
Uses taxi at least monthly (reference: not)				1.56	1.17, 2.07	0.002
Health						
Having poor vision (reference: not)	0.55	0.45, 0.68	<0.001	1.10	0.89, 1.36	0.40
Having hearing problems (reference: not)	1.01	0.85, 1.21	0.88	1.06	0.88, 1.28	0.55
Pain (reference: not often troubled)	1.00			1.00		
Mild pain	1.26	0.94, 1.68		0.98	0.73, 1.33	
Moderate pain	1.32	1.04, 1.67		0.76	0.60, 0.98	
Severe pain	1.65	1.20, 2.28	0.009	0.58	0.40, 0.85	0.015
Urinary incontinence (reference: not)	1.05	0.84, 1.31	0.69	0.71	0.55, 0.92	0.010

Continues

Table 3A.23 continued

Circumstances at wave 3	Drives vehicle to which has access: Odds ratio	Confidence interval	p-value	Using public transport more than once a week: Odds ratio	Confidence interval	p-value
Four or more depressive symptoms (reference: fewer)	0.81	0.64, 1.03	0.081	1.05	0.80, 1.37	0.74
Fair, bad, very bad health (reference: excellent/good)	0.64	0.52, 0.79	<0.001	0.86	0.69, 1.08	0.20
Physical functioning						
Minimal difficulties (reference group)	1.00			1.00		
Difficulties with motor skills	0.91	0.72, 1.15		0.92	0.71, 1.20	
Difficulties with IADLs, not ADLs	0.43	0.31, 0.60		0.55	0.37, 0.81	
Difficulties with ADLs, not IADLs	0.87	0.63, 1.20		0.61	0.65, 1.22	
Difficulties with both	0.53	0.38, 0.73	<0.001	0.31	0.21, 0.45	<0.001
Wealth quintile						
Richest (reference group)	1.00			1.00		
2	0.59	0.44, 0.79		1.60	1.11, 2.31	
3	0.47	0.36, 0.61		1.89	1.32, 2.70	
4	0.23	0.17, 0.30		2.10	1.49, 2.96	
Poorest	0.12	0.09, 0.16	<0.001	1.82	1.24, 2.67	<0.001
Educational qualification						
Degree or higher	1.00			1.00		
A-level or higher, not degree	0.95	0.62, 1.46		0.65	0.42, 0.99	
O-level or GCSE	0.68	0.44, 1.05		1.08	0.70, 1.65	
CSE or foreign qualification	0.43	0.29, 0.66		0.93	0.61, 1.41	
No qualification	0.26	0.18, 0.39	<0.001	0.81	0.55, 1.19	0.049

Note: Adjusted for age. Age is not shown as individual ages above 90 were not distinguished.

Table 3A.24. Factors associated with taking a lift at least once a week or taking a taxi at least once a month

Respondents aged 65 years and over at wave 3

	Takes a lift at least once a week			Takes a taxi at least once a month		
Circumstances at wave 3	Odds ratio	Confidence interval	p-value	Odds ratio	Confidence interval	p-value
		(n=3,917)			(n=3,917)	
Women (reference: men)				0.97	0.76, 1.23	0.79
Women (reference: men)						
• if driver	1.43	1.05, 1.94	0.010			
• if passenger	0.80	0.54, 1.18				
• if no access to car	1.43	1.06, 1.92				
Living with partner (reference)	1.00			1.00		
Living alone	2.38	1.86, 3.05		0.87	0.62, 1.21	
Living with other, not partner	1.92	1.29, 2.86	<0.001	1.31	0.79, 2.16	0.056
Other transport						
Driver (reference)	1.00			1.00		
Passenger				2.36	1.60, 3.50	
• if male	8.08	5.18, 12.59	<0.001			
• if female	1.78	1.02, 3.09				
No access to vehicle				6.75	4.47,10.20	<0.001
• if male	3.19	2.13, 4.77	<0.001			
• if female	3.19	2.30, 4.42				
Uses public transport more than once a week (reference: not)	1.30	1.04, 1.63	0.022	1.60	1.20, 2.13	0.001
Uses lift/taxi (reference: not)	1.43	1.09, 1.88	0.011	1.48	1.12, 1.94	0.005
Health						
Having poor vision (reference: not)	0.90	0.93, 1.12	0.35	1.00	0.77, 1.30	0.99
Having hearing problems (reference: not)	0.92	0.77, 1.11	0.39	0.94	0.75, 1.18	0.62
Not troubled by pain (reference)	1.00			1.00		
Mild pain	1.14	0.84, 1.54		1.32	0.90, 1.92	
Moderate pain	1.03	0.81, 1.31		1.38	1.03, 1.86	
Severe pain	1.05	0.75, 1.47	0.87	1.15	0.76, 1.72	0.15
Urinary incontinence (reference: not)	1.14	0.91, 1.43	0.24	0.92	0.70, 1.22	0.58

Continues

Table 3A.24 continued

	Takes a lift at least once a week			Takes a taxi at least once a month		
Circumstances at wave 3	Odds ratio	Confidence interval	p-value	Odds ratio	Confidence interval	p-value
Four or more depressive symptoms (reference: fewer)	0.99	0.91, 1.43	0.93	1.03	0.79, 1.36	0.80
Fair, bad, very bad health (reference: excellent/good)	0.98	0.79, 1.22	0.88	1.25	0.96, 1.63	0.10
Physical functioning						
Minimal difficulties (reference group)	1.00			1.00		
Difficulties with motor skills	1.11	0.85, 3.05		2.18	1.56, 3.04	
Difficulties with IADLs, not ADLs	1.62	1.15, 2.27		2.84	1.85, 4.37	
Difficulties with ADLs, not IADLs	0.92	0.64, 1.33		2.07	1.32, 3.25	
Difficulties with both	1.00	0.72, 1.40	0.015	2.12	1.38, 3.27	<0.001
Wealth quintile						
Richest (reference group)	1.00			1.00		
2	1.06	0.75, 1.48		1.17	0.71, 1.93	
3	1.44	1.03, 2.00		0.97	0.59, 1.60	
4	1.61	1.15, 2.24		1.16	0.71, 1.88	
Poorest	1.15	0.80, 1.65	0.012	1.76	1.10, 2.81	0.011
Educational qualification						
Degree or higher	1.00			1.00		
A-level or higher, not degree	1.49	0.94, 2.36		0.59	0.33, 1.05	
O-level or GCSE	1.17	0.73, 1.87		0.59	0.34, 1.02	
CSE or foreign qualification	1.58	1.01, 2.46		0.54	0.31, 0.94	
No qualification	1.44	0.96, 2.18	0.18	0.44	0.27, 0.74	0.035

Note: Adjusted for age. Age is not shown as individual ages above 90 were not distinguished.

4. Financial resources & well-being

Carl Emmerson *Institute for Fiscal Studies*

Alastair Muriel *Institute for Fiscal Studies*

In this chapter, we use ELSA to examine changes in living standards among those aged 50 and over between 2002–03 and 2006–07, using four different (but related) measures of living standards – family income (in particular, income poverty), wealth, self-reported well-being and self-reported quality of life.

The analysis in this chapter shows the following:

- Single individuals are more likely to be in income poverty than those in couples, with women who are divorced, separated or widowed having the highest risk of income poverty. Those estimated to have accumulated relatively low levels of state and private pension rights and (conditional on other observed characteristics) those who are aged below the State Pension Age are found to have a much greater risk of being in income poverty. It appears to be factors associated with old age (such as not being in the labour force and widowhood) which are significantly associated with an increased risk of income poverty – not age in itself.

- Women who are divorced, separated or widowed, and women who become so, are both found to be more likely to move into income poverty between 2002–03 and 2006–07. This is also true of those who move out of the labour force, those whose partner moves out of the labour force and those who have accumulated relatively low levels of state and private pension rights. Conversely, reaching the State Pension Age is, conditional on other observed characteristics, associated with a lower chance of moving into income poverty.

- Large increases in total wealth occurred between 2002–03 and 2006–07, with these increases being seen right across the distribution of wealth in 2002–03. The median nominal increase in total wealth over this four-year period was 39%. This has been caused by large increases in house prices boosting housing wealth: the median nominal increase in non-housing wealth was just 6%. The distribution of growth in non-housing wealth over this period is very similar among those with and those without housing wealth, suggesting little evidence of those experiencing large increases in their housing wealth choosing to save less in other forms as a result.

- One-in-nine respondents aged 50 or over in 2006–07 had estates worth more than the Inheritance Tax threshold. Over the period from 2002–03 to 2006–07, more estates appear to have moved above the Inheritance Tax threshold. However, given that the driver of the increase in wealth over this period was growth in house prices, whether or not this pattern will continue going forwards might depend heavily on the future path of house prices.

- Those individuals who are divorced, separated or widowed are found, on average, to report lower levels of well-being (measured using the GHQ-12 scale) than other individuals. This is also true of those reporting difficulties with physical functioning (an indicator of poor health). Women are found to report higher levels of quality of life (measured using the CASP-19 scale) than men (for a given marital status). Both improved self-reported well-being and increased self-reported quality of life are found to be associated with increased income.

4.1 Introduction

The standard of living enjoyed by retired people remains a key concern for policymakers. The government is committed to 'tackling poverty and promoting greater independence and wellbeing in later life'[1] as one of its public service agreements (published alongside the 2007 Comprehensive Spending Review).

The richness of the ELSA data-set allows us to analyse the characteristics associated with having different levels of income, wealth and well-being / quality of life, while the panel nature of the survey allows us to explore the characteristics correlated with *changes* in these measures of living standards.

We begin in Section 4.2 by examining the distribution of income among those aged 50 and over, and analysing the characteristics associated with being in income poverty (using an income poverty threshold of 60% median equivalised household income, the most commonly used measure of low income). Section 4.3 then examines the dynamics of income poverty, focusing in particular on the characteristics associated with entering (and leaving) income poverty.

In Section 4.4, we consider how the distribution of wealth in ELSA has changed over time, and the factors correlated with growth in wealth. This section also considers the possible growth in the number of individuals liable for Inheritance Tax, which has been the subject of much recent policy debate.

Section 4.5 examines the factors correlated with self-reported well-being and quality of life among those aged 50 and over, exploring how changes in income, health and marital status affect individuals' answers to questions on these topics. Section 4.6 concludes.

4.2 Income poverty

Gordon Brown has pledged to 'end pensioner poverty in our country',[2] and the percentage of pensioners living on low incomes is one of five 'key indicators'

[1] HM Treasury, 2007.

[2] Labour Party conference speeches of both 2000 and 2002.

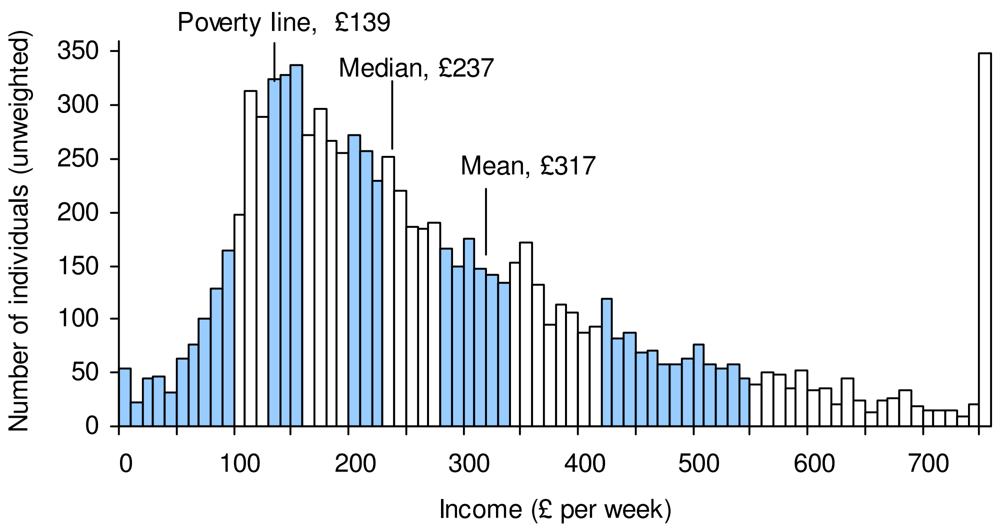
of progress towards the government's public service agreement on well-being in later life. In this section, we examine the income distribution of individuals aged 50 and over in England, before turning to consider the factors associated with being in income poverty.

Figure 4.1 shows the income distribution for individuals aged 50 and over in ELSA in 2006–07. We use a measure of weekly family income from all sources (earnings, pensions, state benefits, investments, etc.). Incomes have been adjusted ('equivalised') to take into account family size,[3] so that they represent the equivalent amount that a benchmark family type (in this case, a single person) would require in order to enjoy the same standard of living.

The graph shows the number of people living in families with different income levels, grouped into £10 income bands. The height of the bars represents the number of people in each income band. The figure reveals that the current distribution is highly skewed, with more than two-thirds of individuals having household incomes below the average (mean) for this age group.

Figure 4.1 also divides the population into 10 equally sized groups, called decile groups. The first decile group contains the lowest-income 10% of the population; the second decile group contains the next-lowest-income 10%; and so on. In the graph, the alternately shaded sections represent these different decile groups, and, as can be seen, the distribution is particularly concentrated within a fairly narrow range of incomes in decile groups 2 to 5. However, as we move further up the income distribution, a widening of the decile group bands can be seen. Note that the tenth decile group band is much wider than is shown in Figure 4.1 because those with incomes greater than £750 are shown together rather than in £10 bands.

Figure 4.1. The income distribution (ELSA, individuals aged 50 and over)



Notes: Unweighted. The right-most bar represents incomes of over £750.

---

[3] Income was equivalised using the modified OECD equivalence scale.

Comparing the income distribution in ELSA with that derived from the Family Resources Survey (FRS, a representative survey of income for the UK, used in the government's official analysis of the income distribution, the Households Below Average Income [HBAI] series), we find that average incomes in ELSA are slightly higher than those in the FRS. When we look at individuals aged 50 and over (in England only) using the FRS, we get a median weekly equivalised income of £227, compared with £237 in ELSA, and mean income of £289, compared with £317 in ELSA.

There are many reasons why average incomes will differ across the two surveys. The surveys use different questions to measure income sources, and different methodologies to construct a measure of 'total' net income. Moreover, both surveys are random samples, and so sampling error means that even were the questions identical, we are unlikely to get identical estimates of average income.

While we may prefer the FRS for a 'snapshot' of the income distribution at any one time, there are important advantages to studying living standards using ELSA. Unlike the FRS, ELSA is a panel survey, which allows us to analyse the dynamics (and persistence) of incomes and income poverty. ELSA also contains a large amount of information about respondents' health and living circumstances, which we can use to analyse the factors associated with, for example, transitions into and out of income poverty.

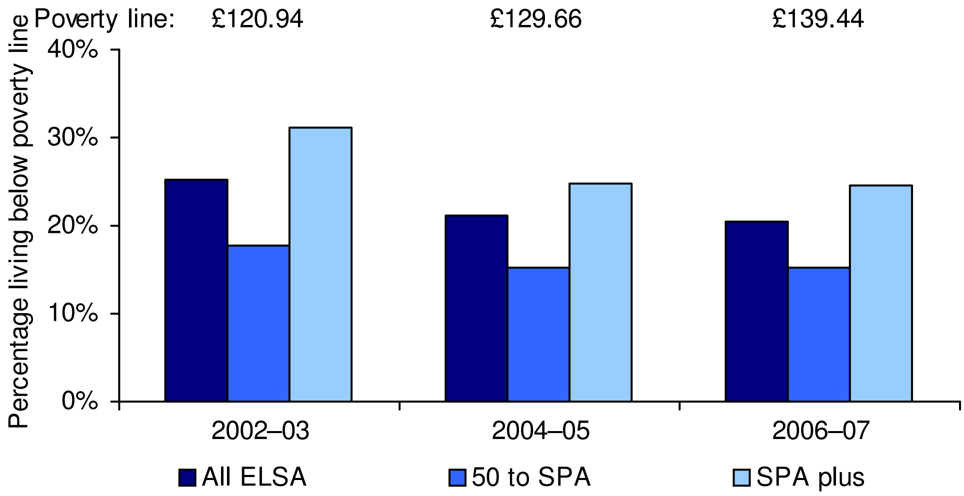
Figure 4.1 shows a relative poverty line, again derived using the FRS. This poverty line has been designed to be as similar as possible to the relative income poverty measure used in the government's official (HBAI) low-income statistics – measuring the number of individuals living on incomes below 60% of median income (before housing costs) for the UK as a whole. However, whereas the HBAI statistics measure income at the household level, using ELSA we can only measure incomes at the family (benefit-unit) level. We have therefore used the FRS to derive a family-level poverty line – £139 for 2006–07. We have shown in previous work that this poverty measure closely tracks HBAI (household) income poverty rates over the last decade, with the difference between the two never exceeding 2 percentage points.[4]

Calculating similar poverty lines for 2002–03 and 2004–05 (again using the FRS), we can derive low-income-based poverty rates in each year of the ELSA survey. Figure 4.2 shows the fraction of individuals living on incomes of less than 60% of median family income in each ELSA wave. Income poverty rates are shown for the entire ELSA sample, as well as for the subgroup aged between 50 and the State Pension Age and for the subgroup above the State Pension Age (SPA).

It is clear that in ELSA 2002–03, income poverty rates were substantially higher for individuals aged above the SPA than for those aged between 50 and the SPA (with the poverty rate for the whole ELSA sample being a weighted average of the two). Almost a third of individuals aged above the SPA were below the poverty line in 2002–03, compared with 17.6% of individuals aged between 50 and the SPA.

[4] See Brewer et al. (2007).

Figure 4.2. Income poverty in ELSA waves 1 to 3



Notes: Unweighted. SPA = State Pension Age.

Income poverty among individuals aged above the State Pension Age fell substantially between 2002–03 and 2004–05, from 31.2% to 24.8%. Changes to the tax and benefit system that benefited older individuals, such as the introduction of the Pension Credit Savings Credit in October 2003 and lump-sum Age-Related Payments in 2004, are likely to have contributed to this fall in income poverty among those aged above the SPA. Among individuals aged between 50 and the SPA, income poverty declined more modestly, from 17.6% to 15.2%.

These declines were not repeated between 2004–05 and 2006–07, with income poverty among individuals aged both below and above the SPA remaining at around the same levels. The abolition of Age-Related Payments in 2006–07 may partly explain why income poverty among those aged above the SPA stopped falling.

Characteristics associated with income poverty

Using ELSA, we can analyse the characteristics that are associated with being in income poverty in a given year. Table 4.1 presents multivariate analysis of characteristics correlated with having family income below the relative poverty line in 2002–03 and in 2006–07.

The coefficients in the table are estimated marginal effects from a probit regression. These coefficients give the approximate change in the probability of being in income poverty, for a one-unit change in each independent variable. Because we need to evaluate these marginal effects for a specific ‘type’ of person, the numbers reported in the table give the marginal effects for a man in a couple, with A levels but no higher education, aged 65 (and so above the State Pension Age) – with all other independent variables set to zero. So, for example, the coefficient on being in the labour force in 2002–03 in the second column of Table 4.1 (with an estimated value of –0.147) tells us that such a 65-year-old man is estimated to be 14.7 percentage points less likely to be in poverty if he is also in the labour force.

Table 4.1. Multivariate analysis of factors associated with being in income poverty in 2002–03 and 2006–07

All aged 50 and over in 2002–03

	2002–03		**2006–07**	
	Without health controls	Controlling for health	Without health controls	Controlling for health
Female in couple	0.011 (0.011)	0.014 (0.011)	–0.003 (0.012)	–0.003 (0.012)
Never-married man	0.091*** (0.029)	0.095*** (0.030)	0.085*** (0.032)	0.090*** (0.032)
Never-married woman	0.116*** (0.030)	0.127*** (0.031)	0.055* (0.030)	0.059* (0.031)
Divorced/Separated/ Widowed man	0.072*** (0.018)	0.076*** (0.018)	0.055*** (0.019)	0.059*** (0.019)
Divorced/Separated/ Widowed woman	0.183*** (0.014)	0.198*** (0.015)	0.151*** (0.016)	0.161*** (0.017)
Age (years)	0.004*** (0.001)	0.005*** (0.001)	0.002** (0.001)	0.002** (0.001)
Aged over State Pension Age	–0.124*** (0.018)	–0.142*** (0.019)	–0.150*** (0.021)	–0.162*** (0.022)
In labour market	–0.147*** (0.010)	–0.162*** (0.010)	–0.131*** (0.012)	–0.140*** (0.013)
Partner in labour market	–0.123*** (0.010)	–0.128*** (0.011)	–0.106*** (0.012)	–0.110*** (0.012)
Education: A levels	–0.093*** (0.010)	–0.102*** (0.010)	–0.052*** (0.011)	–0.058*** (0.011)
Education: degree	–0.104*** (0.010)	–0.113*** (0.011)	–0.092*** (0.011)	–0.098*** (0.012)
Risk of low retirement income	0.179*** (0.028)	0.194*** (0.028)	0.118*** (0.031)	0.134*** (0.032)
Difficulties with any ADL		–0.027** (0.012)		–0.037*** (0.012)
Difficulties with any IADL		–0.036*** (0.011)		–0.020 (0.012)
Two or more mobility difficulties		–0.012 (0.010)		0.002 (0.011)

Notes: Marginal effects and standard errors (in parentheses) are reported. Marginal effects are evaluated for men in couples, with A levels but no higher education, aged 65 (and so above the State Pension Age) – all other variables set to zero. Statistical significance at the 1%, 5% and 10% levels is denoted by ***, ** and * respectively. Sample size = 11,416 in 2002–03 and 8,871 in 2006–07. Reference group is men in couples aged below the State Pension Age, not in the labour force, partner not in the labour force, no reported health problems, education below A level and not at risk of retiring on an income below the Pension Credit Guarantee. Constant and controls for missing education, missing risk, imputed components of income, and whether aged 90 or over are also included.

Two alternative specifications are shown for each year – one controlling for marital status, age, education, labour market status and the risk of low retirement income (see below for details on the last), and another controlling for all of these plus measures of reported physical functioning (which is an indicator of health). The measures of physical functioning are:

- whether an individual reports difficulties with two or more aspects of their mobility, motor skills and strength – henceforth referred to as 'mobility', for brevity's sake – out of a possible ten (difficulty walking 100 yards, difficulty sitting for about two hours, difficulty getting up from a chair after sitting for long periods, difficulty climbing several flights of stairs without resting, difficulty climbing one flight of stairs without resting, difficulty stooping, kneeling or crouching, difficulty reaching or extending arms above shoulder level, difficulty pulling or pushing large objects, difficulty lifting or carrying weights over 10 pounds, difficulty picking up a 5p coin from a table);
- whether an individual reports difficulties in doing *any* 'activities of daily living' (ADLs) out of a possible six (dressing, walking across a room, bathing or showering, eating, getting in or out of bed, using the toilet);
- whether an individual reports difficulties in doing *any* 'instrumental activities of daily living' (IADLs) out of a possible seven (using a map, preparing a hot meal, shopping for groceries, making telephone calls, taking medications, doing work around the house or garden, managing money [such as paying bills]).

The table makes clear that single women are substantially more likely to be in income poverty than men or women in couples, with women who are divorced, separated or widowed facing the highest risk of income poverty. The risk of income poverty among women who have never been married declines between 2002–03 and 2006–07, but it remains high among women who are divorced, separated or widowed.

Having seen in Figure 4.2 that poverty rates are higher among individuals above the SPA, it is perhaps surprising that being above the SPA is associated with a *lower* risk of income poverty in the multivariate analysis. This result is robust to the inclusion of controls for health, and is found in both 2002–03 and 2006–07. This suggests that it is other observed characteristics of individuals above the SPA (such as their being more likely to not be in the labour force and more likely to be widowed) which are associated with a higher risk of poverty, rather than their age in itself. Receipt of the state pension, and other age-related benefits such as the Pension Credit, would be plausible mechanisms by which poverty risk is reduced among individuals above the State Pension Age.

Unsurprisingly, individuals who are not in the labour force and/or whose partners are not in the labour force are substantially more likely to be in income poverty, and this effect shows no sign of declining over time. Higher levels of education are negatively associated with income poverty, with individuals who have attended higher education facing the lowest risk of poverty.

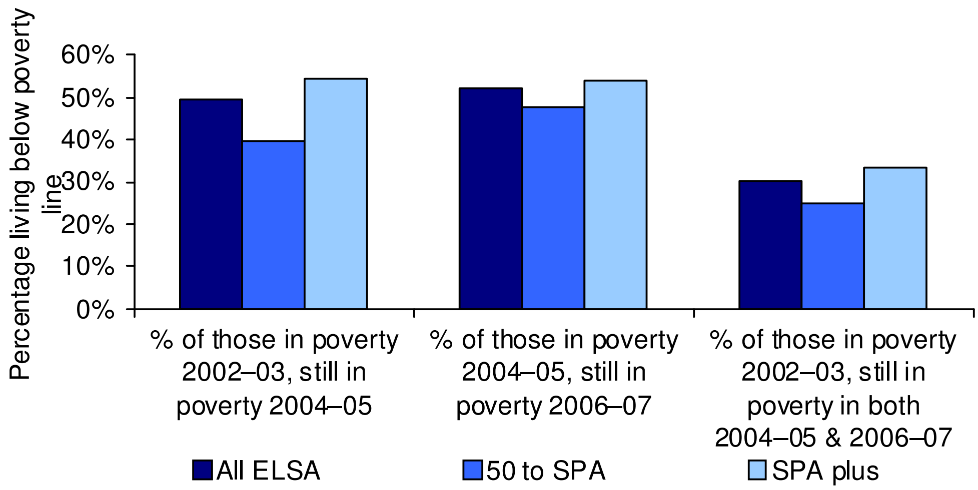
Previous research using ELSA estimated the extent to which individuals aged between 50 and the State Pension Age might be expected to fall below different benchmarks for retirement income adequacy were they to leave (or remain out of) paid work (Banks, Emmerson, Oldfield and Tetlow, 2005). In the current analysis, we include a control for whether or not the family's accumulated wealth (including both estimated state and private pension entitlements in addition to more liquid forms of non-housing wealth) was considered likely to leave them with a retirement level of income below that provided by the Pension Credit Guarantee (which is not far from the income-poverty line being considered here). This indicator of the risk of low retirement income is highly correlated with income poverty, which shows that those individuals who have been unable or unwilling to accumulate wealth are more likely to end up in income poverty in retirement.

The inclusion of the mobility and ADL controls in the analysis in Table 4.1 does little to alter the magnitude or significance of our other results. However, there is some evidence that having difficulties with ADLs is negatively associated with income poverty – perhaps because these difficulties are likely to be correlated with the receipt of disability benefits.

4.3 Income poverty persistence

Because ELSA is a panel survey, unlike the FRS (which uses a different cross-section each year), we can examine how *persistent* income poverty is among various groups – i.e. the extent to which individuals move into and out of income poverty as opposed to the same individuals being in income poverty in each year. A natural question to ask is: of the people in income poverty in a given ELSA wave, what proportion are still in income poverty in the next wave?

Figure 4.3. Persistence of income poverty in ELSA waves 1 to 3



Notes: Unweighted. SPA = State Pension Age.

Figure 4.3 answers this question for the same three age groups charted in Figure 4.2 (all individuals, those aged 50 to the SPA and those above the SPA). The first set of bars show the percentage of those who were in income poverty in 2002–03 who were still in income poverty two years later, in 2004–05. The second set of bars show the percentage of those in income poverty in 2004–05 who remained in income poverty in 2006–07. The final set of bars show the percentage of those in income poverty in 2002–03 who remained in income poverty in both 2004–05 and 2006–07.

Income poverty persistence is highest among individuals aged above the SPA. Of those individuals who were above the SPA and living in income poverty in 2002–03, more than half (54.3%) were still in income poverty in 2004–05. Persistence was somewhat lower among individuals aged between 50 and the SPA in 2002–03 – only four-in-ten (39.6%) of this group who were in poverty in 2002–03 remained in poverty in 2004–05.

The persistence of income poverty (unlike income poverty itself) shows little sign of declining over time for individuals aged above the SPA, with more than half (53.7%) of individuals aged above the SPA in 2004–05 and in income poverty remaining in income poverty in 2006–07. Persistence appears to have risen slightly among individuals aged between 50 and the SPA, with almost half (47.4%) of poor individuals in this age group in 2004–05 remaining in income poverty in 2006–07.

Figure 4.3 also shows the fraction of individuals in income poverty in 2002–03 who remained in income poverty in 2004–05 *and* 2006–07. This extreme persistence is also higher among individuals aged above the SPA. One-in-three (33.2%) of individuals in this age group who were living below the poverty line in 2002–03 remained in poverty for the two following ELSA waves, while for individuals aged between 50 and the SPA the figure is one-in-four (25.0%).

Characteristics associated with moving into and out of income poverty

Table 4.2 presents multivariate analysis of the characteristics associated with entering and leaving income poverty between 2002–03 and 2006–07 (ELSA waves 1 and 3). As with Table 4.1, the coefficients are marginal effects from probit regressions, with two alternative specifications shown – one controlling for baseline marital status, labour market status, education and age (as well as changes in these characteristics between 2002–03 and 2006–07), and another including all these controls plus indicators of physical functioning (as measured by difficulties with mobility, ADL and IADL) and changes in these indicators between 2002–03 and 2006–07.

Women who are divorced, separated or widowed face the greatest risk of entering income poverty, and the lowest chances of leaving income poverty – a result consistent with the findings in Table 4.1. Men who have never been married, though not significantly more likely to enter income poverty than men in couples, are substantially less likely to *leave* income poverty once they have entered it.

Table 4.2. Multivariate analysis of factors associated with entering and leaving income poverty between 2002–03 and 2006–07

All aged 50 and over in 2002–03

	Entered poverty		**Left poverty**	
	Without health controls	Controlling for health	Without health controls	Controlling for health
Female in couple	0.009 (0.011)	0.009 (0.012)	–0.019 (0.037)	–0.013 (0.038)
Never-married man	0.048 (0.038)	0.048 (0.038)	–0.175** (0.072)	–0.169** (0.072)
Never-married woman	0.020 (0.033)	0.021 (0.034)	–0.131* (0.074)	–0.127* (0.075)
Divorced/Separated/ Widowed man	0.051** (0.022)	0.054** (0.023)	–0.125** (0.049)	–0.123** (0.050)
Divorced/Separated/ Widowed woman	0.090*** (0.017)	0.094*** (0.019)	–0.186*** (0.035)	–0.193*** (0.036)
Age (years)	0.001 (0.001)	0.001 (0.001)	–0.002 (0.002)	–0.003 (0.002)
Aged over State Pension Age	–0.057** (0.023)	–0.061** (0.024)	0.078 (0.061)	0.107* (0.062)
In labour market	–0.064*** (0.011)	–0.067*** (0.011)	0.208*** (0.041)	0.240*** (0.041)
Partner in labour market	–0.067*** (0.011)	–0.066*** (0.012)	0.185*** (0.055)	0.199*** (0.055)
Education: A levels	–0.028*** (0.010)	–0.032*** (0.011)	0.039 (0.029)	0.043 (0.029)
Education: degree	–0.062*** (0.010)	–0.063*** (0.010)	0.106** (0.045)	0.118*** (0.046)
Reached State Pension Age	–0.066*** (0.010)	–0.067*** (0.010)	0.152*** (0.041)	0.166*** (0.041)
Obtained partner	–0.085*** (0.026)	–0.086*** (0.026)	(dropped)	(dropped)
Lost partner	0.115*** (0.028)	0.120*** (0.029)	–0.064 (0.067)	–0.063 (0.067)
Moved into labour market	–0.085*** (0.021)	–0.087*** (0.021)	0.178** (0.074)	0.178** (0.078)
Moved out of labour market	0.213*** (0.029)	0.214*** (0.030)	–0.331*** (0.058)	–0.347*** (0.056)
Partner moved into labour market	0.011 (0.036)	0.010 (0.036)	0.070 (0.108)	0.074 (0.110)
Partner moved out of labour market	0.158*** (0.030)	0.155*** (0.030)	–0.240*** (0.087)	–0.264*** (0.084)
Risk of low retirement income	0.129*** (0.041)	0.142*** (0.043)	–0.078 (0.058)	–0.106* (0.059)
Difficulties with any ADL		–0.016 (0.017)		0.110*** (0.043)
Difficulties with any IADL		–0.019 (0.017)		0.059 (0.045)
Two or more mobility difficulties		–0.011 (0.013)		–0.023 (0.039)
ADL worsened		–0.017 (0.015)		0.080** (0.040)

Table 4.2 continued

	Entered poverty		Left poverty	
	Without health controls	Controlling for health	Without health controls	Controlling for health
IADL worsened		0.003		–0.040
		(0.016)		(0.041)
Mobility worsened		0.030*		–0.039
		(0.016)		(0.041)
ADL improved		0.014		–0.048
		(0.024)		(0.057)
IADL improved		0.072**		0.035
		(0.030)		(0.057)
Mobility improved		0.016		–0.119**
		(0.021)		(0.056)

Notes: Marginal effects and standard errors (in parentheses) are reported. Marginal effects are evaluated for men in couples, with A levels but no higher education, aged 65 (and so above the SPA) in 2002–03 – all other variables set to zero. Statistical significance at the 1%, 5% and 10% levels is denoted by ***, ** and * respectively. Sample size = 5,679 for whether or not entered poverty and 1,671 for whether or not left poverty. 'Obtained partner' was dropped from the analysis of leaving poverty because only 13 individuals who were in income poverty in 2002–03 obtained a partner (all of whom moved out of income poverty by 2006–07). Reference group is men in couples aged below the SPA, not in the labour force, partner not in the labour force, no reported health problems, education below A level, no reported health changes of individual between 2002–03 and 2006–07, and not at risk of retiring on an income below the Pension Credit Guarantee. Constant and controls for missing education, missing risk, imputed components of income, and whether aged 90 or over are also included.

Individuals who are in couples in 2002–03 but who 'lose' their partner (whether through separation, divorce or death) face a substantially greater risk of entering income poverty.

As with income poverty in the previous section, we find that being above the SPA is *negatively* associated with entering income poverty once we control for other characteristics of individuals above the SPA. Reaching the SPA between 2002–03 and 2006–07 is also negatively associated with entering poverty and it is positively associated with leaving it. Again this is likely to be explained by individuals receiving the state pension (and possibly other state benefits and even private pensions) once they reach the SPA.

Individuals who leave the labour force and/or whose partner leaves the labour force are substantially more likely to enter income poverty (and substantially less likely to leave income poverty). Higher levels of education are negatively associated with entering income poverty and positively associated with leaving it.

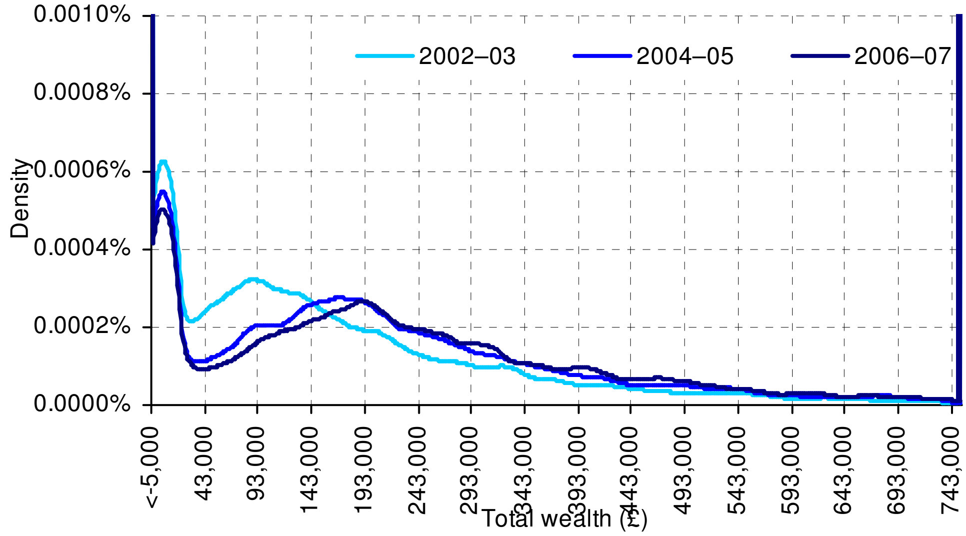
Those considered to be at risk of having retirement resources insufficient to deliver a retirement income in excess of the Pension Credit Guarantee are found to be substantially more likely to move into income poverty.

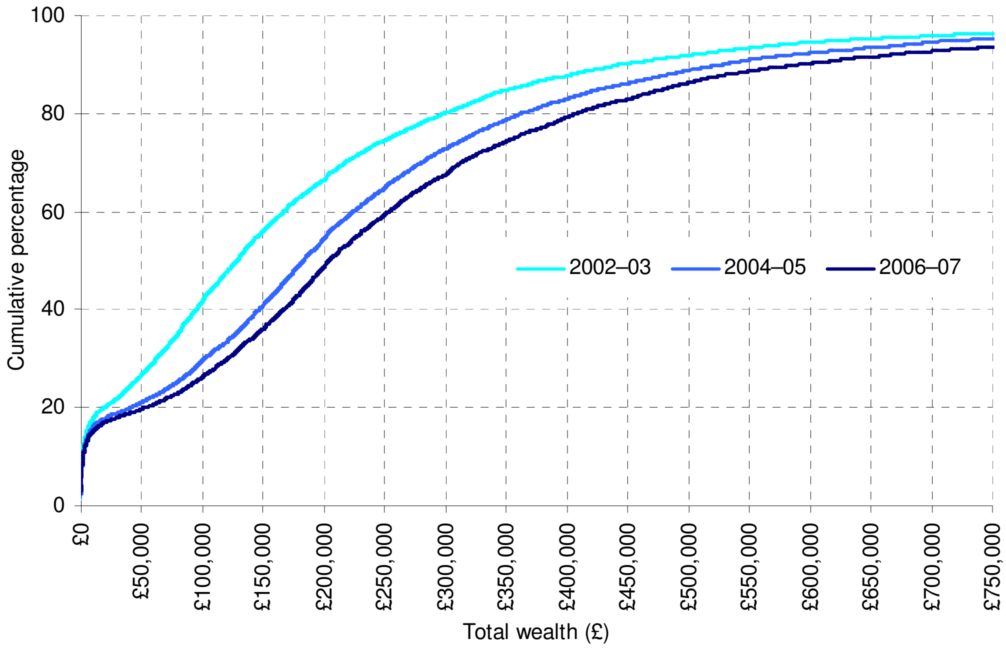
As in the previous section, the inclusion of controls for physical functioning difficulties does not substantially alter our conclusions. There is some evidence, however, that having difficulties with activities of daily living is positively associated with leaving income poverty. Again it seems likely that receipt of income from disability benefits may partly explain this result.

4.4 Wealth

We now turn to examine another dimension of individuals' living standards – namely, the amount of wealth held by them and, where relevant, their partner. The measure of wealth used here includes financial, physical (such as business wealth, land or jewellery) and housing wealth (net of any mortgage debt) but excludes wealth held in state and private pensions. Evidence from the 2002–03 wave of ELSA showed that wealth was far from evenly distributed (see Banks, Karlsen and Oldfield [2004] and Banks, Emmerson, Oldfield and Tetlow [2005]). Figure 4.4 shows that this is also the case in 2004–05 and in 2006–07.

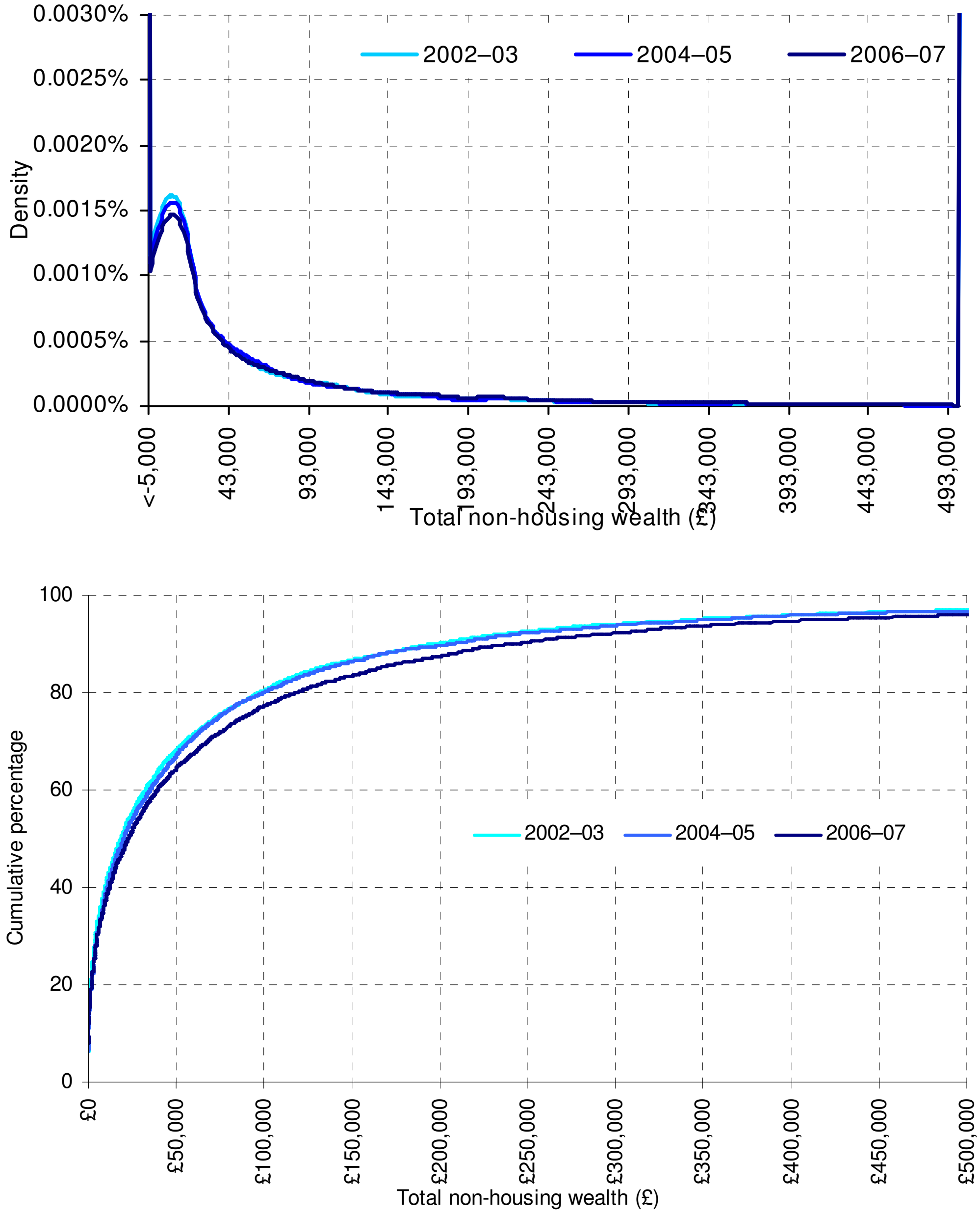
Figure 4.4. Distribution of total wealth





Notes: Unweighted. Probability distribution functions estimated using an Epanechnikov kernel with a half-width of £10,000. Individuals aged 50 and over in 2002–03, 52 and over in 2004–05 and 50 and over in 2006–07. Sample size = 11,416 in 2002–03, 8,878 in 2004–05 and 9,093 in 2006–07.

Figure 4.5. Distribution of non-housing wealth



Notes: Unweighted. Probability distribution functions estimated using an Epanechnikov kernel with a half-width of £10,000. Individuals aged 50 and over in 2002–03, 52 and over in 2004–05 and 50 and over in 2006–07. Sample size = 11,416 in 2002–03, 8,878 in 2004–05 and 9,093 in 2006–07.

Figure 4.4 also shows that there has been considerable growth in the wealth of ELSA respondents over time, and in particular between 2002–03 and 2004–05.[5] For example, at the median, wealth (in nominal terms) grew from just over £128,090 in 2002–03 to £183,000 in 2004–05 to £204,456 in 2006–07

[5] For more detail of the growth in net financial and physical wealth, and housing wealth, among ELSA respondents between 2002–03 and 2004–05, see Banks, Emmerson and Tetlow (2007).

(shown later in Table 4.3). This growth in wealth can be seen across the whole distribution of wealth.

Much of the growth in wealth, and the fact that there was more growth between 2002–03 and 2004–05 than between 2004–05 and 2006–07, is due to growth in house prices increasing the value of housing wealth. For example, according to the Nationwide House Price Index, across the whole of the UK house prices increased by 38% between the third quarter of 2002 and the third quarter of 2004 but by 10% between the third quarter of 2004 and the third quarter of 2006. This is confirmed in Figure 4.5, which shows the distribution of non-housing wealth. This hardly changed between 2002–03 and 2004–05 (when house prices were growing more quickly) and increased slightly between 2004–05 and 2006–07 (when house prices were growing more slowly).

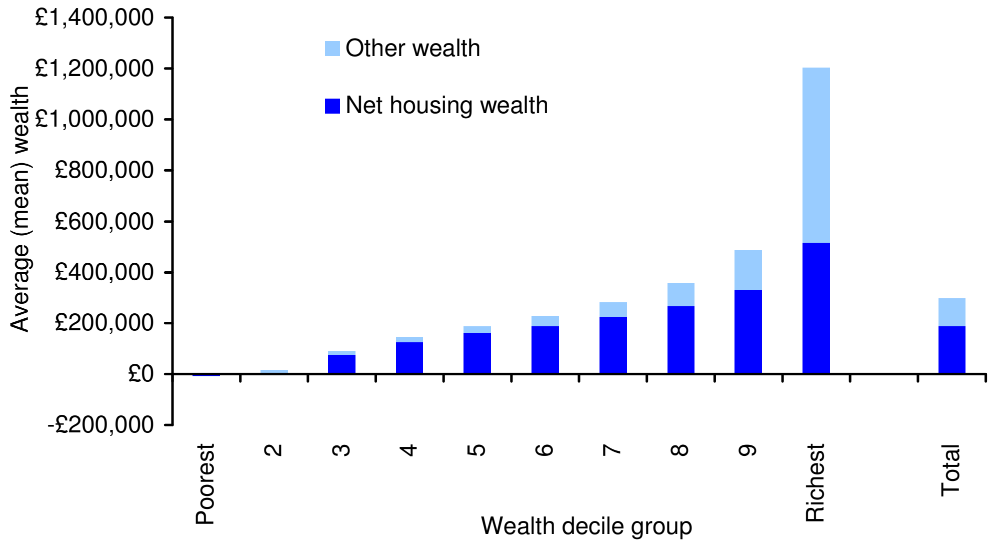
In principle, differences between the distribution of wealth in each wave of ELSA could also be due to differences in the individuals being sampled in each year – for example, the fact that the 2002–03 (1st) and 2006–07 (3rd) waves of ELSA were designed to be representative of those aged 50 and over, whereas the 2004–05 (2nd) wave did not contain core sample members aged 50 or 51. To see the extent to which this matters, summary statistics of the distribution of both total wealth and non-housing wealth are presented in Table 4.3; these are shown separately for all core ELSA respondents and for just those aged 52 or over in each wave. This shows essentially the same pattern as Figures 4.4 and 4.5 – large increases in housing wealth between 2002–03 and 2004–05 with smaller increases over the following two years and much smaller increases in non-housing wealth.

Table 4.3. Distribution of total wealth and non-housing wealth: summary statistics

	Mean	25th percentile	Median (50th)	75th percentile	N
Net total wealth					
2002–03, age≥50	206,453	43,000	128,090	254,000	11,416
2004–05, age≥52	267,225	77,600	183,000	317,000	8,878
2006–07, age≥50	298,417	92,500	204,456	356,360	9,093
2002–03, age≥52	205,800	42,005	126,902	254,000	10,725
2004–05, age≥52	267,225	77,600	183,000	317,000	8,878
2006–07, age≥52	296,779	93,000	205,000	359,040	8,491
Non-housing wealth					
2002–03, age≥50	84,124	2,500	18,100	73,052	11,416
2004–05, age≥52	92,468	3,069	19,965	74,515	8,878
2006–07, age≥50	109,605	3,156	22,500	89,400	9,093
2002–03, age≥52	84,062	2,500	18,000	72,763	10,725
2004–05, age≥52	92,468	3,069	19,965	74,515	8,878
2006–07, age≥52	107,618	3,500	23,000	90,000	8,491

Note: Unweighted.

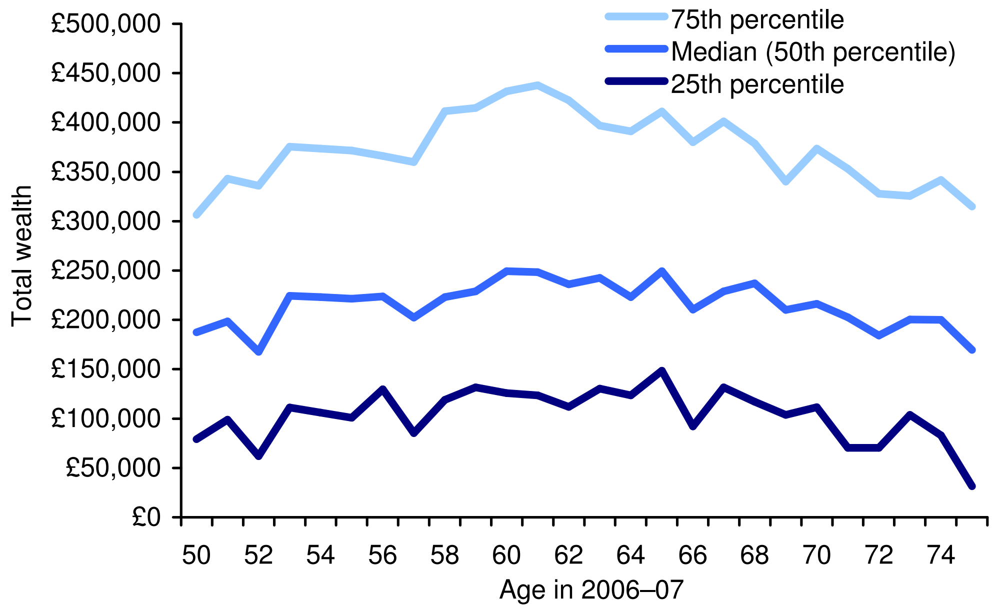
Figure 4.6. Composition of wealth, by decile of total wealth, 2006–07



Notes: Unweighted. Sample size = 9,093.

The components of total wealth are also distributed differently across the distribution of total wealth. As shown in Figure 4.6, housing wealth is more evenly distributed than non-housing wealth. For example, the mean level of housing wealth among the richest tenth of the population is just over three times that held on average among those in the 5th decile, whereas the mean level of non-housing wealth is almost 30 times greater. In total, the wealthiest tenth of the ELSA sample hold 27% of net housing wealth but 63% of non-housing wealth (and 40% of total wealth).

Figure 4.7. Variation in wealth by age, 2006–07



Notes: Unweighted. Total sample size = 7,771, with at least 191 observations at each single age. Value for age 54 interpolated from 53- and 55-year-olds due to the 2006–07 ELSA not containing a representative sample of 54-year-olds.

Holdings of wealth are also found to vary by observed background characteristics. Figure 4.7 shows evidence of an inverse U-shaped pattern of wealth holding by age at the 25th, 50th (median) and 75th percentiles of the distribution. Younger working individuals are likely to still be accumulating wealth, which could explain why they tend to hold less wealth than those around retirement. There is evidence that older individuals typically hold less wealth, for at least two reasons. First, it could be due to wealth being spent by individuals as they approach the end of their lives (an age effect). Second, it could be due to older individuals having had lower earnings when they were in paid work (a cohort effect). Further analysis of subsequent waves of ELSA data will be able to unpick the extent to which explanations such as these explain the pattern seen in Figure 4.7.

Table 4.4. Multivariate analysis (quantile regression) of associations between total wealth and other observed characteristics

All aged 50 and over in 2002–03

	25th percentile	Median (50th percentile)	75th percentile
Age (years)	–132	144	1,236**
	(275)	(423)	(548)
Aged over SPA	27,405***	19,488**	15,254
	(5,291)	(8,291)	(11,060)
Female in couple	–4,563	865	7,923
	(3,679)	(5,705)	(7,387)
Never-married man	–101,763***	–115,320***	–107,186***
	(9,564)	(14,943)	(19,544)
Never-married woman	–97,402***	–115,508***	–119,807***
	(9,462)	(14,649)	(19,020)
Divorced/Separated/Widowed man	–101,907***	–107,946***	–110,199***
	(6,022)	(9,311)	(12,066)
Divorced/Separated/Widowed woman	–89,096***	–96,993***	–91,879***
	(4,450)	(6,826)	(8,889)
Income (£ p.w.)	31***	143***	395***
	(2)	(2)	(2)
In the labour market	11,479***	–15,541**	–35,450***
	(4,114)	(6,399)	(8,734)
Education: A levels	58,511***	83,630***	109,831***
	(3,536)	(5,456)	(7,116)
Education: degree	122,233***	171,717***	215,674***
	(4,664)	(7,167)	(9,328)
Two or more mobility difficulties	–31,239***	–37,430***	–46,268***
	(3,829)	(5,867)	(7,536)
Difficulties with any ADL	–11,936**	–16,578**	–16,363*
	(4,681)	(7,317)	(9,581)
Difficulties with any IADL	–14,553***	–46,271***	–42,844***
	(4,739)	(7,285)	(9,487)

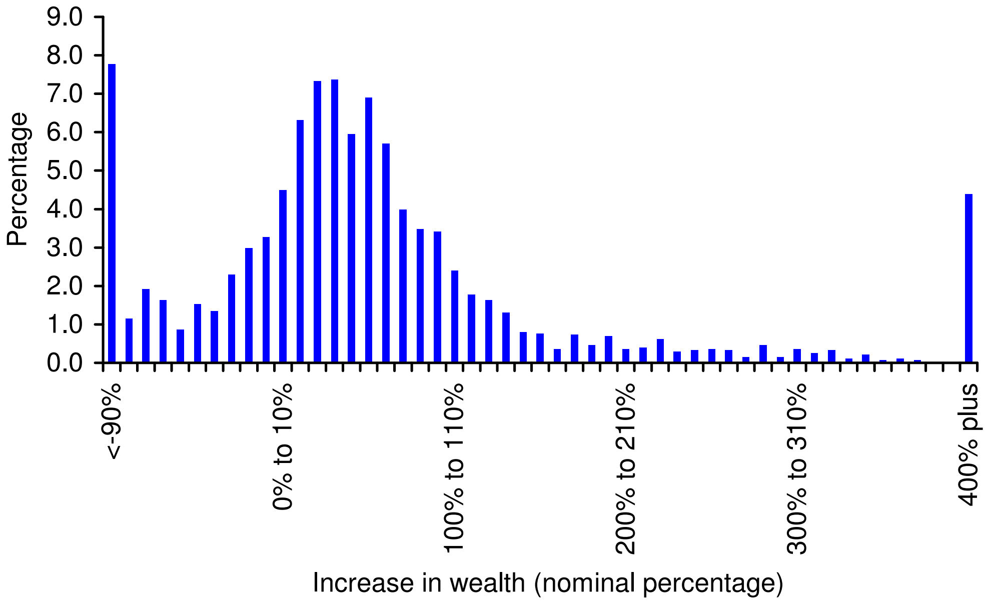
Notes: Sample size = 9,090. Statistical significance at the 1%, 5% and 10% levels is denoted by ***, ** and * respectively. Reference group is men in couples aged below the State Pension Age, not in the labour force, no reported health problems and education below A level. Constant and controls for missing education and whether aged 90 or over are also included. Coefficients and standard errors (in parentheses) for each quantile are estimated separately due to difficulties in getting a joint model to converge.

The findings from a simple multivariate analysis of wealth holdings in 2006–07 are presented in Table 4.4. Results are shown for the 25th, 50th (median) and 75th percentiles of the distribution (this is a quantile regression rather than a standard mean [OLS] regression).[6] Factors associated with higher levels of wealth at all points in the distribution are: having higher current income, having greater levels of education, having a partner, not having any difficulties with ADLs or IADLs and not having two or more difficulties with mobility. Being in the labour market is associated with greater wealth at the 25th percentile but less wealth at the 50th (median) and 75th percentiles. This perhaps suggests that among the wealthy, those who have retired are typically wealthier than those who have not.

Changes in wealth

The fact that ELSA follows the same individuals over time also allows us to examine the changes in wealth at the individual level, both to see how they are distributed and to see how they correlate with other observed characteristics. This subsection examines the percentage change in nominal wealth seen between 2002–03 and 2006–07. The distribution of changes in total wealth is shown in Figure 4.8. The most common increases in wealth were between 20% and 40% over the four years. However, significant numbers experienced very large changes of less than –90% or more than 400%.

Figure 4.8. Distribution of increases in total wealth, 2002–03 to 2006–07 (nominal percentage)



Notes: Unweighted. Total sample size = 2,755. Only individuals who report a precise value for each component of total wealth in both 2002–03 and 2006–07 are used.

[6] Quantile regression (rather than mean regression) is used to ensure that the results are not skewed by the relatively small number of families that hold relatively large amounts of wealth (and therefore would have the most weight in an OLS regression).

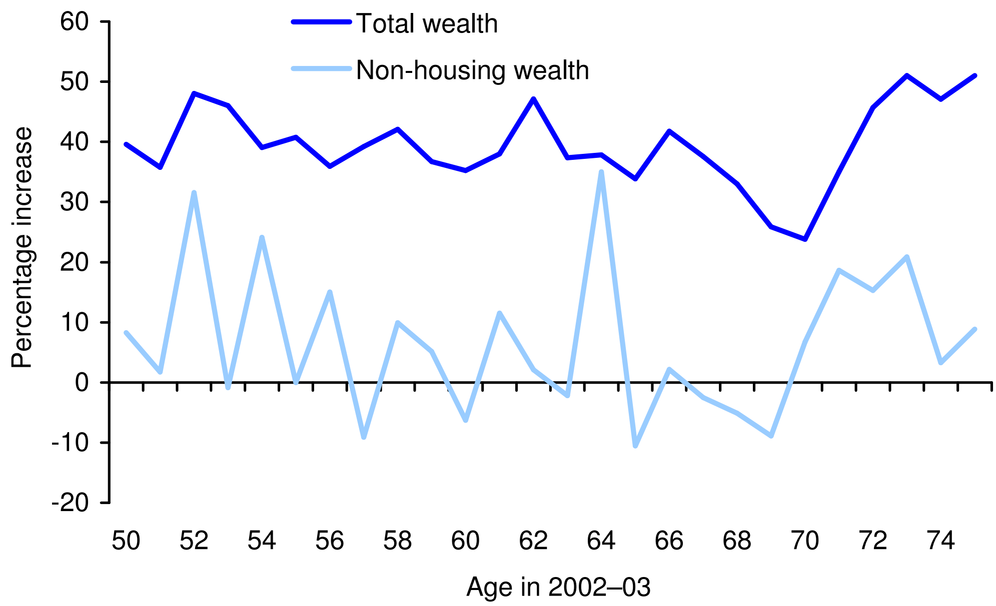
Summary statistics for both the change in total wealth and the change in non-housing wealth are shown in Table 4.5. The median increase in total wealth is found to be 39%. In contrast, the median increase in non-housing wealth is found to be just 6%. There is also little evidence that those with housing wealth, who would typically have benefited from strong growth in house prices, chose to run down their other forms of wealth. The median increase in non-housing wealth among those with housing wealth was 7% whereas the median increase among those without any housing wealth was 0%.

Table 4.5. Distribution of nominal percentage changes in wealth between 2002–03 and 2006–07: summary statistics

	Mean	25th percentile	Median (50th)	75th percentile	N
Total wealth					
All	+120%	+0%	+39%	+86%	2,669
Those with housing wealth	+67%	+15%	+44%	+80%	1,969
Those w/o housing wealth	+269%	–81%	+0%	+139%	700
Total non-housing wealth					
All	+344%	–60%	+6%	+109%	3,295
Those with housing wealth	+311%	–55%	+7%	+106%	2,586
Those w/o housing wealth	+466%	–82%	+0%	+123%	709

Notes: Unweighted. Whether an individual has or has not got any housing wealth is based on gross housing wealth in 2002–03 – since a small number of individuals sold or acquired housing wealth, the increase in total wealth among those with no housing wealth in 2002–03 is not the same as the increase in non-housing wealth among the same group. For each measure of wealth (total wealth and total non-housing wealth), only individuals who report a precise value for each component of that measure of wealth in both 2002–03 and 2006–07 are used.

Figure 4.9. Median nominal percentage increases in wealth between 2002–03 and 2006–07, by age



Notes: Unweighted. Total sample size = 2,262 for total wealth and 2,846 for non-housing wealth. For each measure of wealth (total wealth and total non-housing wealth), only individuals who report a precise value for each component of that measure of wealth in both 2002–03 and 2006–07 are used.

A breakdown of this median increase in wealth, both total and non-housing, by age is presented in Figure 4.9. This shows that there is no obvious pattern with age in the median increases in either form of wealth. Slightly greater increases in total wealth are observed for those who were in their early 50s in 2002–03. This is likely to be because home-owners in this group would be less likely to own their homes outright. This would be expected to lead to larger increases in total wealth, for two reasons. First, mortgage repayments will in part represent an increase in wealth. Second, the large increase in house prices that occurred over this period will have led to a bigger percentage increase in total wealth for those whose gross housing wealth is large relative to their total net wealth.

Table 4.6. Multivariate analysis (median quantile regression) of associations between percentage changes in total wealth and other observed characteristics

	Nominal percentage increase in:			
	Total wealth		**Non-housing wealth**	
	Coefficient	Std error	Coefficient	Std error
Age (years)	–0.4*	(0.3)	0.6	(0.4)
Aged over SPA	6.6	(5.7)	–3.8	(9.1)
Reached SPA	–0.7	(4.6)	2.2	(7.5)
Female in couple	–2.4	(3.3)	0.5	(5.3)
Never-married man	–20.5**	(8.2)	–10.0	(13.2)
Never-married woman	–5.8	(8.5)	5.6	(14.0)
Div./Sep./Widowed man	–7.3	(5.2)	–7.8	(8.4)
Div./Sep./Widowed woman	–8.3**	(3.9)	–3.4	(6.3)
Gained partner	142.6***	(15.9)	77.0***	(26.4)
Lost partner	–20.0***	(6.7)	–21.6**	(10.9)
Income (£ p.w.)	–0.0***	(0.0)	0.0***	(0.0)
In labour market	7.6*	(4.2)	5.5	(6.7)
Moved into labour market	–0.8	(8.2)	–23.7**	(13.1)
Moved out of labour market	–0.1	(4.7)	0.9	(7.6)
Education: A levels	–4.7	(2.8)	0.7	(4.6)
Education: degree	–7.3*	(3.8)	12.2**	(6.2)
Two or more mob. diffs	–2.1	(6.0)	–9.8	(9.7)
Difficulties with any ADL	–5.9	(6.7)	–12.6	(10.8)
Difficulties with any IADL	2.9	(6.5)	6.1	(10.5)
ADL worsened	–1.3	(6.5)	–5.2	(10.6)
IADL worsened	–3.1	(4.9)	–12.2	(7.9)
Mobility worsened	8.3	(6.5)	3.2	(10.5)
ADL improved	3.4	(4.8)	5.4	(7.7)
IADL improved	1.7	(5.6)	7.4	(9.1)
Mobility improved	–4.7	(4.2)	–1.9	(6.8)

Notes: Sample size = 7,584 for total wealth and 7,534 for non-housing wealth. Statistical significance at the 1%, 5% and 10% levels is denoted by ***, ** and * respectively. For each measure of wealth (total wealth and total non-housing wealth), only individuals who report either a precise value, or a closed band, for each component of that measure of wealth in both 2002–03 and 2006–07 are used. Reference group is men in couples aged below the State Pension Age, not in the labour force, partner not in the labour force, no reported health problems, education below A level and not at risk of retiring on an income below the Pension Credit Guarantee. Constant and controls for missing education, whether aged 90 or over, and whether only reporting a closed band (rather than a precise value) for any component of the relevant measure of wealth are also included.

Multivariate analyses of both the percentage change in nominal total wealth and the percentage change in nominal non-housing wealth are shown in Table 4.6. Characteristics associated with greater nominal growth in total wealth over the period from 2002–03 to 2006–07 include having lower income, being in the labour market, having lower education, not being a never-married man or a previously married woman, not obtaining a partner, and losing a partner. None of the measures of health in 2002–03, or changes in health between 2002–03 and 2006–07, was found to be statistically significantly associated with the change in total wealth.

Greater growth in nominal total non-housing wealth is associated with higher income, higher levels of education and not moving into the labour force. The causality on the last finding could well be that it is those with lower levels of non-housing wealth who are more likely to decide to move into the labour force than those who are also out of the labour force but who have higher levels of non-housing wealth. As before, and unsurprisingly given that wealth is measured at the family level, acquiring a partner is associated with an increase in non-housing wealth and losing a partner is associated with a fall in non-housing wealth. Also as before, no statistically significant associations were found between the measures of health and health changes included in the model and the growth in total non-housing wealth.

Potential future Inheritance Tax payers

Sections 4.2 and 4.3 provided a focus on those with relatively low levels of income. In contrast, this subsection provides an examination of the proportions with relatively high levels of wealth – sufficiently high that, were they to have died at the time of their ELSA interview, they would have had wealth in excess of the Inheritance Tax threshold. This has been the subject of much policy debate in recent months: reforms proposed by the opposition Conservative Party in September 2007, and those implemented by the Treasury in October 2007, were both aimed at reducing the number of people potentially facing future Inheritance Tax liabilities.

Previous analysis of ELSA from 2002–03 (Banks, Karlsen and Oldfield, 2004; Banks, Emmerson and Oldfield, 2005) and from 2006–07 (Ross, Lloyd and Weinhardt, 2008) has found that, on average, younger and wealthier individuals report a higher expected chance of leaving a bequest or receiving an inheritance. Here we instead focus on the proportions who currently have wealth in excess of the Inheritance Tax threshold. Research by the Halifax (2007) has estimated that 12% of owner-occupied properties are worth more than the Inheritance Tax threshold. Not all individuals are owner-occupiers, of course, but there are at least three other reasons why the proportion of individuals who will pay Inheritance Tax could differ from this 12% figure. First, for Inheritance Tax purposes, it is the total value of their estate (net of any debt) that matters, not their gross housing wealth. Second, individuals who leave assets to their married (or civil) partner will not be liable for Inheritance Tax. Third, individuals may reduce their wealth between now and death, either for ‘standard’ life-cycle reasons or even because they wish to avoid paying Inheritance Tax – for example, by making *inter vivos* (lifetime) gifts more than seven years before they die.

For this analysis, we are able to deal with these three issues. First, we look at total wealth rather than just gross housing wealth. Second, we assume that all married couples managed their affairs so that they could take advantage of both their individual Inheritance Tax allowances (£250,000 in 2002–03, £263,000 in 2004–05 and £285,000 in 2006–07). Third, we exploit the panel element of the ELSA data to look at whether older individuals tend to move above or below the Inheritance Tax threshold as they age.

The second assumption might seem particularly strong, as it means that only the youngest individual (who is assumed to die last) could pay Inheritance Tax, and then only if their current total wealth exceeded twice the threshold. To the extent to which this was not the case, greater numbers would theoretically have had wealth in excess of the threshold. Note, however, that since the October 2007 Pre-Budget Report, this assumption will be far less strong as married/civil-partnered individuals can inherit the unused proportion of their deceased spouse's allowance.[7] For cohabiting couples, we allocate half their wealth to each individual and assume that Inheritance Tax would be paid if this wealth exceeds the threshold. While this might understate the numbers in cohabiting couples who pay Inheritance Tax (since their wealth might not be equally split, or the first to die might leave their wealth to the other individual),[8] the bias created by this assumption will be relatively small since less than 5% of individuals aged 50 and over in each wave of ELSA are cohabiting (and some of these could marry before they die).

Official administrative data show that the percentage of estates paying Inheritance Tax has increased sharply in recent years, but that despite this increase, the vast majority of estates do not pay it (the percentage paying increased from 2.3% in 1996–97 to 5.9% in 2005–06). However, the 2006–07 ELSA data reveal that a far higher percentage of individuals aged 50 and over – 11.8% – had total wealth that was in excess of the threshold that applied in that year. That is to say that had all ELSA respondents died immediately after their interview, almost one-in-nine would have been liable for Inheritance Tax, which is larger than the fraction of those who died who did pay Inheritance Tax in that year. But not all ELSA respondents will be equally likely to die – older respondents will be substantially more likely to die than younger ones. Hence future numbers of Inheritance Tax payers will depend on how the wealth of those who do not die evolves in the future.

Specifically, the disparity between the number of current Inheritance Tax payers and the number with wealth currently above the threshold will depend on two factors. First, it could be that those who do not die are, on average, from younger cohorts who have amassed greater amounts of wealth over their lifetime; therefore, in future, there could be a genuine increase – potentially sharp – in the percentage with wealth above the threshold. Second, it could be that individuals with wealth in excess of the threshold run down their wealth

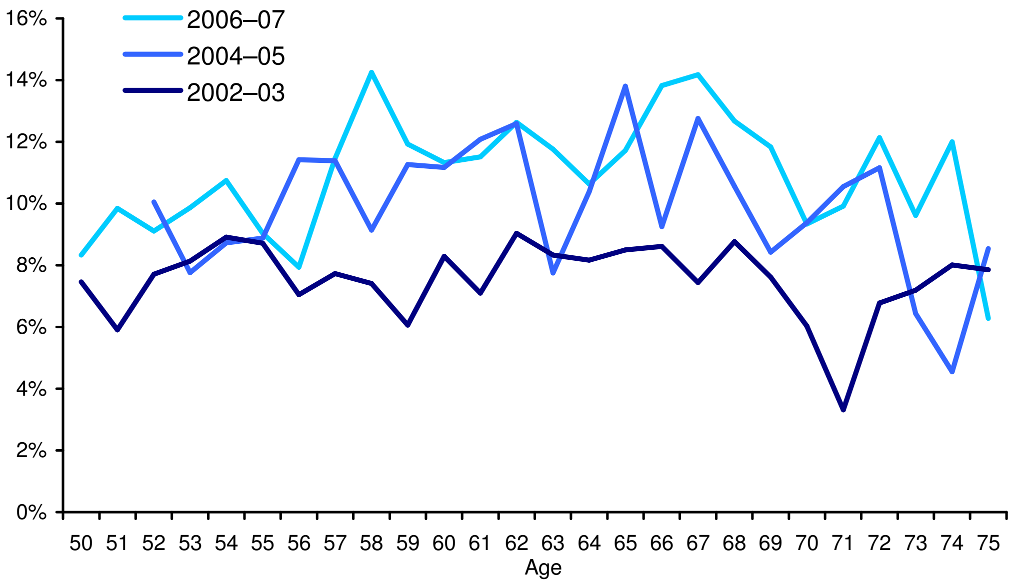
---

[7] Note, however, that we assume that ELSA respondents (whether single, cohabiting or married) have not inherited any unused Inheritance Tax allowance from previous marriages.

[8] It could also overstate the numbers – for example, if the first member of a cohabiting couple to die owns none of the family's wealth then only the second to die could be liable for Inheritance Tax.

as they approach the end of their lives – either for the usual life-cycle reasons or even because of the presence of Inheritance Tax itself. There could also be a combination of the two factors. Some evidence on this is presented in Figure 4.10, which shows the percentage estimated to have wealth in excess of the Inheritance Tax threshold in 2002–03, 2004–05 and 2006–07 split by age. This shows that in cross-section, the percentage estimated to be potentially liable in 2006–07 appears to peak for individuals in their 60s and then falls back. Furthermore, it shows that at most ages, a lower proportion of individuals had wealth in excess of the Inheritance Tax threshold in 2002–03 than in either 2004–05 or 2006–07.

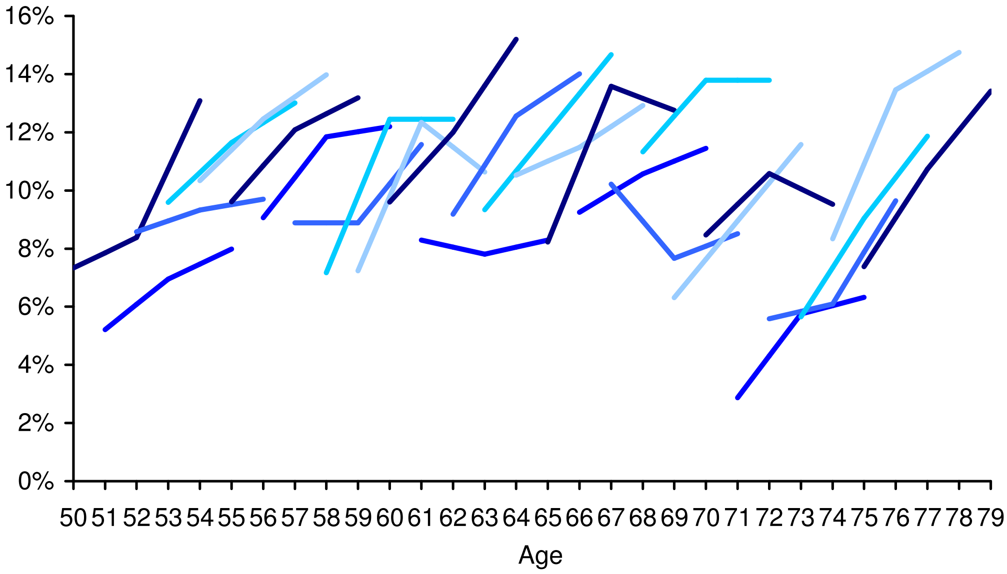
Figure 4.10. Percentage with total wealth in excess of the Inheritance Tax threshold, 2002–03, 2004–05 and 2006–07, by age



Notes: Unweighted. Total sample size = 9,308 in 2002–03, 7,039 in 2004–05 and 7,300 in 2006–07. Assumes that all wealth would be subject to Inheritance Tax (i.e. the estate would not qualify for Business Relief or Agricultural Relief) and that no gifts have been made in the last seven years. Those currently married or in a civil partnership are assumed to benefit from a double allowance and those not currently married or in a civil partnership are assumed to have a single allowance.

However, the data suggest that if we follow the same individuals over time (i.e. individuals interviewed in 2002–03 will age four years by 2006–07), the percentage with wealth in excess of the Inheritance Tax threshold is, if anything, climbing rather than falling with age. This is shown in Figure 4.11 and is evidence that there has been an increase in the percentage of individuals potentially liable for Inheritance Tax. However, we have shown that the driver of the increase in wealth over this period was growth in house prices, which suggests that whether or not this pattern will continue in future might depend heavily on the future path of house prices.

Figure 4.11. Percentage with total wealth in excess of the Inheritance Tax threshold, 2002–03, 2004–05 and 2006–07, by age in 2002–03 and age



Notes: Unweighted. Total sample size = 6,015. Assumes that all wealth would be subject to Inheritance Tax (i.e. the estate would not qualify for Business Relief or Agricultural Relief) and that no gifts have been made in the last seven years. Those currently married or in a civil partnership are assumed to benefit from a double allowance and those not currently married or in a civil partnership are assumed to have a single allowance.

4.5 Well-being and quality of life

Having looked at income and wealth as measures of living standards, we now turn to a potentially more 'direct', but also more difficult-to-interpret, measure of living standards: direct questions asked of ELSA respondents about their well-being and quality of life. We analyse the extent to which changes in income, or other life events that may affect living standards (such as loss of a spouse or leaving the labour force), have an effect on the answers that people give when asked questions about their subjective well-being.

There is an emerging, albeit contentious, economic literature using survey data on subjective well-being to estimate so-called 'happiness equations', with the aim of revealing the correlates (or even the causes) of 'happiness'. Despite the numerous problems (philosophical as well as statistical) with interpreting such equations, which we do not explore in detail here,[9] these analyses have received substantial media and policy attention.

Just as we explored the correlates of income and wealth in previous sections, here we explore the factors correlated with two subjective, self-reported measures of living standards:

[9] A critique of the usefulness of such analysis can be found in Wilkinson (2007), while a defence of the statistical analysis of subjective *well-being* numbers can be found in Clark and Oswald (2002a).

- a self-reported measure of 'well-being' – the 12 questions of the General Health Questionnaire (known as the GHQ-12);
- a self-reported measure of 'quality of life' – the 19 questions of the Control, Autonomy, Self-realisation and Pleasure questionnaire (known as the CASP-19).

The GHQ-12 questionnaire consists of 12 questions used to create a mental well-being measure, often used as a measure of well-being in the economic literature on 'happiness' (see, for example, Clark and Oswald [2002a, 2002b]). The questions ask about how an individual has been feeling over the last few weeks, with respondents choosing among four possible answers for each question. For example, the first question is

> Have you recently been able to concentrate on whatever you're doing?
>
> (1) Better than usual
>
> (2) Same as usual
>
> (3) Less than usual
>
> (4) Much less than usual

For each question, an individual receives a score of zero for the most positive answer ('Better than usual'), one for the next most positive ('Same as usual'), two for the second most negative answer ('Less than usual') and three for the most negative answer ('Much less than usual'). Answers to all questions are summed to give a score (known as a Likert score), with a minimum of zero (if an individual gives the most positive answer to all questions) and a maximum of 36 (if they give all the most negative answers). For ease of interpretation, however, we have reversed this scale (in line with the practice in Clark and Oswald [2002a]), so that higher scores indicate *better* reported mental well-being. Hence, a score of 36 indicates the maximum possible reported well-being, while a score of zero indicates the minimum reported well-being.

The CASP-19 questionnaire is a more recently developed instrument, designed to measure quality of life among older people (see Hyde et al. [2003]). The measure is based on a theory of needs satisfaction, with four sections (each consisting of four or five questions) aiming to gauge the extent to which individuals are fulfilling four sorts of human need:

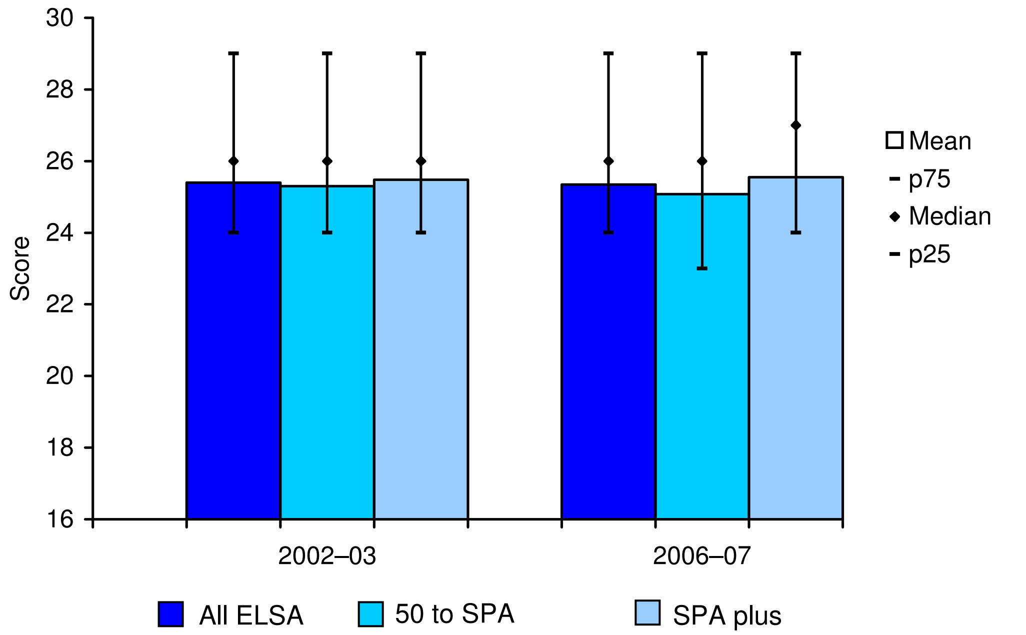
- the need to be able to act freely in one's environment (control);
- the need to be free from undue interference from others (autonomy);
- the need for self-realisation (self-realisation);
- the need to enjoy oneself (pleasure).

As with the GHQ-12, questions are answered on a four-point scale. The first question, for example, is

> My age prevents me from doing the things I would like to do –
>
> (1) Often
>
> (2) Sometimes
>
> (3) Not often
>
> (4) Never

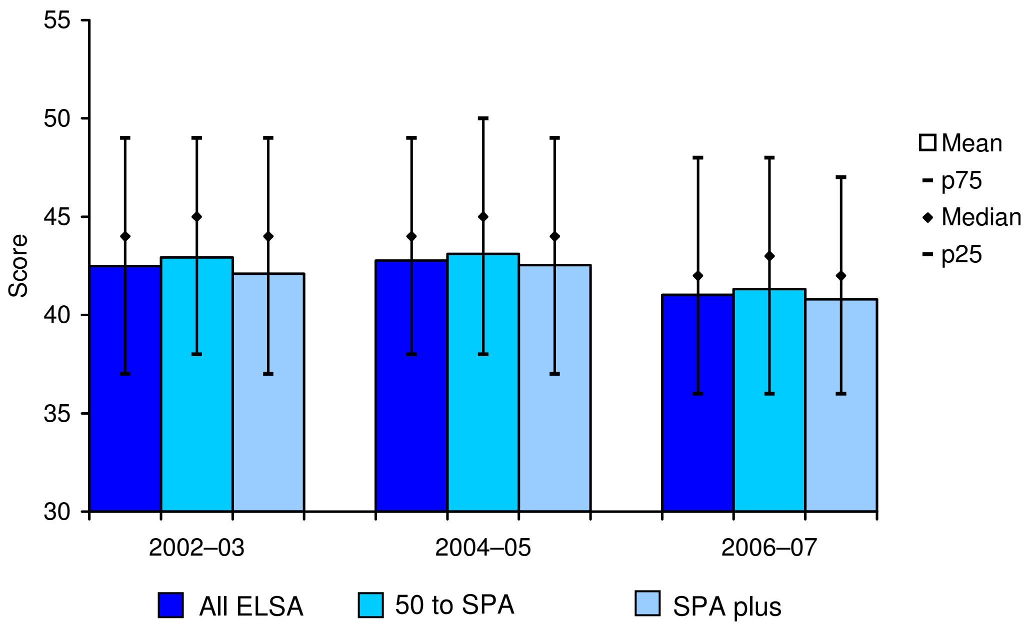
The most negative answer ('Often') receives a score of zero, the next-worst ('Sometimes') a score of one, and so on up to the most positive answer ('Never'), which receives a score of three. Scores for all answers are summed to give a scale with a minimum of zero (lowest reported quality of life) and maximum of 57 (highest reported quality of life).

Figure 4.12a. Mean GHQ scores (greater score = higher reported well-being, maximum score = 36)



Notes: Unweighted. SPA = State Pension Age.

Figure 4.12b. Mean CASP scores (greater score = higher reported quality of life, maximum score = 57)



Notes: Unweighted. SPA = State Pension Age.

Figure 4.12a shows mean and median GHQ scores, as well as the interquartile range, in 2002–03 and 2006–07 (the GHQ questionnaire was not administered in 2004–05), while Figure 4.12b shows the same for CASP in all three ELSA waves.

For both GHQ and CASP, median and mean scores and the interquartile range are strikingly consistent both between age groups and across years. GHQ scores consistently have a mean of around 25, while mean CASP scores remain between 41 and 43. Individuals above the State Pension Age report slightly higher well-being (GHQ): the difference in mean scores is small (no more than half a point) but statistically significant in 2006–07.[10] By contrast, individuals above the State Pension Age report slightly lower quality of life (CASP): again the difference in mean scores is small (less than one point) but it is statistically significant in all years.[11]

Table 4.7 presents multivariate analysis of the factors associated with higher well-being scores (GHQ) and quality-of-life scores (CASP) in the 2002–03 ELSA wave. For ease of interpretation, and following Clark and Oswald (2002b), we use a standard linear regression (OLS) for this analysis.

It is clear that income (incorporated here as the log of household equivalised income) is positively and significantly associated with higher reported well-being and quality of life. Also, being at risk of low income in retirement is strongly associated with lower reported well-being and quality of life.

Reported physical functioning (an indicator of health) appears to be an important correlate of answers to these questions. Having difficulties with any of our three physical functioning measures (ADL, IADL and mobility) is strongly associated with lower scores for well-being and for quality of life. Individuals over the SPA are found to be more likely to report higher well-being and quality of life, holding other factors (such as the measures of physical functioning mentioned above) constant.

There are interesting contrasts, however, in the coefficients on sex and marital status across the two measures. Men in couples (the reference group in the tables) appear to have the highest level of self-reported well-being, while their wives/partners report significantly lower levels of well-being. By contrast, it is women in couples who report the highest quality of life, while their husbands/partners report significantly lower quality of life.

Single individuals who were previously in couples (divorced, separated or widowed) report the lowest well-being, while single individuals who have never been married do not appear to have significantly lower well-being than men in couples. (Statistical evidence perhaps that, contrary to Alfred Lord Tennyson, it may *not* be 'better to have loved and lost than never to have loved at all'.)

---

[10] A two-sample t-test rejects the hypothesis that the means are the same in 2006–07, with a p-value of 0.0000. In 2002–03, the comparable p-value is 0.064, so the hypothesis of equal means cannot be rejected at the 5% level.

[11] A two-sample t-test rejects the hypothesis that the means are the same in all three years, with a p-value of 0.0130 in 2002–03, 0.0070 in 2004–05 and 0.0000 in 2006–07.

Table 4.7. Factors associated with well-being and quality of life in 2002–03 (higher scores indicate higher well-being / quality of life)

All aged 50 and over in 2002–03

	Well-being (GHQ) (0 to 36)	Quality of life (CASP) (0 to 57)
Female in couple	–0.437***	1.212***
	(0.132)	(0.227)
Never-married man	–0.401	–2.437***
	(0.337)	(0.580)
Never-married woman	–0.304	0.886
	(0.350)	(0.620)
Divorced/Separated/Widowed man	–0.964***	–1.326***
	(0.218)	(0.380)
Divorced/Separated/Widowed woman	–0.809***	0.173
	(0.165)	(0.289)
Age (years)	0.020**	0.019
	(0.010)	(0.018)
Aged over State Pension Age	0.811***	1.096***
	(0.198)	(0.343)
In the labour market	0.181	0.779***
	(0.154)	(0.264)
Partner in the labour market	0.117	0.296
	(0.152)	(0.260)
Education: A levels	0.123	0.820***
	(0.120)	(0.207)
Education: degree	–0.055	0.407
	(0.168)	(0.290)
Risk of low retirement income	–0.988***	–3.390***
	(0.282)	(0.487)
Difficulties with any ADL	–1.104***	–2.878***
	(0.165)	(0.291)
Difficulties with any IADL	–1.991***	–4.100***
	(0.164)	(0.289)
Two or more mobility difficulties	–1.553***	–3.976***
	(0.135)	(0.235)
Log equivalised household income (£ p.w.)	0.286***	1.311***
	(0.084)	(0.145)

Notes: Individuals whose income was imputed (unless imputed within a closed band) were dropped from the sample. OLS coefficients and robust standard errors (in parentheses) are reported. Statistical significance at the 1%, 5% and 10% levels is denoted by ***, ** and * respectively. GHQ sample size = 7,515; CASP sample size = 6,869. Reference group is men in couples aged below the State Pension Age, not in the labour force, partner not in the labour force, no reported health problems, education below A level and not at risk of retiring on an income below the Pension Credit Guarantee. Constant and controls for missing education, missing risk, missing happiness, imputed components of income in closed band and whether aged 90 or over are also included.

However, we see a different pattern when we turn to the quality-of-life measure. Here it is single men who have never married who report the lowest quality of life, with divorced/separated/widowed men close behind. Single women, by contrast, do not report significantly lower quality of life than men in couples. Marital status, then, appears to be a significant correlate of well-being, but sex is the more important correlate of quality of life.

One natural concern in interpreting the results in Table 4.7 is that individuals' answers may be biased by their personality (or natural disposition) in a way that is correlated with other observed variables, such as marital status or education. It may be, for example, that naturally 'gloomy' individuals are less likely to marry (or less likely to remain married). This would bias our coefficients on marital status, because such individuals will also be more likely to give negative answers to GHQ or CASP questions. This is referred to as the 'omitted dispositions' problem.

However, we can use the panel nature of the ELSA data to try to overcome this problem. We do this by focusing on the *change* in individuals' answers to these questions (rather than their level), taking first-differences of the model in Table 4.7. By subtracting an individual's score in 2002–03 from their score in 2006–07, we create a variable that potentially varies between –36 and +36 (for GHQ) or –57 and +57 (for CASP). We then regress this variable on an individual's baseline characteristics, plus changes in those characteristics between 2002–03 and 2006–07.

We report the results from such a first-differences model in Table 4.8. As in Table 4.7, the reported coefficients are from a standard linear regression (OLS). For each self-reported measure, two specifications are reported: one in which we treat gains in log income as affecting an individual's answers to the same extent as an equivalent fall in log income, and a second in which we allow gains in log income to affect answers differently from losses in log income.

We find that changes in income are correlated with changes in GHQ and CASP scores, with increases in income associated with an improvement in both reported well-being and quality of life. In the case of CASP, we find no evidence that income gains affect an individual's reported quality of life in an asymmetric way. In contrast, with GHQ, we find evidence that gains in income increase reported well-being much more significantly than income losses reduce it.[12]

Moving out of the labour force is associated with significant improvements in both reported well-being and reported quality of life. Having a partner who moves into or out of the labour force, by contrast, has no significant effect on either measure.

Any worsening of physical functioning is strongly and significantly associated with reduced scores on both the GHQ and CASP measures, and there is (more limited) evidence that improvements in physical functioning improve scores.

[12] For the GHQ regression, an F-test rejects the null hypothesis that the coefficients on positive and negative income changes are equal at the 5% level. For the CASP regression, the null hypothesis that the coefficients are equal cannot be rejected at the 5% level.

Table 4.8. Factors associated with change in well-being and change in quality of life (higher scores indicate improved well-being / quality of life)

All aged 50 and over in 2002–03

	Change in GHQ score, 2002–03 to 2006–07 (–36 to +36)		**Change in CASP score, 2002–03 to 2006–07 (–57 to +57)**	
	Income gains and losses symmetric	Income gains and losses asymmetric	Income gains and losses symmetric	Income gains and losses asymmetric
Female in couple	–0.293 (0.191)	–0.283 (0.191)	0.280 (0.282)	0.279 (0.282)
Never-married man	–0.457 (0.446)	–0.417 (0.445)	0.552 (0.739)	0.548 (0.739)
Never-married woman	–0.319 (0.665)	–0.313 (0.667)	–0.881 (0.985)	–0.881 (0.985)
Divorced/Separated/ Widowed man	0.829** (0.361)	0.832** (0.361)	0.630 (0.546)	0.629 (0.546)
Divorced/Separated/ Widowed woman	0.453* (0.257)	0.491* (0.258)	1.172*** (0.374)	1.168*** (0.374)
Age (years)	–0.061*** (0.020)	–0.058*** (0.020)	–0.114*** (0.027)	–0.115*** (0.027)
Aged over State Pension Age	0.505 (0.368)	0.522 (0.367)	0.218 (0.536)	0.215 (0.537)
In the labour market	–0.166 (0.248)	–0.183 (0.247)	–0.636* (0.367)	–0.635* (0.367)
Partner in the labour market	–0.008 (0.232)	–0.020 (0.231)	–0.026 (0.359)	–0.025 (0.359)
Education: A levels	–0.303* (0.171)	–0.337* (0.172)	–0.376 (0.252)	–0.372 (0.253)
Education: degree	–0.554** (0.241)	–0.612** (0.242)	–0.089 (0.363)	–0.082 (0.366)
Reached State Pension Age	0.375 (0.275)	0.360 (0.275)	0.639 (0.409)	0.640 (0.409)
Gained partner	–0.295 (1.225)	–0.383 (1.234)	0.571 (2.005)	0.580 (2.008)
Lost partner	–0.721 (0.603)	–0.745 (0.604)	0.234 (0.689)	0.237 (0.690)
Moved into labour market	0.199 (0.594)	0.150 (0.594)	0.059 (0.784)	0.063 (0.785)
Moved out of labour market	0.797*** (0.288)	0.767*** (0.287)	1.166*** (0.435)	1.169*** (0.435)
Partner moved into labour market	0.624 (0.427)	0.566 (0.420)	0.816 (0.770)	0.822 (0.772)
Partner moved out of labour market	0.479 (0.317)	0.457 (0.315)	0.596 (0.445)	0.599 (0.445)
Risk of low retirement income	–1.083** (0.537)	–1.013* (0.538)	–0.574 (0.713)	–0.582 (0.718)
Difficulties with any ADL	–0.360 (0.367)	–0.365 (0.367)	0.068 (0.504)	0.069 (0.504)
Difficulties with any IADL	0.602 (0.409)	0.604 (0.409)	1.141** (0.555)	1.141** (0.555)

Continues

Table 4.8 continued

	Change in GHQ score, 2002–03 to 2006–07 (–36 to +36)		Change in CASP score, 2002–03 to 2006–07 (–57 to +57)	
	Income gains and losses symmetric	Income gains and losses asymmetric	Income gains and losses symmetric	Income gains and losses asymmetric
Two or more mobility difficulties	0.068 (0.255)	0.090 (0.256)	–0.578 (0.371)	–0.581 (0.371)
ADL worsened	–0.824*** (0.307)	–0.835*** (0.307)	–1.479*** (0.435)	–1.478*** (0.436)
IADL worsened	–0.896*** (0.326)	–0.877*** (0.327)	–1.163*** (0.439)	–1.165*** (0.440)
Mobility worsened	–0.528** (0.259)	–0.500* (0.259)	–1.537*** (0.379)	–1.540*** (0.379)
ADL improved	1.108** (0.483)	1.098** (0.482)	1.119* (0.669)	1.121* (0.668)
IADL improved	–0.028 (0.483)	–0.005 (0.483)	–0.155 (0.706)	–0.158 (0.707)
Mobility improved	0.268 (0.351)	0.267 (0.351)	1.080** (0.520)	1.081** (0.520)
Change in log income (£ p.w.)	0.414*** (0.129)		0.513*** (0.189)	
Log income gain (£ p.w.)		0.829*** (0.254)		0.469 (0.339)
Log income loss (£ p.w.)		0.108 (0.153)		0.547** (0.258)

Notes: Individuals whose income was imputed in either year (unless imputed within a closed band) were dropped from the sample. OLS coefficients and robust standard errors (in parentheses) are reported. Statistical significance at the 1%, 5% and 10% levels is denoted by ***, ** and * respectively. GHQ sample size = 3,721; CASP sample size = 3,341. Reference group is men in couples aged below the State Pension Age, not in the labour force, partner not in the labour force, no health problems, education below A level, no health changes of individual between 2002–03 and 2006–07, and not at risk of retiring on an income below the Pension Credit Guarantee. Constant and controls for missing education, missing risk, income imputed within closed band and whether aged 90 or over are also included.

Somewhat surprisingly, neither the loss of a partner (whether through death or divorce/separation) nor gaining a partner appears to have a significant effect on changes in scores on either measure. When the analysis is repeated using only the ‘happiness’ question from the GHQ questionnaire (available from the authors on request), loss of a partner is found to be a highly significant determinant of individuals’ answers.

4.6 Conclusions

This chapter has explored the associations between income poverty, wealth, self-reported well-being and self-reported quality of life, using the ELSA panel to show how changes in characteristics (such as leaving work or losing a partner) are associated with a significant change in individuals’ resources and their reported well-being.

The chapter has highlighted the extent to which marital status is correlated with financial resources (and changes in those resources), with women who are divorced, separated or widowed shown to be at particular risk of income poverty and significantly greater risk of moving into income poverty. Losing a partner is also associated with significant loss of wealth (presumably especially among those who divorce or separate).

Individuals with low levels of state and private pension rights are, unsurprisingly, found to be significantly more likely to be in income poverty. Individuals who are not in the labour force are also far more likely to be in income poverty. Less intuitively, being above the State Pension Age is found to be *negatively* associated with income poverty, once other characteristics (such as whether or not they are in the labour force) have been controlled for – presumably because of the benefits (and private pension income) that individuals receive later in life.

The chapter has shown that large increases in total wealth occurred between 2002–03 and 2006–07 (though much of the growth took place between 2002–03 and 2004–05), with the median nominal increase in total wealth over this four-year period being 39%. Large increases in house prices appear to explain virtually all of this increase in total wealth, while non-housing wealth has barely grown at all (even in nominal terms). Perhaps surprisingly, we find no evidence that individuals who experience growth in their housing wealth have taken the opportunity to reduce other forms of savings – growth in non-housing wealth over this period is very similar among those with and those without housing wealth. There has also been an increase in the proportion of individuals whose estates will potentially be liable for Inheritance Tax. However, given that the increase in wealth over the period from 2002–03 to 2006–07 happened while house prices were growing very strongly, whether or not this pattern continues in future could well depend in large part on the future path of house prices.

We find that income and reported physical functioning (a measure of health) are significantly positively correlated with both self-reported well-being and quality of life. This chapter has also highlighted the possibility that marital status is a significant correlate of reported well-being (with individuals in couples reporting the highest levels of well-being, and divorced, separated or widowed individuals reporting the lowest), while sex appears to be a more important correlate of reported quality of life (with women reporting higher quality of life than men for any given marital status). However, somewhat surprisingly, gaining or losing a spouse does not appear to be significantly correlated with changes in these measures.

This chapter has shown that worsening physical functioning is, as we would expect, associated with significant deterioration in reported well-being and quality of life. Increased income is found to be significantly associated with an increase in both reported well-being and reported quality of life.

Acknowledgements

The research for this chapter was funded by the ESRC-funded Centre for the Microeconomic Analysis of Public Policy at IFS (grant number RES-544-28-5001) for which the authors are grateful. The authors also thank James Banks, Elizabeth Breeze, Gemma Tetlow and officials from the Department for Work and Pensions, HM Revenue & Customs and HM Treasury for useful comments. Responsibility for interpretation of the data, as well as for any errors, is the authors' alone.

References

Banks, J., Emmerson, C. and Oldfield, Z. (2005), *Preparing for Retirement: The Pension Arrangements and Retirement Expectations of those Approaching State Pension Age in England*, London: Institute for Fiscal Studies (http://www.ifs.org.uk/publications.php?publication_id=3396).

Banks, J., Emmerson, C., Oldfield, Z. and Tetlow, G. (2005), *Prepared for Retirement? The Adequacy and Distribution of Retirement Resources in England*, London: Institute for Fiscal Studies (http://www.ifs.org.uk/publications.php?publication_id=3443).

Banks, J., Emmerson, C. and Tetlow, G. (2007), 'Better prepared for retirement? Using panel data to improve wealth estimates of ELSA respondents', Institute for Fiscal Studies, Working Paper no. 12/07 (http://www.ifs.org.uk//wps/wp1207.pdf).

Banks, J., Karlsen, S. and Oldfield, Z. (2004), 'Socio-economic position', in J. Banks, E. Breeze, C. Lessof and J. Nazroo (eds), *Retirement, Health and Relationships of the Older Population in England: The 2004 English Longitudinal Study of Ageing (Wave 2)*, London: Institute for Fiscal Studies (http://www.ifs.org.uk/elsa/report_wave2.php).

Brewer, M., Browne, J., Emmerson, C., Goodman, A., Muriel, A. and Tetlow, G. (2007), *Pensioner Poverty over the Next Decade: What Role for Tax and Benefit Reform?*, Commentary no. 103, London: Institute for Fiscal Studies (http://www.ifs.org.uk/publications.php?publication_id=3991).

Clark, A. and Oswald, A. (2002a), 'A simple statistical method for measuring how life events affect happiness', *International Journal of Epidemiology*, vol. 31, pp. 1139–1144.

Clark, A. and Oswald, A. (2002b), 'Well-being in panels', Working Paper (http://www2.warwick.ac.uk/fac/soc/economics/staff/faculty/oswald/revwellbeinginpanelsclarkosdec2002.pdf).

Halifax (2007), 'Inheritance tax and stamp duty – the key facts', Press Release, 20 March, available at http://www.hbosplc.com/economy/inheritance_tax.asp.

HM Treasury (2007), *PSA Delivery Agreement 17: Tackle Poverty and Promote Greater Independence and Wellbeing in Later Life* (http://www.hm-treasury.gov.uk/media/0/0/pbr_csr07_psa17.pdf).

Hyde, M., Wiggins, R.D., Higgs, P. and Blane, D.B. (2003), 'A measure of quality of life in early old age: the theory, development and properties of a needs satisfaction model (CASP-19)', *Ageing and Mental Health*, vol. 7, pp. 186–194.

Ross, A., Lloyd, J. and Weinhardt, M. (2008), *The Age of Inheritance*, London: ILC-UK (http://www.ilcuk.org.uk/files/pdf_pdf_54.pdf).

Wilkinson, W. (2007), *In Pursuit of Happiness Research: Is It Reliable? What Does It Imply for Policy?*, Policy Analysis no. 590, Washington, DC: Cato Institute (http://www.cato.org/pubs/pas/pa590.pdf).

5. Investigating the dynamics of social detachment in older age

Wojtek Tomaszewski *National Centre for Social Research*

Matt Barnes *National Centre for Social Research*

This chapter focuses on the relational and dynamic aspects of social exclusion by introducing the concept of social detachment. We measure social detachment according to disadvantage on three of six indicators of social participation: contacts with other people, social support, civic/political involvement, participation in culture, participation in recreational activities/hobbies and participation in leisure.

- Approximately half of older people were at risk of social detachment (disadvantaged on at least one of the six indicators of participation) and around 7% showed signs of social detachment (disadvantaged on at least three of the six indicators of participation) at a given point in time.
- One in ten (10%) older people experienced social detachment at least once across three biennial observations. Half of them (4.5% of all older people) experienced persistent social detachment – detached in at least two of the three waves.
- The duration of social detachment does matter: quality of life (as measured by CASP-19, the government's indicator of subjective well-being) consistently reduces with the duration of social detachment. Other measures of well-being also decrease the longer social detachment lasts.
- The characteristics most strongly associated with a longer duration of social detachment were those related to family composition, specifically not living with a partner. Older people living alone, those living with their children only (i.e. without a partner) and those living with other people but not with partner or children were at risk of longer-lasting social detachment (the odds 3.5 to 8 times higher than for people living with their partner).
- Other demographic characteristics that increase the odds of sustained social detachment include having a low level of education (the odds for those with CSE education or lower are 2.5 times higher than those with a high level of education) and being male (the odds 1.5 times higher than for females).
- General health also had an independent association with persistent social detachment. The odds of being persistently detached were three times higher for those reporting poor health than for those reporting excellent health.
- Material resources were significantly related to the risk of persistent social detachment. Older people on low income, those suffering from material

deprivation and those living in poor housing were markedly more likely to be affected by longer-lasting social detachment.

- Also, older people who lacked access to various services, transport, financial products or modern communication technologies faced an increased risk of prolonged social detachment (in each case the odds were 1.5 to 2 times higher than for people who had access).
- Age itself has been found not to have an independent effect on the persistence of social detachment. The effect of age disappears when family type is controlled for; this is partly because the oldest people (aged 80 years and over) tend to live alone more frequently.

5.1 Introduction

Lack of social participation and poor social relations are an integral part of the concept of social exclusion (see for example Levitas et al., 2007). This chapter focuses on these problems by introducing the concept of *social detachment*, understood as the 'discontinuity in relationships with the rest of society' (Room, 1999, p. 171).

Social detachment can be particularly acute for older people. The impact of key life events, such as bereavement and the onset of ill health, can exacerbate such experiences. Furthermore, detachment can be compounded by the failure of services to react to the combination of difficulties and disadvantages faced by older people.

A recent report by a leading charity has identified 1.2 million older people as severely socially excluded and refers to this experience as 'feeling detached from society; trapped at home; cut-off from services; lonely and isolated' (Age Concern, 2008, p. 2). The government views the problems related to social detachment as significant for older people in particular: 'we have a duty to ensure the ageing generation does not become a lonely generation' (Miliband, 2006, p 9).

Despite a growing body of research on social exclusion of older people, social detachment does not appear prominently in the literature. Especially missing from our understanding of social detachment is how long it lasts and the extent to which the duration of social detachment is linked to quality of life. This chapter will help to fill that gap by using ELSA data to explore the dynamics of social detachment for older people. The chapter will investigate five separate, but linked, research questions:

- How many older people experience social detachment?
- How long does social detachment last?
- How is the duration of social detachment associated with quality of life?
- Which older people are most at risk of persistent social detachment?
- What are the implications for policy and further research?

To answer these questions, consistent indicators of social detachment have been constructed over three biennial waves of ELSA (2002, 2004 and 2006).

Older people were categorised according to the pattern of their experience over the three waves and the analysis focused on those who experience persistent forms of social detachment. Multivariate analysis was used to explore what kinds of older people experience different patterns of detachment using the wide range of information in ELSA about the characteristics of older people, their family and their local area. The findings may have implications for policy – by indicating which specific groups of older people are most at risk of persistent social detachment and suggesting areas of policy that may need to be reconsidered. The chapter will also point to further, more extensive research on social detachment and social exclusion that can be undertaken using ELSA.

5.2 What do we mean by social detachment?

Social detachment describes the outcome of not being able to participate fully in society. Social participation is of particular importance in later life. The SEU report *A Sure Start to Later Life* (SEU, 2006) gives prominence to the relationships older people have, stating that ‘everyone, including older people, has the right to participate and continue throughout their lives having meaningful relationships and roles’ (SEU, 2006, p 8). The SEU report also stresses the importance relationships and participation have in leisure, learning and volunteering activities. Consultation with older people stressed ‘the importance of good relationships with family and friends, of having a role, feeling useful, and being treated with respect’ (SEU, 2006, p 18).

Sure Start to Later Life emphasises the importance of meaningful relationships and roles, and this chimes with Room’s focus on inadequate social participation, lack of social integration and lack of power (Room, 1995). Participation can help to fulfil the basic human needs for a sense of competence, worth and socialisation. This can range from engagement in political parties, trade unions and tenants’ groups to social groups and sports clubs. People’s local communities can provide numerous opportunities both for help and for the chance to help (Palmer, MacInnes and Kenway, 2006).

5.3 How do we measure social detachment?

Social detachment is hard to quantify. A number of approaches can be found in the literature and different authors have accentuated various aspects of detachment, mostly within a broader context of social exclusion (Gordon et al., 2000; Barnes, 2005; Barnes et al., 2006). Another area of research touching upon related issues is the literature on social capital, which focuses on relationships, participation and networks (for a succinct review, see ONS, 2001). Here, relationships, participation and networks are seen as positive activities that can bring about general well-being as well as links to other positive outcomes such as employment and social support.

Despite the importance of participation in later life, exploration of this area is relatively sparse. The government’s own stocktake of progress made in tackling social exclusion – the annual *Opportunity for All* reports (DWP, 2007) – has seven indicators for people in later life, yet none of the indicators touches on social participation or detachment. *Opportunity Age*, the government's strategy for an ageing society, does specify a focus on 'enabling older people to play a full and active role in society' (DWP, 2005). CASP-19, the key overall index of subjective well-being in *Opportunity Age*, is a multidimensional measure related to, among other things, subjective assessment of social networks and possibilities of participation. However, again there is little direct and objective measurement of participation as only three of the thirty-three *Opportunity Age* indicators measure participation: contact with friends and family; sport, leisure and volunteering; and voting. The Poverty and Social Exclusion survey has been used to measure directly the exclusion from social relations (Gordon et al., 2000). It found that some social groups were more badly affected by non-participation, including those aged over 65, women, those without paid work and those living in poverty. Those living alone reported the lowest levels of support.

Social detachment is inherently linked to the notion of social exclusion, which Levitas et al. (2007, p. 8) describe as involving 'the lack or denial of resources, rights, goods and services, and the inability to participate in the normal relationships and activities available to the majority of people in a society'. Levitas et al. (2007) have created a conceptual framework – The Bristol Social Exclusion Matrix (B-SEM) – with which to investigate social exclusion.

Although not necessarily designed for use in this way, we adopt the B-SEM structure in this analysis to investigate social detachment within the general context of social exclusion. We do this by investigating the association between *participation* and the other two core themes of the B-SEM: *resources* and *well-being*[1] (see Figure 5.1). In doing so we use the ordered relationship implied in Figure 5.1. We first explore why *participation* is important for older people by investigating the association between social detachment (the corollary of a breakdown of an individual's *participation* in society) and *well-being*. We then explore who is most at risk of social detachment by investigating the association between the *resources* that older people have and their risk of social detachment. The *resources* that we consider include income, housing, material goods, health[2] and access to services.

We choose to focus on the domain of *participation* for two main reasons. Firstly, this is an area that is relatively under-researched despite its importance, especially among older people. Secondly, this is a relatively complex approach, and the focus on dynamics, combined with limited space, does not allow us to cover all the possible dimensions of social exclusion. However, more exhaustive study using this framework would be possible with ELSA, and constitutes a very promising direction for future research.[3]

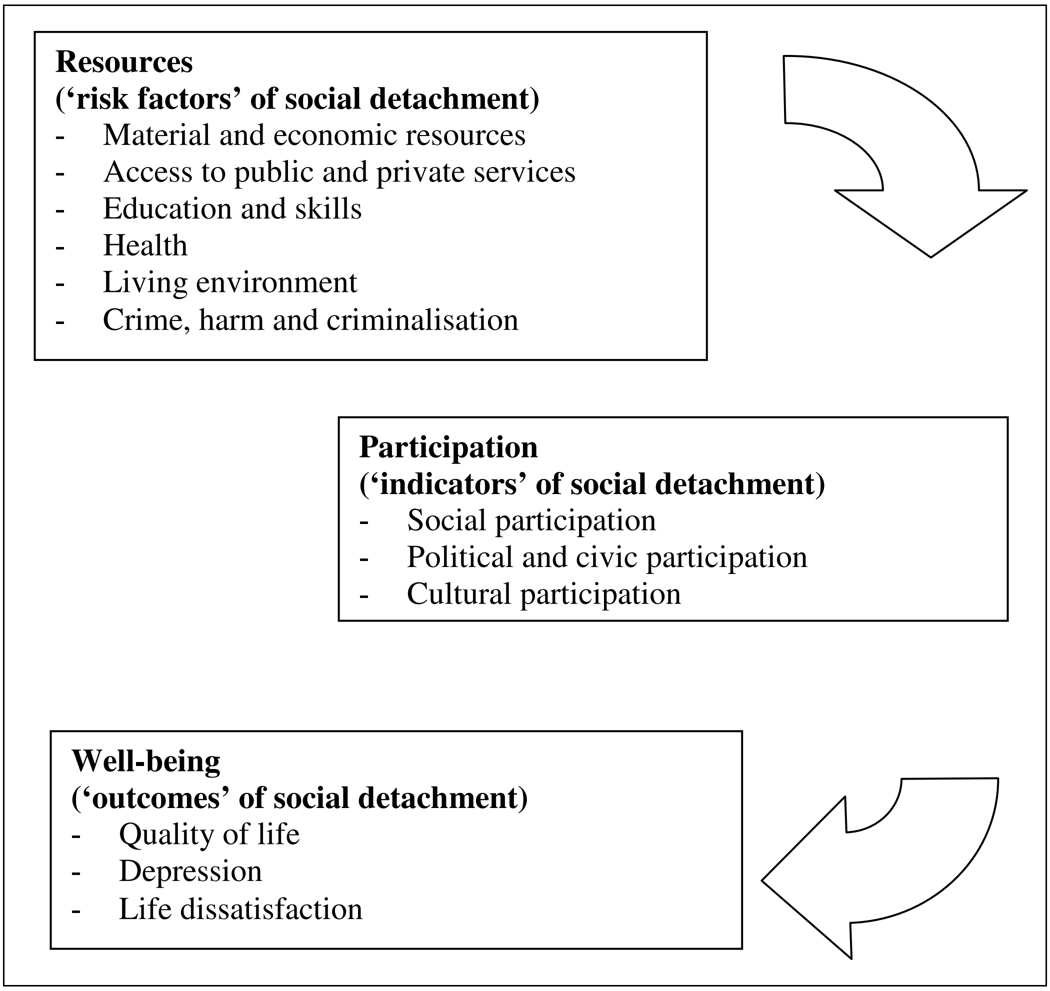
[1] These three concepts form the basis of much of the discussion in this chapter and are italicised throughout.

[2] Having poor health may be considered both a risk factor and an outcome of social detachment (for example where isolation contributes to poor mental health). For the purpose of this research we treat physical health as a risk factor but we consider depression, which is related to mental health, as one of our outcome variables.

[3] For example, it would be possible to use ELSA to construct longitudinal indicators of income poverty, material deprivation, housing quality, access to financial products, general

Inherent in our analysis is a focus on dynamics. The experience of social detachment is likely to be determined by the intensity of the experience, and also by the time spent detached and by whether spells of detachment persist or recur. Recent advances in the study of social exclusion have seen a shift from static to dynamic analysis,[4] but this is very much restricted by the data available. The maturing of the ELSA data means that for the first time we have dynamic information on a large sample of older people on which such analyses can be performed.

Figure 5.1. Analytical framework for investigating social detachment[5]



health, disability, education, economic non-participation and others, all of which could be thought of as dimensions of social exclusion; see Becker and Boreham (2008, forthcoming) for an example of the application.

[4] For example, see Barnes (2006) and Becker and Boreham (2008, forthcoming).

[5] The analytical framework is adopted from the Bristol Social Exclusion Matrix (Levitas et al., 2007).

Understanding dynamics is crucial for policy designed for the most disadvantaged. It seems self-evident that more appropriate policy solutions can be formulated by classifying people according to their experience of disadvantage rather than relying on one-size-fits-all solutions. Furthermore, identifying the duration and recurrence of disadvantage can focus policy on the people where policy needs to act more quickly.

We make time explicit in our measurement of social detachment by considering how many times older people experience social detachment over the three observations of ELSA data. To try to understand the links between *resources* and social detachment, and social detachment and *well-being*, we measure *resources* at the start of our observation period (wave 1) and *well-being* at the end of this period (wave 3).[6] We also use a dynamic measure of *participation* using information across all three available waves of ELSA. Although it is very difficult to show cause and effect in survey analysis such as this, we can get closer to understanding these associations by exploring the timing and dynamics of the ELSA data.

We measure social detachment in the ELSA data using six indicators of *participation* according to societal involvement, social/recreational activities, social contact, social support, cultural activities and leisure.[7] The definition of each indicator is outlined in Box 5.1 and is simplified to ensure the meaning of the indicator is clear.[8] We also present the percentage of older people disadvantaged on each indicator.

[6] Using this ordered sequence we assume that risk factors at wave 1 will have an effect on the duration of social detachment and consequently also on the quality of life in wave 3. Naturally, in this relatively simple model we do not take into account whether the risk has changed in the interim. A more elaborate model – impossible to implement here due to limited space – could explicitly take into account changes in some of the risk factors, for example in the level of income or health status.

[7] It needs to be stressed here that the main focus of this chapter lies not in comparing different indicators but on creating a 'latent' concept of non-participation to represent social detachment. The choices we made while selecting the indicators were motivated by a wish to cover quite a broad domain of participation, yet keeping the elements conceptually related. We do not claim that this set of indicators is exhaustive or the only one conceivable; in fact it would be possible to use ELSA data to create, for example, separate indicators for societal involvement and civic participation, or to look at voluntary work. However, given that the main focus of the chapter is on social detachment as a whole, rather than on substantive differences between the specific indicators, the exact composition of the set is less of a problem here.

[8] The full description of each indicator is presented in Appendix 5A. The indicators differ from our previous work on the social exclusion of older people (Barnes et al., 2006) for a number of reasons. First, we focus much more tightly on non-participation in this study, as described above. Secondly, not all of the indicators used in the SEU report (2006) can be constructed in all three waves of ELSA, something that is crucial for the dynamics analysis later in this chapter. Finally, we have simplified the indicators included in SEU (2006) to aid interpretation in this relatively short piece of analysis.

Box 5.1. Indicators of social detachment (measured at waves 1–3)

Societal involvement (9% disadvantaged) – this captures involvement in social, political and civic life. Political/civic participation is important for people to feel that their actions matter and they are part of society. A person is deemed as disadvantaged on this dimension if he/she:

- is not a member of any of the following:

political party, trade union or environmental group;

tenants' group, resident group, neighbourhood watch, etc.;

church or other religious group;

charitable associations; and

- did not vote in the last general election.

Participation in social/recreational activities (17% disadvantaged) – this captures participation in leisure activities and elements of having an active social life. A person is classified as disadvantaged on this indicator if he/she:

- is not a member of any of the following:

education, arts or music groups or evening classes;

social clubs;

sports clubs, gyms, exercise classes; and

- does not have a hobby or pastime.

Frequent contact with others (15% disadvantaged) – this captures the frequency of personal contact with other people. It is important for older people to have personal contact with somebody on a daily basis, as loneliness is one of the things that older people fear most (Age Concern, 2008). A person is classified as disadvantaged on this indicator if he/she:

- does not live with a partner and does not meet any of their children, family or friends at least three times a week.

Social support (14% disadvantaged) – this captures the quality, rather than quantity or frequency, of social contacts. The indicator aims to assess the existence of strong bonds between people, on the premise that it is very important for older people to have somebody who they can count on and who can understand them. A person is classified as disadvantaged on this indicator if he/she:

- has nobody (a partner, children, family or friends) strongly supporting them.

Participation in cultural activities (9% disadvantaged) – this captures involvement in cultural activities that involve leaving the home, on the premise that being involved in activities outside the home can reduce the level of isolation that older people experience. A person is deemed disadvantaged on this indicator if he/she:

- does not go to the theatre, cinema or museum or does not eat out at least once a year.[a]

Taking holidays (15% disadvantaged) – this captures whether people experience rest and relaxation in the form of a holiday. A person is deemed disadvantaged on this indicator if he/she:

- did not go on holiday or a day trip in the last year.

a. Similarly to Barnes et al. (2006) we include eating out as a cultural activity to allow for a broader notion of cultural life. The reason for doing so is that going to the theatre, cinema or museum are quite specific activities, which are associated with particular groups of society, such as white, middle-class older people.

There are of course limitations to measuring social detachment in this way. ELSA is not designed solely to measure social detachment and therefore may not collect as much information as a survey that focuses only on this issue. However, collecting a variety of other information, notably on characteristics of older people, their *resources* and their *well-being*, allows the type of investigations in this chapter to take place.

When creating indicators of disadvantage we often have to make arbitrary decisions about a threshold that distinguishes 'disadvantage' from 'non-disadvantage'. This is more problematic when using indicators separately – in this research we use a range of indicators in an additive way to identify social detachment according to the number of dimensions of *participation* in which an individual is disadvantaged. Here again, an arbitrary decision has to be made as to how many dimensions of disadvantage represent social detachment. This decision has to be made to allow us to explore patterns of detachment among older people.[9] The thresholds chosen are validated to some degree against measures of *well-being* as social detachment can be seen to impact on older people's quality of life. Also, we seek to use this measure to compare social detachment across older people with different characteristics and *resources*, rather than focusing on its absolute levels.

Some of the most disadvantaged older people who are at highest risk of detachment, such as the homeless and those in prison, are often outside the scope of surveys such as ELSA. Even when sampled, those who are most disadvantaged are more likely to refuse an interview and this is likely to be exacerbated in longitudinal studies through differential attrition. Although we acknowledge this to be true of surveys such as ELSA, the benefits of the data set far outweigh the limitations.

The chapter is based on the data covered by the first three waves of ELSA (2002, 2004 and 2006). Specifically, a sample of 6,166 of core members aged 50 and over who participated in all three waves of the survey, and who returned self-completion questionnaires, has been used in the analysis. The data have been weighted using longitudinal weights to account for known differences in response between subgroups.[10]

5.4 How many older people experience social detachment?

This section discusses in greater detail how we measure social detachment and shows its prevalence among the older population. As there is no universally accepted set of indicators to separate the detached from those who participate, any estimates of prevalence will naturally depend on the definition of social detachment and the construction of indicators used to measure *participation*.

[9] Also, the statistical technique used later in the chapter (ordinal logistic regression) uses an ordered in time measure of social detachment, which requires a binary variable (i.e. detached or non-detached at a given point in time) to be constructed.

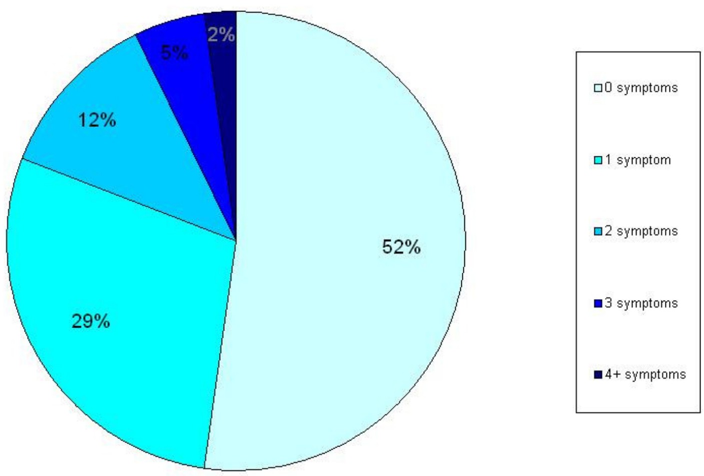
[10] It is worth noting that the analyses based on weighted and unweighted data produce very similar results, which increases robustness and confidence in the conclusions.

Our study is no exception in this respect and therefore all findings should be interpreted with reference to the choice and measurement of the indicators.

We use the six indicators described in the previous section to capture different aspects of *participation*. If a person is disadvantaged with respect to any of these aspects, we will say that he or she shows a *symptom* of social detachment. We will essentially treat such a person as being at risk of social detachment, although it does not mean he or she is necessarily detached. However, at any point in time, a person may be disadvantaged on more than one of the indicators simultaneously. We assume that the more symptoms of social detachment a person shows at the same time, the more his or her relationship with society has been disrupted. When a number of symptoms are displayed simultaneously, we can say that a significant 'discontinuity in relationships with the rest of society' (Room, 1999, p. 171) has occurred, and there is an instance of social detachment.

Figure 5.2 shows the distribution of the number of symptoms of social detachment simultaneously affecting older people (presented as the average across the first three waves of ELSA). We can see that approximately half of older people (48%) were at risk of social detachment (that is, they were disadvantaged on at least one of the six indicators of *participation*); one in five of older people (19%) show two or more symptoms of social detachment and 7% were disadvantaged on at least three indicators.

Figure 5.2. Number of symptoms of social detachment averaged across three points in time (2002, 2004, 2006)



Note: All people aged 50 and over; based on weighted data, average N=4,524 cases (weighted).

We have decided to set the threshold that signifies social detachment at three symptoms and therefore we will classify older people as detached if they are disadvantaged on three or more aspects of *participation* at the same time.[11] By setting the cut-off point at as many as three symptoms, we can be quite confident that the people who are classified as detached have their social *participation* and relationships considerably disrupted.

5.5 How long does social detachment last?

This chapter introduces a longitudinal element to our investigation of social detachment. The dynamic nature of disadvantage has been underlined in the literature on poverty and social exclusion (e.g. Walker and Walker, 1997; Room, 1998) and there are a number of reasons why we would want to investigate social detachment from a longitudinal perspective.

First, it is only by looking at evidence over time that we are able to estimate the true extent of the problem. This means that single point-in-time estimates, as available from cross-sectional surveys, will fail to pick up all the older people who may be affected by social detachment for at least some time over a longer period.

Secondly, taking a dynamic perspective will allow us to distinguish between older people with different histories of social detachment (albeit over a relatively short period here). Identifying how long older people are detached can help us to understand better how social detachment is linked to other negative outcomes for older people – for example the nature of the link between the duration of social exclusion and psychological *well-being*.

Finally, differentiating people who experience social detachment on a persistent basis from those who experience it on a short-term basis enables us to identify better those at risk of the most entrenched forms of social disadvantage. This may be important for developing effective policy solutions for older people.

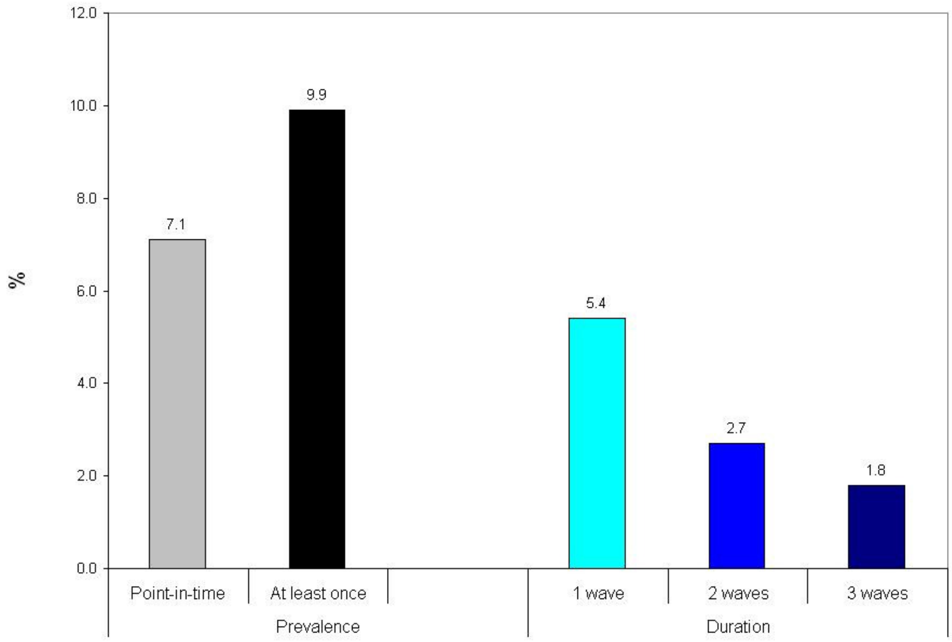
Figure 5.3 shows how many older people experienced social detachment at a point in time (using a single wave of ELSA) and how often they experienced it over a period of time (using three biennial waves of ELSA). This analysis helps to show one of the advantages of using longitudinal data, as the estimates suggest that the proportion of people affected by social detachment over a period of time is higher than the figures for a given year would suggest. Almost one in ten older people experienced social detachment at some point

[11] Although the focus of our analysis is now very much on the older people who experienced social detachment (that is, disadvantage on at least three of our six participation indicators) we do not lose interest completely in the different aspects of participation. For example, when looking at how social detachment is associated with well-being, we also report on interesting associations between well-being and the six individual indicators of participation. We also report on the characteristics and resources of older people that are associated with the particular aspects of participation as identified by the six indicators.

over the period from 2002 to 2006,[12] compared with 7% on average in any single year.

This means that social detachment is dynamic. At least some older people made movements into or out of social detachment over the period, and more older people are touched by social detachment than point-in-time estimates may lead one to believe.

Figure 5.3. Prevalence and persistence of social detachment in waves 1–3 of ELSA (2002, 2004, 2006)



Note: All people aged 50 and over; based on weighted data; N=4,524 cases (weighted).

Figure 5.3 shows that most older people experienced social detachment on a temporary basis (5.4% experienced social detachment in just one of the three waves). However, there is still a significant minority of older people (4.5%) who suffered from detachment on a more persistent basis – 2.7% were detached in two of the three waves and around 1.8% in all three waves.[13] This means that among the older people who experienced detachment at least once, almost half were detached on a more persistent basis (in at least two of the three waves).

The dynamics of social detachment are the main focus of this study. Given the relatively small number of older people in ELSA who experienced

[12] ELSA is a longitudinal survey and the data are collected at regular, but isolated, points in time. Hence we know nothing about the situation in the interim periods. Since the ELSA interviews take place biennially, we do not have information about the person's participation status between waves, whether annually or within a particular year.

[13] In fact we suspect that the figures might be even higher than reported here, not just because some may have experienced detachment between observations, but also because of selective attrition, which is a common problem in longitudinal surveys and is known mostly to affect the disadvantaged groups.

detachment, sample size issues mean that we cannot focus our analysis on those who were continuously detached for all three waves. We therefore create three categories of older people according to their history of social detachment across this three-wave period:

- *No social detachment*, older people who avoided social detachment over the period;
- *Temporary social detachment*, older people who experienced social detachment in one of the three waves; and
- *Persistent social detachment*, older people who experienced social detachment in two or three of the three waves.[14]

Our categorisation of the dynamics of social detachment is relatively simplistic. A more comprehensive categorisation is not possible given the limited number of waves of ELSA at present. As already mentioned, having just three waves of ELSA means it is not sensible to distinguish between people who were detached for two (or three) consecutive waves, nor for those who experienced recurrent detachment (for example detached in the first and third waves, but not the second). Because of this, and also to accommodate small sample size issues, we do not distinguish those who experienced detachment in the first two waves from those detached in the last two waves or in the first and third waves only.[15]

5.6 Is the duration of social detachment associated with well-being?

Implicitly or explicitly, the goal of a great array of social policies is to maximise *well-being*. The aim of this section is to investigate whether the duration of social detachment is associated with *well-being* and other measures of self-evaluation of one's own situation. Quality of life is based on a theory that once people have satisfied fundamental needs for the basic requirements

---

[14] There are a variety of alternative approaches that could have been used to define persistent social detachment. One approach would be first to identify people persistently disadvantaged on each of the indicators and then, for a given person, to look at the number of symptoms on which he/she is persistently disadvantaged. This approach, although equally valid from a methodological point of view, focuses more on the multidimensional aspect of social detachment (severity measured as a number of symptoms displayed at the same time), while the focus of our approach is on the dynamics and occurrence over time (measured as the number of years detached).

[15] Further waves of ELSA will allow a more detailed analysis of dynamics, for example, on whether older people's social detachment improves, worsens, fluctuates or remains stable over time. Similar analyses are currently being undertaken by NatCen researchers in a separate project for the Social Exclusion Task Force (SETF). The SETF project explores the multidimensional and dynamic nature of social exclusion in older age using data from ELSA and the British Household Panel Survey (BHPS). This forms part of a suite of research projects that SETF are commissioning to investigate social exclusion across the life course. The research is expected to be published later in 2008 (Becker and Boreham, 2008, forthcoming). Please see the SETF website for further details: www.cabinetoffice.gov.uk/social_exclusion_task_force.

of human existence (food, shelter, clothing, etc.) they pursue such objectives as self-realisation, happiness and esteem (Maslow, 1968).

The ELSA study collects a range of measures of *well-being*, including CASP-19, which is used to measure quality of life in the government's *Opportunity Age* indicator set.[16] CASP-19 is comprised of 19 questions used to measure quality of life in four categories:[17]

Control – the ability to intervene actively in one's own environment.

Autonomy – the right of an individual to be free from unwanted interference by others.

Self-realisation – the active processes of human fulfilment.

Pleasure – explained as the 'reflexive processes of being human'.

The CASP-19 measure takes account of whether or how often (often, sometimes, not often or never) statements on the four categories of quality of life apply to older people. A scale is created that ranges from 0, which represents a complete absence of quality of life, to 57, which represents total satisfaction on all domains (see Hyde et al., 2003 for more details on the theory and construction of the CASP-19 measure).[18,19]

It follows our conceptual approach to look at *well-being* as a consequence of social detachment – hence we take these measures from the third wave of ELSA. The mean quality of life score for all older people in the ELSA study in wave 3 was 41.1. Figure 5.4 shows the relationship between the number of waves of social detachment and quality of life as measured by CASP-19 across all four domains. It clearly shows that the quality of life score systematically reduces with the duration of social detachment and the reduction is consistent across all four categories of the indicator.

We also look at a number of other measures of subjective *well-being*: feeling of isolation, dissatisfaction, unhappiness, feeling worse off than other people and wanting to have changed a lot in life. Figure 5.5 shows that these measures also increased the longer an older person experienced social detachment.[20] All measures also show an increase for people who had any experience of social detachment compared to those who avoided social detachment over the period.[21]

---

[16] www.dwp.gov.uk/opportunity_age

[17] There is an ongoing academic debate concerning the measure. For example, Wiggins et al. (2007) argue that the domains of control and autonomy should be combined into a single domain. In any case, such alterations would not change our conclusions.

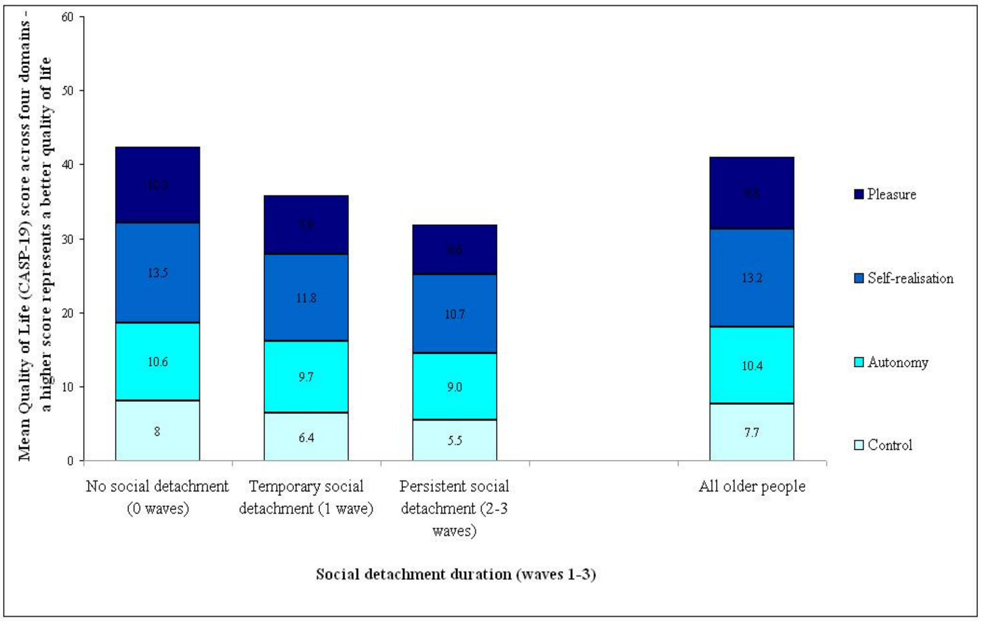
[18] It should be noted that the CASP-19 measure was developed specifically for those in early old age and is not, as yet, validated for the oldest old.

[19] A detailed definition of the CASP-19 measure, and the measures used in this section, can be found in Appendix 5A.

[20] Although some of these relationships may appear circular this is less of a problem than might be expected. For example, the subjective measure of social isolation is based on a direct question about feelings (see Appendix 5A), whereas the measures of social exclusion use objective measures such as number of visits, etc.

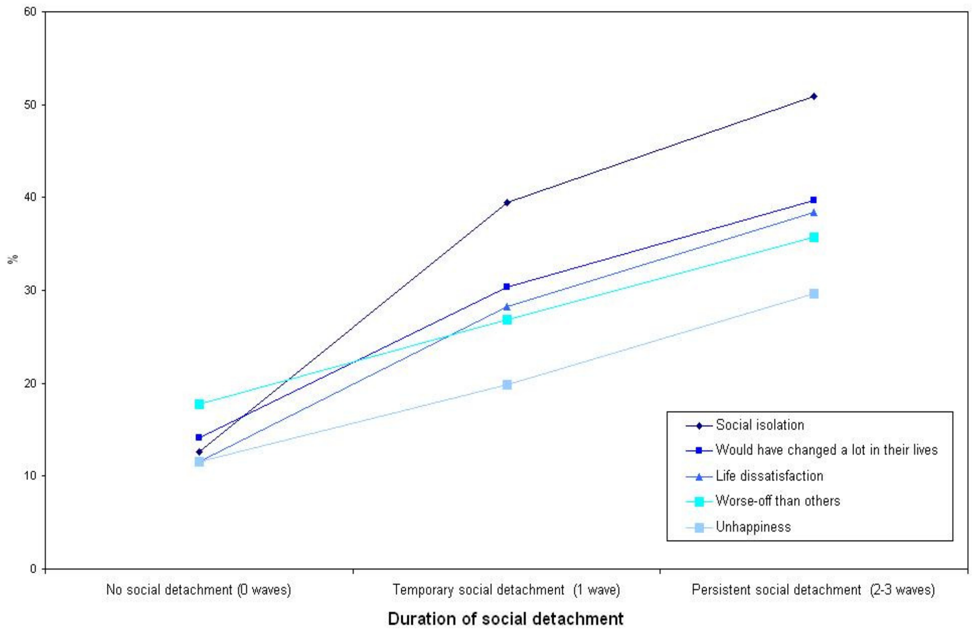
[21] Precise definitions of these indicators can be found in Appendix 5A.

Figure 5.4. Quality of life score (CASP-19 measure) by duration of social detachment



Note: All people aged 50 and over; based on weighted data; N=4,524 cases (weighted).

Figure 5.5. Measures of subjective well-being (in wave 3) by duration of social detachment (waves 1–3)



Note: All people aged 50 and over; based on weighted data; N=4,524 cases (weighted).

There is also a relationship between social detachment and self-reported depression, measured according to the Center for Epidemiological Studies Depression Scale (CES-D) – the higher score means worse depression. Older people who did not experience social detachment over the period had an average CES-D depression score of 1.0. The average went up to 1.9 for those with temporary social detachment, and rose to 2.6 for those with persistent social detachment.[22]

5.7 Which older people are most at risk of persistent social detachment?

In this section we explore whether the risk of persistent social detachment varies according to the socio-demographic characteristics of older people and the *resources* at their disposal. We have established earlier that, on average, 4% of older people experienced persistent social detachment. In the charts below we present the percentage of older people who are persistently (and temporarily) socially detached according to the characteristics and *resources* specified in Box 5.2. These characteristics and *resources* of older people are measured from the first wave of ELSA data, whereas the measure of social detachment is taken as a dynamic measure across waves 1 to 3. The descriptive analysis presented here is an introduction to a more elaborate analysis of associations using ordinal logistic regression, which will follow in the next section.

Box 5.2. 'Risk factors' of social detachment (measured at wave 1)[23]

Demographics
Age group
Sex
Education level
Main activity
Family type
Number of living children
Number of living siblings
Cared for somebody last month
Tenure

Resources
Economic:
Income
Main source of income
Material deprivation
Housing problems

Health:
Self-reported general health
Had a fall within the last 2 years
Limiting long-lasting illness
Any physical activity

Characteristics of local area:
Urbanisation
Index of Multiple Deprivation
Region

Access to services and products:
Current account
Financial products
Own car or public transport
Basic services
Landline phone
Internet or mobile

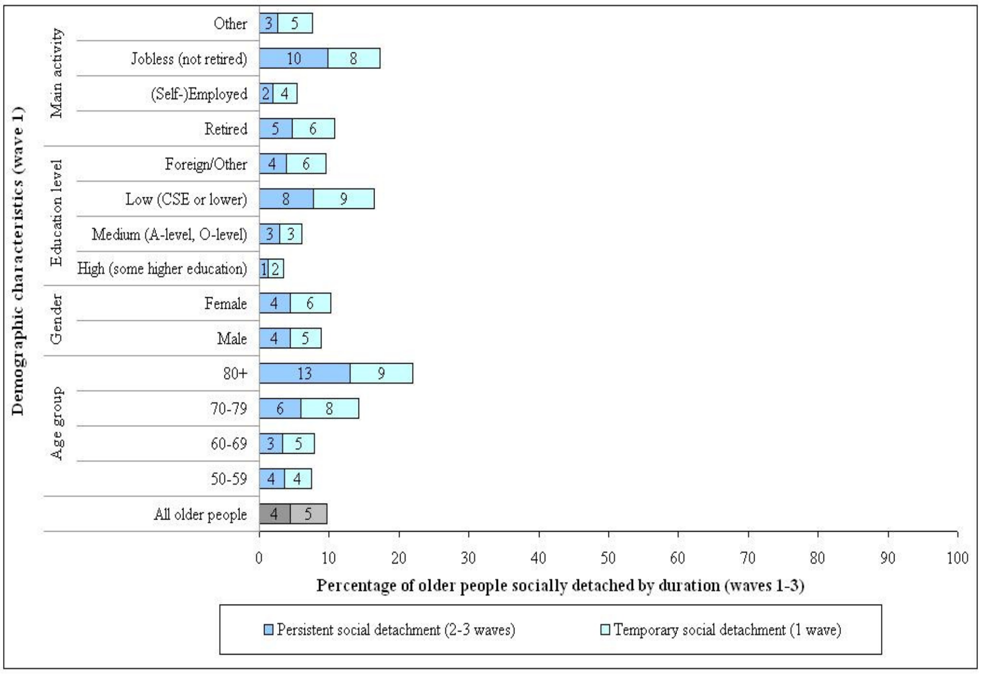
[22] Additional analysis (detailed results available upon request) shows that certain indicators of social exclusion are associated more strongly than others with certain subjective measures of well-being. Quality of life measured on the CASP-19 scale and unhappiness were most strongly dependent on social support, participation in culture and leisure (holidays). Depression measured on the CES-D scale and feeling worse off than others were mostly dependent on participation in culture and leisure (holidays). Subjective feeling of social isolation and wish to change a lot in life were most strongly associated with social contacts and social support. Life dissatisfaction was most strongly related to social support. These patterns of association between specific social exclusion indicators and different outcomes may be a subject for further research.

[23] See Appendix 5B for the distribution (including unweighted counts) of all the socio-demographic variables used in the chapter.

Figures 5.6 and 5.7 represent the percentage of older people who were persistently (and temporarily) socially detached according to the socio-demographic characteristics of themselves and their household. Figure 5.6 looks at older people according to their age, sex, education level and main activity status. The figure can be viewed in a number of ways. Combining both coloured bars shows the percentage of older people who experienced social detachment at least once over the three-wave observation period. However, we are more interested in persistence and reading just the first coloured bar (the darker bar) shows the percentage of older people who experienced persistent social detachment. It is these older people who we concentrate on in this chapter and on whom the interpretation below is focused.

We know that around 4%[24] of older people experienced persistent social detachment overall (the 'average' for all older people). Figure 5.6 shows that for certain categories of older people, there was triple the proportion of older people experiencing persistent detachment than the average. For example 13% of older people aged 80 years and over experienced persistent social detachment. Older people who were not employed were more than twice as likely as the average to be persistently detached (10%); older people with low education are in a similar situation (8% persistently detached). Likewise, there were certain groups of older people which had a markedly lower risk of persistent social detachment than the average. These included older people with high education (1%) and older people who were employed or self-employed (2%).

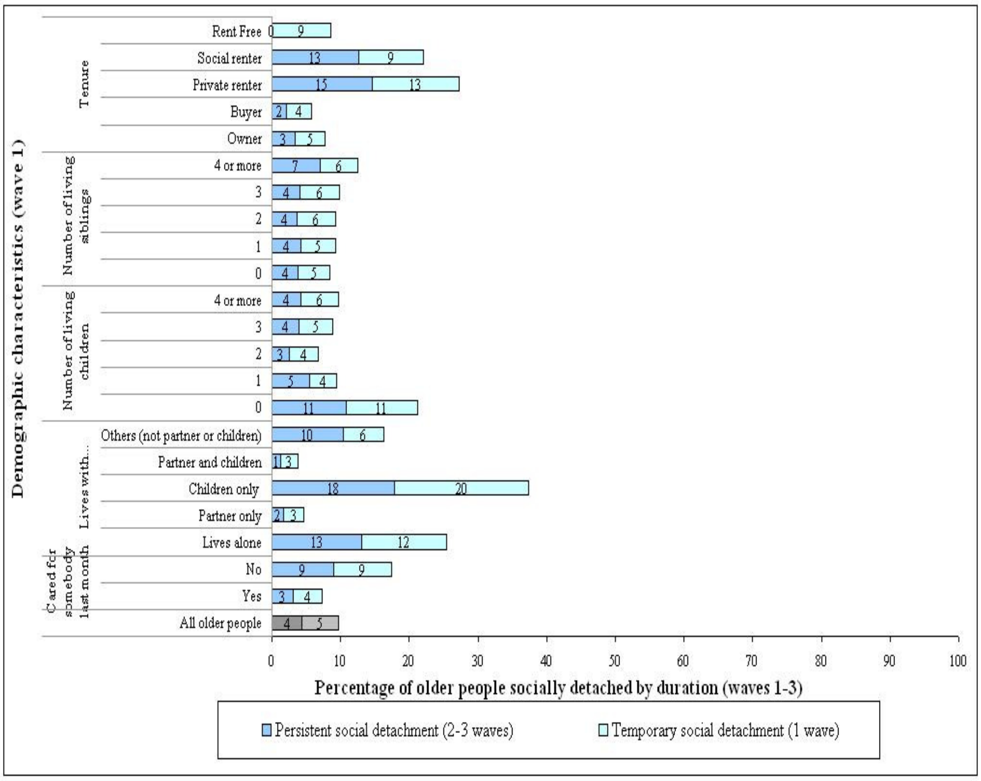
Figure 5.6. The duration of social detachment by socio-demographic characteristics (1)



Note: All people aged 50 and over; based on weighted data; N=4,524 cases (weighted).

[24] A more precise estimate is 4.5% (see Figure 5.3). However, in the subsequent graphs we prefer to report the percentage points rounded to the nearest integer.

Figure 5.7. The duration of social detachment by socio-demographic characteristics (2)



Note: All people aged 50 and over; based on weighted data; N=4,524 cases (weighted).

Figure 5.7 takes the same approach as Figure 5.6 and continues to look at the proportion of older people who were persistently socially detached according to socio-demographic characteristics of themselves and their household – this time focusing on older people according to their family type, number of living children, number of living siblings and tenure.

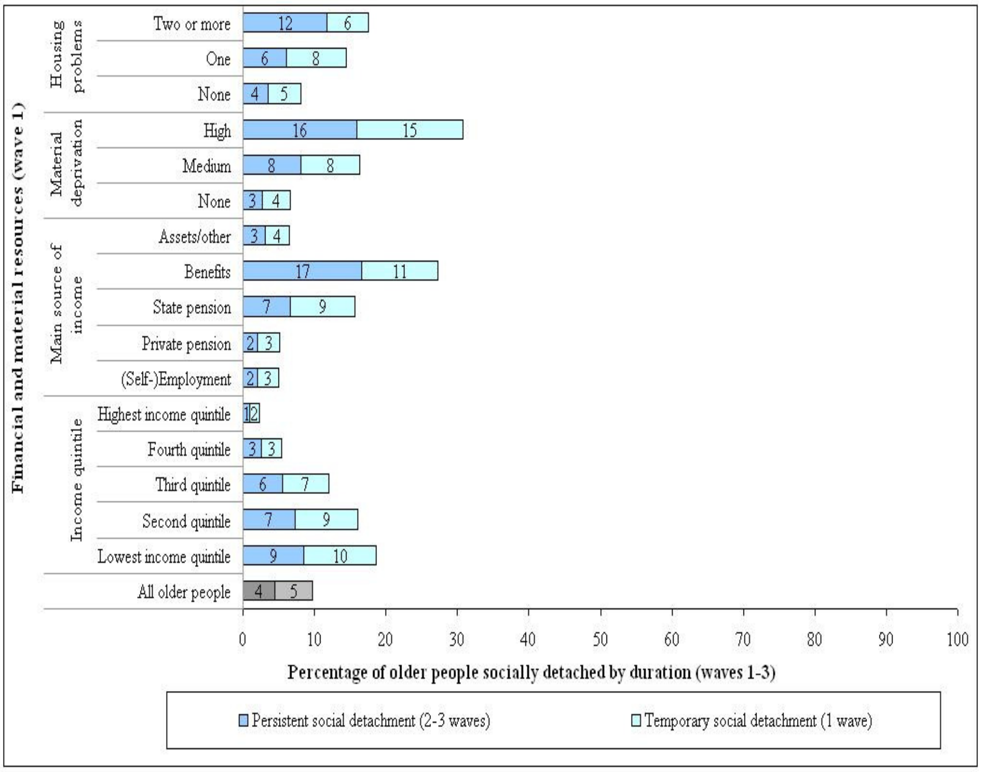
In Figure 5.6 we saw that persistent social detachment appears to increase with age, as 13% of older people aged 80 and over experienced persistent social detachment. Figure 5.7 shows that other characteristics linked to age are also associated with persistent social detachment, most notably family status. Older people who did not live with a partner, whether with children or alone, were at risk of persistent social detachment (18% and 13%, respectively). This suggests that being without a partner can limit social *participation* in older age. This could be because single older people do not have someone to rely on for support and contact, or because they do not have someone with whom to participate in social and cultural events.

Interestingly, it was older people who lived only with their children (i.e. not with a partner or any other people) who were the most likely to have experienced persistent social detachment. We know from other research that older people who live with their children do so for a number of reasons. The expected model is that the older person requires care from their adult children. Hence these older people may be more likely to be at increased risk of social detachment because of factors associated with being cared for, such as having long-term ill health. However it should not be forgotten that some may be living with their children because they are still providing care for them, perhaps for a disabled adult with care needs.[25]

Indeed, one of the functions of family is having responsibility towards others, helping and caring for them when they are in need. Figure 5.7 shows that older people who did not care for anybody during the last month were three times more likely to be persistently detached than those who did so (9% compared with 3%). Older people who rented their accommodation were also at high risk of persistent social detachment. Approximately one in seven experienced persistent social detachment (15% who rent privately and 13% of social renters).

Figure 5.8 focuses on the risk of persistent social detachment according to the economic *resources* of older people. The general picture is that the more deprived older people were, the higher their risk of persistent social detachment. For example, 9% of older people in the poorest income quintile experienced persistent social detachment compared to just 1% of older people in the richest income quintile.

Figure 5.8. The duration of social detachment by economic resources indicators



Note: All people aged 50 and over; based on weighted data; N=4,524 cases (weighted).

[25] Older people who live with their children are an interesting group worthy of more detailed investigation, which is beyond the scope of this study.

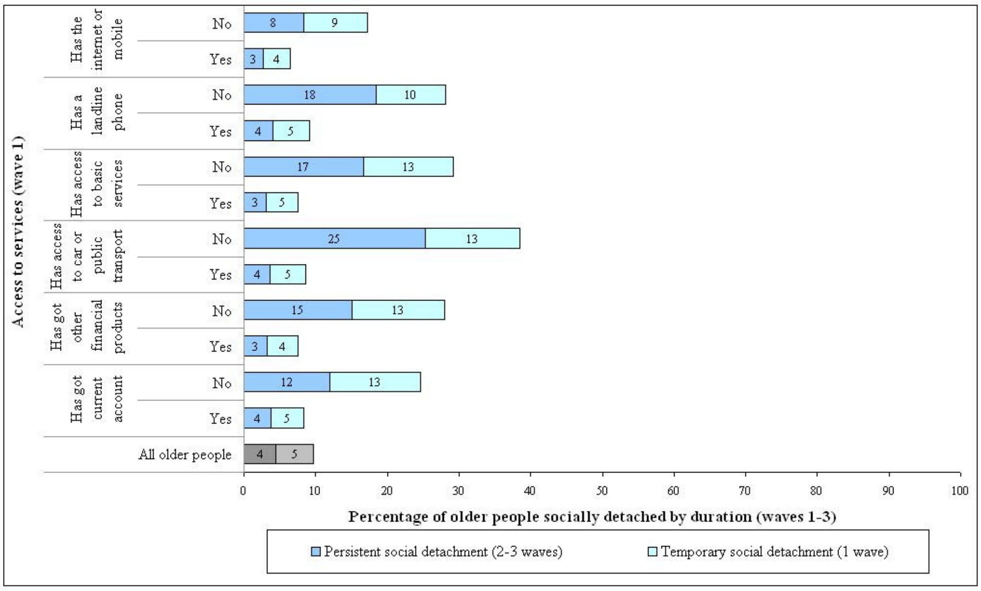
The older people at most risk of persistent social detachment, according to their economic *resources*, were those whose main source of income was from benefits. Older people are able to claim benefits such as Housing Benefit, Council Tax Benefit and Pension Credit, which guarantee a minimum level of income. Of those older people who claim benefits, 17% experienced persistent social detachment.

Other groups of older people at risk of persistent social detachment were those who had high levels of material deprivation (16%) and older people who lived in housing with two or more problems (12%).

Having access to transport and forms of communication are important factors in helping older people participate in society and establish meaningful relationships and roles. Figure 5.9 shows that there are marked differences in the proportion of older people who experienced persistent social detachment according to whether they had access to transport, forms of communication and other services; this is true for all types of access measured. The older people at most risk of persistent social detachment were those with no access to private or public transport. These older people were six times more likely to have experienced persistent social detachment than those with access to private or public transport (25% compared with 4%).

Older people with no landline telephone, or with no mobile phone or internet access, had an increased risk of persistent social detachment (18% and 8%, respectively). Being without a landline telephone meant older people were four times as likely as those with a landline telephone to have faced persistent social detachment. Although a mobile phone and internet access are newer technologies that older people are less likely to covet, the evidence here does suggest that they do contribute to a decreased risk of experiencing persistent social detachment.

Figure 5.9. The duration of social detachment by access to services and products



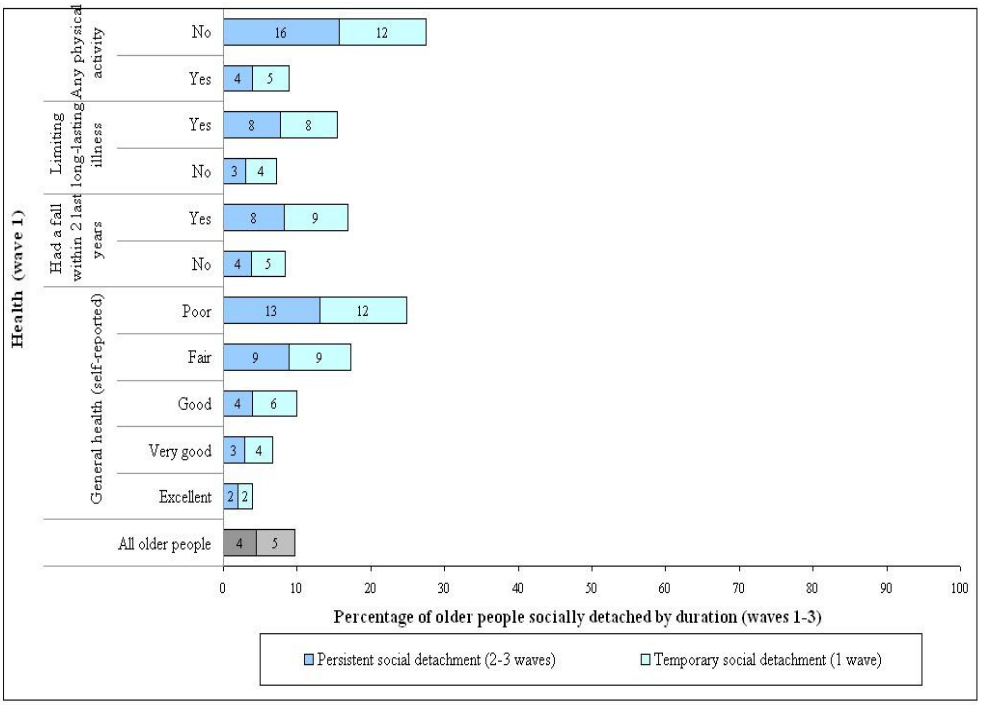
Note: All people aged 50 and over; based on weighted data; N=4,524 cases (weighted).

Other forms of limited access to services may also have an impact on social *participation*, although they could also be a by-product of related forms of disadvantage. For example, Figure 5.9 shows that older people who experienced financial exclusion were at risk of persistent social detachment. Over one in ten of older people with no bank account (12%) and with no other financial products (15%) experienced persistent social detachment. It may be that being without these financial products meant that participating in society was difficult – for example, being unable to pay for services with a debit card – although it could also be the case that these older people faced other associated disadvantages, such as being income poor.

Likewise, Figure 5.9 shows that 17% of older people with difficulties accessing basic services such as a post office or shops experienced persistent social detachment. It may be that these older people live far away from these services or do not have adequate transport links, or it could be that these older people also have health problems that limit their mobility. However, either of these scenarios indicates a need for attention towards older people's circumstances and needs.

Health is a factor likely to be associated with social detachment in a number of ways. Figure 5.10 shows that the likelihood of experiencing social detachment increases for less healthy people on a range of health indicators. The older people reporting poor health status were six times more likely to have experienced persistent social detachment than those reporting excellent health (13% compared with 2%). Likewise there was a large increase in detachment for older people with a limiting long-standing illness (8% compared to 3% without an illness).

Figure 5.10. The duration of social detachment by indicators of health



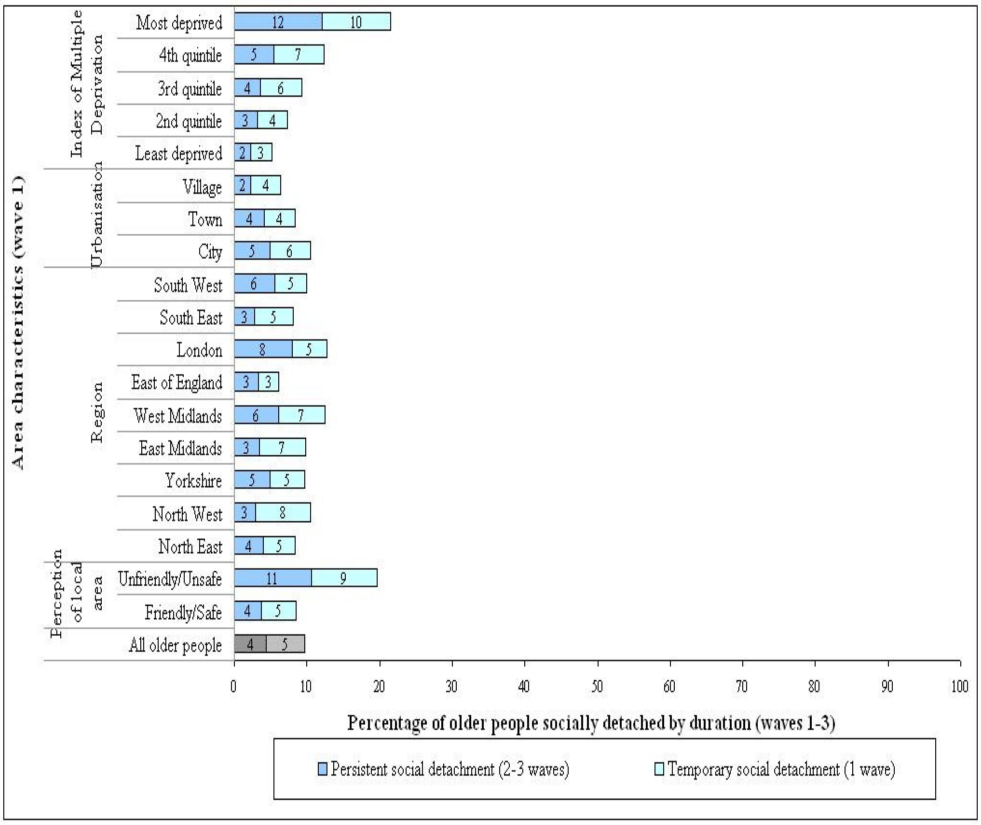
Note: All people aged 50 and over; based on weighted data; N=4,524 cases (weighted).

The proportion of older people persistently detached was four times higher for those who did no physical activity (16% compared to 4% who were physically active). Of course, physical activity itself may be a form of social *participation*, particularly if done with other people or as part of a club.

There is evidence that the onset of poor health can have an impact on social *participation* as 8% of older people who had a fall in the past two years experienced persistent social detachment. This was twice as high as those who had not had a fall (4%).

Finally, the quality of the local neighbourhood (Figure 5.11) may also be a factor affecting the risk of persistent social detachment, particularly if it does not encourage *participation* through lacking facilities or being unsafe. People who lived in the most deprived areas were markedly more likely to have experienced persistent social detachment (12% of those in the bottom Index of Multiple Deprivation quintile). A similar proportion (11%) were persistently detached among older people who regarded their neighbourhood as unfriendly or unsafe.

Figure 5.11. The duration of social detachment by characteristics of local area



Note: All people aged 50 and over; based on weighted data; N=4,524 cases (weighted).

As for the region and urbanisation in which older people live, the differences are less pronounced. However, older people living in cities, especially those living in London, seem to be more at risk of persistent social detachment than those living in rural areas.[26]

5.8 Drivers of persistent social detachment

Having looked at each of the many socio-demographic characteristics in turn, this section investigates which of them are most strongly associated with a longer duration of social detachment when holding the other, potentially confounding characteristics constant (using a multivariate technique known as ordinal logistic regression).[27] It is important to note that this kind of analysis presents significant *relationships* between the characteristics of families and the risk of persistent detachment – in principal such analysis does not unravel any *cause and effect* in the relationship. However, the way in which we have set up the analysis, taking advantage of the longitudinal nature of the data, limits the possibility of reciprocal causation (for example social detachment measured in wave 3 cannot be a direct cause of low income measured in wave 1).[28] In this way, although still not formally testing causality we may be more confident about the direction of the relationship.

Figure 5.12 shows the odds ratios from the stepwise ordinal logistic regression analysis. Only statistically significant relationships have been reported here; full results, listing all the categories of the variables, can be found in Appendix 5C. All the odds ratios presented in Figure 5.12 are related to relevant reference categories, which are listed below the figure.[29] The length of the blue bars (the odds ratios) should be interpreted as the number of times the odds for a given category are higher than those of the related reference category; hence they should be compared with the bar of length 1, which always represents the corresponding reference category (shown in a dark colour).[30]

The characteristics most strongly associated with a longer duration of social detachment are those related to family composition.[31] The older people living

[26] As the regression analysis shows (see Section 5.8), this perhaps surprising finding is due to the urban areas being less safe and friendly.

[27] See Box 5.3 for a brief description of odds ratios and ordinal logistic regression.

[28] However, it needs to be remembered that although the temporal nature of the analysis may limit the possibility of reciprocal causation, it might still be the case that the variables in the analysis are influenced by other factors that have not been accounted for by the model. Another source of potentially confounding influence is the non-participation unaccounted for by our binary indicator (i.e. those cases which displayed too few symptoms of non-participation to be classed as disadvantaged).

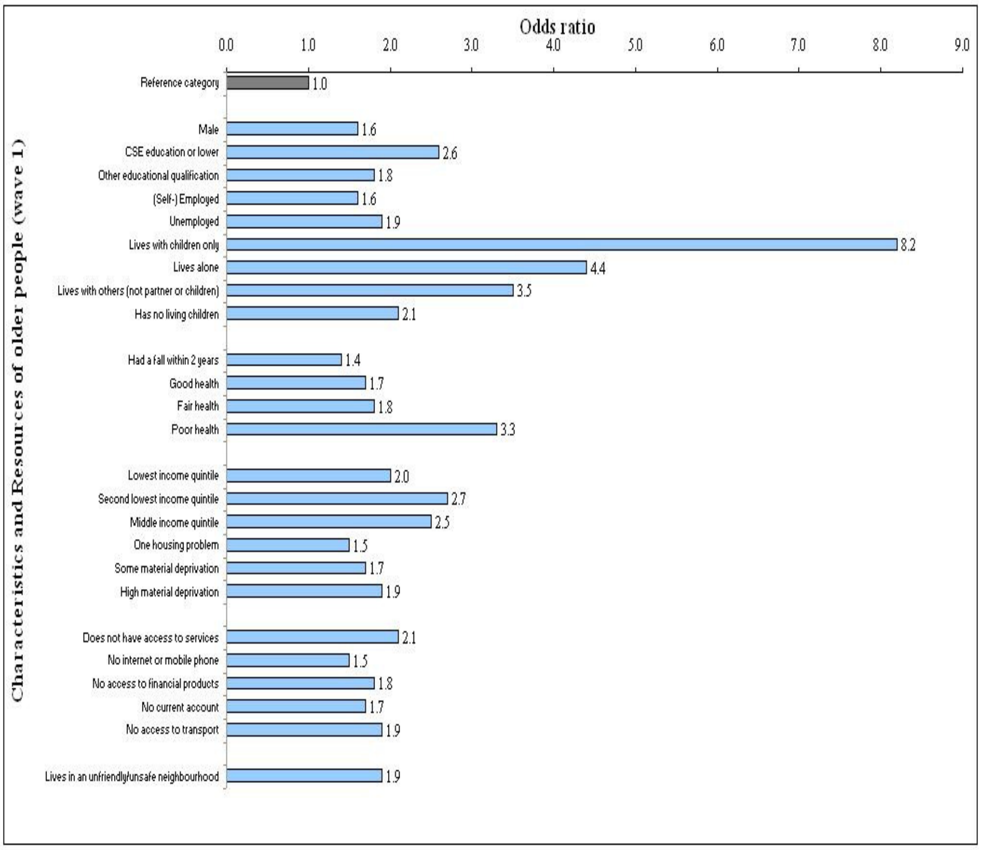
[29] Precise definitions of all the variables can be found in Appendix 5A, and the distributions, including unweighted cell sizes, in Appendix 5B.

[30] See Box 5.3 for a more detailed explanation of odds ratios.

[31] It is important to underline that although some of our indicators are empirically related to the type of family unit in which older people live, the indicators have been carefully constructed not to be biased against people living alone. In other words, people living alone are *not* automatically classified as disadvantaged on any of the indicators. For example, in the

only with their children (i.e. without a partner) are particularly exposed to the risk of persisting social detachment (the odds over 8 times higher than for people living with their partner). Also those living alone or living with others (but not with partner or children) face an increased risk (the odds of longer detachment, respectively, 4.5 and 3.5 times the odds for the reference category), as do those who have no living children (twice the odds for the reference category). All in all, these findings underline the importance of not being lonely, and especially living with a partner in older age.

Figure 5.12. Statistically significant odds ratios of persisting[32] social detachment, ordinal logistic regression model



Note: All people aged 50 and over; based on weighted data; N=4,524 cases (weighted 'All older people' category). Reference categories for the categorical variables are: Sex: female; Education level: high; Family type: lives with partner only; Number of living children: two; Main activity: retired; Falls: have not had a fall; Health: excellent; Income quintile: highest; Material deprivation: none; Housing problems: none; Access to services/internet or mobile/financial products/current account/transport: has access.

case of social contacts indicators, people not living with a partner may still have children, family or neighbours who they see on a daily basis.

[32] Since the ordinal logistic regression models the odds of being in a higher category, which in our case indicates longer exposure to social detachment, we will sometimes refer to 'persisting' social detachment meaning longer duration (as opposed to 'persistent' indicating a state of being persistently detached).

Box 5.3. Odds ratios and ordinal logistic regression

To understand an odds ratio we first need to describe the meaning of odds. This is best explained in the form of an example. If 200 individuals out of a population of 1,000 experienced social detachment, the *probability* of experiencing social detachment is 200/1000=0.2, and the probability of not experiencing social exclusion is 1–0.2= 0.8. The *odds* of experiencing social detachment are calculated as the quotient of these two mutually exclusive events. So, the odds in favour of experiencing social detachment to not experiencing social detachment are 0.2/0.8=0.25.

Suppose that 150 out of 300 people living alone experience social detachment compared to 50 out of 150 who live with a partner. The odds of a person experiencing social detachment are 0.5/0.5=1.0 for people living alone, while they are 0.3333/0.6666=0.5 for couples. The *odds ratio* of experiencing social detachment is the ratio of these odds, 1.0/0.5=2.0. Thus the odds of experiencing social detachment are twice as high among people who live alone than for people who live with a partner (the 'reference category').

The concept of odds ratios is used in the statistical technique known as logistic regression. If the dependent variable is dichotomous (like social exclusion in the example above) a version called binary logistic regression would be used. If the dependent variable has more than two categories and they can be meaningfully ordered (for example: 0, 1 and 2–3 years in social detachment), *ordinal* logistic regression is applicable. The odds ratios in ordinal logistic regression have a similar interpretation to those in binary logistic regression, except in this case there are two transitions estimated instead of one transition as there would be with a dichotomous dependent variable. An odds ratio higher than 1 indicates an increased chance that a subject with a higher score on the independent variable will be observed in a higher category of the dependent variable (i.e. higher number of waves in social detachment).

However, the fact that the people living with their children, but not their partner, are more at risk than those living alone, indicates that social detachment is not entirely about loneliness. Older people may be living with their children because of the relatively recent loss of a partner. It could also mean being in need of care and dependent on an adult child; it could mean caring for a dependent adult child; finally, it could mean living in more difficult conditions (e.g. in overcrowding), all of which can be problematic. Since, as mentioned earlier, those with no living children also faced an increased risk of persisting detachment, it is not having children but living with them which seems to be the issue here. A further investigation of key events that happen in older age (such as bereavement) and a more detailed examination of older people's relationships with their children might help to throw more light on these issues.

Other demographic characteristics that increase the odds of sustained social detachment include having a low level of education (the odds for those with CSE education or lower are 2.5 times higher than those with high level of education) and being male (the odds 1.5 times higher than for females).

Earlier in the chapter (see Figure 5.6) it was suggested that older people who were employed (or self-employed) faced the lowest risk of persistent social detachment. However, when controlling for other factors, the association between main activity and detachment is somewhat different. The findings from the multivariate analysis presented in Figure 5.12 show that those in employment or self-employment were more likely to experience longer detachment than those who were retired. A possible explanation for this is that it is income and time that have the largest impact on *participation*, rather than being in employment per se.

General health also has an independent association with persisting social detachment. The odds of being persistently detached are three times higher for those reporting poor health than for those reporting excellent health. In fact older people who reported their health to be anything other than 'excellent' were significantly more likely to be detached.[33] Older people who had a fall in the last two years were also more likely to be detached (the odds 1.4 times higher than those who had not had a fall). Other health indicators were not significantly associated with persisting detachment.

Material *resources* and access to various services also significantly influenced the risk of sustained social detachment. Older people on low income, those suffering from material deprivation and those living in poor housing were markedly more likely to be affected by persisting social detachment.

Older people who lacked access to services, transport, financial products or modern communication technologies faced an increased risk of prolonged social detachment (in each case the odds were 1.5 to 2 times higher than for people who had access). Access to a car or public transport is among the factors significantly associated with increased duration of non-*participation*. Nevertheless, when controlling for other variables, the relationship is weaker than the simple tabulation might suggest (see Figure 5.9). This reflects the fact that access to means of transport (and access to services in general) is dependent on other factors, most notably on family type (people living alone are more likely to have poor access) and income (poor people tend to have worse access). Finally, the odds of longer social detachment were higher for people who lived in an unfriendly or unsafe neighbourhood (almost twice the odds of people who did not).[34]

It is also interesting to examine which of the socio-demographic characteristics have not been included in the final model. Although some of them seemed to be associated with persisting detachment when investigated in turn in the previous section, the relationships were eventually shown to be spurious – in other words the relationship was explained by other factors. Notably the effect of age disappears when other factors are controlled for. Further analysis shows that what renders the effect of age insignificant is family type. This is partly because the oldest people (aged 80 years and over)

---

[33] ELSA measures general health using a 5-point scale: excellent, very good, good, fair and poor. The precise wording of this variable is given in Appendix 5A and the distribution (including unweighted cell counts) in Appendix 5B.

[34] Additional analysis (detailed results available upon request) shows that there are considerable differences between the patterns of association of the socio-demographic characteristics with specific indicators of social exclusion. Family type (living alone or with children only) was most strongly associated with social contacts and somewhat less strongly with social support and taking holidays. Bad health was most especially important in the case of participation in culture, recreational activities and holidays. Being a member of an ethnic minority group most strongly increased the chance of being disadvantaged in terms of participation in culture and social support. Access to transport and various services was most strongly associated with participation in culture and holiday indicators, while income was significantly related to participation in holidays. The differences between various indicators of social exclusion in this respect point to a very interesting direction for further research.

tend to live alone more frequently (almost 60% of people aged 80 or over live alone, as compared with 20% of those aged 50–79).

Another characteristic that has not been included in the final model is the number of living siblings. This might be surprising, given the prominence of family type and number of living children in the model. This finding may suggest the importance of very close and personal relationships between partners or parents and children.

In terms of characteristics related to health, only self-reported general health and the number of falls are included in the final model. Other characteristics, for example limiting long-standing illness, have been excluded from the model. This suggests that self-reported general health is a better predictor of persisting detachment than self-reported limiting long-lasting illness.[35]

Finally, in terms of geographic characteristics, only the subjective assessment of safety and friendliness of neighbourhood have been included in the model. This suggests the importance of connecting to the local area and may stress the role of integrated local communities.

5.9 What are the implications for policy and further research?

The evidence from ELSA suggests that persistent social detachment is concentrated in a minority, but not an insignificant proportion (approximately one in twenty), of older people. These people face being unable to participate in the normal relationships and activities available to the majority of older people in society. The concerns about persistent social detachment are, perhaps, obvious and are verified by associations in the ELSA data with decreased *well-being*.

This evidence points to the need for concerted policy measures to tackle persistent social detachment among older people. Although the introduction of the later life PSA17 – covering healthy life expectancy, support and services to continue to live at home and satisfaction with home and neighbourhood – may be expected to help with issues of social detachment, it might not be focusing on the most detached, as demonstrated in the analysis in this chapter.

It can also be argued that most policies on disadvantaged older people still focus primarily on the economic disadvantages that older people face. This is despite evidence from older people themselves of the importance of *participation* in society and relationships with family and friends. Evidence in this chapter does show an association between low income, other economic disadvantages and social detachment, meaning that policies which focus on hardship should have some impact on social detachment. However, it is clear that there is a wealth of other factors that contribute to social detachment for older people and there is a danger that more general economic policies may not work for older people with the most entrenched problems of detachment.

[35] Interestingly, far more people report limiting long-lasting illness than poor health (see Appendix 5B for details).

It is clear from the evidence in this chapter that the duration of social detachment does matter – the longer someone is detached the worse their quality of life and all other measures of *well-being* – and that policy needs to focus on persistent social detachment. Policy makers may therefore want to target policies at groups of older people who experience persistent social detachment and evaluate how such initiatives fare.

There are particular kinds of older people at most risk of persistent social detachment. These include people living without a partner and people with very bad health. Longer-term demographic changes mean that an increasing number of older people will be living alone, particularly women (CLG, 2006). We know that older people rely on their partners as a significant source of social relationships and social support. It is possible that an increasing number of people living alone may lead to increased demands on health, social services and voluntary sector support.

Although we know that many carers are themselves older people, because people are living longer it is possible that the oldest old will be less able to rely on their children to care for them, as their children will also have reached the later life stage and may be unable to sustain major caring responsibilities. This may also have an impact on the frequency of social contact that the oldest people receive from their children, at least in person, which may lead to more demand for and training in more advanced technological means of communication.

Perhaps most clearly, local service providers may need to provide opportunities for older people to engage in society, through improved and more accessible transport and other services and opportunities for leisure, learning and volunteering. Evidence from ELSA suggests that policy makers may need to be particularly aware of accessibility issues for older people with poor health.

Our analysis also shows the importance of income, material deprivation and housing conditions for social *participation*. A direct solution to this problem would be to increase the level of income available to older people. A more refined approach could involve policies proposed in the Age Concern (2008) report: 'handyperson' schemes available nationwide or the promotion of home repair schemes and free home audits.

To tackle effectively the risk factors identified in this report, it is necessary to look at the mechanisms by which they lead to reduced *participation* and try to influence those. Naturally, some of the problems are more straightforward and may be addressed more easily than others. For example, improving transport links and making public transport more affordable could directly improve access to activities and holidays. Initiatives like offering free annual bus passes for people aged 60 and over introduced by the Transport Secretary in April 2006 and extended to cover the whole of England from April 2008 appear to be moves in the right direction though we have no evidence from this survey as to whether or not they have had an effect.

However, in some cases the mechanisms are more indirect and more complex policy measures may be required. For example, in the case of childless people or those living alone it is clearly not possible to address this directly. However, there are still many things that can be done: exploring different models of housing,[36] providing a carer to look after or simply visit an older person on a regular basis or opening local community centres and integrating older people with other people in the area, so they do not feel isolated.

Further research is required to investigate the dynamics of social detachment, and social exclusion, in more depth. Having just three observations of information in ELSA limits our understanding of how social detachment behaves over time, though it provides useful insights into what patterns might exist, and what is possible in the future. When more waves of the data become available, an obvious direction of future research is both to use more sophisticated analytical methods to increase our understanding of dynamics and causality, and to expand the scope of the research by analysing social detachment alongside other dimensions of social exclusion. Such a thorough study could involve explicit tests of causal relationships between the elements of our conceptual framework (i.e. *resources*, *participation* and *well-being*) using structural equation modelling, and taking fuller advantage of the longitudinal data (e.g. by controlling for unobserved heterogeneity with fixed or random effects models). Further research is also needed to understand what drives social detachment for older people and whether there are key events, such as bereavement, that trigger experiences of social detachment in later life.

Acknowledgements

We are grateful for data support and contributions from Carli Lessof, James Trinder and Elizabeth Becker at NatCen and for comments from a number of sources, particularly ONS, DWP and Elizabeth Breeze.

References

Age Concern (2008), *Out of Sight, Out of Mind: Social Exclusion behind Closed Doors*, London: Age Concern England.

Barnes, M. (2005), *Social exclusion in Great Britain: An Empirical Investigation and Comparison with other European Union Member States*, Aldershot: Ashgate Publishing Limited.

Barnes, M., Blom, A., Cox, K. and Lessof, C. (2006), *The Social Exclusion of Older People: Evidence from the First Wave of the English Longitudinal Study of Ageing (ELSA)*, London: Social Exclusion Unit, Office of the Deputy Prime Minister.

Becker, E. and Boreham, R. (2008, forthcoming), *Understanding Social Exclusion across the Life Course: Older Age*, London: Cabinet Office.

Communities and Local Government (CLG) (2006), *Tackling Exclusion among Older People and New Opportunities and Challenges for Older People Services*, Speech by Baroness Andrews, 26 March 2006.

Department for Work and Pensions (DWP) (2005), *Opportunity Age: Meeting the Challenges of Ageing in the 21st Century*, London: HM Government.

[36] An example could be the Elderflowers project, which proposes housing complexes that allow people to live as part of loosely formed communities with some shared services; for more details see: http://www.elderflowers-projects.co.uk/objects/ep/Elderflowers_report.pdf

Department for Work and Pensions (DWP) (2007), *Opportunity for All: Indicators Update*, London: HMSO.

Gordon, D., Townsend, P., Levitas, R., Pantazis, C., Payne, S., Patsios, D., Middleton, S., Ashworth, K. and Adelman, L. (2000), *Poverty and Social Exclusion in Britain*, York: Joseph Rowntree Foundation.

Hyde, M., Wiggins, R.D., Higgs, P. and Blane, D.B. (2003), 'A measure of the quality of life in early old age: the theory, development and properties of a needs satisfaction model (CASP-19)', *Aging and Mental Health*, vol. 7, pp. 186–194.

Levitas, R., Pantazis, C., Fahmy, E., Gordon, D., Lloyd, E. and Patsios, D. (2007), *The Multidimensional Analysis of Social Exclusion*, London: Social Exclusion Task Force.

Maslow, A.H. (1968), *Towards a Psychology of Being*, 2nd edn, Princeton, NJ: Van Nostrand.

Miliband, D. (2006), *Social Exclusion: The Next Steps Forward*, London: ODPM.

Office for National Statistics (ONS) (2001), *Social Capital: A Review of the Literature*, Social Analysis and Reporting Division, Office for National Statistics.

Palmer, G., MacInnes, T. and Kenway, P. (2006), *Monitoring Poverty and Social Exclusion 2006,* New Policy Institute (http://www.npi.org.uk/reports/mpse%202006.pdf).

Room, G. (Ed.) (1995), *Beyond the Threshold: The Measurement and Analysis of Social Exclusion*, Bristol: The Policy Press.

Room, G. (1999), 'Social exclusion, solidarity and the challenge of globalisation', *International Journal of Social Welfare*, vol. 8, no. 3, pp. 166–174.

Social Exclusion Unit (SEU) (2006), *A Sure Start to Later Life*, London: Social Exclusion Unit.

Walker, A. and Walker, C. (eds) (1997), *Britain Divided: The Growth of Social Exclusion in the 1980s and 1990s*, London: CPAG.

Wiggins, R.D., Netuveli, G., Hyde, M., Higgs, P. and Blane, D. (2007), *The Evaluation of a Self-Enumerated Scale of Quality of Life (CASP-19) in the Context of Research on Ageing: A Combination of Exploratory and Confirmatory Approaches*, Social Indicators Research, Online First issue (http://www.springerlink.com/content/w8w7k13457630m55).

Appendix 5A

A. Full definition of participation indicators

Societal involvement – disadvantaged are those who are not members of any of the following: (1) political party, trade union or environmental group, (2) tenants' group, residents' group, neighbourhood watch, (3) church or other religious group, (4) charitable associations, and did not vote in the last general election.

Contact with others – disadvantaged are those who did not live with a partner and did not meet any of their children, family or friends at least three times a week.

Social support – this indicator has been based on the answers to the following questions concerning the respondent's partner, children, family or friends:

- How much do you feel they understand the way you feel about things?
- How much can you rely on them if you have a serious problem?
- How much can you open up to them if you need to talk about your worries?

Respondents could answer to each of the questions in the following way: 'A lot', 'Some', 'A little', 'Not at all'. We assume that the respondent has strong support from others (i.e. partner, children, family or friends) if he/she gave the answer 'A lot' to at least two of the three questions above. A person is deemed disadvantaged on this dimension when he/she has nobody (partner, children, family or friends) strongly supporting them.

Participation in culture – disadvantaged are those who did not go to the theatre, cinema or museum or did not eat out at least once a year.

Participation in social/recreational activities – excluded are those who were not members of any of the following: (1) education, arts or music groups or evening classes, (2) social clubs, (3) sports clubs, gyms, exercise classes, and did not have any other hobby/pastime.

Taking holidays – disadvantaged are those who had not taken a holiday (in the UK or abroad) and had not gone on a day trip or outing in the 12 months before the survey.

B. Questions used for well-being indicators

Control

My age prevents me from doing the things I would like to

I feel that what happens to me is out of my control

I feel free to plan for the future

I feel left out of things

Autonomy

I can do the things that I want to do

Family responsibilities prevent me from doing what I want to do

I feel that I can please myself what I do

My health stops me from doing things I want to do

Shortage of money stops me from doing things I want to do

Self-realisation

I feel full of energy these days

I choose to do things that I have never done before

I feel satisfied with the way my life has turned out

I feel that life is full of opportunities

I feel that the future looks good for me

All answers have been recoded into binary indicators in such a way that 0 means a positive answer and 1 indicates a negative answer. Therefore, the higher overall score indicates worse quality of life.

Pleasure

I look forward to every day

I feel that my life has meaning

I enjoy the things that I do

I enjoy being in the company of others

On balance, I look back on my life with a sense of happiness

Statements used in the CES-D quality of life measure:

Whether felt depressed much of the time during past week

Whether felt everything they did during past week was an effort

Whether felt their sleep was restless during past week

Whether was happy much of the time during past week

Whether felt lonely much of the time during past week

Whether enjoyed life much of the time during past week

Whether felt sad much of the time during past week

Whether could not get going much of the time during past week

All answers have been recoded into binary indicators in such a way that 0 means a positive answer and 1 indicates a negative answer. Therefore, the higher overall score indicates worse depression.

Statements used in other well-being measures:

Deemed *unhappy* if answered ‘Rather more than usual’ or ‘Much more than usual’ to the question ‘Whether recently been feeling unhappy and depressed’.

Classified as *dissatisfied with life* if slightly disagreed, disagreed or strongly disagreed with the sentence ‘I am satisfied with my life’.

Classified as *feeling worse off than others* if answered ‘A bit worse off’ or ‘Much worse off’ when asked how well off they felt compared to other people nearby.

Deemed a person who *would have changed a lot in their life* if disagreed or strongly disagreed with the statement ‘If I could live my life again, I would change almost nothing’.

Indicator of subjective *feeling of isolation* was constructed on the basis of the answers to the following questions:

How often do you feel you lack companionship?

How often do you feel left out?

How often do you feel isolated from others?

How often do you feel in tune with the people around you?

How often do you feel lonely?

For each question there were three possible responses: 'Hardly ever or never', 'Some of the time', 'Often'. All responses have been recoded in such a way that 1 meant most positive answer and 3 most negative answer and a mean of the scores was computed. A person was classified as subjectively isolated if he/she had an average score higher than 2, indicating an average answer more negative than 'Some of the time'.

C. Precise definitions of composite risk factors

Material deprivation indicator was based on possession of items from the following list: central heating, TV, video recorder, freezer or fridge freezer, washing machine, microwave oven. Lack of one or two items was defined as indicating moderate material deprivation; lack of three or more as high material deprivation.

Housing quality indicator was based on the number of housing problems reported by the respondents from the following list: shortage of space; too dark accommodation; rising damp; water getting in from roof; condensation problems; electrical problems; general rot and decay; problems with insects, mice or rats; accommodation too cold in winter.

A person was classified as not having **access to other financial services** if he/she did not have any of the following: Savings Account, TESSA, ISA, Premium Bonds, National Savings Accounts or Certificates, PEP, Stocks and/or Shares, Share Options, Unit or Investment Trusts Bonds and Gifts, Other Savings or Investments.

A person was classified as having **poor access to transport** if he/she had no access to a car and rarely or never used public transport.

A person was classified as having poor **access to basic services** if he/she could not easily reach one or more of the following services using their usual form of transport: bank/cashpoint, chiropodist, dentist, GP, hospital, local shops, optician, post office, shopping centre, supermarket.

Neighbourhood assessment was based on the answers to the following questions:

I really feel part of this area

Vandalism and graffiti are a big problem in this area

Respondent often feels lonely living in this area

Most people in this area can be trusted

People would be afraid to walk alone after dark in this area

Most people in this area are friendly

People in this area will take advantage of you

This area is kept very clean

If you were in trouble, there are lots of people in this area who would help you

For each question respondents could grade their answer on a 7-point scale. All answers have been recoded in such a way that 1 meant most positive answer and 7 most negative answer and a mean of the scores was computed. A person was classified as assessing their neighbourhood as unfriendly/unsafe if he/she had an average score higher than 4.

Appendix 5B

Table 5B.1. Distribution of risk factors: percentages based on weighted data, cell counts unweighted

All people aged 50+

	N	%		N	%
Age group			**Education**		
50–59	2,467	40.7	High (some higher education)	1,636	23.8
60–69	2,000	30.9	Medium (A-level, O-level)	1,542	23.8
70–79	1,302	21.5	Low (CSE or lower)	2,423	43.6
80+	397	6.9	Foreign/Other	560	8.9
Total	6,166	100.0	Total	6,161	100.0
Number of living children			**Number of living siblings**		
0	725	11.8	0	1,274	20.2
1	812	13.3	1	1,979	31.6
2	2,442	39.2	2	1,308	21.1
3	1,234	20.0	3	677	11.3
4 or more	951	15.7	4 or more	912	15.8
Total	6,164	100.0	Total	6,150	100.0
Family type			**Sex**		
Lives alone	1,363	20.8	Male	2,750	45.6
Partner only	3,316	53.2	Female	3,414	54.4
Children only	238	4.1	Total	6,164	100.0
Partner and children	1,073	18.8			
Others (not partner or children)	174	3.0			
Total	6,164	100.0			
Tenure			**Main activity**		
Owner	3,637	56.6	Retired	2,965	46.6
Buyer	1,597	26.4	(Self-)Employed	2,165	35.7
Private renter	733	13.6	Jobless (not retired)	958	16.5
Social renter	126	2.3	Other	75	1.2
Rent free	59	1.1	Total	6,163	100.0
Total	6,152	100.0			
Income quintile			**Main source of income**		
Lowest	972	16.8	(Self-)Employment	2,250	37.3
Second	1,074	18.2	Private pension	1,152	16.9
Third	1,210	20.1	State pension	1,924	31.7
Fourth	1,384	22.3	Benefits	450	8.0
Highest	1,479	22.6	Assets/others	388	6.1
Total	6,119	100.0	Total	6,164	100.0
Material deprivation			**Housing problems**		
No deprivation	4,646	74.7	No problems	4,824	77.7
1–2 items lacking	1,083	17.8	1 problem	953	15.8
3+ items lacking	426	7.5	2+ problems	379	6.6
Total	6,155	100.0	Total	6,156	100.0

Continues

Table 5B.1 continued

	N	%		N	%
Has got current account			**Access to car or public**		
Yes	5,472	89.7	**transport**		
No	572	10.3	Yes	5,878	95.0
Total	6,044	100.0	No	288	5.0
			Total	6,166	100.0
Has got other financial			**Access to basic services**		
products			Yes	5,388	88.2
Yes	5,358	87.4	No	675	11.8
No	686	12.6	Total	6,063	100.0
Total	6,044	100.0			
Landline phone			**Internet or mobile**		
Has	6,027	97.6	Yes	4,133	65.8
No	128	2.4	No	2,010	34.3
Total	6,155	100.0	Total	6,143	100.0
General health			**Any physical activity**		
Excellent	915	14.7	Yes	5,875	94.8
Very good	1,958	31.1	No	289	5.2
Good	1,965	32.0	Total	6,164	100.0
Fair	1,025	17.0			
Poor	301	5.2	**Had a fall within last 2 years**		
Total	6,164	100.0	No	5,013	82.6
			Yes	1,060	17.4
Limiting long-lasting illness			Total	6,073	100.0
No	4,272	69.0			
Yes	1,894	31.0	**Cared for somebody last**		
Total	6,166	100.0	**month**		
			Yes	4,645	74.7
Region			No	1,519	25.3
North East	406	6.2	Total	6,164	100.0
North West	740	13.2			
Yorkshire	714	10.8	**Index of Multiple Area**		
East Midlands	619	9.4	**Deprivation – quintiles**		
West Midlands	639	10.6	Least deprived	1,573	24.5
East of England	772	12.3	2nd quintile	1,552	24.3
London	515	9.2	3rd quintile	1,259	20.1
South East	1,015	16.2	4th quintile	1,053	18.1
South West	741	12.0	Most deprived	724	13.0
Total	6,161	100.0	Total	6,161	100.0
Unfriendly/unsafe			**Urbanisation**		
neighbourhood			City	4,483	74.1
No	5,470	89.2	Town	797	12.6
Yes	618	10.8	Village	881	13.4
Total	6,088	100.0	Total	6,161	100.0

Appendix 5C

Table 5C.1. The results of stepwise ordinal logistic regression model for the duration of social detachment

Base: All people aged 50+

	Odds ratio	[95% conf. interval]		P>|z|
Male	1.6	1.23	2.00	**0.00**
Education level (ref: high)				**0.00**
Medium (A-level, O-level)	1.23	0.81	1.88	0.34
Low (CSE or lower)	2.55	1.75	3.72	0.00
Foreign/other	1.84	1.12	3.03	0.02
Family type (ref: lives with partner only)				**0.00**
Lives alone	4.40	3.29	5.88	0.00
Children only	8.15	5.11	12.99	0.00
Partner and children	0.95	0.63	1.44	0.82
Others (not partner or children)	3.46	1.99	6.00	0.00
Number of living children (ref: 2)				**0.00**
0	2.08	1.49	2.89	0.00
1	1.06	0.72	1.56	0.77
3	1.04	0.74	1.44	0.84
4 or more	1.06	0.74	1.51	0.76
Main activity (ref: retired)				**0.00**
(Self-)Employed	1.62	1.16	2.25	0.00
Jobless (not retired)	1.85	1.36	2.53	0.00
Other	0.69	0.20	2.38	0.56
Had a fall in last two years	1.40	1.05	1.87	**0.02**
Health (ref: excellent)				**0.00**
Very good	1.45	0.92	2.30	0.11
Good	1.73	1.10	2.71	0.02
Fair	1.83	1.13	2.96	0.01
Poor	3.28	1.84	5.84	0.00
Income quintile (ref: highest)				**0.00**
Lowest	1.95	1.19	3.21	0.01
Second	2.70	1.67	4.36	0.00
Third	2.50	1.56	3.99	0.00
Fourth	1.43	0.88	2.33	0.15
No access to basic services	2.11	1.58	2.82	**0.00**
No internet or mobile	1.47	1.15	1.89	**0.00**
No current account	1.72	1.25	2.36	**0.00**
No other financial products	1.78	1.33	2.38	**0.00**
No access to car or public transport	1.92	1.30	2.84	**0.00**
Housing problems (ref: none)				**0.01**
1 problem	1.52	1.14	2.03	0.00
2+ problems	1.34	0.91	1.98	0.14
Material deprivation (ref: none)				**0.00**
1–2 items lacking	1.50	1.14	1.98	0.00
3+ items lacking	1.90	1.31	2.73	0.00
Unfriendly/unsafe neighbourhood	1.93	1.41	2.63	0.00

Note: Variables not included in the model by the stepwise procedure: Age group, Number of living siblings, Any physical activity, Cared for somebody last month, Main source of income, Index of Multiple Area Deprivation, Urbanisation, No landline phone, Limiting long-lasting illness, Region.

6. Resilience in older age: a depression-related approach

Panayotes Demakakos *University College London*

Gopalakrishnan Netuveli *Imperial College*

Noriko Cable *University College London*

David Blane *Imperial College*

Among other findings the analysis presented in this chapter shows that:

- Resilience, the ability of people to resist adversity and flourish under it, existed irrespective of the way it was measured.
- Resilient older people were more satisfied with their lives and had a better quality of life than non-resilient older people.
- Resilient older people expected to live longer than their non-resilient counterparts.
- Age and socio-economic status did not seem to be much related to resilience but further exploration on this issue is needed.
- Sex, marital status and social support were related to resilience cross-sectionally but not longitudinally. Further evaluation of these factors as correlates of resilience is required.

6.1 Introduction

This chapter focuses on resilience: the ability of people to resist adversity and flourish under it. Its main objectives are: (a) to examine whether resilience exists among the ELSA respondents irrespective of the way it is measured; (b) to explore resilience both cross-sectionally and longitudinally; and (c) to describe the socio-demographic characteristics of resilient people.

The concept of resilience originates from psychiatric and developmental studies (Luthar, Ciccheti and Becker, 2000). It is a concept that has been used mostly in studies concerning children and young people but recently it has also been used successfully in older populations (Ryff et al., 1998; Staudinger et al., 1999). There is no consensus about what resilience is and how to define it but it is commonly understood as the ability of people to resist and effectively overcome adversity (Schoon, 2006). Thus, the existence of adversity is a necessary condition for resilience. But beyond that common understanding there are different views on: (a) whether resilience is a personality trait or a process; (b) the dimensions of resilience; (c) the validity of resilience as a concept and its consistency over time; and (d) the relationships of resilience with adaptation and whether it adds something new in developmental and life-course theories (Luthar, Ciccheti and Becker, 2000).

This chapter conceptualises resilience as a dynamic process and not as a personality trait. It explores cross-sectionally older people's ability to flourish under adversity. The term 'flourish' describes people's ability not only to avoid depression when under adversity but also to achieve happiness and well-being and have a good quality of life. The longitudinal equivalent of flourishing is effectively resisting adversity in the long run. This refers to the ability to overcome the long-term consequences of a negative change in life and to bounce back from it; to avoid, in other words, a long-term or permanent decline in one's quality of life, well-being and happiness because of the emergence of adversities such as widowhood or deterioration of mobility.

In this chapter different types of adversity are considered in order to explore resilience in older age comprehensively. The cross-sectional analysis examined the following adversities: material deprivation, self-perceived material deprivation and widowhood, while the longitudinal analysis focused on deterioration of mobility and widowhood.

The focus of this chapter on resilience is warranted both from a research standpoint and a policy-making perspective. From a research standpoint, exploring resilience in older age is warranted and needed predominantly because adversities such as loss of partner/spouse and deterioration of mobility are much more common among older people. The higher prevalence of these adversities in older people, coupled with any financial difficulties they may have, make older age the most appropriate stage of life to study resilience and its associations with well-being, health and development. Moreover, research on resilience in older age is scarce in comparison with research on resilience in younger ages (Netuveli et al., 2008) and therefore there is a need for more studies on this issue, especially longitudinal ones using national samples such as ELSA's.

From the policy maker's perspective, an exploration of resilience in older age such as the present one may provide useful insights into the factors that relate to living happily and independently at later stages of life.

6.2 Methods

Sample

Our analysis employed data from all three waves of ELSA. The sample consisted of core members of the study (eligible members of the study who participated in the first wave of the study and have since remained active members of it) for whom a weighting factor to correct for non-response had been estimated (n = 7,167). Information on partners of core members of the study, who were not themselves core members, was not used because of age restrictions (i.e. some of these respondents were younger than 50 years old) and the lack of an appropriate weighting factor to correct for non-response from them. The cross-sectional refreshment sample from the third wave of the study was not used. This was because the cross-sectional analysis did not use data exclusively from wave 3 but also utilised information from previous waves, thus precluding the use of the refreshment sample for which no pre-wave 3 information was available.

Measures

(1) Age was coded in three groups. The youngest age group included respondents aged 54 to 59 years old, the intermediate age group aged 60 to 74 years old and the oldest age group all respondents aged 75 and over.

(2) Marital status data from wave 3 were coded as: married (one time or more); widowed; and separated/divorced or single.

(3) Education was measured as highest educational qualifications reported in ELSA wave 1 and coded as: degree or equivalent qualification; other lower than degree qualifications; and no qualifications.

(4) Wealth was employed as quintiles of net total non-pension wealth measured at benefit unit level (benefit unit is a couple or single person with any dependent children they may have). The longitudinal analysis used wealth data from the first wave of ELSA. The cross-sectional analysis used wealth data from the second but not the third wave of ELSA as the latter were unavailable at the time of analysis. The cut-off point between the lowest (poorest) and the second lowest quintiles of net total non-pension wealth (measured at benefit unit level) in wave 2 (2004–05) was £25,000 worth of wealth. The focus on wealth and not on other widely used measures of socio-economic status such as education, occupational class or income was decided on methodological grounds. Wealth reflects command over material resources much better than any other measure of socio-economic status (Oliver and Shapiro, 1995) and is more appropriate to use in older people as, unlike the other socio-economic measures, it is an indicator that reflects in the most complete way an older person's contemporary socio-economic status (Demakakos et al., 2008).

(5) Home ownership data from wave 3 were used. They were coded as: home owner; home buyer – mortgage holder; and renter or partial ownership.

(6) Self-perceived financial adversity was assessed by the following question: 'Looking at this card, please say how often you find you have too little money to spend on what you feel [your] needs are?' Responses to this question ranged from never (1) to most of the time (5). For the needs of the analysis these responses were dichotomised: those who never or rarely felt they had too little money to spend on their needs vs. those who sometimes or more often felt that way. Respondents who in both wave 2 and wave 3 (in wave 1 this question had not been asked) reported that they felt they had too little money to spend on their needs were treated as cases of self-perceived financial adversity.

(7) Social support was measured as receiving positive social support. The following three questions were put to the respondents regarding the social support they might have received from partner/spouse, children and friends: (a) How much do they really understand the way you feel about things? (b) How much can you rely on them if you have a serious problem? (c) How much can you open up to them if you need to talk about your worries? Responses for each question ranged from not at all

(coded as 0) to a lot (coded as 3). Responses to all three questions were added up and summary scores ranging from 0 (absolute lack of social support from this source – lowest possible score) to 9 (highest possible score). Social support summary scores were not calculated for cases with missing values. The cross-sectional analysis employed data exclusively from the third wave of the study, while the longitudinal analysis used data from all three waves.

(8) Satisfaction with life was measured by the satisfaction with life scale (SWLS) (Diener et al., 1985), which consisted of five statements. Responses to these statements ranged from 7 (strongly agree) to 1 (strongly disagree) (mid-point 3: neither agree nor disagree). The life satisfaction summary score ranged from 5 to 35 with higher values reflecting greater satisfaction with life.

(9) Quality of life was measured by CASP-19 which contained 19 questions aiming to assess quality of life in early old age (Hyde et al., 2003). The CASP-19 summary score was derived in the way its developers have indicated. The expected range of the CASP-19 summary score was from 0 (worst/lowest possible score) to 57 (best/highest possible score).

(10) Expectancy to survive for the next ten years was assessed with the following question: What are the chances that you will live to be [the actual age of the respondent plus ten years] or more? The possible response range was from 0% (absolutely no chance) to 100% (absolutely certain). The main reason for using this self-assessment of survival expectancy was that this has been found to be predictive of actual mortality (Van Doorn and Kasl, 1998; Hurd and McGarry, 2002).

(11) A summary score of the following ten questions on self-reported mobility limitations was used:

(a) Walking 100 yards

(b) Sitting for about two hours

(c) Getting up from a chair after sitting for long periods

(d) Climbing several flights of stairs without resting

(e) Climbing one flight of stairs without resting

(f) Stooping, kneeling or crouching

(g) Reaching or extending arms above shoulder level (either arm)

(h) Pulling or pushing large objects like a living-room chair

(i) Lifting or carrying weights over 10 pounds, like a heavy bag of groceries

(j) Picking up a 5p coin from a table

Responses in all questions were dichotomous (either the condition was present or not) and the mobility limitations score ranged from 0 (lack of any limitation) to 10 (all ten limitations were present).

(12) Depression was measured by an abridged version of the Center for Epidemiological Studies-Depression (CES-D) scale containing eight

dichotomous questions on recent experience of depressive symptoms (Radloff, 1977; Steffick and the HRS Health Working Group, 2000). Details on how these self-reported data were used can be found in the next section where the derivation of resilience measures is described.

Measures of resilience and adversity

Undoubtedly there are many different ways to measure resilience in older age. Following existing research (Netuveli et al., 2008), this study concentrated on negative affectivity that might stem from experiencing adversities, and measured resilience cross-sectionally as the lack of depressive symptoms or depression and longitudinally as the non-worsening of one's depression (CES-D) score after exposure to an adversity.

Cross-sectionally, resilience was operationalised as reporting no or just one CES-D depressive symptom when under financial adversity, and resilient older people are identified as those who, under financial adversity, manage to be affected only a little or not at all by depression and to live their lives better than expected. Two different measures of financial adversity were used: objective and self-perceived. Objective financial adversity was measured as being in the lowest (poorest) quintile of total net non-pension wealth (measured at benefit unit level) in ELSA wave 2. Self-perceived financial adversity was measured as reporting having sometimes or more often too little money to spend on needs in both wave 2 and wave 3.

In cross-sectional analysis, resilience was also measured as the ability to overcome recent widowhood. Recent widowhood was assessed as a change in marital status from being married or single in the ELSA wave 2 interview to being widowed in ELSA wave 3. The decision to focus on recent widowhood and not on widowhood in general is made on the basis that the former is expected to be a more intense adversity than the latter. Resilience in recently widowed older people was measured differently than in the case of financial adversity. The criterion used to assess resilience among recently widowed older people was their depression status (case of depression measured as reporting four or more CES-D depressive symptoms) (Steffick and the HRS Health Working Group, 2000) and not the absence (either absolute or relative) of CES-D depressive symptoms. This was decided on empirical grounds as the lack of CES-D depressive symptoms seemed an inappropriate measure to assess resilience among recently widowed older people given the severity of recent widowhood as an adversity. A preliminary analysis of the frequency distribution of recent widowhood by CES-D score showed that the number of recently widowed people who reported no or just one CES-D symptom was too small (29 out of 118) for further meaningful analysis. Thus, among recently widowed older people those who were not depressed (reporting less than four CES-D symptoms) were characterised as resilient while those who were depressed (reporting four or more CES-D symptoms) were characterised as non-resilient.

The longitudinal analysis made use of data from all three waves of ELSA and focused on adversities that emerged after wave 1 and were reported in wave 2. Two adversities were considered: deterioration of mobility and widowhood. Resilience, as in the cross-sectional analysis, was related to depressive symptoms but this time the focus was on change in depression (CES-D) score after the experience of adversity. Respondents were characterised as resilient if their post-adversity (wave 3) depression score was equal to or better than their pre-adversity (wave 1) depression score after having experienced an adversity in wave 2 (adversity time point). Respondents whose post-adversity (wave 3) depression score was worse than their pre-adversity (wave 1) score after having experienced an adversity in wave 2 were characterised as non-resilient. The rationale behind the longitudinal analysis was to measure older people's ability to fight adversity effectively, overcome its long-term consequences and bounce back from it.

Deterioration of mobility in wave 2 was established by comparing wave 1 and wave 2 mobility limitations scores. If the wave 2 score was higher than the wave 1 score, then mobility had worsened and people were considered to be 'under adversity'. In order to ensure that our respondents were under real adversity and that the observed worsening of mobility was not transient, wave 2 mobility limitations score was checked against wave 3 mobility limitations score. Only if the wave 3 mobility limitations score was the same as or higher than the respective score in wave 2 were respondents finally characterised as 'under adversity'. With respect to widowhood, people were characterised as widowed if their marital status changed between wave 1 and wave 2 from being married or single to being widowed.

Box 6.1. A description of the resilience variables

Adversity	**Criterion to establish resilience among those under adversity**
Cross-sectional analysis	
Objective financial adversity: being in the lowest quintile of total (non-pension) wealth (measured at benefit unit level) in ELSA wave 2	Reporting one or no CES-D symptom
Self-perceived financial adversity: reporting in ELSA wave 2 and wave 3 sometimes or more often having too little money to spend on needs	Reporting one or no CES-D symptom
Widowhood: change in marital status from being married or single in ELSA wave 1 to being widowed in ELSA wave 2	Reporting four or more CES-D symptoms
Longitudinal analysis	
Deterioration of mobility: deterioration of mobility in ELSA wave 2 compared to ELSA wave 1 that persisted or worsened in ELSA wave 3	Wave 3 CES-D score $\leq$ wave 1 CES-D score
Widowhood: change in marital status from being married or single in ELSA wave 1 to being widowed in ELSA wave 2	Wave 3 CES-D score $\leq$ wave 1 CES-D score

Analysis

In the cross-sectional analysis the socio-demographic characteristics of resilient and non-resilient people are described and the differences in satisfaction with life, quality of life and expectancy to survive in the next ten years by resilience status are assessed. The longitudinal analysis employed an existing methodological framework to measure resilience (Netuveli et al., 2008). It assessed the temporal dimension of resilience (older people's ability effectively to resist adversity in the long run). Also, it assessed the long-term differences in quality of life and expectancy of survival by resilience status and described the socio-demographic characteristics of the longitudinally resilient people. All differences were statistically tested by either chi-square or ANOVA. The level of statistical significance was $p \leq 0.05$. Numbers used in analysis may vary because of the differing numbers of missing values. All analyses were weighted for non-response.

The cross-sectional and longitudinal exploration of differences in satisfaction with life, quality of life and expectancy to survive in the next ten years by resilience status aimed at refining the depressive symptomatology-based results by showing that resilience exists even if measured in different ways.

6.3 Cross-sectional results

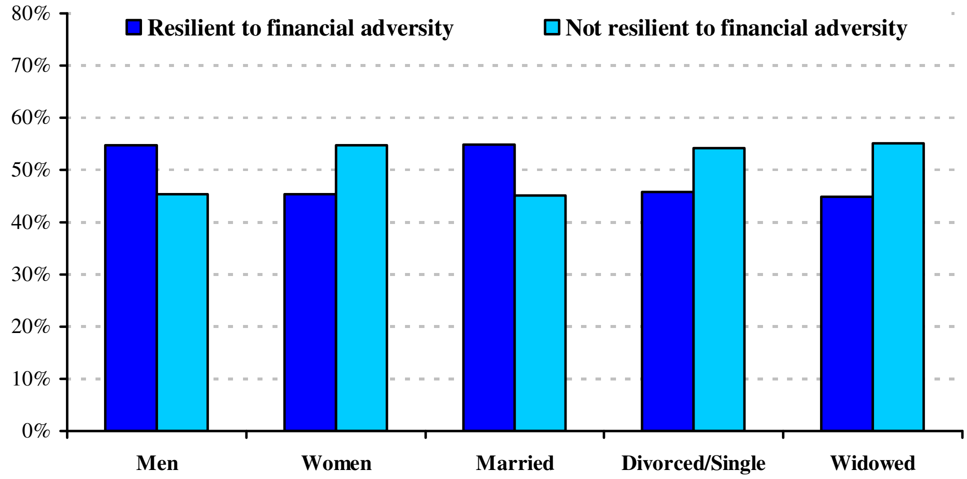
Resilience to objectively measured financial adversity

One of the adversities that the cross-sectional analysis explored in relation to older people's resilience was financial strain. This was defined as being in the lowest (poorest) quintile of wealth in ELSA wave 2. Older people who report no or just one depressive symptom while objectively being in an adverse financial position were characterised as resilient.

Table 6A.1 shows that almost 5% more older women than older men (23% and 18%, respectively) were in the lowest (poorest) quintile of wealth. It also shows that people in the oldest age group (75+) were doing worse than their younger counterparts. The lowest rates of financial adversity are observed in the youngest age group of men (16%) and the highest in the oldest age group of women (32%). With respect to depressive symptoms, more women (39%) than men (28%) reported suffering from two or more depressive symptoms. The majority of our sample (72% of men and 61% of women) have managed to avoid depression as they have reported no or just one depressive symptom. Age exerted a negative effect on older people's affective state as considerably more people in the oldest age group (34% of men and 49% of women) reported two or more depressive symptoms compared to the two younger age groups.

A combination of the two states, that of financial adversity and that of positive affective state (reporting no or just one CES-D symptom) results in a 2 x 2 table with four categories: (a) those not under financial adversity who were in positive affective state; (b) those not under financial adversity who reported two or more CES-D symptoms; (c) those under financial adversity who were in positive affective state (reported no or just one depressive symptom) and could be characterised as resilient; and (d) those under financial adversity who reported suffering from two or more depressive symptoms and were characterised as non-resilient. Our analysis shows that men were more resilient than women (Table 6A.2 and Figure 6.1) (resilience rates were 55% and 45%, respectively, for men and women) and that this difference was statistically significant (p≤0.001). But this finding should be treated with caution as the observed sex difference might be a function of the higher prevalence of depressive symptoms among the women, irrespective of financial adversity.

Figure 6.1. Resilience to financial adversity by sex and marital status



The examination of resilience by marital status shows that being married was related to higher rates of resilience (Table 6A.2 and Figure 6.1). Out of married older people 55% are resilient to financial adversity while the respective rates for widowed and divorced or never married older people are lower: 45% and 46%, respectively. Chi-square test shows that the differences in resilience by marital status are statistically significant (p≤0.001). Differences in resilience according to age were not statistically significant (p=0.96). Nevertheless, it is worth highlighting that it is the oldest men (75+) who reported the highest rates of resilience (60%) among all age groups considered in this part of the analysis as well as that age influenced the association between marital status and resilience.

Another factor that was examined in relation to resilience in older ages was social support (see Table 6A.3). Different types of positive social support stemming from partner/spouse, children and friends were examined. A series of analysis of variance (ANOVA) tests shows that difference in social support received from all sources between resilient and non-resilient people was significant at the highest level of statistical significance (p≤0.001). Also, our analysis indicated that there was not a single age group where non-resilient people received more social support from their partner/spouse, children or friends than their resilient counterparts. This finding indicates that social environment might be important for resilience and individual flourishing. Moreover, our analysis reveals that age influenced somewhat the association between social support and resilience as differences in the amounts of social support received from all sources between resilient and non-resilient people were smaller in the two older age groups than in the younger age group.

An innovative part of this chapter is that it explores the differences in well-being and quality of life measures by resilience status. This is important as it provides the opportunity to explore whether resilience measured as lack of depressive symptoms relates to other outcomes and therefore to assess to what extent resilience, people's ability to flourish under adversity, exists irrespective of the way it is measured.

In this chapter the statistical significance of differences between resilient and non-resilient people in three measures was tested: satisfaction with life scale (SWLS) (a measure of well-being); CASP-19 (a measure of quality of life in older age); and expectancy to survive in the next ten years (a measure reflecting an overall positive assessment of life and future prospects).

Figure 6.2. Mean SWLS and CASP-19 scores and chances of survival by resilience to financial adversity

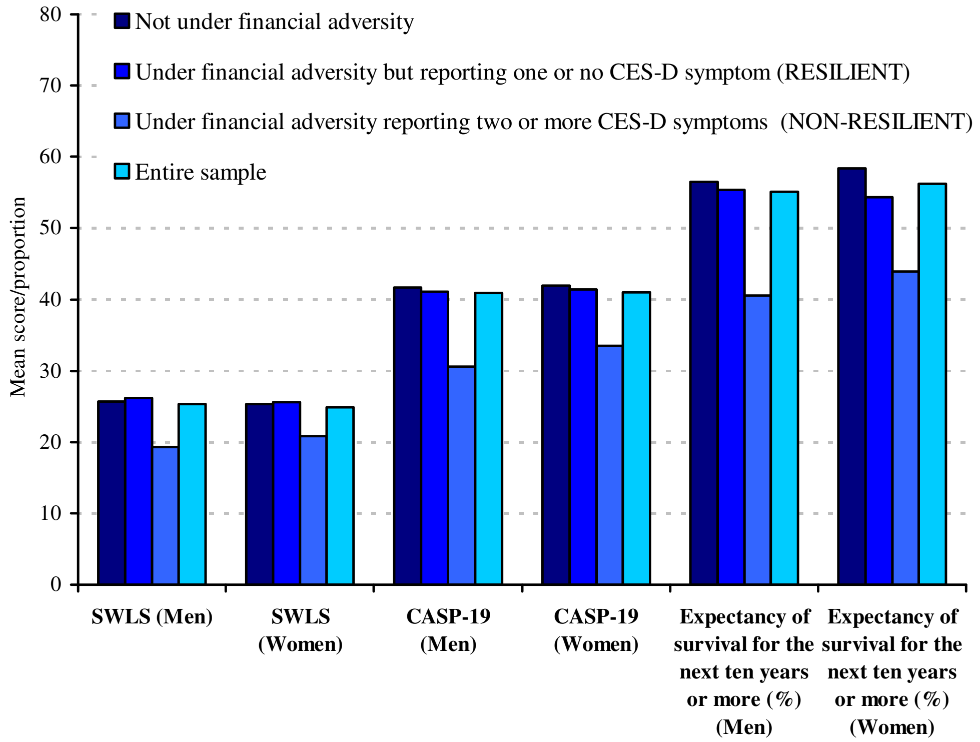


Figure 6.2 provides an overview of the differences in SWLS score, CASP-19 score and expectancy (chances) to survive in the next ten years (in %) between those who were not under financial adversity, those who were under financial adversity but were resilient and those who were under financial adversity and were not resilient. It shows that irrespective of sex it is non-resilient older people who scored lower (worse) on all three outcomes. Table 6A.4 examines the statistical significance of these differences and further analyses them by age. It shows that differences in SWLS by resilience status were significant at the highest level of statistical significance ($p \leq 0.001$). The mean score of SWLS in resilient men was almost seven points higher than that of non-

resilient men, while in women the respective difference was close to five points. These differences are great given that the expected range of the SWLS measure is from 5 to 35. Further analysis of this association by age reveals two interesting findings. Firstly, it shows that the differences in SWLS between resilient and non-resilient people (in both men and women) decreased by age and secondly that this decrease was a result of a notable increase in the SWLS score of non-resilient older people by age. The highest observed score on SWLS was reported by resilient men in the oldest age group (27 points) and the lowest by non-resilient men in the youngest age group (16 points).

Table 6A.4 also shows that the association between CASP-19 and resilience shared similar characteristics with the one between SWLS and resilience. The difference in CASP-19 score between resilient and non-resilient people was also significant at the highest level of statistical significance ($p \leq 0.001$). In men the difference in CASP-19 score between resilient and non-resilient was 10 points, while in women the respective difference was 8 points. This part of the analysis also suggests that, irrespective of sex, age was related to positive changes in quality of life (CASP-19 score). But it is the difference in expectancy of survival between resilient and non-resilient people ($p \leq 0.001$) that shows in the most eloquent way the significance of resilience for older people's lives. On average, older resilient men reported a 15% higher chance to survive in the next ten years compared to their non-resilient counterparts. The equivalent difference for women was 9%. Also striking were the differences in expectancy of survival between resilient and non-resilient people in the youngest age group, 28% difference in men and 14% difference in women. Moreover, it should be noted that resilient men aged 75 and over reported higher chances of future survival (45%) than non-resilient men who were at least 15 years younger than them (aged 60 or younger) (38%).

Resilience to self-perceived financial adversity

Our analysis expanded also on self-perceived adversities as it aimed to establish that resilience exists irrespective of the type of the considered adversity. The self-perceived adversity used in this part of the analysis was self-perceived financial adversity. This was assessed by asking respondents how often they were feeling that they had too little money to spend on their needs. Respondents who repeatedly reported that sometimes or more often they felt they had too little money to spend on their needs were classified as being under self-perceived financial adversity. An analysis of the frequency distribution of self-perceived financial adversity by quintiles of total net non-pension wealth measured at benefit unit level in wave 2 was performed to check that the distributions of these two variables were meaningfully different and, therefore, that the exploration of the association between resilience and self-perceived financial adversity would be useful and not repetitive of the analysis of resilience by wealth. The performed analysis showed that only 38% of people who reported that sometimes or more often they had too little money to spend on their needs were in the lowest (poorest) quintile of wealth. This was a clear indication that an analysis of resilience by self-perceived financial adversity would not be repetitive and redundant.

The distribution of self-perceived financial adversity by sex was somewhat different from the respective distribution of wealth-related financial adversity, with men and women feeling equally under financial adversity (19% and 20%, respectively) (Table 6A.5). Interestingly, age was related to self-perceived financial adversity in the opposite direction from that in which it was related to wealth-related adversity; irrespective of sex the older the respondents the lower the proportion of older people feeling under financial strain. This decrease was particularly evident in women, where the rates of people reporting that they were under financial strain halved from 28% among the youngest women to 14% in women aged 75 and over.

Table 6A.6 presents the analysis of resilience to self-perceived financial adversity by age and sex. As in the case of objectively measured financial adversity presented earlier (see Table 6A.2), men reported significantly ($p \leq 0.001$) higher rates of resilience (54%) than women (44%), while differences by age group were not statistically significant. Table 6A.7 presents the differences in SWLS, CASP-19 and expectancy of survival for the next ten years by resilience to self-perceived financial adversity broken down by sex and age. Differences in all three measures by resilience status were significant at the highest level of statistical significance ($p \leq 0.001$). The patterns of differences in the three measures by resilience to self-perceived financial adversity across age groups were similar to the ones described earlier for resilience related to objective financial adversity. These findings constitute further evidence for the existence of resilience in the ELSA sample and, most importantly, show that adversities do not have to be 'objective' in order to impede older people's lives. Self-perceived adversities can also be harmful to older people's well-being and quality of life.

Resilience to recent widowhood

Within the perspective of assessing resilience in older ages in the most complete way, this chapter also examined resilience to recent widowhood (Table 6A.8). Recent widowhood was measured as a change in marital status from being either single or married in ELSA wave 2 to being widowed in wave 3. Given the intensity of recent widowhood as a severe socio-emotional adversity and its relative rarity as an event, it was decided to assess resilience among recently widowed people as not being depressed (reporting less than four CES-D depressive symptoms) rather than as reporting no or just one CES-D depressive symptom. The prevalence of recent widowhood in our population was low, just 1.8%.

Table 6A.9 presents the rates of resilient and non-resilient people among those who have recently experienced widowhood. Although resilience to widowhood was measured differently from resilience to financial adversity, the proportion of resilient people among widowed older people was comparable to those reported earlier in Tables 6A.2 and 6A.6. Of the recently widowed people 57% did not suffer from depression. This similarity in the prevalence rates a posteriori justifies our decision to measure differently resilience among the recently widowed. When dealing with a severe and very intense adversity such as recent bereavement, appropriate measures need to be selected that will successfully distinguish resilient from non-resilient people. Difference in resilience to recent widowhood by sex and age was not statistically significant (data not shown in a table).

Figure 6.3. Mean SWLS and CASP-19 scores and chances of survival by recent widowhood and resilience to it

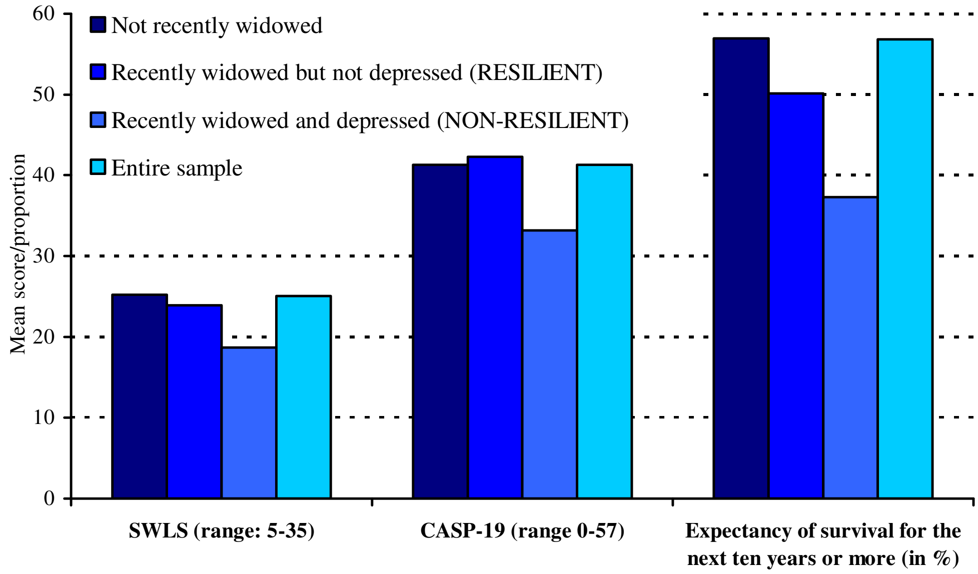


Table 6A.10 shows that the differences in social support received from children and friends between resilient and non-resilient people were not statistically significant (p=0.19). This finding is in contrast with earlier findings showing that social support was related to resilience to financial adversity. Figure 6.3 presents the differences in SWLS and CASP-19 between not recently widowed older people, recently widowed but resilient older people and recently widowed non-resilient older people. It suggests that non-resilient older people reported the lowest scores on SWLS and CASP-19 scales and the lowest expectancy to survive in the future. Table 6A.10 complements Figure 6.3 by analysing the differences in SWLS, CASP-19 and survival expectancy by resilience to recent widowhood. In accordance with Tables 6A.3 and 6A.7, it shows that recently widowed resilient people scored significantly better (higher) on all three measures than non-resilient people. The statistical significance of the differences in SWLS and CASP-19 was at the highest level, $p \leq 0.001$, while that in expectancy of survival was still significant but at a lower level, $p \leq 0.05$.

6.4 Discussion of cross-sectional results

It was found that approximately half the respondents who had suffered different types of adversity were able to live a better-than-expected life and managed not only to avoid depressive symptoms but also to enjoy their lives and to remain optimistic for the future. Although this finding is not major as a definite account of prevalence of resilience in older age (as any estimation of prevalence of resilience is conditional upon the way this is measured), it is a major indication that resilience exists in older age and that a fair number of older people can potentially resist adversity.

A second interesting finding of the cross-sectional analysis is that resilience was related to SWLS, CASP-19 and future expectations irrespective of the adversity considered (objective financial adversity, self-perceived financial adversity or recent widowhood). This finding is also major as it contributes to the establishment of the concept of resilience and shows the significance of resilience for well-being, quality of life and human development.

A further intriguing finding is that age was not, at least directly, related to resilience. This was rather surprising as one would expect younger respondents to be more resilient as they may have more resources at their disposal. But clearly this is not the case. Thus, our analysis provides preliminary evidence that resilience is not a property of specific age groups, but further research on this issue is needed. Sex, social support and marital status were related to resilience but only in analysis involving financial adversity (marital status could not be used in analysis involving widowhood). Thus, no safe conclusion can be drawn on their associations with resilience and, as with the association between age and resilience, further research is needed on these.

6.5 Longitudinal results

This chapter examined resilience among older people not only cross-sectionally but also longitudinally. Longitudinally, resilience was conceptualised as bouncing back after having experienced an adversity. It was measured as the ability to keep the post-adversity (wave 3) levels of depression (CES-D) scores as low as (or even lower than) they were in the pre-adversity time point (wave 1) after the establishment of an adversity in wave 2. The adversities considered in longitudinal analysis were deterioration of mobility and widowhood. The necessary conditions for them to be considered in the longitudinal analysis were that (a) they should have emerged since wave 1 and (b) that they should have been reported in wave 2. Deterioration of mobility was measured as a self-reported worsening of mobility that occurred in wave 2 and persisted or worsened in wave 3. Widowhood was measured as a change in marital status from being single or married in wave 1 to being widowed in wave 2.

Resilience to deterioration of mobility

Deterioration of mobility was one of the adversities examined longitudinally. Our analysis shows that this was common in our sample, with more women than men reporting that their mobility had deteriorated between wave 1 and wave 2 (16% and 12%, respectively) (Table 6A.11). With respect to age, as expected our analysis shows that deterioration of mobility was positively related to age. The older our respondents were the more they reported that their functional ability became worse between wave 1 and wave 2. An examination of age and sex in parallel reveals that age influenced the observed sex differences in recent deterioration of mobility. In the youngest age group (54 to 59 years old), the proportion of women reporting that their mobility had recently deteriorated was almost double that of men (13% and 7%, respectively). This difference became smaller in the middle age group (60 to

74 years old) (16% and 11% for men and women, respectively), while in the oldest age group there was no sex difference, with 18% of both men and women reporting a recent deterioration of their mobility.

Table 6A.12 presents the socio-demographic characteristics of resilient and non-resilient respondents by age and sex. There are two main findings from this table. The first is that 60% of respondents who reported a deterioration in their mobility were found to be resilient as their post-adversity depression (CES-D) score was not worse than their respective pre-adversity score. This is an interesting finding, indicating that many older people were able to cope with the fact that their mobility worsened as their age progressed. The second main finding of Table 6A.12 is that the differences between resilient and non-resilient older people by any of the employed socio-demographic variables (age, sex and marital status) were not statistically significant. This is a major finding, suggesting that it might not be socio-demographic factors that drive older people's ability to bounce back after experiencing an adversity.

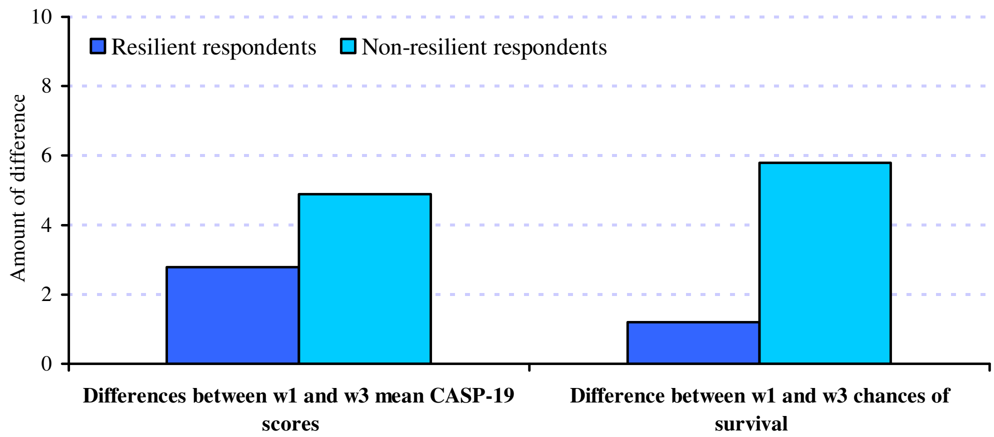
Another interesting finding from Table 6A.12 is the lack of a clear socio-economic gradient in resilience. This is rather unexpected given the potential contribution of education and material resources to resisting adversities effectively. A more detailed analysis of the associations between education and resilience shows that there is a statistically significant educational gradient in resilience ($p \leq 0.05$) but only among the oldest respondents (75+). This is quite paradoxical given that chronologically this group is the most distant one from the time point of the end of full-time education. If not a statistical artefact this finding is an indication of the importance of education as a resource to fight problems in life for the generation of those currently 75+. An examination of the association between wealth and resilience by age group is also informative. It shows that the association between wealth and resilience has more of the characteristics of a gradient in the middle age group (60 to 74 years old) but not in the other two age groups where its shape suggests the existence of clear thresholds. This is particularly evident among the oldest respondents (75+), where there was a remarkable difference in the resilience rates between people in the highest (wealthiest) quintile of wealth and the rest of 75+ people.

In Table 6A.13, the quality of life (CASP-19) of older people is longitudinally analysed by resilience to recent deterioration of mobility. At all three points of time, pre-adversity, adversity and post-adversity, the mean CASP-19 scores were larger for the resilient group and the differences in the mean between the two groups were statistically significant. The major finding here is that in wave 3 the resilient people managed to minimise somewhat the impact of deterioration of their mobility on their quality of life as the difference between their wave 1 (pre-adversity) and wave 3 (post-adversity) CASP-19 scores is almost three points, while the respective difference among the non-resilient people is five points (Figure 6.4).

The same patterns can be observed even more clearly in the association between expectancy of survival and resilience. In all three successive measurements (three waves of the study) a greater proportion of resilient than non-resilient respondents expected to survive for the next ten years but differences were significant only in wave 3 (post-adversity). In wave 3 (post-adversity) the non-resilient respondents reported 6% less chance to survive for the next ten years and beyond than in wave 1 (pre-adversity baseline), while the respective difference among the resilient people was just 1% (see Figure 6.4).

Table 6A.14, in accordance with Table 6A.10, shows that social support, irrespective of where it came from, was not associated with resilience in this analysis. Except for a few comparisons, resilient respondents reported a lower level of social support than the non-resilient but these differences were small and not significant.

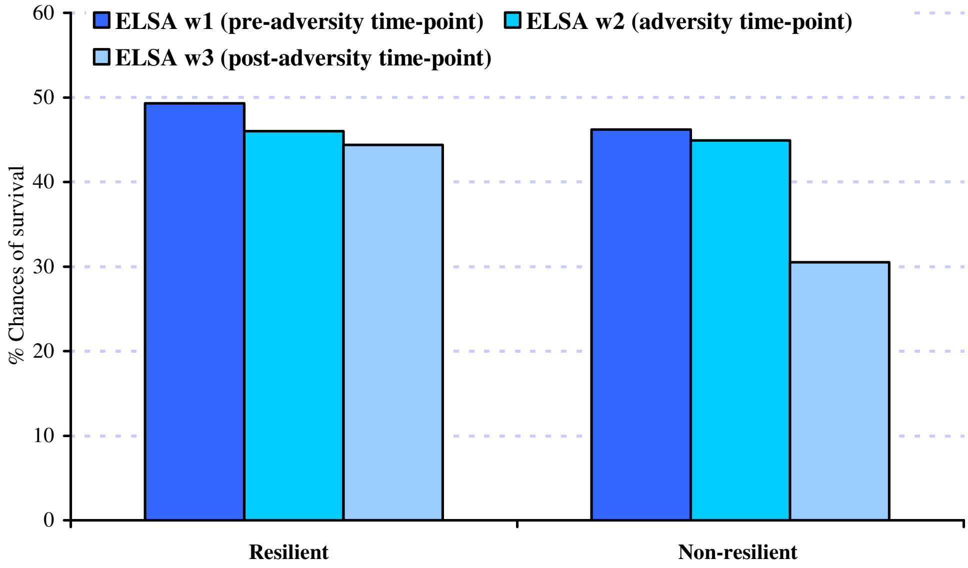
Figure 6.4. The differences between resilient and non-resilient respondents in mean CASP-19 score and expectancy of survival (in %) in the pre-adversity (wave 1) and post-adversity (wave 3) time points



Resilience to widowhood

Table 6A.15 presents the rates of recent widowhood in wave 2 by age and sex. There were 134 new cases of widowhood between wave 1 and wave 2 and the proportion of recently widowed people among our respondents was small, 1.6% and 2.4% for men and women, respectively. As resilience is a phenomenon related to adversity, the respective count of people resilient to widowhood was similarly low. From the 134 cases of recently widowed respondents, 69 could be characterised as non-resilient and 65 as resilient (unweighted counts). The proportion of resilient people among those recently bereaved (49% – weighted estimate) resembles that of resilient people among those who reported a recent deterioration of mobility (presented in Table 6A.11), though it is somewhat smaller. The longitudinal analysis of the differences in quality of life score (CASP-19) and chances of expectancy to survive in the future by resilience to widowhood is presented in Table 6A.16. Differences were not significant in the pre-adversity (wave 1) and adversity time points (wave 2). In contrast, in the post-adversity time point (wave 3), where resilience has exerted its beneficial effect, differences in both CASP-19 score and expectancy to survive in the future were statistically significant. Table 6A.16 and Figure 6.5 show that resilient people manage to minimise the

Figure 6.5. The expectancy of survival (in %) in three ELSA waves by resilience to recent widowhood



damage inflicted on them by widowhood. This is evident both in the stability of their CASP-19 scores throughout the three waves and in the lesser decrease in their chances of survival in comparison with those of their non-resilient counterparts.

6.6 Discussion of longitudinal findings

In the longitudinal analysis, the working definition of resilience was bouncing back from adversity. Our findings suggest that many resilient people were able to minimise the losses to their quality of life and expectancy of survival that adversities such as widowhood and worsening of mobility might have brought about. Nevertheless, a full 'bouncing back', where our resilient respondents would manage fully to make up for all the losses originating from the adversity they experienced, was not observed. Thus, our findings suggest that a complete recovery from all consequences of intense adversities might not be easily attainable. This is a conclusion with implications for research on resilience as it shows that bouncing back in older age might be conceptualised in relative terms as a minimisation of the long-term consequences of adversities rather than in absolute terms as a complete alleviation of all negative changes caused by exposure to adversities.

At this point a major dimension of the present work should be discussed. This chapter found that depression-related resilience is not rare among older people. This is seemingly at odds with previous reports on resilience in older age (Netuveli et al., 2008) suggesting that resilience in older age is relatively rare. The difference between this work and other studies is a result of the way resilience was conceptualised and measured. The present study has focused on the lack of depression and depressive symptomatology. Although the lack of depression or depressive symptoms when under adversity is a necessary condition to achieve flourishing in older age, it is unlikely on its own to be a comprehensive measure of such achievement. Our findings describe the lower layer – the basis of resilience but not resilience in its entirety – and they should be used in conjunction with more refined accounts of resilience (Netuveli et al., 2008).

Another finding that couples some of the findings of the cross-sectional analysis is that demographic factors such as age, sex and marital status appeared not to exert any long-term influence on resilience. Although more research is needed on this issue, it can be argued tentatively that it is not demographic factors that drive the formation of resilience. The truly surprising finding in this analysis is the lack of influence of social support on resilience. Social support has been shown elsewhere (Netuveli et al., 2008) to be a significant determinant of resilience. The difference between Netuveli et al.'s finding and that of the present study may be due to methodological differences such as use of the different outcomes and adversities and different analytical strategies. But further research on the role of social support for resilience is required in order to draw any safe conclusions. The lack of clear associations between resilience and socio-economic factors such as education, wealth and home ownership is a finding that has been reported by other studies (Netuveli et al., 2008). It is also a very intriguing finding given that socio-economic resources and status could be used to enhance the individual's ability to resist adversities. Nevertheless, the lack of socio-economic gradients in resilience does not necessarily entail a complete lack of association between socio-economic status and resilience. There is a possibility (and our data provide some indication for this) that the association between socio-economic status and resilience may not be linear and graded and, most importantly, that socio-economic resources may not equally influence resilience in all age groups.

6.7 Concluding remarks

This chapter suggests that resilience exists in older ages. It measured depression-related resilience in different ways and found that those who were identified as resilient to depression reported better quality of life, more satisfaction with life and higher expectancy of survival. A surprising finding of this chapter is the lack of clear (if any) associations between social (i.e. social support) and socio-demographic factors (i.e. age, sex, marital status, education, wealth and home ownership) and resilience. This is something that future research needs to explore in detail.

Studying resilience has some particularities that the reader should bear in mind. The first is that it is very difficult for any study of resilience to account for the heterogeneity of the events (adversities). Even obviously negative events may mean different things to different people. The second is related to the distribution of events. Adversities are not distributed randomly. They have specific causes and this is something that any research on resilience should try to address. We have included in our analysis several socio-demographic factors to account for this, but our study is far from being an all-inclusive account of the causes of adversities. A third related issue is that of multiple events. Adversities do not necessarily come one at a time as examined in this chapter. Although this does not diminish the value of our work as an exploration of resilience in older age, it is surely an issue that future research needs to explore.

Moreover, studying resilience is not an easy task as resilience is not a well-defined concept. This chapter, following existing evidence (Netuveli et al., 2008), has conceptualised and operationalised resilience in relation to negative affectivity. Undoubtedly there are many more ways to use and measure resilience. Efforts have been made to ensure that our findings would be valid even if resilience was measured differently.

References

Demakakos, P. Nazroo, J. Breeze, E. and Marmot, M. (2008), 'Socioeconomic status and health: the role of subjective social status', *Social Science and Medicine*, vol. 67, pp. 330–340.

Diener, E., Emmons, R.A., Larsen, R.J. and Griffin, S. (1985), 'The satisfaction with life scale', *Journal of Personality Assessment*, vol. 49, pp. 71–75.

Hurd, M.D. and McGarry, K. (2002), 'The predictive validity of subjective probabilities of survival', *The Economic Journal*, vol. 112, pp. 966–985.

Hyde, M., Wiggins, R.D., Higgs, P. and Blane, D.B. (2003), 'A measure of quality of life in early old age: the theory, development and properties of a needs satisfaction model (CASP-19)', *Aging and Mental Health*, vol. 7, pp. 186–194.

Luthar, S.S., Ciccheti, D. and Becker, B. (2000), 'The construct of resilience: a critical evaluation and guidelines for future work', *Child Development*, vol. 71, pp. 543–562.

Netuveli, G., Wiggins, R.D., Montgomery, S.M., Hildon, Z. and Blane, D.B. (2008), 'Mental health and resilience at older ages: bouncing back after adversity in the British Household Panel Survey', *Journal of Epidemiology and Community Health* (in press).

Oliver, M.L. and Shapiro, T.M. (1995), *Black Wealth/White wealth*, New York: Routledge.

Radloff, L.S. (1977), 'The CES-D scale: a self-report depression scale for research in the general population', *Applied Psychological Measurement*, vol. 1, pp. 385–401.

Ryff, C.D., Singer, B., Dienberg-Love, G. and Essex, M.J. (1998), 'Resilience in adulthood and later life. Defining features and dynamic processes', in J. Lomranz (ed.), *Handbook of Aging and Mental Health. An Integrative Approach*, New York: Plenum.

Schoon I. (2006), *Risk and Resilience. Adaptation in Changing Times*, Cambridge: Cambridge University Press.

Staudinger, U.M., Freund A.M., Linden M. and Maas, I. (1999), 'Self, personality, and life regulation: facets of psychological resilience in old age', in P.B. Baltes and K.U. Mayer (eds.), *The Berlin Aging Study: Aging from 70 to 100*, New York: Cambridge University Press.

Steffick, D.E. and the HRS Health Working Group (2000), *Documentation of Affective Functioning Measures in the Health and Retirement Study*, Ann Arbor, MI: HRS Health Working Group.

Van Doorn, C. and Kasl, S.V. (1998), 'Can parental longevity and self-rated life expectancy predict mortality among older persons? Results from an Australian cohort', *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, vol. 53, pp. S28–S34.

Appendix 6A
Tables on resilience in older age

Table 6A.1. Objective financial adversity, depression and resilience status by age and sex in ELSA wave 3

Respondents 54+ who have participated in the study since its first wave (core members of the study)

		54–59	60–74	75+	All
		%	%	%	%
Men					
Financial adversity	Not in financial adversity	84.3	82.4	77.2	81.7
	In financial adversity	15.7	17.6	22.8	18.3
Depressive symptoms	No or just one CES-D symptom	75.4	73.3	66.2	72.2
	Two or more CES-D symptoms	24.6	26.7	33.8	27.8
Resilience status (entire sample)	No financial adversity, no or just one CES-D symptom	66.4	64.5	52.5	62.2
	No financial adversity, two or more CES-D symptoms	17.9	17.9	24.7	19.5
	Financial adversity, no or just one CES-D symptom (RESILIENT)	9.0	8.8	13.7	10.0
	Financial adversity, two or more CES-D symptoms (NON-RESILIENT)	6.7	8.7	9.1	8.3
Women					
Financial adversity	Not in financial adversity	80.8	82.0	67.7	77.4
	In financial adversity	19.2	18.0	32.3	22.6
Depressive symptoms	No or just one CES-D symptom	64.6	65.4	50.9	60.8
	Two or more CES-D symptoms	35.4	34.6	49.1	39.2
Resilience status (entire sample)	No financial adversity, no or just one CES-D symptom	56.6	56.6	36.6	50.6
	No financial adversity, two or more CES-D symptoms	24.1	25.4	31.1	26.8
	Financial adversity, no or just one CES-D symptom (RESILIENT)	8.0	8.8	14.3	10.2
	Financial adversity, two or more CES-D symptoms (NON-RESILIENT)	11.2	9.2	18.0	12.4

Table 6A.1 continued

	54–59	60–74	75+	All
Weighted N				
Men	*848*	*1,550*	*723*	*3,121*
Women	*918*	*1,675*	*1,115*	*3,709*
Unweighted N				
Men	*736*	*1,589*	*730*	*3,055*
Women	*903*	*1,844*	*1,054*	*3,801*

Table 6A.2. Resilience to financial adversity by age, sex and marital status in ELSA wave 3

Core members of the study who were in the lowest quintile of wealth in wave 2

	54–59	60–74	75+	All
	%	%	%	%
Men				
NOT resilient	42.8	49.7	40.0	45.3
Resilient	57.2	50.3	60.0	54.7
Women				
NOT resilient	58.5	51.1	55.8	54.7
Resilient	41.5	48.9	44.2	45.3
Married				
NOT resilient	44.8	48.6	38.2	45.1
Resilient	55.2	51.4	61.8	54.9
Divorced/Single				
NOT resilient	53.7	51.3	63.0	54.2
Resilient	46.3	48.7	37.0	45.8
Widowed				
NOT resilient	–	54.8	53.0	55.1
Resilient	–	45.2	47.0	44.9
Weighted N				
Men	*133*	*272*	*165*	*570*
Women	*176*	*302*	*360*	*838*
Married	*145*	*277*	*133*	*556*
Divorced/Single	*140*	*200*	*76*	*416*
Widowed	*24*	*96*	*314*	*434*
Unweighted N				
Men	*99*	*236*	*144*	*479*
Women	*158*	*300*	*311*	*769*
Married	*118*	*249*	*108*	*475*
Divorced/Single	*119*	*188*	*71*	*378*
Widowed	*20*	*98*	*275*	*393*

Notes: Statistical significance of the differences in resilience by age group: p= 0.938. Statistical significance of the differences in resilience by sex and marital status: p<= 0.01.

Table 6A.3. Resilience to financial adversity by social support and age in ELSA wave 3

Core members of the study who were in the lowest quintile of wealth in wave2

	54–59		60–74		75+		All	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
Social support from partner (range: 0–9)								
NOT resilient	6.9	*2.5*	7.5	*1.7*	[7.7]	*[1.9]*	7.3	*2.0*
Resilient	7.9	*1.5*	8.0	*1.5*	8.4	*1.1*	8.1	*1.4*
Social support from children (range: 0–9)								
NOT resilient	6.3	*2.7*	6.8	*2.4*	7.7	*1.9*	7.0	*2.4*
Resilient	7.1	*2.1*	7.5	*1.8*	8.1	*1.5*	7.7	*1.8*
Social support from friends (range: 0–9)								
NOT resilient	6.0	*2.4*	6.4	*2.4*	6.6	*2.3*	6.4	*2.3*
Resilient	6.9	*1.8*	6.8	*2.2*	6.8	*2.1*	6.8	*2.1*
Social support from partner, children and friends (range: 0–27)								
NOT resilient	18.8	*5.2*	20.7	*4.1*	–	–	20.2	*4.5*
Resilient	21.6	*3.5*	22.0	*3.7*	[22.5]	*[3.3]*	22.0	*3.5*
Weighted N								
Social support from partner								
NOT resilient	*63*		*115*		*37*		*214*	
Resilient	*76*		*127*		*64*		*267*	
Social support from children								
NOT resilient	*108*		*204*		*155*		*467*	
Resilient	*98*		*207*		*168*		*473*	
Social support from friends								
NOT resilient	*108*		*208*		*170*		*487*	
Resilient	*116*		*224*		*179*		*520*	
Social support from partner, children and friends								
NOT resilient	*52*		*90*		*21*		*164*	
Resilient	*63*		*108*		*47*		*217*	
Unweighted N								
Social support from partner								
NOT resilient	*52*		*101*		*28*		*181*	
Resilient	*62*		*119*		*54*		*235*	
Social support from children								
NOT resilient	*92*		*192*		*138*		*422*	
Resilient	*86*		*199*		*146*		*431*	

Continues

Table 6A.3 continued

	54–59	60–74	75+	All
Unweighted N				
Social support from friends				
NOT resilient	*92*	*194*	*147*	*433*
Resilient	*100*	*211*	*157*	*468*
Social support from partner, children and friends				
NOT resilient	*43*	*80*	*18*	*141*
Resilient	*51*	*102*	*40*	*193*

Note: Differences in resilience by social support (all four types) are statistically significant: $p<= 0.001$.

Table 6A.4. Satisfaction with life (SWLS), quality of life (CASP-19) and expectancy of survival (chances to survive for the next ten years or more) by resilience to financial adversity and age in ELSA wave 3

Core members of the study who were in the lowest quintile of wealth in wave 2

	Age group	NOT resilient		Resilient		All	
		Mean	*SD*	Mean	*SD*	Mean	*SD*
SWLS score (range: 5–35)							
Men	54–59	[15.6]	*[7.3]*	25.5	*5.9*	21.6	*8.1*
	60–74	19.7	*7.3*	25.9	*5.7*	22.9	*7.2*
	75+	[22.0]	*[6.9]*	27.3	*4.4*	25.3	*6.0*
	All	19.3	*7.5*	26.2	*5.4*	23.2	*7.2*
Women	54–59	17.7	*7.5*	22.9	*6.9*	20.0	*7.7*
	60–74	20.1	*6.9*	26.0	*5.1*	23.2	*6.7*
	75+	23.3	*7.0*	26.6	*5.4*	24.8	*6.5*
	All	20.8	*7.4*	25.6	*5.8*	23.1	*7.1*
CASP-19 score (range: 0–57)							
Men	54–59	[26.8]	*[9.9]*	41.6	*7.7*	35.6	*11.3*
	60–74	31.8	*8.9*	40.7	*6.9*	36.4	*9.1*
	75+	[31.6]	*[10.2]*	41.3	*6.7*	37.6	*9.5*
	All	30.6	*9.6*	41.1	*7.0*	36.6	*9.8*
Women	54–59	32.0	*9.5*	40.0	*9.5*	35.5	*10.3*
	60–74	33.0	*9.0*	42.8	*6.1*	37.9	*9.1*
	75+	34.7	*8.9*	40.6	*6.6*	37.3	*8.4*
	All	33.5	*9.1*	41.4	*7.2*	37.2	*9.2*
Expectancy of survival (%)							
Men	54–59	38.3	*28.1*	66.6	*24.1*	54.5	*29.4*
	60–74	49.4	*29.3*	56.1	*27.5*	52.8	*28.6*
	75+	24.5	*31.5*	45.2	*31.3*	36.8	*32.9*
	All	40.6	*31.3*	55.4	*29.0*	48.7	*30.9*
Women	54–59	54.3	*26.2*	68.6	*21.8*	60.3	*25.4*
	60–74	50.4	*28.4*	60.1	*27.6*	55.1	*28.4*
	75+	33.3	*30.0*	42.0	*33.8*	37.1	*32.0*
	All	43.9	*29.6*	54.3	*34.2*	48.6	*32.0*
Weighted N							
SWLS score							
Men	*54–59*	*42*		*64*		*106*	
	60–74	*98*		*107*		*205*	
	75+	*47*		*75*		*122*	
	All	*187*		*246*		*433*	
Women	*54–59*	*76*		*58*		*134*	
	60–74	*119*		*128*		*247*	
	75+	*131*		*102*		*233*	
	All	*326*		*288*		*614*	

Continues

Table 6A.4 continued

	Age group	NOT resilient	Resilient	All
Weighted N				
CASP-19 score				
Men	*54–59*	*41*	*61*	*102*
	60–74	*96*	*104*	*201*
	75+	*44*	*72*	*116*
	All	*182*	*238*	*420*
Women	*54–59*	*77*	*58*	*135*
	60–74	*119*	*119*	*238*
	75+	*123*	*99*	*221*
	All	*318*	*276*	*594*
Expectancy of survival				
Men	*54–59*	*57*	*76*	*133*
	60–74	*131*	*131*	*262*
	75+	*63*	*93*	*156*
	All	*251*	*300*	*551*
Women	*54–59*	*103*	*73*	*176*
	60–74	*152*	*145*	*297*
	75+	*195*	*153*	*349*
	All	*450*	*372*	*822*
Unweighted N				
SWLS score				
Men	*54–59*	*31*	*50*	*81*
	60–74	*85*	*93*	*178*
	75+	*38*	*68*	*106*
	All	*154*	*211*	*365*
Women	*54–59*	*68*	*54*	*122*
	60–74	*118*	*128*	*246*
	75+	*117*	*88*	*205*
	All	*303*	*270*	*573*
CASP-19 score				
Men	*54–59*	*30*	*48*	*78*
	60–74	*85*	*92*	*177*
	75+	*37*	*66*	*103*
	All	*152*	*206*	*358*
Women	*54–59*	*69*	*55*	*124*
	60–74	*117*	*120*	*237*
	75+	*109*	*87*	*196*
	All	*295*	*262*	*557*
Expectancy of survival				
Men	*54–59*	*41*	*58*	*99*
	60–74	*115*	*115*	*230*
	75+	*53*	*84*	*137*
	All	*209*	*257*	*466*
Women	*54–59*	*90*	*68*	*158*
	60–74	*149*	*146*	*295*
	75+	*171*	*131*	*302*
	All	*410*	*345*	*755*

Note: Differences in all three outcome measures (SWLS, CASP-19 and expectancy of survival) by resilience are statistically significant: p<= 0.001.

Table 6A.5. Self-perceived financial adversity, depression and resilience status by age and sex in ELSA wave 3

Respondents 54+ who have participated in the study since its first wave (core members of the study)

		54–59	60–74	75+	All
		%	%	%	%
Men					
Self-perceived financial adversity (sometimes or more often having TOO LITTLE money to spend on needs)	No	78.8	80.0	85.1	80.8
	Yes	21.2	20.0	14.9	19.2
Resilience status (entire sample)	No self-perceived financial adversity, no or just one CES-D symptom	63.6	62.6	58.3	61.9
	No self-perceived financial adversity, two or more CES-D symptoms	15.2	17.3	26.7	18.9
	Self-perceived financial adversity, no or just one CES-D symptom (RESILIENT)	11.3	10.8	8.4	10.4
	Self-perceived financial adversity, two or more CES-D symptoms (NON-RESILIENT)	9.9	9.3	6.5	8.8
Women					
Self-perceived financial adversity (sometimes or more often having TOO LITTLE money to spend on needs)	No	72.3	80.3	85.9	79.9
	Yes	27.7	19.7	14.1	20.1
Resilience status (entire sample)	No self-perceived financial adversity, no or just one CES-D symptom	53.0	56.1	45.7	52.2
	No self-perceived financial adversity, two or more CES-D symptoms	19.3	24.2	40.2	27.7
	Self-perceived financial adversity, no or just one CES-D symptom (RESILIENT)	12.1	9.5	5.1	8.9
	Self-perceived financial adversity, two or more CES-D symptoms (NON-RESILIENT)	15.6	10.1	9.0	11.2
Weighted N					
Men		*856*	*1,558*	*721*	*3,135*
Women		*940*	*1,696*	*1,100*	*3,736*
Unweighted N					
Men		*743*	*1,600*	*730*	*3,073*
Women		*923*	*1,867*	*1,044*	*3,834*

Table 6A.6. Resilience to self-perceived financial adversity by age and sex in ELSA wave 3

Core members of the study who in waves 2 and 3 reported that sometimes or more often they had too little money to spend on needs

	54–59	60–74	75+	All
	%	%	%	%
Men				
NOT resilient	46.7	46.3	43.8	46.0
Resilient	53.3	53.7	56.2	54.0
Women				
NOT resilient	56.2	51.5	63.8	55.7
Resilient	43.8	48.5	36.2	44.3
Weighted N				
Men	*182*	*312*	*108*	*602*
Women	*260*	*334*	*155*	*749*
Unweighted N				
Men	*146*	*294*	*103*	*543*
Women	*248*	*349*	*145*	*742*

Notes: Differences in resilience by sex are statistically significant: $p<= 0.001$. Differences in resilience by age groups are not statistically significant: $p= 0.182$.

Table 6A.7. Satisfaction with life (SWLS), quality of life (CASP-19) and expectancy of survival (chances to survive for the next ten years or more) by resilience to self-perceived financial adversity, sex and age in ELSA wave 3

Core members of the study who in waves 2 and 3 reported that sometimes or more often they had too little money to spend on needs

	Age group	NOT resilient		Resilient		All	
		Mean	*SD*	Mean	*SD*	Mean	*SD*
SWLS score (range 5–35)							
Men	54–59	16.2	*7.5*	25.2	*6.1*	21.2	*8.1*
	60–74	19.7	*7.3*	24.2	*5.9*	22.2	*6.9*
	75+	[19.9]	*[6.8]*	[26.7]	*[4.8]*	23.7	*6.7*
	All	18.7	*7.4*	24.9	*5.9*	22.1	*7.3*
Women	54–59	16.6	*7.6*	22.3	*5.9*	19.2	*7.5*
	60–74	19.6	*7.6*	24.1	*5.6*	21.8	*7.1*
	75+	20.0	*7.8*	[26.1]	*[4.9]*	22.3	*7.5*
	All	18.6	*7.8*	23.8	*5.7*	21.0	*7.4*
CASP-19 score (range: 0–57)							
Men	54–59	29.2	*9.6*	41.3	*7.7*	35.9	*10.5*
	60–74	31.4	*8.0*	39.0	*6.5*	35.6	*8.1*
	75+	–	–	[40.0]	*[5.9]*	36.6	*8.6*
	All	30.7	*8.8*	39.8	*6.9*	35.9	*9.0*
Women	54–59	32.8	*8.8*	40.1	*7.3*	36.1	*8.9*
	60–74	32.3	*8.7*	41.0	*6.4*	36.5	*8.8*
	75+	30.0	*8.8*	[40.2]	*[7.4]*	33.9	*9.7*
	All	32.0	*8.8*	40.6	*6.9*	35.9	*9.1*
Expectancy of survival (%)							
Men	54–59	47.3	*27.1*	68.5	*20.9*	58.6	*26.2*
	60–74	48.5	*27.9*	58.1	*26.6*	53.7	*27.6*
	75+	[26.6]	*[30.7]*	45.7	*29.7*	37.1	*31.4*
	All	44.4	*29.2*	59.0	*26.7*	52.2	*28.8*
Women	54–59	58.2	*25.5*	70.2	*18.1*	63.4	*23.3*
	60–74	52.4	*26.1*	60.2	*25.5*	56.2	*26.1*
	75+	36.8	*30.7*	44.9	*29.8*	39.8	*30.5*
	All	50.8	*28.2*	61.1	*25.5*	55.4	*27.5*
Weighted N							
SWLS score							
Men	*54–59*	*67*		*84*		*151*	
	60–74	*114*		*142*		*256*	
	75+	*36*		*46*		*82*	
	All	*216*		*272*		*489*	
Women	*54–59*	*111*		*92*		*203*	
	60–74	*139*		*133*		*272*	
	75+	*72*		*43*		*115*	
	All	*322*		*268*		*590*	

Continues

Table 6A.7 continued

	Age group	NOT resilient	Resilient	All
Weighted N				
CASP-19 score				
Men	*54–59*	*66*	*82*	*148*
	60–74	*112*	*145*	*256*
	75+	*29*	*44*	*73*
	All	*207*	*270*	*477*
Women	*54–59*	*111*	*93*	*204*
	60–74	*134*	*126*	*260*
	75+	*68*	*42*	*110*
	All	*313*	*261*	*573*
Expectancy of survival				
Men	*54–59*	*85*	*97*	*182*
	60–74	*143*	*168*	*310*
	75+	*47*	*58*	*105*
	All	*275*	*323*	*598*
Women	*54–59*	*146*	*113*	*260*
	60–74	*169*	*159*	*328*
	75+	*95*	*56*	*151*
	All	*410*	*328*	*739*
Unweighted N				
SWLS score				
Men	*54–59*	*56*	*71*	*127*
	60–74	*106*	*140*	*246*
	75+	*33*	*46*	*79*
	All	*195*	*257*	*452*
Women	*54–59*	*105*	*93*	*198*
	60–74	*148*	*140*	*288*
	75+	*66*	*43*	*109*
	All	*319*	*276*	*595*
CASP-19 score				
Men	*54–59*	*55*	*69*	*124*
	60–74	*105*	*142*	*247*
	75+	*27*	*44*	*71*
	All	*187*	*255*	*442*
Women	*54–59*	*106*	*94*	*200*
	60–74	*142*	*135*	*277*
	75+	*61*	*42*	*103*
	All	*309*	*271*	*580*
Expectancy of survival				
Men	*54–59*	*67*	*79*	*146*
	60–74	*130*	*163*	*293*
	75+	*43*	*58*	*101*
	All	*240*	*300*	*540*
Women	*54–59*	*134*	*113*	*247*
	60–74	*176*	*167*	*343*
	75+	*86*	*55*	*141*
	All	*396*	*335*	*731*

Note: Differences in all three outcome measures (SWLS, CASP-19 and expectancy of survival) by resilience are statistically significant: $p <= 0.001$.

Table 6A.8. Recent widowhood (after ELSA wave 2 interview) and resilience status by age in ELSA wave 3

Respondents 54+ who have participated in the study since its first wave (core members of the study)

	54–59	60–74	75+	All
	%	*%*	*%*	*%*
Recent widowhood (after ELSA wave 2 interview)				
Not recently widowed	99.5	98.6	96.2	98.2
Recently widowed	0.5	1.4	3.8	1.8
Resilience status (entire sample)				
Not recently widowed, not depressed	85.0	85.9	79.3	83.9
Not recently widowed, depressed	14.4	12.7	17.0	14.3
Recently widowed, not depressed (RESILIENT)	0.3	0.9	2.0	1.0
Recently widowed, depressed (NON-RESILIENT)	[0.2]	0.5	1.8	0.8
Weighted N	*1,807*	*3,274*	*1,854*	*6,935*
Unweighted N	*1,676*	*3,485*	*1,801*	*6,962*

Table 6A.9. Resilience to recent widowhood by age in ELSA wave 3

Core members of the study who recently (after wave 2) became widowed

	54–59	60–74	75+	All
	%	*%*	*%*	*%*
Resilience to recent widowhood				
NOT resilient	–	[37.6]	47.6	43.2
Resilient	–	[62.4]	52.4	56.8
Weighted N	*10*	*45*	*70*	*125*
Unweighted N	*8*	*46*	*61*	*115*

Note: Differences in resilience by age group are not statistically significant: p<= 0.556.

Table 6A.10. Satisfaction with life (SWLS), quality of life (CASP-19), expectancy of survival (chances to survive for the next ten years or more) and social support from children and friends by resilience to recent widowhood in ELSA wave 3

Core members of the study who recently (after wave 2) became widowed

	NOT resilient		Resilient		All	
	Mean	*SD*	Mean	*SD*	Mean	*SD*
SWLS score (range: 5–35)	[18.8]	*7.8*	24.3	*6.2*	22.0	*7.4*
CASP-19 score (range: 0–57)	[32.5]	*9.0*	42.1	*7.0*	38.3	*9.1*
Expectancy of survival (%)	34.4	*30.2*	47.7	*31.3*	41.8	*31.4*
Social support from children and friends (range 0–18)	[13.7]	*3.8*	14.7	*3.9*	14.3	*3.9*
Weighted N						
SWLS score	*42*		*61*		*103*	
CASP-19 score	*37*		*55*		*92*	
Expectancy of survival	*54*		*67*		*121*	
Social support	*37*		*54*		*91*	
Unweighted N						
SWLS score	*39*		*57*		*96*	
CASP-19 score	*34*		*53*		*87*	
Expectancy of survival	*49*		*64*		*113*	
Social support	*34*		*54*		*87*	

Notes: Differences in SWLS and CASP-19 by resilience are statistically significant: p<= 0.001. Differences in expectancy of survival by resilience are statistically significant: p= 0.020. Differences in social support by resilience are not statistically significant: p= 0.229.

Table 6A.11. Recent deterioration of mobility in wave 2 that persisted in wave 3 by age and sex

Respondents 54+ who have participated in the study since its first wave (core members of the study)

	Deterioration of mobility in ELSA wave 2 that persisted in ELSA wave 3	54–59	60–74	75+	All
		%	%	%	%
Men	No	92.7	88.9	81.9	88.3
	Yes	7.3	11.1	18.1	11.7
Women	No	87.5	84.0	82.2	84.4
	Yes	12.5	16.0	17.8	15.6
Weighted N					
Men		*842*	*1,524*	*711*	*3,077*
Women		*732*	*1,569*	*718*	*3,019*
Unweighted N					
Men		*921*	*1,658*	*1,078*	*3,657*
Women		*905*	*1,826*	*1,023*	*3,754*

Table 6A.12. Resilience to deterioration of mobility by age and sex, marital status, education, wealth and home ownership

Core members of the study whose self-reported mobility deteriorated between wave 1 and wave 2 and remained so or deteriorated even more in wave 3

	54–59	60–74	75+	All
	%	%	%	%
Men				
NOT resilient	39.6	36.5	44.3	39.8
Resilient	60.4	63.5	55.7	60.2
Women				
NOT resilient	45.0	39.7	38.9	40.5
Resilient	55.0	60.3	61.1	59.5
Married				
NOT resilient	43.8	36.3	42.1	39.2
Resilient	56.2	63.7	57.9	60.8
Divorced/Single				
NOT resilient	[38.0]	45.7	[31.8]	40.3
Resilient	[62.0]	54.3	[68.2]	59.7
Widowed				
NOT resilient	–	39.3	42.2	42.2
Resilient	–	60.7	57.8	57.8
Degree or equivalent				
NOT resilient	–	[36.0]	–	33.4
Resilient	–	[64.0]	–	66.6
Other qualifications				
NOT resilient	39.8	39.7	36.1	38.6
Resilient	60.2	60.3	63.9	61.4
No qualifications				
NOT resilient	47.4	37.8	47.3	42.9
Resilient	52.6	62.2	52.7	57.1
Poorest quintile				
NOT resilient	[47.1]	49.5	41.5	45.6
Resilient	[52.9]	50.5	58.5	54.4
2nd quintile				
NOT resilient	[39.1]	43.1	42.3	42.1
Resilient	[60.9]	56.9	57.7	57.9
3rd quintile				
NOT resilient	[42.0]	36.2	43.7	40.0
Resilient	[58.0]	63.8	56.3	60.0
4th quintile				
NOT resilient	[42.9]	33.4	41.4	37.6
Resilient	[57.1]	66.6	58.6	62.4
Wealthiest quintile				
NOT resilient	–	31.7	[30.5]	33.3
Resilient	–	68.3	[69.5]	66.7

Table 6A.12 continued

	54–59	60–74	75+	All
	%	%	%	%
Homeowner				
NOT resilient	42.6	36.5	44.3	40.1
Resilient	57.4	63.5	55.7	59.9
Home buyers – mortgage holders				
NOT resilient	43.2	31.4	–	36.5
Resilient	56.8	68.6	–	63.5
Renters or partial owners				
NOT resilient	[42.2]	50.0	38.3	43.3
Resilient	[57.8]	50.0	61.7	56.7
Weighted N				
Men	*62*	*168*	*129*	*359*
Women	*115*	*265*	*192*	*572*
Married	*114*	*296*	*125*	*535*
Divorced/Single	*48*	*74*	*34*	*156*
Widowed	*14*	*63*	*162*	*239*
Degree or equivalent	*10*	*40*	*24*	*74*
Other qualifications	*103*	*191*	*125*	*420*
No qualifications	*63*	*202*	*172*	*437*
Poorest quintile	*49*	*71*	*84*	*205*
2nd quintile	*37*	*92*	*62*	*191*
3rd quintile	*35*	*84*	*69*	*188*
4th quintile	*32*	*99*	*63*	*194*
Wealthiest quintile	*20*	*83*	*40*	*143*
Homeowner	*66*	*291*	*206*	*564*
Home buyer – mortgage holders	*62*	*60*	*14*	*136*
Renters or partial ownership	*47*	*75*	*92*	*214*
Unweighted N				
Men	*50*	*171*	*127*	*348*
Women	*113*	*288*	*182*	*583*
Married	*105*	*308*	*117*	*530*
Divorced/Single	*45*	*77*	*35*	*157*
Widowed	*13*	*73*	*157*	*243*
Degree or equivalent	*10*	*51*	*27*	*88*
Other qualifications	*102*	*215*	*128*	*445*
No qualifications	*51*	*193*	*154*	*398*
Poorest quintile	*40*	*66*	*75*	*181*
2nd quintile	*34*	*93*	*61*	*188*
3rd quintile	*34*	*89*	*67*	*190*
4th quintile	*32*	*109*	*62*	*203*
Wealthiest quintile	*20*	*98*	*41*	*159*
Homeowner	*65*	*318*	*205*	*588*
Home buyer – mortgage holders	*59*	*63*	*14*	*136*
Renters or partial ownership	*38*	*70*	*82*	*190*

Note: No difference in resilience by age, sex, marital status, home ownership, baseline wealth and education is statistically significant.

Table 6A.13. Quality of life (CASP-19) and expectancy of survival (chances to survive for the next ten years or more) by resilience to deterioration of mobility in three successive waves of ELSA (pre-adversity, adversity and post-adversity time points)

Core members of the study whose self-reported mobility deteriorated between wave 1 and wave 2 and remained so or deteriorated even more in wave 3

	NOT resilient		Resilient		All	
	Mean	*SD*	Mean	*SD*	Mean	*SD*
CASP-19 score (possible range: 0–57)						
ELSA w1 (pre-adversity)*	40.6	*9.0*	42.3	*7.9*	41.7	*8.4*
ELSA w2 (adversity)**	38.1	*9.6*	41.4	*8.4*	40.1	*9.0*
ELSA w3 (post-adversity)**	35.7	*8.8*	39.5	*8.1*	38.1	*8.6*
Expectancy of survival (%)						
ELSA w1 (pre-adversity)‡	51.9	*29.2*	54.6	*28.0*	53.6	*28.5*
ELSA w2 (adversity)‡	51.0	*30.1*	53.9	*27.6*	52.7	*28.6*
ELSA w3 (post-adversity)**	46.1	*29.9*	53.4	*29.0*	50.5	*29.5*
Weighted N						
CASP-19	*214*		*343*		*557*	
Expectancy of survival	*348*		*538*		*886*	
Unweighted N						
CASP-19	*218*		*358*		*576*	
Expectancy of survival	*347*		*541*		*888*	

Notes: *Differences by resilience are statistically significant: p<= 0.05. **Differences by resilience are statistically significant: p<= 0.001. ‡Differences by resilience are not statistically significant.

Table 6A.14. Resilience to deterioration of mobility and social support from partner, children and friends in three successive waves of ELSA (pre-adversity, adversity and post-adversity time points)

Core members of the study whose self-reported mobility deteriorated between wave 1 and wave 2 and remained so or deteriorated even more in wave 3

	NOT resilient		Resilient		All	
	Mean	*SD*	Mean	*SD*	Mean	*SD*
Social support from partner (range: 0–9)						
ELSA w1 (pre-adversity)	8.07	*1.36*	7.81	*1.64*	7.91	*1.55*
ELSA w2 (adversity)	8.00	*1.46*	7.75	*1.78*	7.84	*1.67*
ELSA w3 (post-adversity)	8.08	*1.35*	7.82	*1.88*	7.92	*1.70*
Social support from children (range: 0–9)						
ELSA w1 (pre-adversity)	7.09	*2.08*	6.97	*2.07*	7.01	*2.07*
ELSA w2 (adversity)	6.89	*2.10*	7.13	*1.94*	7.04	*2.00*
ELSA w3 (post-adversity)	7.18	*2.04*	7.45	*1.79*	7.34	*1.89*
Social support from friends (range: 0–9)						
ELSA w1 (pre-adversity)	6.74	*2.15*	6.57	*2.09*	6.64	*2.11*
ELSA w2 (adversity)	6.80	*2.39*	6.71	*2.02*	6.74	*2.17*
ELSA w3 (post-adversity)	6.70	*2.24*	6.78	*2.04*	6.75	*2.12*
Weighted N						
Social support from partner	*165*		*278*		*443*	
Social support from children	*225*		*359*		*584*	
Social support from friends	*228*		*374*		*601*	
Unweighted N						
Social support from partner	*165*		*282*		*447*	
Social support from children	*229*		*371*		*600*	
Social support from friends	*232*		*388*		*620*	

Note: No difference in resilience by social support is statistically significant.

Table 6A.15. Widowhood in wave 2 by age and sex

Respondents aged 54+ who have participated in the study since its first wave (core members of the study)

	Recent widowhood in wave 2	54–59	60–74	75+	All
		%	%	%	%
Men	No	99.4	99.0	96.0	98.4
	Yes	[0.5]	1.0	4.0	1.6
Women	No	99.5	97.8	95.6	97.6
	Yes	[0.4]	2.2	4.4	2.4
Weighted N					
Men		*841*	*1,524*	*711*	*3,076*
Women		*921*	*1,656*	*1,079*	*3,657*
Unweighted N					
Men		*731*	*1,569*	*718*	*3,018*
Women		*905*	*1,826*	*1,024*	*3,755*

Table 6A.16. Quality of life (CASP-19) and expectancy of survival (chances to survive for the next ten years or more) by resilience to widowhood in three successive waves of ELSA (pre-adversity, adversity and post-adversity time points)

Core members of the study who became widowed in wave 2

	NOT resilient		Resilient		All	
	Mean	*SD*	Mean	*SD*	Mean	*SD*
CASP-19 score (possible range: 0–57)						
ELSA w1 (pre-adversity)‡	[41.4]	*[9.6]*	[43.0]	*[8.6]*	42.2	*9.1*
ELSA w2 (adversity)‡	[40.9]	*[9.8]*	[43.3]	*[7.1]*	42.1	*8.6*
ELSA w3 (post-adversity)*	[38.7]	*[10.2]*	[42.8]	*[7.4]*	40.8	*9.1*
Expectancy of survival (%)						
ELSA w1 (pre-adversity)‡	46.2	*35.4*	49.3	*27.9*	47.7	*31.8*
ELSA w2 (adversity)‡	44.9	*32.3*	46.0	*31.0*	45.4	*31.5*
ELSA w3 (post-adversity)**	30.5	*29.9*	44.4	*29.2*	37.4	*30.3*
Weighted N						
CASP-19	*38*		*38*		*76*	
Expectancy of survival	*67*		*66*		*133*	
Unweighted N						
CASP-19	*38*		*38*		*76*	
Expectancy of survival	*66*		*64*		*130*	

Notes: ‡Differences by resilience are not statistically significant. *Differences by resilience are statistically significant: p<= 0.05. **Differences by resilience are statistically significant: p<= 0.01.

7. Anthropometric measures and health

Paola Zaninotto *University College London*

Cesar de Oliveira *University College London*

Meena Kumari *University College London*

The findings in this chapter take account of differences in age between people of differing Body Mass Index (BMI) and waist circumference and look at changes in outcome over a four-year period, 2002–03 to 2006–07 (wave 1 to wave 3) relative to their anthropometric measurements when first recruited in 1998–2001 (wave 0).

Key points arising from this chapter are:

- In men aged 50 to 55 and women aged 50 to 67 (at wave 1), BMI increased significantly between wave 0 and wave 2. BMI in women changed more over time than men's BMI. In men and women aged 50 to 74 (at wave 1), mean waist circumference increased significantly between wave 0 and wave 2.
- Increases in prevalence of moderate or severe back pain over a four-year period were associated with obesity and high waist circumference (at wave 0) among men and women but also with being overweight or having medium waist circumference among women.
- Neither BMI nor waist circumference reported at wave 0 was related to the prevalence rates of those who have fallen and had serious injuries occurring in any of the subsequent waves of data collection.
- Increased prevalence of reported shortness of breath over the four-year period was found among people who were either overweight or obese or had a high waist circumference at wave 0.
- Men and women who were obese or had high waist circumference at wave 0 had the highest increase over time (wave 1 to wave 3) in the prevalence of arthritis.
- Among overweight men and women and obese women, mean walking speed decreased significantly from wave 1 to wave 3. Men with low waist circumference and women with medium waist circumference had the greatest decrease in mean walking speed over four years.
- Greater waist circumference at wave 0 was related to higher odds of having cardiovascular disease at wave 3 in both men and women. These effects were independent of all covariates examined.
- Men and women who were obese or overweight at wave 0 had significantly lower quality of life scores than normal weight people in any

of the subsequent waves. Increased waist circumference (at wave 0) was related to lower quality of life scores at wave 3 in women only.

- Normal weight and overweight men and obese women had a greater increase over time in the prevalence rates of depression.
- Greater waist circumference is associated with increased risk of death in men and women. Being underweight is associated with increased risk of death in men but not women.

7.1 Introduction

Obesity is a common public health problem. In England, more than half of all adults are currently classified as overweight or obese (The Information Centre, 2007). If current trends continue, obesity rates could well rise even higher (Zaninotto et al., 2006). The increase in the prevalence of obesity that has occurred over the last decade is of major public health concern but complex to tackle (Foresight Report, 2007).

Obesity creates a strain on health services, with a cost of £1 billion a year for treatment of disease brought on by obese adults (Department of Health, 2004a). The public health White Paper, *Choosing Health: Making Healthier Choices Easier* (Department of Health, 2004b), along with the *Physical Activity* and *Food Health* action plans (Department of Health, 2005a, 2005b), set out the action needed to combat obesity and increase physical activity as well as improve people's health through better diet and nutrition. The programme for action in relation to the *National Service Framework for Older People* (Department of Health, 2006) aims to promote healthy ageing and is the vehicle for delivering the older people's component of the White Paper *Choosing Health*, and it is also a key component in the delivery of the cross-government strategy for older people described in *Opportunity Age* (Department for Work and Pensions, 2005).

Obesity, as measured by increased BMI, is associated with serious chronic conditions such as type 2 diabetes, hypertension and hyperlipidaemia (i.e., high levels of lipids [fat] in the blood that can lead to narrowing and blockages of blood vessels), which are major risk factors for cardiovascular disease (Kopelman, 2000; Gensini et al., 1998). It is generally recognised that the central deposition of fat is more closely associated with these chronic diseases than Body Mass Index, especially in older people (Sjostrom, 1997). This is because, as people age, there is an increase in abdominal fat in relation to skeletal or total body fat and there is also a change in the distribution of fat mass that may result in little change in the overall BMI (Villareal et al., 2005).

While obesity can reduce a person's overall quality of life, and can lead to premature death, these associations of obesity have not been thoroughly examined in older populations. Indeed it has been mooted that except at true statistical extremes, high body mass is a very weak predictor of mortality, and may even be protective in older populations (Campos et al., 2006).

In this chapter we describe change in BMI and waist circumference between wave 0 and wave 2 of ELSA. We also explore whether overweight, obesity or raised waist circumference are associated with a number of measures of ill health (pain reporting, chronic diseases), with reduced physical functioning and well-being (depressive symptoms and quality of life) and with mortality.

7.2 Methods and definitions

Methods

Height, weight and waist circumference were measured during the nurse visit carried out in wave 2. However, the ELSA sample was drawn from households that have previously responded to the Health Survey for England (HSE) in 1998, 1999 or 2001 and were born before March 1952. ELSA used the samples for these years to form 'ELSA wave 0'. For those who took part in wave 1 we had available height, weight and waist circumference measurements collected during the Health Surveys for England; the procedure for collecting measurements was the same in ELSA and HSE.

All analyses have been run on those core respondents who took part in waves 1–3 and either had valid BMI (2,593 men and 3,213 women) or valid waist circumference measurements (2,273 men and 2,862 women). This is a subsample of the original ELSA sample. Tables 7A.1 and 7A.2 report the age distribution of the sample by BMI and waist circumference and sex. For some analyses smaller numbers are involved because of restrictions on eligibility for the questions or because of missing answers.

Age standardisation has been used in all tables analysing health and well-being by BMI or waist category unless age is included as a break variable. Age standardisation removes the effect of differences in age distributions from comparisons between groups. Direct standardisation was applied for both sexes, expressing male and female data to the overall population, with the standards being the age distribution of the whole ELSA sample at wave 1.

All analyses that used data from the three waves have been weighted using the wave 3 longitudinal weight.

Height

Height was measured using a portable stadiometer with a sliding headplate, a base plate and three connecting rods marked with a metric scale (for full information on the methodology see Erens and Primatesta, 1999; Erens, Primatesta and Prior, 2001; Prior et al., 2003). Respondents were asked to remove their shoes. One measurement was taken with the respondent stretching to the maximum height and the head in the Frankfort plane.[1] The reading was recorded to the nearest millimetre.

Weight

Weight was measured using a portable electronic scale. Respondents were asked to remove their shoes and any bulky clothing. A single measurement

[1] The Frankfort Plane is an imaginary line passing through the external ear canal and across the top of the lower bone of the eye socket, immediately under the eye. This line must be parallel with the floor. This gives the maximum vertical distance from the floor to the highest point of the skull.

was recorded to the nearest 0.1 kg. Respondents who weighed more than 130 kg were asked for their estimated weights because the scales are inaccurate above this level. These estimated weights were included in the analysis.

Waist circumference

Waist circumference was defined as the midpoint between the lower rib and the upper margin of the iliac crest. It was measured using a tape with an insertion buckle at one end. The measurement was taken twice, using the same tape, and was recorded to the nearest even millimetre. Those whose waist circumference measurement differed by more than 3 cm had a third measurement taken. The mean of the two valid measurements (the two out of the three measurements that were closest to each other, if there were three measurements) were used in the analysis.

Change in health and functioning

Change in health has been measured in terms of changes in percentages ever reporting a condition between waves 1 and 3. For the chronic conditions reported in this chapter and for depression it is assumed that it will be rare for the condition to disappear completely even if it becomes symptomless, so ‘ever reported’ also reflects current prevalence of the condition. Change in mean (gait speed and quality of life) has been calculated as the difference between the mean value reported at wave 2 and the mean reported at wave 1, and the difference between the mean reported at wave 3 and the mean reported at wave 2.

Definitions

Body Mass Index (BMI)

Body Mass Index (BMI) is a widely accepted measure of weight for height and is defined as weight in kilograms divided by the square of the height in metres (kg/m^2). BMI was calculated for all those respondents for whom both a valid height and weight measurement were recorded.

Applying the classification of the World Health Organisation (2000) and NICE (2007) we categorised the BMI scores into four main groups:

- underweight group (<20.0 kg/m^2);
- normal (≥ 20.0 and <25 kg/m^2);
- overweight (≥ 25 and <30 kg/m^2);
- obese (≥ 30 kg/ m^2).

In general a BMI below 18.5 kg/m^2 is considered to be low and a BMI between 18.5 kg/m^2 and below 25.0 kg/m^2 is considered to be normal. However, there is no accepted definition for classification using BMI in older people (NICE, 2007), especially for what is considered underweight and normal. We anticipated that for older people a BMI below 20.0 kg/m^2 can be associated with health risks.

Waist circumference

BMI does not distinguish between mass due to body fat and mass due to muscular physique and does not take account of the distribution of fat. It has therefore been postulated that waist circumference may be a better measure than BMI or waist to hip ratio (World Health Organisation, 2000) to identify those with a health risk from their body shape. Among older people the fat distribution changes considerably and abdominal fat tends to increase with age. Therefore waist circumference can be considered an appropriate indicator of body fatness and central fat distribution among the elderly.

Waist circumference was categorised into three main groups using sex-specific cut-offs (Flegal, 2007):

- low risk (<94 cm for men and <80 cm for women);
- medium risk (≥94 cm and <102 cm for men; ≥80 cm and <88 cm for women);
- high risk (≥102 cm for men and ≥88 cm for women).

7.3 Change in anthropometric measures by age groups and sex

Methods

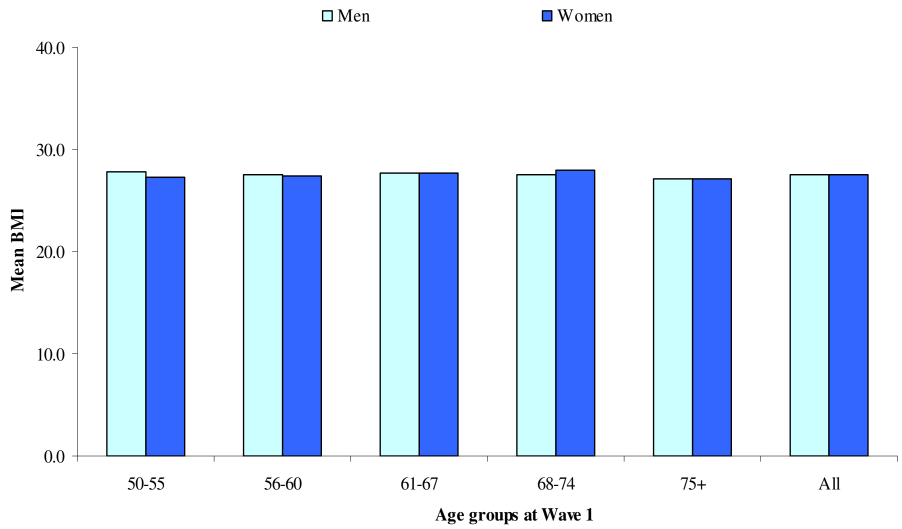
In this section we present changes over time (between wave 0 and wave 2) in BMI and waist circumference by age groups and sex (both at wave 1). We divided age into five equal groups. Mean changes in BMI and waist were calculated using data from the sample of people who took part in both wave 1 and wave 2, and had valid anthropometric measurements at wave 0 and wave 2 (BMI was not measured at wave 1). The median time between the first interview at wave 0 and the interview at wave 2 was 5.6 years.

Results

Changes in Body Mass Index (BMI) by age groups and sex

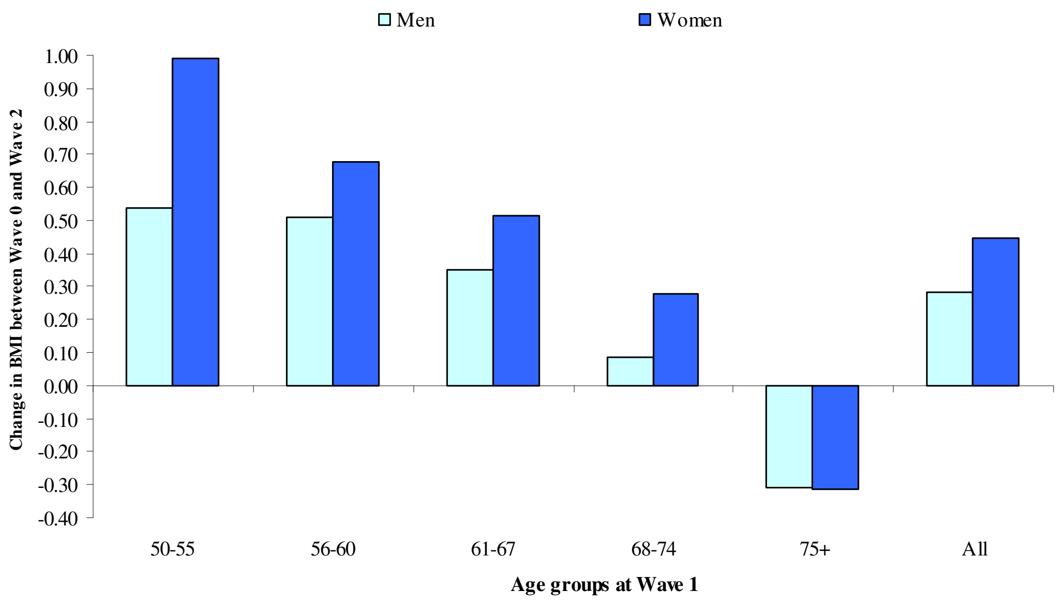
Mean BMI (measured at wave 0) in each of the age groups was over 27.0 kg/m^2, indicating that, on average, men and women were overweight (Figure 7.1). At wave 2, the same respondents had their BMI measured again. Figure 7.2 shows the change over time in mean BMI for men and women in each age group (both at wave 1). Among men aged 50 to 55, mean BMI increased significantly over time, while in all of the other age groups the change over time was not statistically significant. Among women, mean BMI increased significantly over time up to the age of 67 while for those aged 68 and over there was no significant change over time in BMI. Generally there is a trend of smaller changes in BMI at progressively older ages, with some signs of reduction for the oldest group (but not statistically significant).

Figure 7.1. Mean BMI at wave 0, by age and sex



Note: Sample: respondents in wave 1 and wave 2, with a valid BMI measurement at wave 0.

Figure 7.2. Change in mean BMI between wave 0 and wave 2, by age and sex



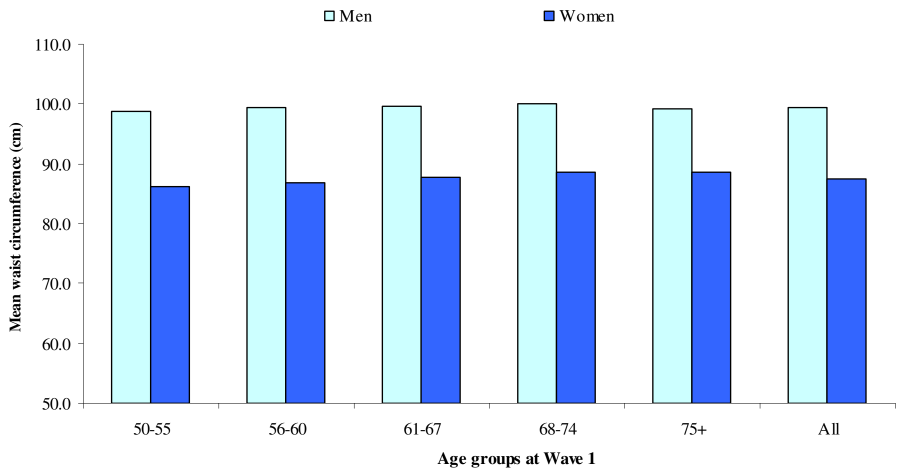
Note: Sample: respondents in wave 1 and wave 2, with a valid BMI measurement at wave 0.

In both waves men had similar mean BMI (27.6 kg/m^2 at wave 0 and 27.8 kg/m^2 at wave 2) to women (27.5 kg/m^2 at wave 0 and 28.0 kg/m^2 at wave 2). However, the mean change over time is greater for women than for men in all age groups except those aged 75 years and over, being particularly marked in the youngest age group (50–55 in 2002–03).

Changes in waist circumference by age groups and sex

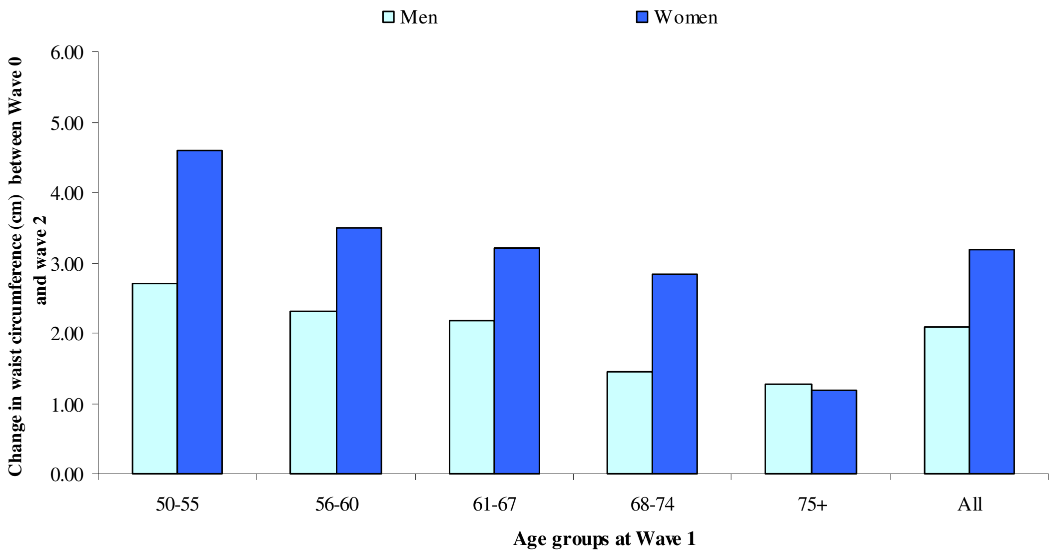
Figure 7.3 shows that, at wave 0, the mean waist circumference was over 99 cm among men and over 86 cm among women in each of the age groups. Over time, mean waist circumference increased significantly in each age group, with the exception of those aged 75 and over. As with BMI, the increases tended to be smaller at older ages. Although men have a higher mean waist circumference than women, the increase over time is greater in women than in men (mean of 3 cm compared to 2 cm overall), with the exception of those aged 75 and over (Figure 7.4).

Figure 7.3. Mean waist circumference (cm) at wave 0, by age and sex



Note: Sample: respondents in wave 1 and wave 2, with a valid waist circumference measurement at wave 0.

Figure 7.4. Change in mean waist circumference (cm) between wave 0 and wave 2, by age and sex



Note: Sample: respondents in wave 1 and wave 2, with a valid waist circumference measurement at wave 0.

7.4 Anthropometric measures and physical health

Anthropometric measures and back pain

Methods

All respondents were asked whether they were often troubled by pain and, if so, how bad the pain was most of the time. Respondents were asked separately about pain in their back, hip, knee and feet. We defined back pain as having severe or moderate pain in the back.

Results

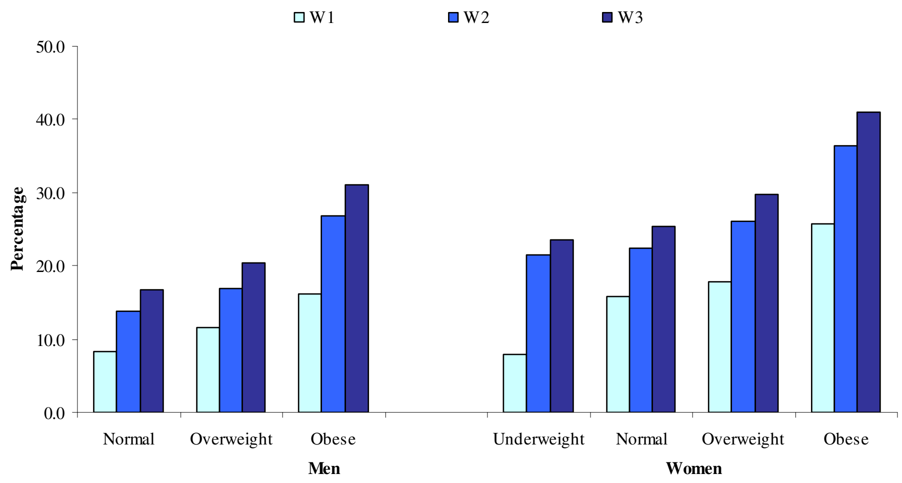
Changes in prevalence of back pain by Body Mass Index (BMI), waist circumference and sex

Figure 7.5 reports the change in prevalence rates of moderate and severe back pain for men and women, by BMI categories.

In both sexes the prevalence rates of severe and moderate back pain increased over time (between waves 1 and 2, waves 2 and 3 and waves 1 and 3) in each of the BMI categories. The exception was for underweight men, for whom the base was too small to detect a significant change, and for underweight women there was not a significant increase between wave 2 and wave 3.

Obese men and overweight and obese women had the greatest increase in the prevalence of severe and moderate back pain compared to normal weight people; this increase was of 15 percentage points for obese men and women and 12 percentage points for overweight women. Moreover, for obese and overweight women the increase in the prevalence of back pain over time was greater than for men in the same categories of BMI.

Figure 7.5. Percentage reporting severe or moderate back pain at each wave of ELSA, by BMI categories and sex

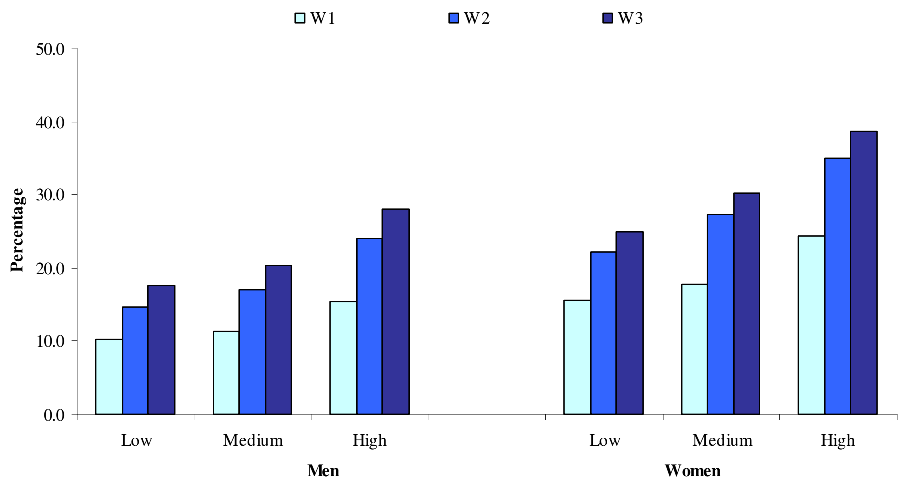


Notes: BMI at wave 0. ‘Underweight’ indicates BMI <20.0. ‘Normal’ indicates BMI from 20.0 to 24.9. ‘Overweight’ indicates BMI from 25 to 29.9. ‘Obese’ indicates BMI 30 or more. Men underweight omitted because of small base. Age-standardised prevalence.

At wave 3, 31% of obese men and 41% of obese women had severe or moderate back pain, significantly higher percentages than those of overweight and normal weight people.

Figure 7.6 shows the change in the prevalence rates of moderate and severe back pain for men and women, by waist circumference categories. In both sexes, the prevalence rates of severe and moderate back pain increased wave on wave in all the waist circumference categories. Compared to those with low waist circumference, those with high waist circumference and women with medium waist circumference had greater increases in the prevalence of severe and moderate back pain, the greatest increase occurring among those with high waist circumference.

Figure 7.6. Percentage reporting severe or moderate back pain at each wave of ELSA, by waist circumference categories and sex



Notes: Waist circumference at wave 0. ‘Low’ indicates waist <94 cm for men and <80 cm for women. ‘Medium’ indicates waist from 94 cm to 101.9 cm for men and from 80 cm to 87.9 cm for women. ‘High’ indicates waist 102 cm or more for men and 88 cm or more for women. Age-standardised prevalence.

Women had a higher increase in prevalence of back pain than men, especially those with a high waist circumference. At wave 3, 28% of men and 39% of women with high waist circumference reported having had severe and moderate back pain, which was significantly higher than the prevalence in those with a low and medium waist circumference.

Anthropometric measures and falls

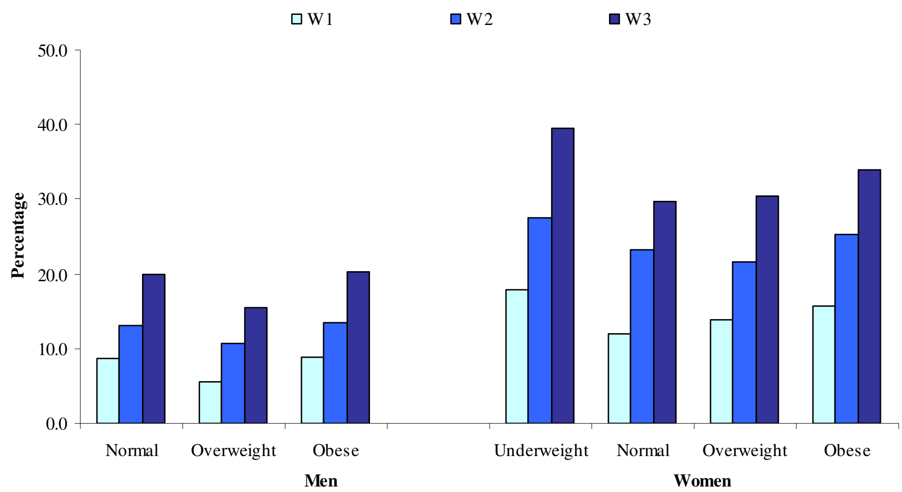
Methods

Respondents aged 60 years and over at wave 1 were asked whether they had fallen down during the previous two years. If they had fallen, they were asked the number of falls and whether they had injured themselves seriously enough to need medical treatment. For the purpose of this section we considered those falls with a serious injury. For BMI the sample analysed is formed of 1,531 men and 1,931 women, while for waist circumference the sample is formed of 1,337 men and 1,709 women.

Results

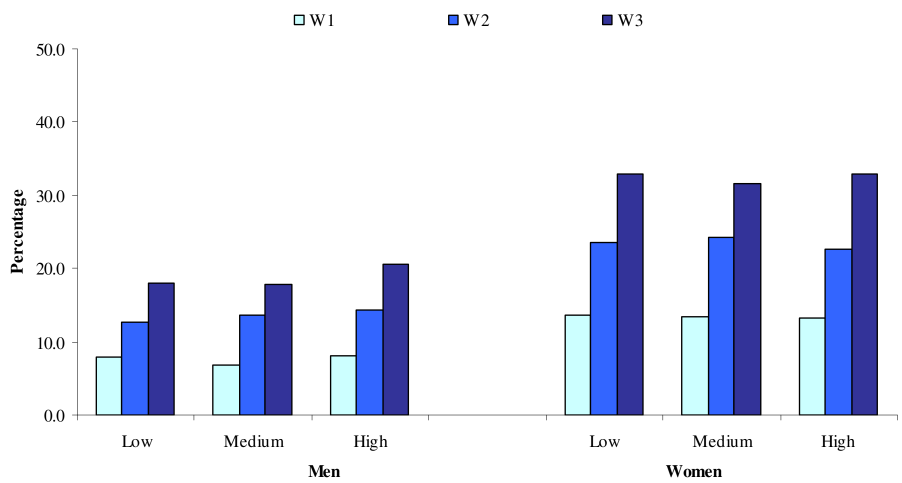
Among men, the prevalence of those who had fallen down and injured themselves seriously did not differ significantly at each wave by BMI or waist circumference category measured at wave 0 (Figures 7.7 and 7.8). In both sexes, there is a significant increase in the prevalence of falls between waves 1 and 2, between waves 2 and 3 and between waves 1 and 3 in all BMI and waist circumference categories, the only exception being underweight men and women for whom the base was too small to detect a significant trend over time. The increase over time was not related to BMI or waist circumference.

Figure 7.7. Percentage reporting falls with injury at each wave of ELSA, by BMI categories and sex



Notes: BMI at wave 0. ‘Underweight’ indicates BMI <20.0. ‘Normal’ indicates BMI from 20.0 to 24.9. ‘Overweight’ indicates BMI from 25 to 29.9. ‘Obese’ indicates BMI 30 or more. Men underweight omitted because of small base. Age-standardised prevalence.

Figure 7.8. Percentage reporting falls with injury at each wave of ELSA, by waist circumference categories and sex



Notes: Waist circumference at wave 0. ‘Low’ indicates waist <94 cm for men and <80 cm for women. ‘Medium’ indicates waist from 94 cm to 101.9 cm for men and from 80 cm to 87.9 cm for women. ‘High’ indicates waist 102 cm or more for men and 88 cm or more for women. Age-standardised prevalence.

Anthropometric measures and shortness of breath

Methods

Respondents were asked four questions about shortness of breath:

- Whether they have shortness of breath when hurrying on level ground or walking.
- Whether they get shortness of breath when walking with other people of the same age on level ground.
- Whether they have to stop for breath when walking at their own pace on level ground.
- Whether they have ever experienced attacks of shortness of breath with wheezing.

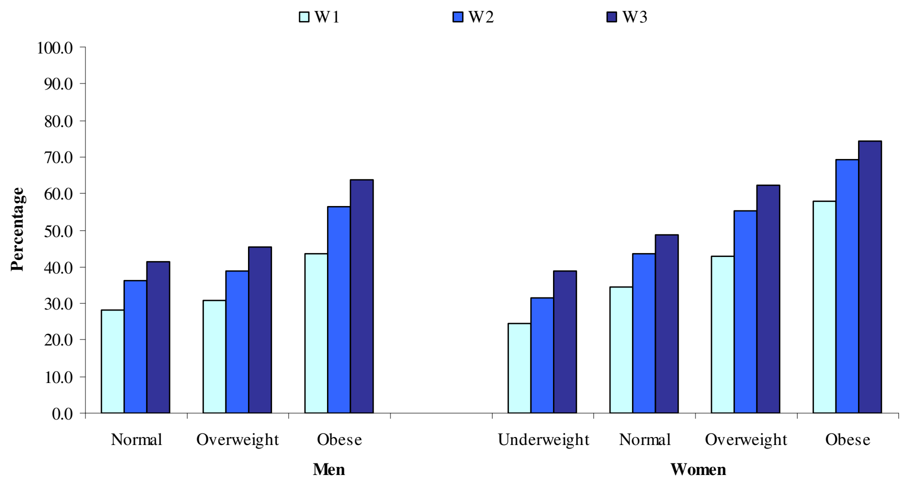
Respondents were considered to have experienced shortness of breath if they answered affirmatively to any of the above questions.

Results

There is a positive gradient across the BMI and waist circumference categories in the increase in prevalence of reported shortness of breath from wave 1 to wave 3, wave 1 to wave 2 and wave 2 to wave 3 (Figures 7.9 and 7.10).

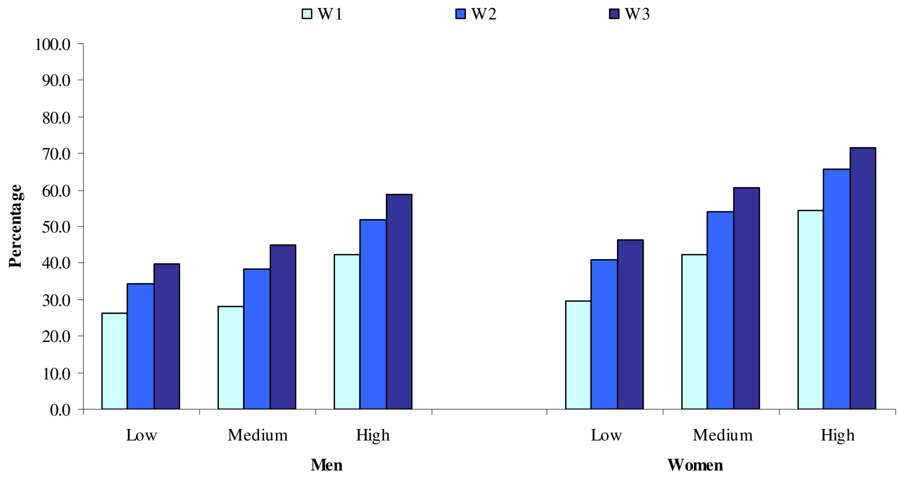
In both sexes, the prevalence of shortness of breath reported has increased over time in each BMI category with obese men and overweight women reporting the greatest increase over time, despite starting from a higher prevalence at wave 1. Similarly, the prevalence rates of shortness of breath present a clear increase in each waist circumference category. Thus, a greater increase was apparent in those with medium and high waist circumference than for those with a low waist circumference.

Figure 7.9. Percentage experiencing shortness of breath at each wave of ELSA, by BMI categories and sex



Notes: BMI at wave 0. ‘Underweight’ indicates BMI <20.0. ‘Normal’ indicates BMI from 20.0 to 24.9. ‘Overweight’ indicates BMI from 25 to 29.9. ‘Obese’ indicates BMI 30 or more. Men underweight omitted because of small base. Age-standardised prevalence.

Figure 7.10. Percentage experiencing shortness of breath at each wave of ELSA, by waist circumference categories and sex



Notes: Waist circumference at wave 0. 'Low' indicates waist <94 cm for men and <80 cm for women. 'Medium' indicates waist from 94 cm to 101.9 cm for men and from 80 cm to 87.9 cm for women. 'High' indicates waist 102 cm or more for men and 88 cm or more for women. Age-standardised prevalence.

Underweight and normal weight women had similar patterns in the prevalence rates of shortness of breath and in the changes over time.

Experience of shortness of breath, as defined in this chapter, was very common among people with relatively high weight or abdominal fat. At wave 3, 64% of obese men, 74% of obese women and 59% of men and 66% of women with high waist circumference reported having experienced shortness of breath. Overall, women reported higher prevalence rates of shortness of breath than men at each wave. Overweight and obese women reported significantly more shortness of breath than men in the same BMI categories ($p<0.001$). Similarly, there was a significant difference in the prevalence of shortness of breath reported by women in the medium and high waist circumference categories compared to those reported by men ($p<0.001$).

Anthropometric measures and arthritis

Methods

Arthritis is defined as having been diagnosed by a doctor as having any form of arthritis, such as rheumatoid arthritis or osteoarthritis.

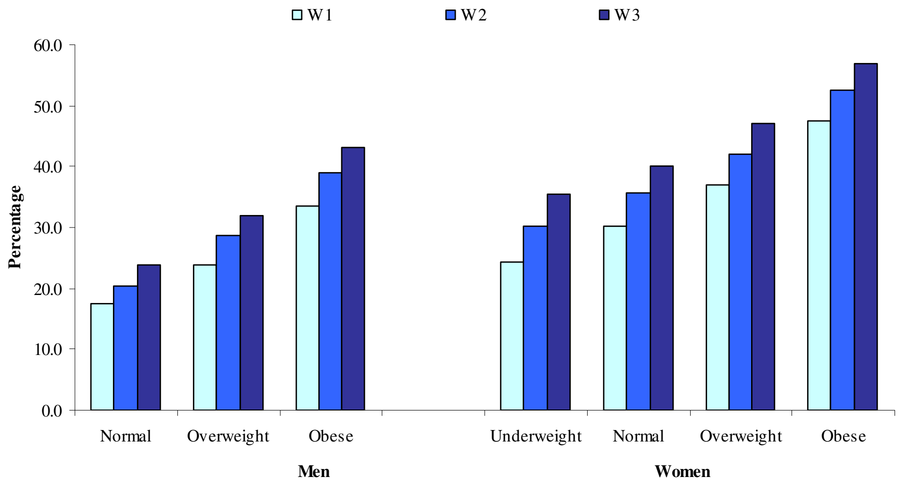
Results

The prevalence of arthritis increased significantly over time in each of the BMI and waist circumference categories. The prevalence of arthritis also differed significantly at each wave across the BMI groups and waist circumference categories with obese men and women (at wave 0) reporting the highest prevalence rates of arthritis at each of the subsequent waves. The increase over time in the prevalence of arthritis was highest among overweight and obese men (8 and 10 percentage point increase, respectively).

At wave 3, 43% of obese men, 57% of obese women and 41% of men and 57% of women with high waist circumference reported having arthritis.

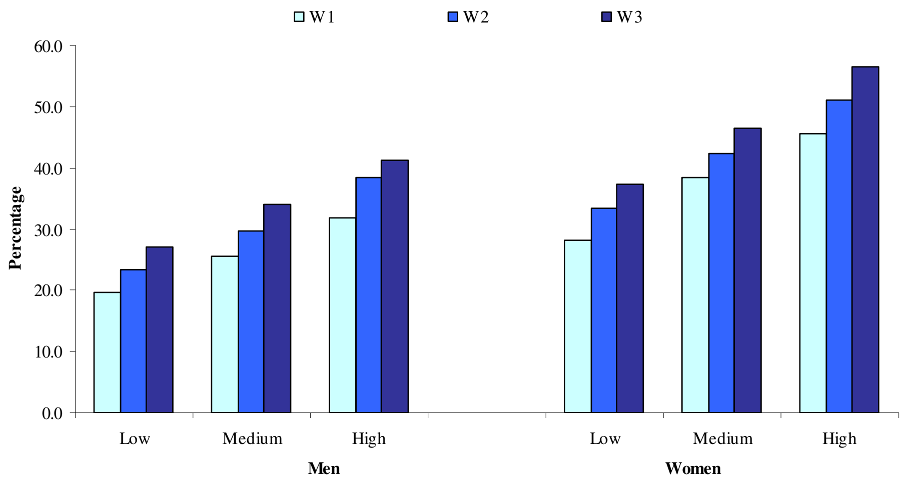
Women compared to men reported higher prevalence rates of arthritis; this was true in each of the BMI groups and for all waist circumference groups measured at wave 0 (Figures 7.11 and 7.12).

Figure 7.11. Percentage reporting arthritis at each wave of ELSA, by BMI categories and sex



Notes: BMI at wave 0. ‘Underweight’ indicates BMI <20.0. ‘Normal’ indicates BMI from 20.0 to 24.9. ‘Overweight’ indicates BMI from 25 to 29.9. ‘Obese’ indicates BMI 30 or more. Men underweight omitted because of small base. Age-standardised prevalence.

Figure 7.12. Percentage reporting arthritis at each wave of ELSA, by waist circumference categories and sex



Notes: Waist circumference at wave 0. ‘Low’ indicates waist <94 cm for men and <80 cm for women. ‘Medium’ indicates waist from 94 cm to 101.9 cm for men and from 80 cm to 87.9 cm for women. ‘High’ indicates waist 102 cm or more for men and 88 cm or more for women. Age-standardised prevalence.

Anthropometric measures and gait speed

Methods

All respondents aged 60 years and over at wave 1 completing the interviews on their own behalf were eligible for the walking speed test, which was performed as part of the main ELSA interview. The test involved timing how long it took to walk a distance of eight feet. Respondents began with both feet together at the beginning of the course. The interviewer started timing as soon as the respondent placed either foot down on the floor across the start line. They were asked to walk (not race) to the other end of the course at their usual speed, just as if they were walking down the street to the shops, and to walk all the way past the other end of the tape before stopping. Timing was stopped when either foot was placed on the floor across the finish line. Respondents were then asked to repeat the test by lining up their feet and walking back along the course, all the way past the other end. The gait speed test was carried out in each wave.

For BMI the sample analysed is formed of 1,261 men and 1,582 women, while for waist circumference the sample is formed of 1,092 men and 1,379 women.

Results

The distributions of change in walking speed (between wave 1 and wave 3) of those with valid BMI measurements and of those with valid waist circumference measurements were approximately normal, with a positive kurtosis, i.e. with higher peaks around the mean (zero) which means a higher probability of values near the mean and lower probability of extreme values than a normally distributed variable.

Table 7A.3 shows the change over time in the mean walking speed (metre per second) by BMI groups and sex. In normal weight men the decrease in the mean walking speed occurred only between wave 1 and wave 3. Among those who were overweight at wave 0 there was a significant decrease in the mean walking speed wave on wave. For overweight men, this decrease was large in comparison to the decrease apparent for normal weight and obese men. Among obese men, the male group with the slowest initial walking speed, the apparent decrease over time was not significant; thus, although still the slowest at wave 3 there was a smaller margin between them and the overweight group. For women the overall decline in walking speed between wave 1 and wave 3 was similar and significant for all groups, such that obese women remained at a disadvantage compared to the other groups.

Table 7A.4 reports that men with a low waist circumference measurement at wave 0 had the greatest decrease in mean walking speed between wave 1 and wave 3. For women the overall decline in walking speed between wave 1 and wave 3 was greatest among those with medium waist circumference.

At wave 3 the mean walking speed of obese men was 0.785 (s.e. 0.02) and that of obese women 0.700 (s.e. 0.01), both significantly lower than in the other BMI groups. Similarly men and women with high waist circumference had the slowest speeds at wave 3. Generally, within BMI and waist circumference categories women had lower mean walking speed (i.e. poorer mobility functioning) than men.

Anthropometric measures and CVD

Methods

Cardiovascular disease (CVD) was defined as having ever had angina, heart attack or stroke. During the interview respondents were asked whether a doctor had ever told them that they suffered from angina, heart attack or stroke. At each wave this information was updated.

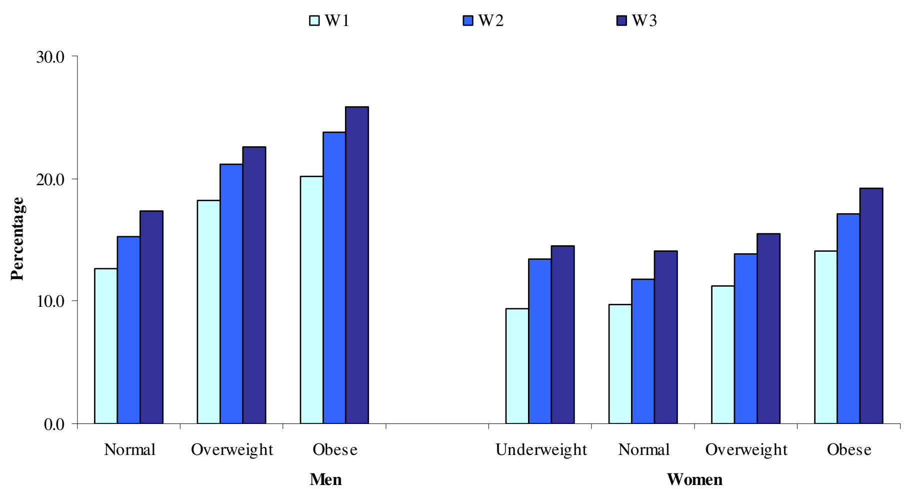
Results

Figures 7.13 and 7.14 show that among men and women in any of the BMI and waist circumference groups (at wave 0), the prevalence of CVD increased significantly over time. Men who were obese and women who were obese or had high waist circumference had the greatest increase in prevalence rates of CVD (6% increase in obese men versus 4% in the other BMI groups and 5% in obese or high waist circumference women versus 3% and 4% in women with low and medium waist circumference). Men with high waist circumference had similar increase in CVD prevalence to those with medium waist circumference.

Among women, the prevalence of CVD did not differ significantly between normal weight and underweight and between normal weight and overweight, at any wave. At wave 3, but not at earlier waves, women with high waist circumference had statistically significant higher prevalence of CVD than women with a medium waist circumference.

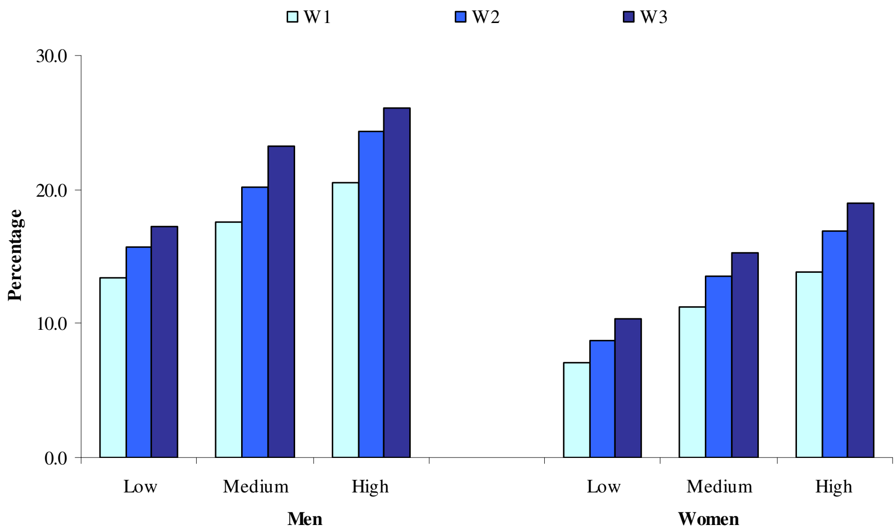
At wave 3, among both obese men and those with high waist circumference 26% had ever reported CVD; for women the prevalence in the obese and high waist circumference groups was the same, at 19%. Men in general had higher prevalence of CVD than women regardless of BMI or waist circumference.

Figure 7.13. Percentage reporting CVD at each wave of ELSA, by BMI categories and sex



Notes: BMI at wave 0. ‘Underweight’ indicates BMI <20.0. ‘Normal’ indicates BMI from 20.0 to 24.9. ‘Overweight’ indicates BMI from 25 to 29.9. ‘Obese’ indicates BMI 30 or more. Men underweight omitted because of small base. Age-standardised prevalence.

Figure 7.14. Percentage reporting CVD at each wave of ELSA, by waist circumference categories and sex



Notes: Waist circumference at wave 0. 'Low' indicates waist <94 cm for men and <80 cm for women. 'Medium' indicates waist from 94 cm to 101.9 cm for men and from 80 cm to 87.9 cm for women. 'High' indicates waist 102 cm or more for men and 88 cm or more for women. Age-standardised prevalence.

Table 7A.5 reports the odds ratios (OR) for the longitudinal association between waist circumference, measured at wave 0, and prevalence of CVD at wave 3. It does not model change in prevalence over time. Waist circumference was categorised in 5 cm groups and used as continuous measures in the regression analysis; the distribution of this variable was the same as the distribution of the original variable. The models were run separately for men and women and first adjusted for age only (at wave 1) and then subsequently adjusted for age, marital status, limiting long-standing illness, smoking status, alcohol consumption, physical activity and wealth, all measured at wave 1, and the year of interview at wave 0.

The results show that in both sexes, 5 cm increase in waist circumference is significantly related with higher odds of reporting CVD at wave 3 independently of age (OR: 1.11 [CI 1.06; 1.16], $p<0.001$ in men; OR: 1.16 [CI 1.11; 1.21], $p<0.001$ in women) and independently of age, marital status, limiting long-standing illness, cigarette smoking, alcohol consumption, physical activity and wealth, all at wave 1, and year of interview at wave 0 (OR: 1.07 [CI 1.02; 1.12], $p<0.01$ in men; OR: 1.08 [CI 1.04; 1.13], $p<0.001$ in women).

7.5 Anthropometric measures and well-being

Previous studies have shown that among old people increased body weight and/or Body Mass Index is associated with lower quality of life and/or with poor mental health (Jia and Lubetkin, 2005; Lopez-Garcia et al., 2003; Daviglus et al., 2003). In this section we want to explore the association between anthropometric measures, such as BMI and waist circumference, measured at wave 0, and well-being reported at wave 3.

Methods

The two measures of well-being reported in this section are quality of life and depressive symptoms. Quality of life was measured using the CASP-19 in the self-completion booklet. CASP-19 contains 19 questions on four sub-domains of quality of life. These sub-domains (from which the acronym is derived) are: Control, Autonomy, Self-realisation and Pleasure. We used the total score of CASP-19 which ranges from 0 to 57, with higher scores indicating better quality of life (Hyde et al., 2003).

The eight-item version of the CES-D was used to estimate the prevalence of depressive symptoms. The questions asked the degree to which the respondent had experienced depressive symptoms, such as restless sleep, being unhappy and so on, over the past month. The total score ranges from 0 to 8, which was recoded as: 0, '0–2 symptoms' of depression and 1, '3+ symptoms' of depression (Steffick, 2000). Analyses were also carried out using a cut-off of four or more symptoms of depression; since results produced the same pattern we decided to keep a cut-off of three or more symptoms to have greater power.

Waist circumference was categorised in 5 cm groups and used as continuous measures in the regression analysis; the distribution of this variable was the same as the distribution of the original variable.

Results

Quality of life and anthropometric measures

Table 7A.6 reports changes in the mean scores of quality of life between wave 1 and wave 3, by BMI categories at wave 0. Between wave 1 and wave 2 the mean quality of life slightly decreased in each BMI group (except underweight); however the change was not statistically significant. Significant decreases in quality of life of men and women were found between wave 1 and wave 3 ($p<0.001$) and between wave 2 and wave 3 in most of the BMI groups ($p<0.01$), the exceptions being obese men and underweight men and women. Men who were obese at wave 0 had the greatest decrease in quality of life over time. Overweight men had the smallest decrease in their quality of life between waves 1 and 2; however, they had the highest decrease in the long term (wave 1 to wave 3), compared to normal weight and obese. The greatest decrease in mean quality of life of women occurred among overweight women between waves 1 and 3 although obese women had the lowest mean of quality of life at each wave ($p=0.001$).

Similar results were obtained for waist circumference. Men and women with medium waist circumference had the greatest decrease over time in their mean quality of life (Table 7A.7). While women with high waist circumference had lower quality of life scores than the others at each wave, men with high waist circumference had lower mean quality of life scores than men with normal waist circumference at waves 1 and 2 but not at wave 3.

Table 7A.8 reports the unstandardised regression coefficients for the longitudinal association between quality of life (at wave 3) and waist circumference (at wave 0). The regressions have been run separately for men and women and first adjusted for age only (at wave 1) and then subsequently adjusted for age, marital status, limiting long-standing illness, smoking status, alcohol consumption, physical activity and wealth, all measured at wave 1, and the year of interview at wave 0. Among men, for 5 cm increase in waist circumference, quality of life decreases by 0.263 point ($p<0.01$); however, when the model is adjusted for other variables, the negative association between waist circumference and quality of life is no longer significant. In the age-adjusted model of women, for a 5 cm increase in waist circumference there is a decrease in quality of life of 0.491 ($p<0.001$); when the model is further adjusted for other variables, the coefficient decreases in magnitude to 0.191, but remains statistically significant.

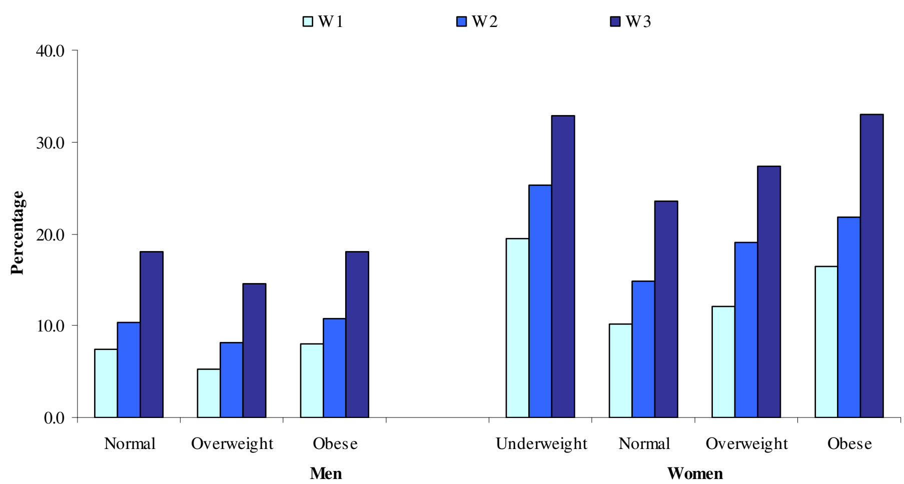
Symptoms of depression and anthropometric measures

Figure 7.15 reports changes in the prevalence of symptoms of depression (three or more), by BMI groups at wave 0, separately for men and women. In both sexes, the prevalence of symptoms of depression increased significantly wave on wave in each of the BMI groups. The greatest increase over time occurred among obese women.

Among men, the prevalence rates of symptoms of depression did not differ significantly according to the BMI groups in any of the three waves.

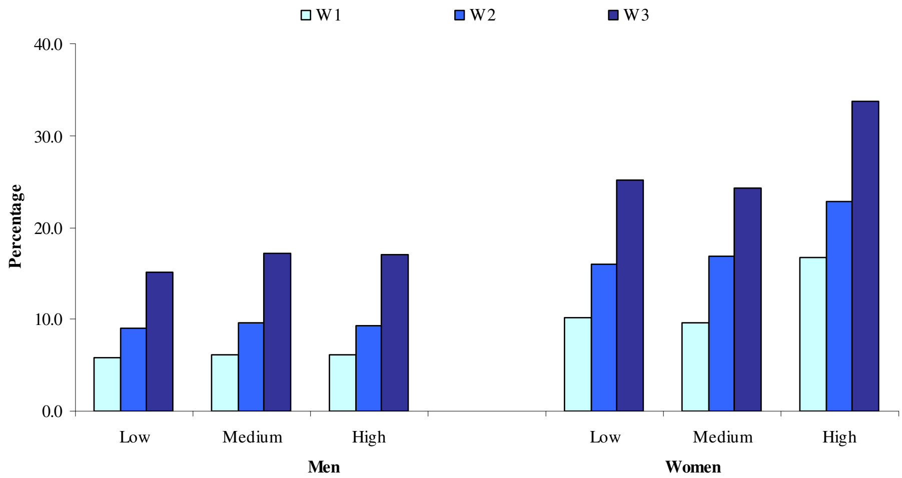
At wave 3 33% of women who were obese at wave 0 reported three or more symptoms of depression, compared to 24% of women with a normal weight. This was the only significant difference at wave 3; in fact, for overweight and underweight women the prevalence rates of depression were significantly higher than for normal weight women at wave 1 and wave 2, but no longer at wave 3.

Figure 7.15. Percentage reporting symptoms of depression at each wave of ELSA, by BMI categories and sex



Notes: BMI at wave 0. ‘Underweight’ indicates BMI <20.0. ‘Normal’ indicates BMI from 20.0 to 24.9. ‘Overweight’ indicates BMI from 25 to 29.9. ‘Obese’ indicates BMI 30 or more. Men underweight omitted because of small base. Age-standardised prevalence.

Figure 7.16. Percentage reporting symptoms of depression at each wave of ELSA, by waist circumference categories and sex



Notes: Waist circumference at wave 0. ‘Low’ indicates waist <94 cm for men and <80 cm for women. ‘Medium’ indicates waist from 94 cm to 101.9 cm for men and from 80 cm to 87.9 cm for women. ‘High’ indicates waist 102 cm or more for men and 88 cm or more for women. Age-standardised prevalence.

In general, women reported higher prevalence of three and more symptoms of depression than men in each of the BMI categories.

Figure 7.16 reports changes in the prevalence of symptoms of depression (three or more) by waist circumference at wave 0, separately for men and women. The prevalence of symptoms of depression increased significantly in each of the waist circumference categories; however, men with medium and high waist circumference and women with high waist circumference had the greatest increase over time.

At wave 3, 17% of men with medium and high waist circumference and 15% of men with low waist circumference reported three or more symptoms of depression. However, the prevalence rates of symptoms of depression did not differ significantly according to the waist circumference groups in any of the three waves. At wave 3, 34% of women with high waist circumference reported having three and more symptoms of depression; this was significantly higher than in the other two groups and mirrored patterns observed at earlier waves. The prevalence rates of symptoms of depression were similar for those with low and medium waist circumference at wave 3 and also in the previous waves.

Women reported higher prevalence of three and more symptoms of depression than men in each of the waist circumference categories.

Table 7A.9 reports the odds ratios (OR) for the longitudinal association between waist circumference, measured at wave 0, and symptoms of depression at wave 3. The models were run separately for men and women and first adjusted for age only (at wave 1) and then subsequently adjusted for age, marital status, limiting long-standing illness, smoking status, alcohol consumption, physical activity and wealth, all measured at wave 1, and the year of interview at wave 0. Among men, there was no association between waist circumference and symptoms of depression. By contrast, among women, a 5 cm increase in waist circumference corresponded to an odds ratio of reporting three or more symptoms of depression at wave 3 of 1.13 ($p<0.001$) in the model adjusted for age only. When further adjustment was made, the odds ratio decreased to 1.07, but remained statistically significant ($p<0.001$).

7.6 Anthropometric measures and mortality

Methods

The mortality data have been described in Chapter 8. In this paragraph we look at the relationships between BMI and waist circumference and deaths occurring after wave 1. We give the percentage who died by age and sex (at wave 1) according to the BMI and waist circumference categories (at wave 0). We then report the odds ratios of the logistic regression that explores the association between BMI and waist circumference (mutually adjusted), at wave 0, and deaths. The models were run separately for men and women and first adjusted for age only (at wave 1) and then subsequently adjusted for age, marital status, limiting long-standing illness, smoking status, alcohol consumption, physical activity and wealth, all measured at wave 1, and the year of interview at wave 0. Mortality data have been weighted for wave 1 weight.

Results

Among respondents of wave 1, BMI measured at wave 0 was not related to all causes of mortality (Table 7A.10).

Among those aged 50–74, men with a high waist circumference were most likely to die and women with medium and high waist circumference more likely to die than those with low waist circumference. There were no statistically significant differences according to the waist categories in the likelihood of death among men and women aged 75 and over (Table 7A.11).

Table 7A.12 shows the results from the logistic regression for the longitudinal association between the anthropometric groups and death. Underweight in men was associated with a greatly increased risk of mortality compared to normal weight men (OR: 3.58 [CI 1.49; 8.59], $p=0.004$). This effect was independent of waist circumference, age, marital status, limiting long-standing illness, cigarette smoking, alcohol consumption, physical activity and wealth at wave 1 and year of interview at wave 0 (OR: 2.53 [CI 1.02; 6.28], $p=0.05$). Overweight was protective of mortality compared to normal weight men (OR: 0.64 [CI 0.45; 0.92], $p=0.016$); this effect was independent of waist circumference and age but was not independent of additional covariates. Men with moderate and high waist circumference were more likely to die than men with low waist circumference and this remained true after adjusting for BMI and other covariates.

In women, BMI was not associated with all causes of mortality. By contrast, having medium and high waist circumference (compared to low waist circumference) was associated with increased risk of death in women, independently of BMI and other covariates, such as age, marital status, limiting long-standing illness, smoking status, alcohol consumption, physical activity and wealth, all measured at wave 1, and the year of interview at wave 0.

7.7 Discussion and conclusions

In this chapter we have reported changes in BMI and waist circumference between wave 0 and wave 2. We have also described the relationships between anthropometric measures at wave 0 and several health conditions, quality of life and mortality at subsequent waves.

We found that while BMI increased significantly (between wave 0 and wave 2) only for men in the youngest age group (50 to 55) and for women up to the age of 67, waist circumference increased significantly in both men and women up to the age of 74. We also found that although mean BMI and waist circumference did not differ significantly by sex, BMI and waist circumference both increased more over time among women than among men.

Among men we found that being obese at wave 0 was accompanied by greater increases over time in prevalence of reporting back pain, shortness of breath, arthritis and CVD and also by greater reduction in quality of life. Being overweight at wave 0 was related to greater change in prevalence of reported shortness of breath, arthritis and greater measured reduction in mobility functioning. Men with high waist circumference at wave 0 were also more likely to experience increased shortness of breath, arthritis and CVD over time and greater decrease in physical functioning. We have also shown that men being underweight at wave 0 was related to increased risk of death compared to being normal weight, even after taking into account waist circumference and other covariates. In agreement with previous research (Campos et al., 2006), we found that men who were overweight at wave 0 were less likely to die than normal weight men; however, once we adjusted the model for other covariates, this relationship was no longer significant, suggesting that not accounting for these covariates may lead to a conclusion that overweight is protective of mortality while this is not the case in our population. On the other hand, men with medium and high waist circumference (at wave 0) were clearly more likely to die at subsequent waves than men with low waist circumference, even after taking into account the effect of BMI and other covariates.

The health of women who were obese at wave 0 deteriorated more than women of normal BMI between waves in the following ways: relative increases in reported back pain, arthritis and CVD; greater decrease in measured physical functioning; lower quality of life score at each subsequent wave and increased prevalence rates of three and more symptoms of depression. In addition, being overweight at wave 0 was related to excess increase in prevalence rates of back pain, shortness of breath, arthritis and lower mobility functioning at subsequent waves compared to women of normal BMI. Underweight women, compared to normal weight, showed greater increases in the prevalence of three and more symptoms of depression at subsequent waves.

Compared with women who had low waist circumference, those with high waist circumference (at wave 0) showed greater increases in prevalence of reported back pain, shortness of breath and arthritis, greater decrease in physical functioning, lower quality of life score at each subsequent wave and greater increases in prevalence rates of three and more symptoms of depression at subsequent waves. The risk of increased prevalence of back pain, and greater deterioration in walking speed and quality of life, was also higher for women with medium waist circumference (at wave 0).

Waist circumference, but not BMI (as measured at wave 0), was predictive of mortality among women. After accounting for BMI and other covariates, women with medium and high waist circumference (at wave 0) were more likely to die than women with low waist circumference.

We have also shown that, in both sexes, increased waist circumference (as measured at wave 0) was a predictor for greater risk of having CVD at wave 3; this effect was independent of adjustments. At all waves obese men and women and men with high waist circumference had higher prevalence of arthritis than the other groups; however, they did not deteriorate more than others.

In general women were more likely than men to report higher prevalence rates of back pain, arthritis, falls, shortness of breath, symptoms of depression and lower mobility functioning. This was true especially for obese and overweight women and women with high waist circumference compared to men in the same categories. A possible explanation of the difference between the sexes is that women in general are more disadvantaged than men, especially at older ages. Previous studies have reported that older women are disadvantaged by their relative lack of financial and material resources, which derive from their family caregiving and from their lower position in the labour market. Compared to their male counterparts, older women have poorer health and higher levels of disability and are more likely to provide care to a co-resident family member (Arber and Ginn, 1995).

Attrition could have introduced some bias into our results. To correct at least in part for biases due to loss of respondents, we used longitudinal weights that adjust for differential attrition. In addition we compared basic characteristics of the complete sample analysed in this chapter (i.e., those with valid BMI and waist circumference measurements) with the ELSA sample who completed the three waves. We found that the respondents in the sample analysed in this chapter were on average younger, less likely to have a limiting long-standing illness and less likely to be in the bottom quintile of wealth (all measured at wave 1) than the ELSA sample overall. The two samples did not differ in terms of mean BMI and waist circumference.

To conclude, we have shown that it is important to understand the adverse effects that not only high BMI but also large waist circumference might have on the future health of older people. While it is often believed that BMI can have a protective effect on the health of older people, we have shown that this is not the case; notably we have shown that an apparent protective effect for mortality in men disappears after adjusting for alcohol consumption, cigarette smoking status and physical activity. It is also important to highlight that while increased BMI was unrelated to mortality in either men or women, waist circumference was, even among those with moderate waist circumference. Our results also stress the importance that being fat or thin can have on the well-being of people. This reinforces policies that aim to counter perceptions that a decline in quality of life and mental health is a 'normal' consequence of ageing rather than the consequence of factors such as high BMI and waist circumference; these perceptions can inhibit action to ameliorate the situation.

In terms of policy our findings confirm that anthropometric measures are still relevant to health at older ages; we also highlight the fact that increased waist circumference is as much of a concern as obesity.

References

Arber, S. and Ginn, J. (1995), *Connecting Gender and Ageing: A Sociological Approach*, Buckingham: Open University Press.

Campos, P., Saguy, A., Ernsberger, P., Oliver, E. and Gaesser, G. (2006), 'The epidemiology of overweight and obesity: public health crisis or moral panic?', *International Journal of Epidemiology*, vol. 35, pp. 55–60.

Daviglus, M.L., Liu, K., Yan, L.L., Pirzada, A., Garside, D.B., Schiffer, L., Dyer, A.R., Greenland, P. and Stamler, J. (2003), 'Body Mass Index in middle age and health-related quality of life in older age: the Chicago Heart Association detection project in industry study', *Archives Internal Medicine*, vol. 163, no. 20, pp. 2448–2455.

Department of Health (2004a), *Working Together to Halt the Rise in Obesity*, Choosing health: Obesity Bulletin Issue 1, London: Department of Health (http://www.sportengland.org/obesity_bulletin_1_final.pdf).

Department of Health (2004b), *Choosing Health: Making Healthy Choices Easier*, London: Department of Health (http://www.dh.gov.uk/PublicationsAndStatistics/).

Department of Health (2005a), *Choosing Activity: A Physical Activity Action Plan*, London: Department of Health (http://www.dh.gov.uk/assetRoot/04/10/57/10/04105710.pdf).

Department of Health (2005b), *Choosing a Better Diet: A Consultation on Priorities for a Food and Health Action Plan*, London: Department of Health (http://www.dh.gov.uk/assetRoot/04/06/58/34/04065834.pdf).

Department of Health (2006), *A New Ambition for Old Age: Next Steps in Implementing the National Service Framework for Older People*, London: Department of Health (http://www.dh.gov.uk/assetRoot/04/13/39/47/04133947.pdf).

Department for Work and Pensions (2005), *Opportunity Age – Opportunity and Security throughout Life*', London: Department for Work and Pensions (http://www.dwp.gov.uk/opportunity_age/).

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

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

Flegal, K.M. (2007), 'Waist circumference of healthy men and women in the United States', *International Journal Obesity*, vol. 31, pp. 1134–1139.

Foresight Report (2007), *Tackling Obesities: Future Choices – Modelling Future Trends in Obesity and the Impact on Health*, 2nd edn, Government Office for Science (http://www.foresight.gov.uk/Obesity/obesity_final/14.pdf).

Gensini, G.F., Comeglio, M. and Colella, A. (1998), 'Classical risk factors and emerging elements in the risk profile for coronary artery disease', *European Heart Journal*, vol. 19, Suppl. A, pp. A53–61.

Hyde, M., Wiggins, R.D., Higgs, P. and Blane, D.B. (2003), 'A measure of quality of life in early old age: the theory, development and properties of a needs satisfaction model (CASP-19)', *Aging and Mental Health*, vol. 7, no. 3, pp. 186–194.

The Information Centre (2007), *Health Survey for England – Updating of Trend Tables to Include 2006 Data* (http://www.ic.nhs.uk/pubs/hse06trends).

Jia, H. and Lubetkin, E.I. (2005), 'The impact of obesity on health-related quality-of-life in the general adult US population', *Journal Public Health*, vol. 27, no. 2, pp. 156–164.

Kopelman, P.G. (2000), Obesity as a medical problem, *Nature*, vol. 404, pp. 635–643.

Lopez-Garcia, E., Banegas, B. Jr, Gutierrez-Fisac, J.L., Perez-Regadera, A.G., Ganan, L.D. and Rodriguez-Artalejo, F. (2003), 'Relation between body weight and health-related quality of life among the elderly in Spain', *International Journal of Obesity and Related Metabolic Disorders*, vol. 27, no. 6, pp. 701–709.

National Institute of Health and Clinical Excellence (2007), *Obesity: The Prevention, Identification, Assessment and Management of Overweight and Obesity in Adults and Children* (http://www.nice.org.uk/guidance/index.jsp?action=download&o=38295).

Prior, G., Deverill, C., Malbut, K. and Primatesta, P. (2003), *Health Survey for England 2001. Vol. 2: Methodology and Documentation*. London: HMSO.

Sjostrom, L. (1997), 'Obesity and its relationship to other diseases, in P.S. Shetty and K. McPherson (eds), *Diet, Nutrition and Chronic Disease: Lessons from Contrasting Worlds 1996*, London School of Hygiene and Tropical Medicine Sixth Annual Public Health Forum, London: Wiley, pp. 235–239.

Steffick, D.E. (2000), *Documentation of Affective Functioning Measures in the Health and Retirement Study*, HRS/AHEAD Documentation Report DR-005.

Villareal, D.T., Apovian, C.M., Kushner, R.F. and Klein, S. (2005), 'Obesity in older adults: technical review and position statement of the American Society for Nutrition and NAASO', The Obesity Society, *Obesity Research*, vol. 13, pp. 1849–1863.

World Health Organisation (2000), 'The problems of overweight and obesity', in WHO, *Obesity: Preventing and Managing the Global Epidemic. Report of a WHO Consultation*. WHO Technical Report Series 894, Geneva: WHO (http://whqlibdoc.who.int/trs/WHO_TRS_894_(part1).pdf).

Zaninotto, P., Wardle, H., Stamatakis, E., Mindell, J. and Head, J. (2006), *Forecasting Obesity to 2010*, London: Department of Health (http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsStatistics/DH_4138630).

Appendix 7A
Tables on anthropometric measures and health

Table 7A.1. Age distribution, by Body Mass Index (BMI) and sex

Respondents to the three waves (2,593 men and 3,213 women)

	Underweight		Normal		Overweight		Obese	
	n	%	n	%	n	%	n	%
Men								
50–55	9	[30.0]	142	23.5	333	24.0	163	28.5
56–60	3	[10.0]	140	23.2	250	18.0	113	19.7
61–67	11	[36.7]	130	21.5	335	24.2	127	22.2
68–74	6	[20.0]	111	18.4	305	22.0	108	18.9
75+	1	[3.3]	81	13.4	163	11.8	62	10.8
Total	30	100	604	100	1,386	100	573	100
Women								
50–55	31	35.6	267	26.9	297	23.3	203	23.6
56–60	17	19.5	195	19.7	243	19.1	159	18.5
61–67	7	8.0	229	23.1	277	21.7	200	23.3
68–74	19	21.8	170	17.1	275	21.6	192	22.3
75+	13	14.9	131	13.2	182	14.3	106	12.3
Total	87	100	992	100	1,274	100	860	100

Notes: BMI at wave 0. 'Underweight' indicates BMI <20.0 kg/m^2. 'Normal' indicates BMI from 20.0 to 24.9 kg/m^2. 'Overweight' indicates BMI from 25 to 29.9 kg/m^2. 'Obese' indicates BMI 30 kg/m^2 or more. Age at wave 1.

Table 7A.2. Age distribution, by waist circumference and sex

Respondents to the three waves (2,273 men and 2,862 women)

	Low		Medium		High	
	n	%	n	%	n	%
Men						
50–55	189	26.8	173	23.5	201	24.1
56–60	143	20.3	138	18.8	165	19.8
61–67	152	21.6	173	23.5	188	22.6
68–74	131	18.6	158	21.5	175	21.0
75+	90	12.8	93	12.7	104	12.5
Total	705	100	735	100	833	100
Women						
50–55	237	29.3	195	25.3	284	22.2
56–60	184	22.8	126	16.3	236	18.4
61–67	171	21.2	181	23.5	272	21.2
68–74	137	17.0	156	20.2	291	22.7
75+	79	9.8	114	14.8	199	15.5
Total	808	100	772	100	1,282	100

Notes: Waist at wave 0. 'Low' indicates waist <94 cm for men and <80 cm for women. 'Medium' indicates waist from 94 cm to 101.9 cm for men and from 80 cm to 87.9 cm for women. 'High' indicates waist 102 cm or more for men and 88 cm or more for women. Age at wave 1.

Table 7A.3. Changes in mean walking speed between waves, by Body Mass Index (BMI) and sex

Respondents aged 60+ with a valid BMI measurement

	Underweight	Normal	Overweight	Obese
		Mean walking speed m/s		
Men				
Wave 1	–	0.9194	0.9268	0.8261
(s.e. of the mean)		(0.017)	(0.011)	(0.018)
Wave 2	–	–0.0282	–0.0353	–0.0065
(s.e. of the difference)		(0.023)	(0.016)	(0.027)
Wave 3	–	–0.0253	–0.0445	–0.0345
(s.e. of the difference)		(0.024)	(0.015)	(0.030)
Women				
Wave 1	[0.8997]	0.8900	0.8453	0.7720
(s.e. of the mean)	[(0.049)]	(0.013)	(0.011)	(0.014)
Wave 2	[0.0077]	–0.0163	–0.0323	–0.0308
(s.e. of the difference)	[(0.073)]	(0.019)	(0.016)	(0.019)
Wave 3	[–0.0806]	–0.0551	–0.0370	–0.0409
(s.e. of the difference)	[(0.076)]	(0.018)	(0.016)	(0.018)
Unweighted N				
Men	*16*	*294*	*705*	*246*
Women	*32*	*477*	*662*	*411*

Notes: BMI at wave 0. ‘Underweight’ indicates BMI <20.0 kg/m^2. ‘Normal’ indicates BMI from 20.0 to 24.9 kg/m^2. ‘Overweight’ indicates BMI from 25 to 29.9 kg/m^2. ‘Obese’ indicates BMI 30 kg/m^2 or more. Age-standardised figures.

Table 7A.4. Changes in means of walking speed between waves, by waist circumference and sex

Respondents aged 60+ with a valid waist measurement

	Low	Medium	High
		Mean walking speed m/s	
Men			
Wave 1	0.9373	0.8917	0.8569
(s.e. of the mean)	(0.016)	(0.014)	(0.016)
Wave 2	–0.0488	–0.0117	–0.0302
(s.e. of the difference)	(0.023)	(0.020)	(0.021)
Wave 3	–0.0184	–0.0344	–0.0352
(s.e. of the difference)	(0.024)	(0.021)	(0.022)
Women			
Wave 1	0.8820	0.8606	0.7993
(s.e. of the mean)	(0.015)	(0.014)	(0.012)
Wave 2	–0.0168	–0.0252	–0.0393
(s.e. of the difference)	(0.022)	(0.020)	(0.016)
Wave 3	–0.0419	–0.0555	–0.0305
(s.e. of the difference)	(0.022)	(0.020)	(0.016)
Unweighted N			
Men	*329*	*369*	*394*
Women	*358*	*395*	*626*

Notes: Waist at wave 0. ‘Low’ indicates waist <94 cm for men and <80 cm for women. ‘Medium’ indicates waist from 94 cm to 101.9 cm for men and from 80 cm to 87.9 cm for women. ‘High’ indicates waist 102 cm or more for men and 88 cm or more for women. Age-standardised figures.

Table 7A.5. Logistic regression for the association between CVD at wave 3 and waist circumference at wave 0, by sex

Respondents with a valid answer to the CVD question and valid waist measurement

	Men				Women			
	Base	Odds ratio	95% CI	p-value	Base	Odds ratio	95% CI	p-value
Model 1	2,482				3,108			
Waist (5 cm increase)		1.11	1.06; 1.16	<0.001		1.16	1.11; 1.21	<0.001
Model 2	2,459				3,071			
Waist (5 cm increase)		1.07	1.02; 1.12	<0.01		1.08	1.04; 1.13	<0.001

Notes: Model 1 adjusted for age at wave 1. Model 2 adjusted for age, marital status, limiting long-standing illness, cigarette smoking, alcohol consumption, physical activity and wealth, all at wave 1, and year of interview at wave 0.

Table 7A.6. Changes in means of quality of life scores (CASP-19), by Body Mass Index (BMI) and sex

Respondents with a valid BMI measurement

	Underweight	Normal	Overweight	Obese
		Mean quality of life		
Men				
Wave 1	–	44.2	43.7	42.7
(s.e. of the mean)		(0.39)	(0.24)	(0.51)
Wave 2	–	–0.8	–0.4	–0.9
(s.e. of the difference)		(0.59)	(0.35)	(0.79)
Wave 3	–	–1.5	–2.0	–1.4
(s.e. of the difference)		(0.61)	(0.37)	(0.76)
Women				
Wave 1	44.1	44.5	43.9	42.0
(s.e. of the mean)	(1.18)	(0.33)	(0.32)	(0.40)
Wave 2	+0.9	–0.3	–0.4	–0.3
(s.e. of the difference)	(1.65)	(0.47)	(0.46)	(0.57)
Wave 3	–2.5	–1.8	–2.1	–1.7
(s.e. of the difference)	(1.63)	(0.47)	(0.47)	(0.57)
Unweighted N				
Men	*19*	*431*	*1,006*	*370*
Women	*52*	*709*	*844*	*554*

Notes: BMI at wave 0. 'Underweight' indicates BMI <20.0 kg/m^2. 'Normal' indicates BMI from 20.0 to 24.9 kg/m^2. 'Overweight' indicates BMI from 25 to 29.9 kg/m^2. 'Obese' indicates BMI 30 kg/m^2 or more. Age-standardised figures.

Table 7A.7. Changes in means of quality of life between waves, by waist circumference at wave 0 and sex

Respondents with a valid waist measurement

	Low	Medium	High
		Mean quality of life	
Men			
Wave 1	43.8	43.8	42.5
(s.e. of the mean)	(0.33)	(0.34)	(0.39)
Wave 2	–0.3	–0.6	–0.6
(s.e. of the difference)	(0.50)	(0.50)	(0.58)
Wave 3	–1.8	–1.9	–1.6
(s.e. of the difference)	(0.53)	(0.54)	(0.58)
Women			
Wave 1	44.6	44.5	42.3
(s.e. of the mean)	(0.38)	(0.34)	(0.34)
Wave 2	–0.4	–0.2	–0.5
(s.e. of the difference)	(0.55)	(0.49)	(0.48)
Wave 3	–1.5	–2.6	–1.8
(s.e. of the difference)	(0.56)	(0.53)	(0.48)
Unweighted N			
Men	*514*	*517*	*566*
Women	*587*	*542*	*808*

Notes: Waist at wave 0. 'Low' indicates waist <94 cm for men and <80 cm for women. 'Medium' indicates waist from 94 cm to 101.9 cm for men and from 80 cm to 87.9 cm for women. 'High' indicates waist 102 cm or more for men and 88 cm or more for women. Age-standardised figures.

Table 7A.8. Linear regression coefficients for the association between quality of life score at wave 3 and waist circumference at wave 0, by sex

Respondents with valid answers to the CASP-19 questionnaire and valid waist measurement

	Men				Women			
	Base	Regression coefficient	95% CI	p-value	Base	Regression coefficient	95% CI	p-value
Model 1	2,081				2,541			
Waist (5 cm increase)		–0.263	–0.428; –0.097	0.002		–0.491	–0.626; –0.355	<0.001
Model 2	1,956				2,511			
Waist (5 cm increase)		–0.005	–0.332; 0.321	0.957		–0.191	–0.323; –0.059	<0.01

Notes: Model 1 adjusted for age at wave 1. Model 2 adjusted for age, marital status, limiting long-standing illness, cigarette smoking, alcohol consumption, physical activity and wealth, all at wave 1, and year of interview at wave 0.

Table 7A.9. Logistic regression for the association between symptoms of depression at wave 3 and waist circumference at wave 0, by sex

Respondents with valid answers to the CES-D questionnaire and valid waist measurement

	Men				Women			
	Base	Odds ratio	95% CI	p-value	Base	Odds ratio	95% CI	p-value
Model 1	2,440				3,043			
Waist (5 cm increase)		1.03	0.98; 1.08	0.217		1.13	1.09; 1.17	<0.001
Model 2	2,418				3,007			
Waist (5 cm increase)		0.99	0.94; 1.04	0.740		1.07	1.03; 1.11	<0.001

Notes: Three or more symptoms of depression at wave 3 and waist measured at wave 0. Model 1 adjusted for age at wave 1. Model 2 adjusted for age, marital status, limiting long-standing illness, cigarette smoking, alcohol consumption, physical activity and wealth, all at wave 1, and year of interview at wave 0.

Table 7A.10. Deaths from all causes, by Body Mass Index (BMI) at wave 0, age and sex

Respondents with a valid BMI measurement and who gave consent for mortality record linkage

		Underweight	Normal	Overweight	Obese
			% died		
Men	50–74	12.3	6.1	4.9	7.4
	75+	–	29.6	27.5	27.5
	All	21.2	10.3	8.7	10.6
Women	50–74	5.5	3.0	3.7	4.1
	75+	37.5	[22.4]	22.7	19.6
	All	16.8	7.3	8.1	7.1
Unweighted N					
Men	50–74	*58*	*852*	*1,932*	*861*
	75+	*11*	*198*	*403*	*163*
	All	*69*	*1,050*	*2,335*	*1,024*
Women	50–74	*1,302*	*112*	*1,635*	*1,208*
	75+	*313*	*49*	*426*	*253*
	All	*1,615*	*161*	*2,061*	*1,461*

Notes: BMI at wave 0. ‘Underweight’ indicates BMI <20.0 kg/m^2. ‘Normal’ indicates BMI from 20.0 to 24.9 kg/m^2. ‘Overweight’ indicates BMI from 25 to 29.9. kg/m^2. ‘Obese’ indicates BMI 30 kg/m^2 or more. Deaths between 2002 and January 2008.

Table 7A.11. Deaths from all causes, by waist circumference at wave 0, age and sex

Respondents with a valid waist measurement and who gave consent for mortality record linkage

		Low	Medium	High
			% died	
Men	50–74	4.7	5.0	8.1
	75+	27.1	30.2	31.2
	All	8.5	10.1	12.5
Women	50–74	1.3	4.6	4.6
	75+	23.9	23.0	25.5
	All	5.5	9.2	10.0
Unweighted N				
Men	50–74	*934*	*968*	*1,167*
	75+	*201*	*252*	*279*
	All	*1,135*	*1,220*	*1,446*
Women	50–74	*1,039*	*943*	*1,588*
	75+	*198*	*268*	*473*
	All	*1,237*	*1,211*	*2,061*

Notes: Waist at wave 0. 'Low' indicates waist <94 cm for men and <80 cm for women. 'Medium' indicates waist from 94 cm to 101.9 cm for men and from 80 cm to 87.9 cm for women. 'High' indicates waist 102 cm or more for men and 88 cm or more for women. Deaths between 2002 and January 2008.

Table 7A.12. Logistic regression for the association between deaths and BMI and waist circumference, by sex

Respondents with a valid BMI and waist measurement and who gave consent for mortality record linkage

	Men				Women			
	Base	Odds ratio	95% CI	p-value	Base	Odds ratio	95% CI	p-value
Model 1	3,519				4,160			
BMI								
Normal weight		1				1		
Underweight		3.58	1.49; 8.59	0.004		1.40	0.68; 2.85	0.359
Overweight		0.64	0.45; 0.92	0.016		0.86	0.60; 1.25	0.439
Obese		0.66	0.42; 1.03	0.068		0.79	0.51; 1.24	0.304
Waist								
Low		1				1		
Medium		1.62	1.11; 2.36	0.013		1.75	1.13; 2.70	0.012
High		2.33	1.51; 3.60	<0.001		2.17	1.36; 3.47	0.001
Model 2	3,464				4,088			
BMI								
Normal weight		1				1		
Underweight		2.53	1.02; 6.28	0.046		1.22	0.61; 2.46	0.569
Overweight		0.75	0.51; 1.09	0.130		0.88	0.61; 1.29	0.525
Obese		0.66	0.41; 1.04	0.074		0.79	0.50; 1.25	0.319
Waist								
Low		1				1		
Medium		1.59	1.06; 2.37	0.024		1.66	1.07; 2.57	0.025
High		2.15	1.36; 3.41	0.001		1.92	1.19; 3.09	0.007

Notes: Deaths between 2002 and January 2008, BMI and waist measured at wave 0. Model 1 adjusted for age at wave 1. Model 2 adjusted for age, marital status, limiting long-standing illness, cigarette smoking, alcohol consumption, physical activity and wealth, all at wave 1, and year of interview at wave 0.

8. Mortality and healthy life expectancy

James Nazroo *The University of Manchester*

Paola Zaninotto *University College London*

Edlira Gjonça *University College London*

This chapter examines the incidence of mortality in the English population aged 50 and over living in private households. It explores demographic, socio-economic and lifestyle factors associated with increased risk of mortality and how mortality is patterned across the year (excess winter mortality), and estimates the proportion of remaining life that will be spent in good health. Key points arising from this chapter are:

- Risk of death was higher for men than women for all ages studied here. In a multivariate analysis adjusting for demographic, behavioural and socio-economic factors, men aged 50 and over had on average an 83% higher risk of dying (hazard ratio 1.83, 95% confidence intervals [CI] 1.59–2.11).
- Risk of death was lower for those living with a partner (married or not) than those living without a partner, and for those who were married compared with those who were not. In a multivariate analysis those who were widowed had a 39% greater risk, those who were separated or divorced a 62% greater risk and those who had never married a 76% greater risk, compared with those currently married.
- The incidence of mortality was strongly patterned by the three socio-economic indicators examined here: level of qualifications, occupational class and wealth. In bivariate analyses stratified by age and sex:
    - There were more deaths among those without qualifications and fewer among those with a degree or higher qualification, compared with those with an 'intermediate' level of qualification.
    - Those in routine and manual occupations had a higher risk of death than those in intermediate occupations, while those in managerial and professional occupations had a lower risk.
    - Risk of mortality by wealth was similarly graded, with those in the richest wealth quintile having the lowest risk and those in the poorest wealth quintile having the highest risk.
- In multivariate analyses, where all three socio-economic measures (qualifications, occupational class and wealth) were included in a joint model, together with demographic and lifestyle measures, wealth was the only socio-economic measure that predicted risk of mortality. This may be because wealth is a more accurate marker of socio-economic position at older ages than the other measures, or because the effects of education and occupational class operate through wealth.

- The three lifestyle factors examined, physical activity, smoking and drinking alcohol, were all associated with risk of mortality in multivariate analyses accounting for demographic and socio-economic effects:
  - Those who were physically inactive had twice the risk of death compared with those who had the highest level of physical activity (hazard ratio 2.01, 95% CI 1.56–2.59).
  - Compared with those who had never smoked, ex-smokers had a 20% greater risk of mortality and current smokers had a 74% greater risk of mortality.
  - Compared with those who never drink alcohol and those who drink daily, occasional drinkers had a reduced risk of mortality (hazard ratio 0.79, 95% CI 0.67–0.92, in comparison with those who never drink alcohol).
  - Although these analyses are longitudinal, the interpretation of the strength of these associations should be made cautiously, because behaviours may change after the onset of disease, but before mortality.
- Analysis of deaths by the month of year in which they occur shows the expected excess occurring in the winter months of December to March compared with other months (8.5% of deaths in those months were excess 'winter' deaths). An unusual peak of deaths occurred in the month of October and if these deaths are excluded from the analysis, the estimate of excess winter mortality increases to 14.7% of deaths occurring in the period December to March, which is 5.9% of all deaths.
- The excess of deaths in winter months was not clearly patterned by age, cohabiting status, central heating, quality of accommodation or socio-economic position.
- Three estimates of life spent in good health were used: life expectancy with excellent or good health (rather than fair or poor health); life expectancy without a limiting illness; and healthy life expectancy, estimated using measures of mobility, activities of daily living and instrumental activities of daily living:
  - For all three measures, at older ages an increasing proportion of life expectancy is spent without good health. For example, men aged 50–54 are estimated to spend 21% of their remaining life with a disability, compared with 36% for men aged 75–79, while for women in the same age groups the figures are 27% and 46%, respectively.
  - The three measures used give different estimates of the proportion of life to be spent unwell or disabled. For example, men aged 50–54 are estimated to spend 8.2 years with fair or poor self-rated health, 10.3 years with a limiting long-standing illness and 6 years with a disability. This is not surprising, because they represent different dimensions of health, but this sensitivity to the measure used is important for policy.

8.1 Introduction

The patterning and predictors of mortality at older ages is of increasing relevance to policy and has been an increasing focus of research. In developed countries mortality at young ages is very low, so improvements in mortality come mainly from declines in mortality rates at older ages. In fact, the further ageing of the already older populations of developed countries, which have been characterised by both low fertility and low mortality, is now largely driven by declines in mortality rather than declines in fertility (Preston, Himes and Eggers, 1989). In addition, governments are concerned with socio-economic differences in mortality, but research on socio-economic inequalities in health and mortality has traditionally focused on the working-age population, so there is a need for more data on the socio-economic patterning of mortality at older age, as well as health and disability. There is more research on one of the central areas of policy concern, the excess of deaths that occur in the winter months. Nevertheless, there remains uncertainty about the primary causes of this excess and, therefore, appropriate policy responses. Finally, while it is known that there have been large improvements in mortality, less is known about how much time is spent unwell, or in disability, prior to mortality, something that is clearly of relevance to health, social care and economic policy. Recent evidence suggests that the prevalence of chronic disability has declined alongside increases in life expectancy, and has declined faster in recent periods than previously (Manton, Corder and Stallard, 1997; Manton and Gu, 2001; Bobak et al., 2004; ONS, 2008). If this is the case, increases in life expectancy may not be associated with increases in levels of dependency and the associated increases in health and social welfare costs.

ELSA allows us to explore the patterning of mortality at older ages in relation to a number of determinants. The analyses presented in this chapter examine demographic and socio-economic factors associated with mortality at older ages and how mortality varies across the months and seasons of the year and the factors that might relate to seasonal variation, and estimate the proportions of life that people at older ages spend in poor health or disabled.

8.2 Descriptive analysis of mortality rates

In this section we describe the patterning of mortality of the ELSA population by sex, age, socio-economic and behavioural factors. We study deaths that occurred from wave 1 of ELSA (2002–03) up to early January 2008. We only include in these analyses deaths occurring to core wave 1 ELSA respondents who agreed to have their data linked to mortality records and did not withdraw that consent. Such consent was given by 10,769 (96% of those eligible) ELSA respondents, with the majority of the remaining respondents not consenting to have their data linked to mortality records when first asked, and a very small number withdrawing their consent at a subsequent interview (11 respondents). As almost all ELSA wave 1 respondents are included in the sample used here, the analyses in this section use the wave 1 weight, which adjusts for non-response to the wave 1 interview.

Table 8.1. Deaths occurring after wave 1, by age and sex at wave 1

Respondents in 2002–03 who gave consent for mortality record

	50–64	65–74	75–84	85+	All
	%	%	%	%	%
Men	3.5	11.9	25.3	50.3	10.6
Women	2.0	7.0	18.6	40.9	8.8
Unweighted N					
Men	*2,765*	*1,315*	*754*	*167*	*5,000*
Women	*2,864*	*1,488*	*1,056*	*361*	*5,769*

Over the period studied (from wave 1 (2002/03) to early January 2008) 1,009 deaths occurred, equating to 9.4% of the sample. Table 8.1 shows the patterning of mortality during this period by sex and age, and shows the expected higher mortality rate for men (at all ages) and for older people.

The first block of Table 8.2 shows death rates by partnership status (living with a partner, including a spouse, compared with not living with a partner), while the second block of Table 8.2 shows death rates by marital status.

Table 8.2. Deaths occurring after wave 1, by age, sex, and cohabiting and marital status at wave 1

Respondents in 2002–03 who gave consent for mortality record

	Partnership status		Marital status			
	Living with partner	Not living with partner	Married	Separated or divorced	Widowed	Never married
	%	%	%	%	%	%
Men						
50–59	1.7	6.7	1.8	5.3	[2.3]	6.1
60–74	8.4	14.2	8.3	14.5	17.1	10.6
75+	24.0	40.7	24.1	–	40.2	[35.6]
Women						
50–59	1.2	2.7	1.1	2.7	0.0	5.1
60–74	4.3	8.5	4.4	6.2	8.8	9.9
75+	15.8	27.6	16.0	[24.4]	27.2	32.5
Unweighted N						
Men						
50–59	*1,497*	*312*	*1,393*	*238*	*38*	*139*
60–74	*1,741*	*437*	*1,712*	*182*	*156*	*128*
75+	*596*	*338*	*607*	*28*	*266*	*33*
Women						
50–59	*1,657*	*497*	*1,569*	*371*	*113*	*101*
60–74	*1,580*	*876*	*1,550*	*277*	*538*	*90*
75+	*381*	*888*	*385*	*43*	*752*	*89*

Table 8.3. Deaths occurring after wave 1, by age, sex and socio-economic position at wave 1

Respondents in 2002–03 who gave consent for mortality record

	Men			Women		
	50–59	60–74	75+	50–59	60–74	75+
	%	%	%	%	%	%
Qualifications						
Degree or higher	1.8	4.9	22.4	2.7	2.7	[15.0]
Intermediate	2.3	8.9	27.0	1.4	4.7	20.5
No qualification	4.0	11.7	32.7	1.2	7.2	25.2
NSSEC occupational class						
Managerial and professional	1.6	6.7	25.7	1.4	4.1	18.5
Intermediate	3.3	9.6	30.6	1.3	4.5	20.3
Routine and manual	3.2	11.6	32.8	1.7	7.2	27.4
Total wealth quintile						
Richest	0.9	5.0	22.9	1.4	1.8	17.4
4th	1.4	6.8	25.3	0.2	4.4	21.0
3rd	1.0	11.0	24.1	1.6	5.7	16.9
2nd	3.9	12.8	31.8	2.0	6.0	26.7
Poorest	7.9	13.8	41.4	2.6	11.4	30.4
Unweighted N						
Qualifications						
Degree or higher	*360*	*276*	*94*	*252*	*148*	*40*
Intermediate	*991*	*992*	*341*	*1,161*	*1,033*	*356*
No qualification	*423*	*862*	*478*	*654*	*1,187*	*752*
NSSEC occupational class						
Managerial and professional	*739*	*704*	*348*	*614*	*534*	*209*
Intermediate	*374*	*409*	*161*	*566*	*690*	*348*
Routine and manual	*689*	*1,057*	*424*	*942*	*1,180*	*624*
Total wealth quintile						
Richest	*406*	*485*	*172*	*503*	*487*	*151*
4th	*432*	*447*	*165*	*431*	*495*	*198*
3rd	*356*	*430*	*176*	*434*	*520*	*224*
2nd	*339*	*442*	*188*	*413*	*488*	*271*
Poorest	*260*	*362*	*228*	*328*	*451*	*424*

The analysis of mortality by partnership status shows the clear advantage of those living with a partner for all ages and both men and women. This pattern is repeated for the analysis by marital status, with men and women who are married having lower mortality rates than others. With the exception of widowed women aged 50–59, men and women who are separated or divorced, widowed or never married have a similar level of higher risk of mortality.

Table 8.3 examines mortality rates by three markers of socio-economic position: qualifications, occupational class and wealth. For qualifications the sample is divided into three groups: 'degree or higher', 'intermediate qualifications' and 'without qualification'. The analyses show that for both males and females and at all ages (except women aged 50–59) there are more deaths among those without qualification and fewer deaths among those with a degree or higher qualification.

NSSEC is used for the analysis by occupational class, and the sample is divided into three groups: managerial and professional, intermediate, and routine and manual occupations. For both sexes there is a clear ascending trend in deaths by occupational class, with more deaths occurring to people in the routine and manual class and fewer deaths for those in the managerial and professional class. This pattern is repeated for all age groups.

Finally, Table 8.3 also shows the distribution of deaths by age and total wealth quintile. Again, the distribution of deaths for both males and females and for each of the three age groups shows a very clear descending pattern of deaths from the poorest to the richest groups. For example, among the poorest wealth group 41.4% males aged 75 and over and 30.4% females aged 75 and over have died since wave 1 compared with only 22.9% males and 17.4% females of the same age from the richest wealth group. Focusing on absolute differences in rates between wealth groups suggests that the pattern is accentuated by age, but this is, of course, related to higher mortality rates at older ages. In relative terms inequalities in mortality rates across wealth groups reduce with age.

8.3 Factors predicting mortality

This section of the chapter aims to examine the contribution of different determinants to mortality for the population aged 50 and older, many of which feature in the list of targets for interventions to reduce health inequality (Department of Health, 2005). Building on the descriptive analysis shown in Section 8.2, we examine three categories of explanation:

- *Demographic:* age, sex, marital status, living arrangements;
- *Socio-economic:* education, occupational class (NSSEC), wealth;
- *Behaviour:* smoking, drinking pattern, physical exercise.

These factors are thought to affect health and mortality through interactive mechanisms. As Hummer, Rogers and Eberstein (1998) state, mortality should be conceptualised as a process that is influenced by direct and indirect variables. For example, socio-economic determinants could, and perhaps should, be conceptualised as working through psychosocial, behavioural, psychological, health care and biological factors.

Research on socio-economic mortality differentials is an established field of study. A range of socio-economic factors has been examined in relation to mortality, such as: income, wealth, social class, employment, education, etc. Duncan (1961) describes the connection between some of these elements as follows: ‘Education qualifies the individual for participation in occupational life, and pursuit of an occupation yields him a return in the form of income’ (p. 783). Socio-economic status is thought to be one of the strongest predictors of mortality. Factors such as occupational class, educational attainment, wealth and housing quality have been shown to affect mortality through a number of pathways (Kitagawa and Hauser, 1973; Smith, 1998; Brunner et al., 1999; Elo and Preston, 1996; Marmot et al., 2000). However, much of the research in this field has typically concentrated on the middle-aged, working population, and men, and has neglected the older population. This is in part because the indicators of socio-economic status commonly used in the UK have been based on occupation, which is less relevant and more difficult to measure for economically inactive people, such as those post-retirement, or women who are not in paid employment. Nevertheless, there is a growing body of evidence showing that the socio-economic differentials persist after retirement (Kitagawa and Hauser, 1973; Fingerhut, Wilson and Feldman, 1980; Marmot, Kogevinas and Elston, 1987; Williams, 1990; House, Kessler and Herzog, 1990; Breeze, Sloggett and Fletcher, 1999; Marmot, 2004; Gjonça, 2007), even if socio-economic differentials reduce, in relative terms, at older ages (Deaton and Paxson, 1998; Beckett, 2000; Mishra et al., 2004; House, Lantz and Herd, 2005; McMunn et al., under review).

In addition to examining socio-economic differentials by occupational class, there is value in exploring the impact of education and wealth. There is considerable evidence that an individual's educational attainment is strongly correlated with health and mortality (Preston and Taubman, 1994; Winkleby et al., 1992), and a measure of education is available for those who are not currently in the labour force. Compared with other socio-economic indicators, education is also a more consistent measure and one that is more easily collected (Preston and Elo, 1995). Importantly, its level is less likely than other measures of socio-economic position to be influenced by health problems that develop in adulthood. Indeed, Smith and Kington (1997) suggest that, because of its prior timing relative to current health, education is less likely to reflect 'reverse causation'. However, the fact that education is a distal measure also makes it less able to reflect accumulated socio-economic risks and benefits.

Wealth is a particularly useful measure of socio-economic position for people in older age, because it reflects both accumulated socio-economic position and potential for current consumption. Indeed, some have suggested that wealth is a more important measure of economic status than income, especially for people who are retired (Hurd, 1989; Smith and Kington, 1997). In part this is because an older person's current income largely reflects their pension, but resources to support consumption can be supplemented by spending down financial assets, or wealth. In such cases studying income alone may give a false impression of economic well-being.

Methods and data description

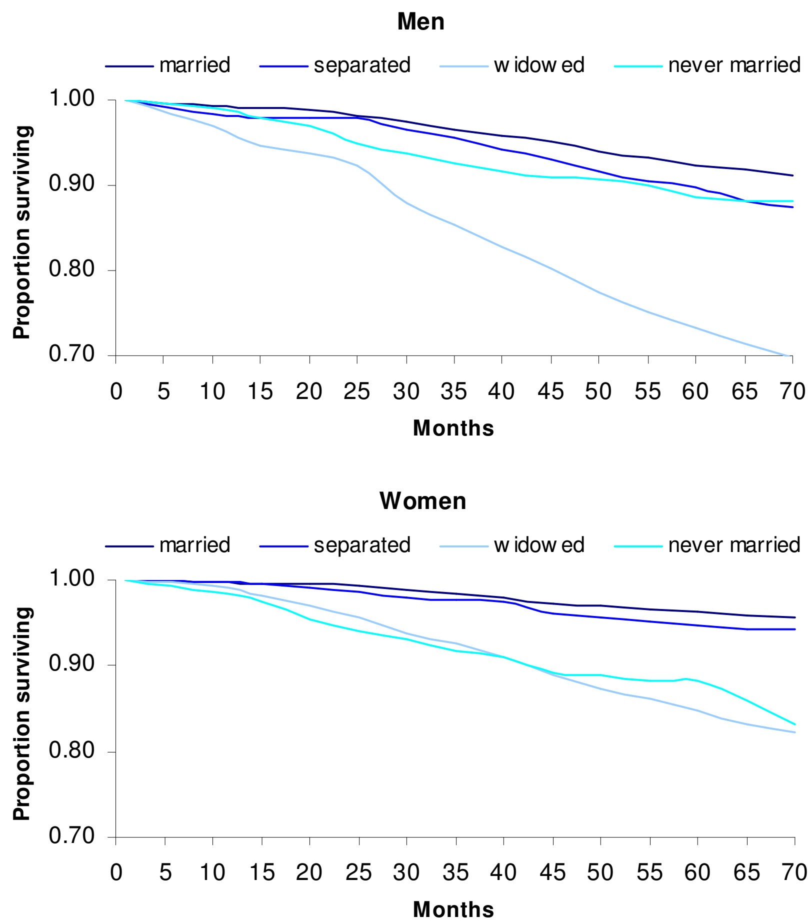
Data covering the period from wave 1 of ELSA (2002–03) to early January 2008 are used for a longitudinal modelling of mortality risk over a 70-month period. This means that the data are left truncated (that is, they do not capture mortality prior to the start of ELSA, so reflect the risks of 'survivors', which is particularly important at older ages). For the purpose of these analyses, we are interested in a particular event, the death of a member of the study. The period until that event is known as the risk period. The temporal sequencing of such data, known as time-to-event, or survival, data, is best approached using survival analysis. In survival analysis there is a *time of entry* and the *time of exit*. Time of entry is the time when the subjects start to be observed, which in our case corresponds to the time wave 1 interviews began (March 2002). The end point (or time of exit) is, for those who died, month and year of death and, for those who did not die, January 2008, which is the last date to which the cases are followed. At this point we censor in cases of people who are still alive by end of study.

As described in Section 8.2, only deaths occurring to core wave 1 ELSA respondents who agreed to have the data linked to mortality records and did not withdraw that consent, are included in this analysis. This gives a total of 10,769 respondents and 1,009 deaths. Survivor functions were estimated using the Kaplan Meier (KM) product-limit estimator method and the hazard function using Cox proportional hazards models (Cox, 1972). For estimating both the survivor function and the cumulative hazard function we have used STATA 10. All analyses use the ELSA wave 1 weight and are age adjusted (using a categorical measure to capture non-linear effects).

Results

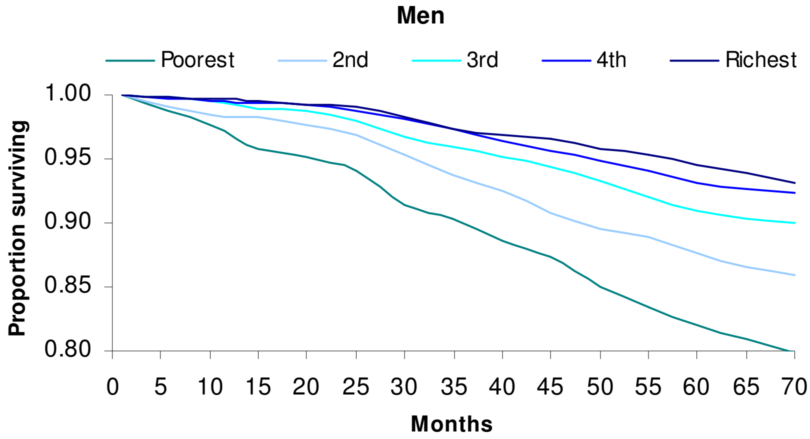
Survival functions were constructed for a range of the factors that could be associated with mortality. A selected number of these analyses are shown for illustrative purposes in Figures 8.1 to 8.7. Figure 8.1 shows survival by marital status. Those who are married have the highest survival rates for both men and women, followed by those who are ‘separated’ (which includes those who are divorced). For men, those who are widowed are at a clear disadvantage.

Figure 8.1. Survival after wave 1, by sex and marital status at wave 1



Survival analysis by wealth, shown in Figure 8.2, shows a very clear gradient for both sexes. Those within the highest wealth quintile have the highest survival chances, followed by those who are in the fourth wealth quintile and so on. Similar findings are present for NSSEC occupational class (Figure 8.3), with those in 'managerial' (and professional) occupations having the highest chances of survival followed by those in 'intermediate' occupations, while

Figure 8.2. Survival after wave 1, by sex and total wealth at wave 1



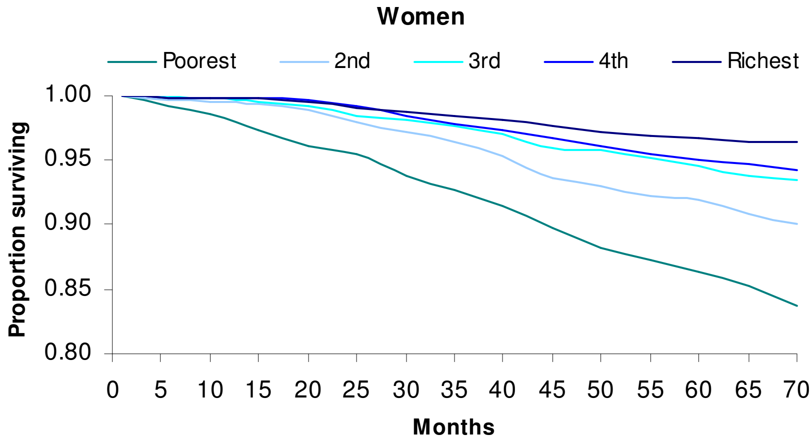


Figure 8.3. Survival after wave 1, by sex and NSSEC occupational class at wave 1

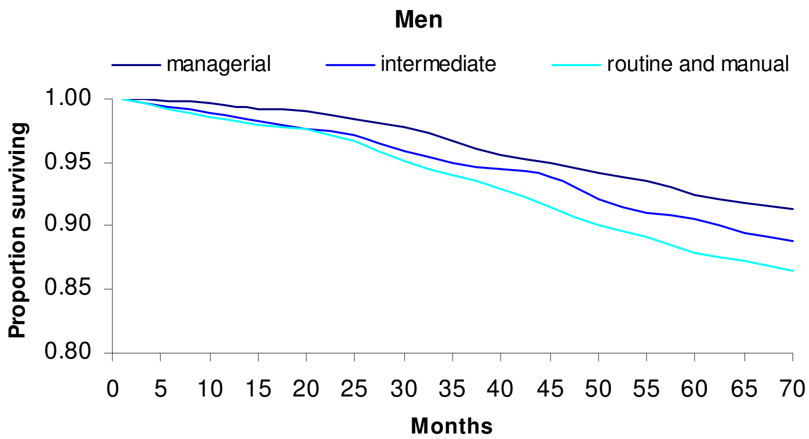


Figure 8.3 continued

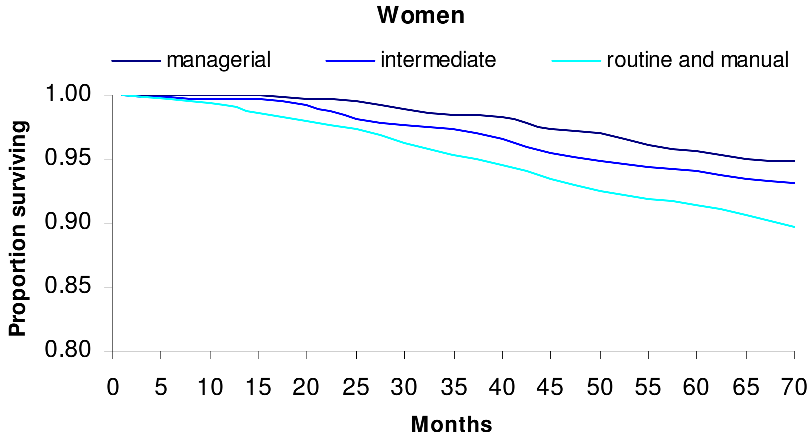
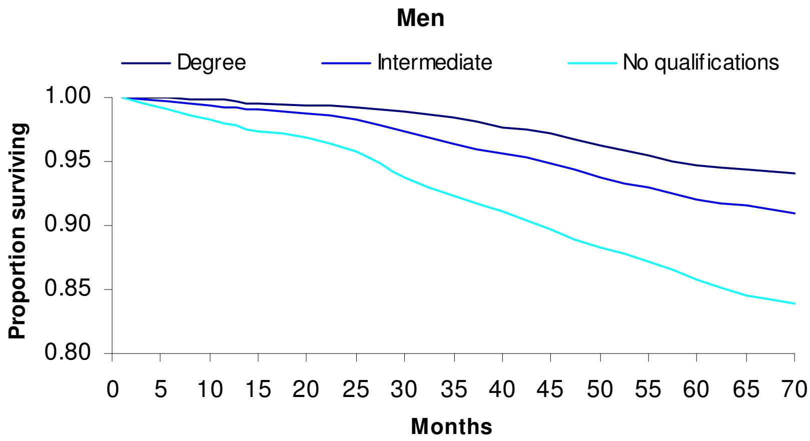
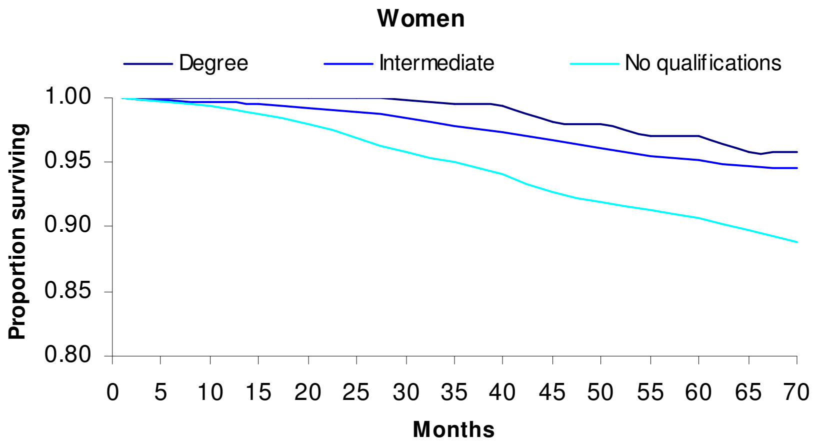


Figure 8.4. Survival after wave 1, by sex and educational qualifications at wave 1



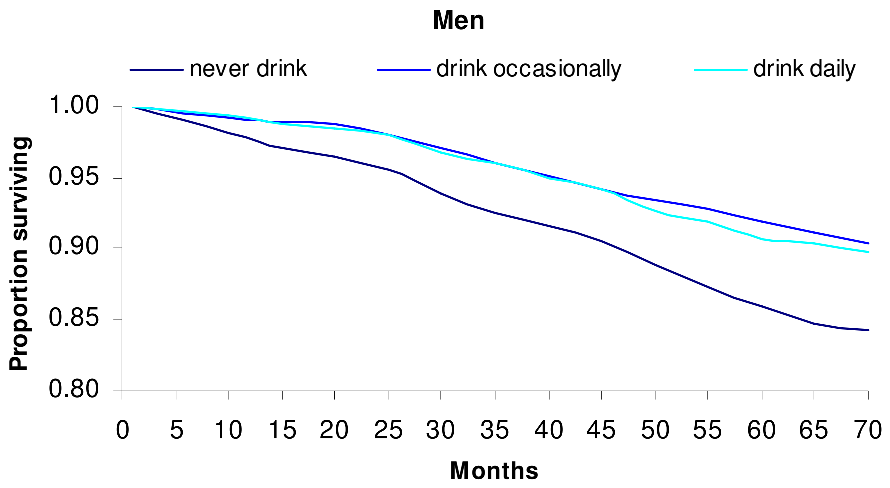


those in 'routine and manual' occupations had the lowest chance of survival. And, results for the more distal socio-economic measure, educational qualifications (Figure 8.4), also show a clear difference in survival for both sexes, with those who report having a degree having the highest chances of survival, followed by people who have an 'intermediate' level of educational attainment, and those with 'no qualification' having the lowest chance of survival.

Finally, we also built survival functions for three behavioural factors: drinking alcohol, smoking and physical activity. For both men and women, those who do not drink alcohol have a lower chance of survival than those who do (Figure 8.5). For men there is an overlap in the survival curves for those who report 'drinking daily' and 'drinking occasionally'. The pattern is different for women, for whom those who drink alcohol 'occasionally' have a greater chance of survival than those who drink 'daily'.

Analysis of survival by smoking pattern (Figure 8.6) shows the expected advantage for non-smokers for both men and women, but does not show a clear difference between ex-smokers and current smokers. This failure to demonstrate the benefits of giving up smoking could, of course, reflect the fact that when people become ill they might stop smoking.

Figure 8.5. Survival after wave 1, by sex and alcohol consumption at wave 1



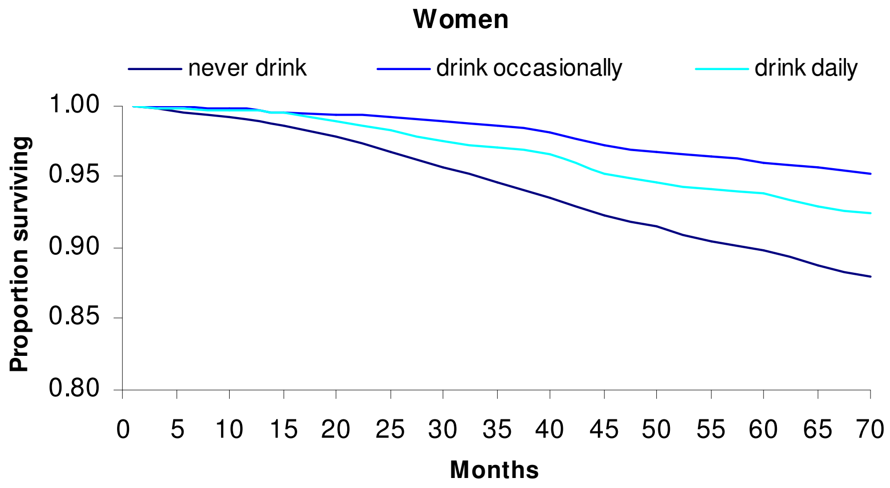
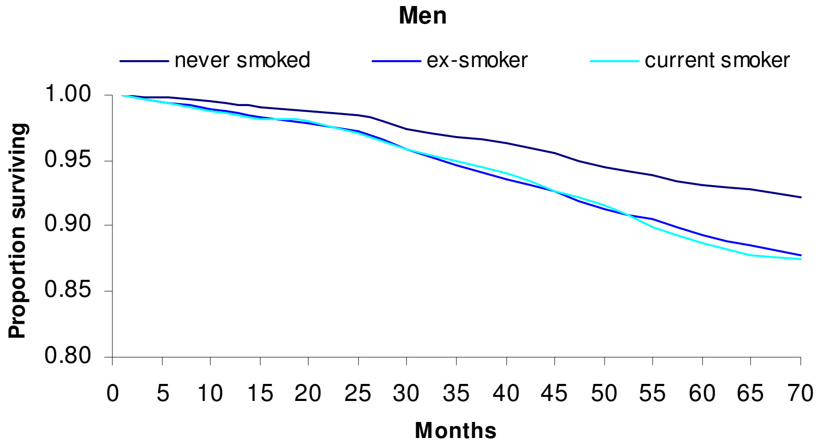
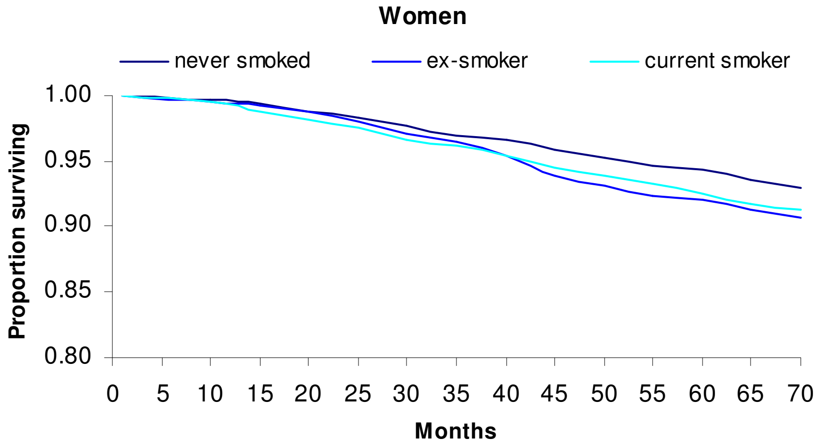


Figure 8.6. Survival after wave 1, by sex and smoking at wave 1

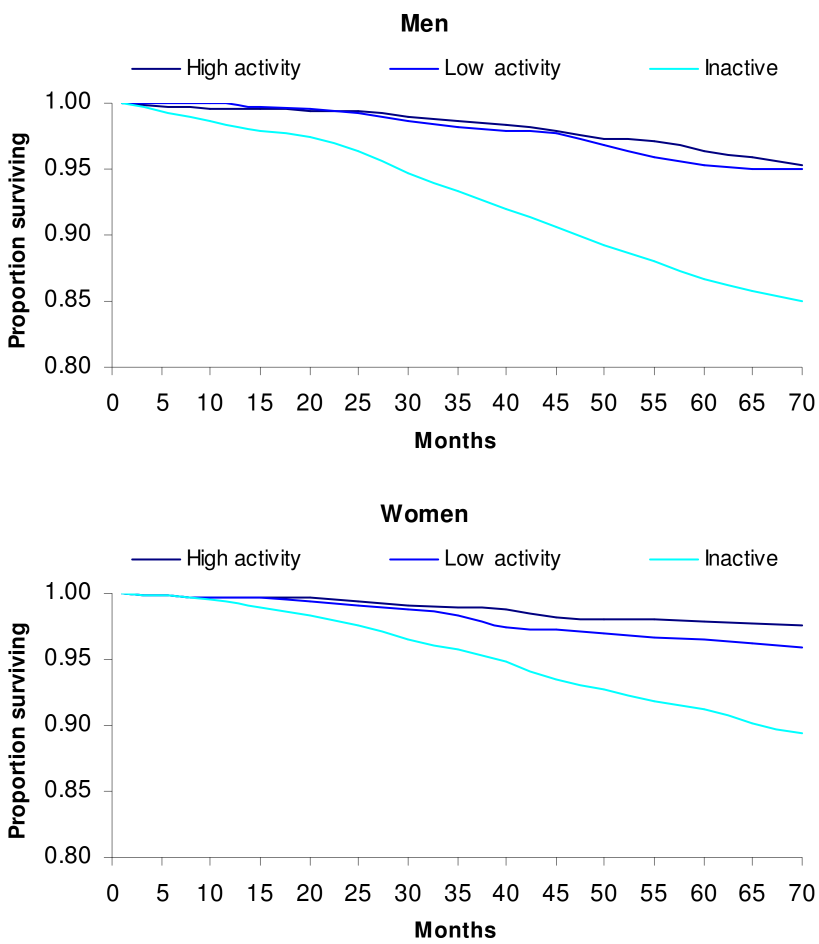




Analyses of the survival pattern by level of physical exercise (Figure 8.7) shows a clear difference between those who perform a 'high' amount of exercise, those who perform a 'low' amount and those who are 'inactive'. The last group is at a clear survival disadvantage in comparison with the other two, but, of course, they may have been physically inactive because of illness that commenced at, or prior to, ELSA wave 1.

As described earlier, the models shown in Figures 8.1 to 8.7 only adjust for age effects; none of the above analyses takes into account the possible associations between different factors. For example, socio-economic position is strongly related to smoking behaviour. A straightforward method for accounting for this is to include a range of competing explanations in a single analysis. To do this we constructed Cox proportional hazard models (Cox, 1972) to estimate the risk of mortality associated with each factor, while simultaneously adjusting for other factors. The model resulting from these analyses is shown in Table 8.4. In addition to the model shown here, sex-stratified models were constructed, but because the pattern of findings for variables other than sex was very similar for men and women, these models are not shown here.

Figure 8.7. Survival after wave 1, by sex and level of physical activity at wave 1



Results show that men have a markedly higher chance of dying compared with women (hazard ratio 1.83, 95% confidence interval [CI] 1.59–2.11). As expected the older cohorts have higher chances of dying, with risk increasing for each increasing five-year age band. Regarding marital status, those who are married have the lowest chance of dying, with the never-married having the highest risk (a hazard ratio relative to the married of 1.76, 95% CI 1.37–2.27), followed by the 'separated and divorced' and then the widowed.

Those who reported engaging in low-level physical activity appear to have had a higher chance of dying compared with those who engage in a high level of physical activity, but this difference is not statistically significant. However, those who report being 'inactive' have a two times greater risk of dying (hazard ratio 2.01, 95% CI 1.56–2.59) than those who engage in a high level of physical activity. Both current smokers and ex-smokers have an increased risk of dying compared with non-smokers, although this risk is greater for current smokers (hazard ratio 1.74, 95% CI 1.43–2.13) than ex-smokers (hazard ratio 1.2, 95% CI 1.02–1.4). The final behavioural factor considered in this model is drinking alcohol, and the analysis shows that drinking occasionally reduces the risk of mortality compared with never drinking alcohol (21% lower hazard), while drinking alcohol daily has a similar risk to never drinking.

Table 8.4. Odds for mortality after wave 1, by demographic, socio-economic and behavioural factors measured at wave 1: results from Cox non-proportional hazards model

Respondents in 2002–03 who gave consent for mortality record

	Hazard ratio	95% confidence interval	p-value
Sample size 10,393			
Females	1.00		
Males	1.83	1.59–2.11	<0.001
50–54	1.00		
55–59	2.09	1.29–3.38	<0.010
60–64	3.39	2.13–5.39	<0.001
65–69	5.21	3.34–8.12	<0.001
70–74	8.83	5.72–13.64	<0.001
75–79	13.23	8.55–20.47	<0.001
80–84	19.41	12.47–30.22	<0.001
85+	32.67	20.81–51.28	<0.001
Married	1.00		
Separated/Divorced	1.62	1.28–2.05	<0.001
Widowed	1.39	1.18–1.63	<0.001
Never married	1.76	1.37–2.27	<0.001
High physical activity	1.00		
Low physical activity	1.18	0.85–1.65	0.324
Inactive	2.01	1.56–2.59	<0.001
Never smoked	1.00		
Ex-smoker	1.20	1.02–1.40	<0.050
Current smoker	1.74	1.43–2.13	<0.001
Never drinks	1.00		
Drinks occasionally	0.79	0.67–0.92	<0.010
Drinks daily	0.96	0.81–1.13	0.627
5th quintile – highest wealth	1.00		
4th quintile	1.14	0.87–1.48	0.339
3rd quintile	1.30	1.00–1.69	<0.050
2nd quintile	1.59	1.24–2.05	<0.001
1st quintile – lowest wealth	1.70	1.32–2.20	<0.001
Degree	1.00		
Intermediate	1.00	0.74–1.34	0.995
No qualifications	0.95	0.70–1.30	0.765
Managerial and professional	1.00		
Intermediate	1.11	0.90–1.36	0.317
Routine and manual	1.20	0.99–1.44	0.066

The final three blocks of the table cover measures of socio-economic position. When these are included together in the model, only wealth has a significant relationship with mortality. There is an increasing risk of mortality with decreasing wealth, with those in the third wealth quintile having a 30% greater risk of mortality (hazard ratio of 1.3, 95% CI 1.00–1.69), those in the second having a 59% greater risk and those in the lowest wealth quintile having a 70% greater risk, all compared with the those in the richest wealth quintile. There are no differences in risk of mortality by educational qualifications, and the gradient is less clear when looking at hazard of dying by occupational classification (NSSEC). Although those in the routine and manual class have more chance of dying that those in the managerial and professional class, this finding is only statistically significant at a $p < 0.1$ level.

Thus, analysis of socio-economic factors in a multivariate model suggests that wealth is the key predictor of survival. There are two important possible explanations for this. First, it may be that wealth is a more accurate marker of socio-economic position at older ages. As described previously, both education and occupation (for those who are retired) represent a position earlier in the life course, and wealth may reflect more accurately both accumulated socio-economic position and the level of resources available to support consumption. Second, in so far as wealth represents accumulated socio-economic position, it may be partially the distal product of the other socio-economic measures (education and occupation) included in the model. So, in these analyses wealth quintiles will reflect, in part, early occupation, which, in part, will reflect earlier education. That is, both education and occupation can be considered to be causally prior to wealth in later life.

8.4 Seasonality of death

Seasonal mortality, especially excess winter mortality, has been an area of public concern and government policy interest. Indeed, there have been prominent stories on this issue in the media, with headlines such as ‘Cold weather’s 25,000 deaths toll is scandal, say charities’ (Carvel, 2006), ‘Cold kills “thousands” in a week’ (BBC, 2003), ‘Britain is a rich nation; its old people should not be dying of the cold’ (*The Independent*, 2003) and ‘Eight older people every hour die during winter in Britain’ (Age Concern, 2005). Such headlines are, in part, reflected in official statistics. The Office for National Statistics (ONS) estimated that in the winter of 2004–05 (December–March) there were around 31,600 more deaths in England and Wales compared with the average number of deaths in the non-winter period (August–November 2004, April–July 2005) (ONS, 2005). This number was higher than levels seen in the previous four years, and has declined since – in the winter of 2006–07 the ONS estimated the figure at 23,900 more deaths (ONS, 2007). Although the 2004–05 figure represents a recent peak, it was less than was seen during the winters of 1998–99 and 1999–2000, when there were 46,840 and 48,440 more deaths, respectively, compared with levels in the non-winter period (ONS, 2005; ONS, 2007). Aylin et al. (2001) have noted that in the UK the excess winter mortality figure has been around 40,000 deaths annually. Paradoxically, countries with relatively cold winter temperatures (for example, Sweden, Canada, Finland and Norway) experience consistently lower excess winter mortality than countries with warm or moderate climate (for example, Portugal, Spain, Italy and the UK) (Rau, 2007).

Explanations proposed for excess winter deaths are predominantly concerned with the effect of cold temperature on the human body, for example the possible effect of cold on the sympathetic nervous system leading to greater vulnerability to cardiac failure, or to increased risk of death from influenza. Interestingly, some have estimated that the influence of influenza on cold-related mortality in recent decades has been small. For example, Donaldson and Keatinge (2002) estimate that only 2.4% of all excess winter deaths during the 1990s occurred either directly or indirectly from influenza, although others have suggested that its role as an indirect cause has been underestimated, and have noted the correspondence between the 1998–2000 peaks in winter mortality and influenza epidemics (ONS, 2007). In fact, the direct causes of deaths that appear to be of importance in explaining the mortality increase in winter are cardiovascular, cerebrovascular and respiratory diseases. The latter group has the strongest seasonal pattern among all major groups of causes of death (Feinstein, 2002; Rau, 2007), but respiratory diseases are not a leading cause of death in Western developed countries (NCHS, 2002). About half of the cold-related mortality can be attributed to ischaemic heart disease and cerebrovascular disease (Van Rossum et al., 2001; Eurowinter Group, 1997).

Another explanation for excess winter mortality is the concentration of air pollutants that are emitted when heating homes during exceptionally cold spells. On the other hand, it is suggested that the spread of central heating is the main cause for the decline in winter mortality during recent decades (Aylin et al., 2001; Donaldson and Keatinge, 1997; McDowall, 1981; Keatinge, Coleshaw and Holmes, 1989).

Other factors influencing seasonal mortality are outdoor, as well as indoor, cold. It has been argued that 'warm housing is not enough' (Keatinge and Donaldson, 2001, p. 166) and that it is equally important to avoid exposure to outdoor cold, which has an impact that is independent of indoor cold (Eurowinter Group, 1997). While the most influential factor in this respect is adequate clothing worn outdoors (Donaldson, Rintamäki and Näyhä, 2001), increased car ownership has also probably influenced the decrease in winter mortality over time (Donaldson and Keatinge, 1997; Keatinge, Coleshaw and Holmes, 1989).

Surprisingly, there is not much literature on socio-economic determinants in the field of seasonal mortality when compared with more general studies of mortality. Factors such as income, deprivation, wealth, marital status, education and occupation could impact specifically on excess winter deaths, as could behavioural factors such as lack of exercise and smoking, but these have not been much investigated. Literature on the influence of nutrition on seasonal mortality is also sparse. It has been suggested that low vitamin C intake during winter may increase cardiovascular risk by raising fibrinogen levels in the blood (Khaw and Woodhouse, 1995). Similarly, there has been only limited investigation of the association between winter mortality and marital status and household structure, with the only published study not finding any significant association (Wilkinson et al., 2004).

Methods and data description

Data are used from those years where the whole sample is observed for the complete year. This means that 2002 and 2003 were not included, because wave 1 of ELSA was ongoing and respondents were still being recruited during these years, and 2008 was not included because we only have data for the very beginning of that year. So we include only deaths covering the period January 2004 to December 2007. We initially describe the incidence of death across the months of the year (aggregated across years). We then follow the generally accepted method of dividing deaths into those occurring in the 'winter' months of December to March and those occurring in April to November, to estimate excess winter mortality. Finally, data collected at wave 1 of ELSA are used to examine factors that may be associated with the excess winter mortality.

As described in Section 8.2, only deaths occurring to core wave 1 ELSA respondents who agreed to have their data linked to mortality records and did not withdraw that consent are included in this analysis. This gives a total of 860 deaths to analyse.

Results

Figure 8.8 shows the distribution of deaths by month of the year, for both men and women and covering the period 2004–07. For an even distribution of deaths, 8.3% would occur in each month, with values above this indicating that the month has a greater than expected number of deaths. The figure suggests a lower than average number of deaths in April, June, July, August and September, with an increase in deaths for the period October to March. There are a surprisingly high number of deaths in October (11.9% of the total, or 102 actual deaths), a finding which is consistently repeated across all four of the years observed and for which there is no obvious explanation – October is neither a cold month nor a particularly hot month.

Figure 8.8. Month of death over 2004–07

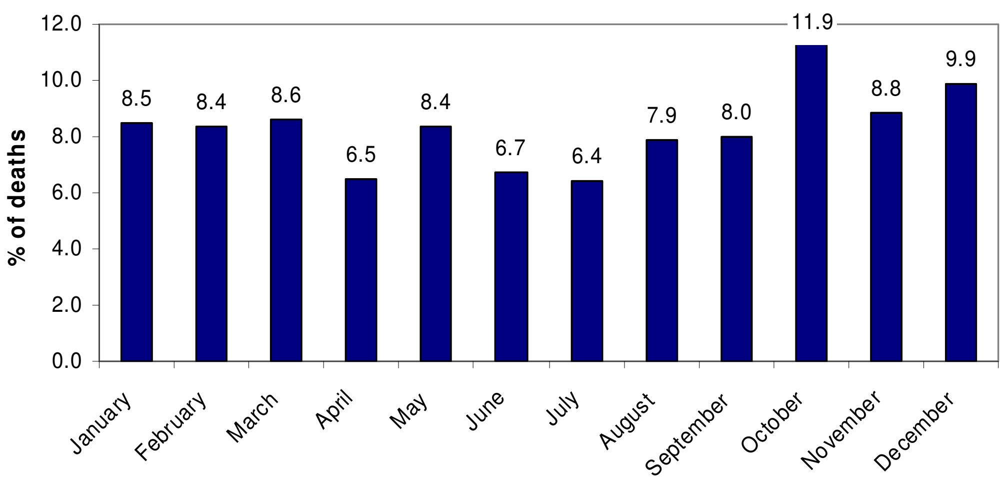


Table 8.5. Excess percentage of deaths occurring in the winter months December to March

Deaths in the period 2004–07, by selected wave 1 measures: respondents in 2002–03 who died after wave 1 and gave consent for mortality record

		October included in 'non-winter' months	
		Yes	No
Age	50–59	–2.3	0.3
	60–74	1.3	2.6
	75+	3.1	5.0
Cohabiting status	Living with partner	–2.7	–1.6
	Not living with partner	7.6	11.0
Central heating	Yes	1.8	3.3
	No	4.4	7.8
Cold, damp, water, decay or condensation in the house	No	2.2	3.6
	Yes	0.6	4.8
Wealth quintile	Richest	3.4	2.8
	4th	–6.7	–3.0
	3rd	0.0	–0.4
	2nd	3.1	4.3
	Poorest	5.9	9.0
Unweighted N			
Age	*50–59*	*71*	*60*
	60–74	*312*	*277*
	75+	*477*	*421*
Cohabiting status	*Living with partner*	*411*	*363*
	Not living with partner	*449*	*395*
Central heating	*Yes*	*766*	*679*
	No	*90*	*77*
Cold, damp, water, decay or condensation in the house	*No*	*757*	*673*
	Yes	*103*	*85*
Wealth quintile	*Richest*	*98*	*92*
	4th	*124*	*99*
	3rd	*150*	*139*
	2nd	*214*	*192*
	Poorest	*273*	*236*

Estimates of the excess number of deaths occurring during the winter months (December to March) depend on whether October is included as a non-winter month. Including October – so comparing December to March with April to November – shows that 35.3% of deaths, rather than 33.3% of deaths to be expected from an even distribution, occurred during the winter months. This gives an excess of 26 deaths over the four years observed, which is 3.0% of all deaths observed, or 8.5% of deaths occurring in winter months. If deaths occurring in October are excluded from the analysis completely, there is an excess of 45 deaths occurring during the winter months of December to March in the four years observed, which is 5.9% of the total deaths observed, or 14.7% of those deaths occurring in winter months.

We then examined how the proportion of deaths occurring in the winter months of December to March varied by a range of factors: age, cohabitation status, presence of central heating at home, housing conditions (the presence of one or more of cold, damp, water, decay or condensation in the house) and wealth quintile. Findings for this are shown in Table 8.5, again with the analysis including and excluding the unexpectedly large number of deaths occurring in October over the four years. The percentage of deaths is represented as an excess (or deficit) over (or below) the percentage of deaths in December to March that would be expected if deaths were evenly distributed throughout the year (which is 33.3% of deaths if October is included in the calculation, and 36.4% if October is not included).

Table 8.5 suggests a deficit or no excess of winter deaths for the youngest age group, and an excess of deaths for the oldest age. Those living with a partner show no excess or deficit, while those not living with a partner show a marked excess. Those without central heating show a greater excess of winter deaths than those with central heating, but housing conditions are not related to the excess of winter deaths. The pattern for wealth quintile is unclear. Those in the bottom two wealth quintiles have a greater excess of winter deaths than those in the third and fourth quintiles, but so do those in the richest quintile.

It is worth noting the bases in Table 8.5, which indicate that the number of deaths is small, particularly for some categories (younger respondents, those without central heating or with housing problems, and the richest quintile). This limits statistical power when analysing the data. Multivariate analyses, using the variables included in the table to predict winter rather than non-winter deaths, suggest that none of the findings described in Table 8.5 are statistically significant. This could be a consequence of limited statistical power, or a result of the inadequacies of broad measures to capture phenomena such as fuel poverty.

8.5 Healthy life expectancy

Life expectancy at birth has seen an unprecedented increase in the last 30 years, mostly as a result of improvements in mortality at older age (Kannisto et al., 1994; Vaupel, 1997). However, these improvements in mortality at older age have raised concerns about levels of dependence and disability for those who are surviving longer. The key question is whether people are surviving longer in good health, or in poor health. How far is the extension of life associated with an extension of the period spent in poor health and physical dependency, or is the period in poor health reducing alongside reductions in mortality rates, leading to a so-called compression of morbidity (Fries, 1980; Manton, Corder and Stallard, 1997; Manton and Gu, 2001)? Data recently published by ONS (2008), contrasting 2004 with 2001, suggest that over this period there has been an increase in healthy life expectancy (that is, period spent in good health) and disability-free life expectancy (in this case, period spent without a limiting long-standing illness) for older people, which goes along with an increase in life expectancy, a finding that is consistent with the work of Manton and colleagues suggesting compression of morbidity is occurring (Manton, Corder and Stallard, 1997; Manton and Gu, 2001).

This section of the chapter provides three estimates of life expectancy: healthy life expectancy, life expectancy without limiting illness and disability-free life expectancy. These definitions extend those used elsewhere (ONS, 2008), in the expectation that the use of three measures will allow us to contrast three dimensions of well-being at older ages: general health, the presence of a limiting illness and direct measures of difficulty performing tasks necessary for everyday living. The analyses use official life table information to calculate life expectancy, and combine this with information from ELSA wave 1 on the three measures of health we use here. Measures of the prevalence of health outcomes at a given age, combined with survival rates, yield estimates of survival with and without excellent or good health, limiting long-standing illness and disability. This allows us to estimate how much of any remaining life expectancy for each age group is with and without the measured health condition.

Methods and data description

In order to estimate life table functions, aggregate data on mortality rates in England and Wales for the year 2002 were used. These data were used as they correspond with the timing of the ELSA wave 1 data collection. Life table functions were calculated based on the data taken from the Human Mortality Database.

ELSA wave 1 data were used to provide the three measures of health. The general health measure was simply dichotomised into those reporting that they had excellent, very good or good health, contrasted with those who reported that they had fair or poor health. The limiting long-standing illness measure consisted of combined responses to a question asking about the presence of a long-standing illness and then whether the illness limited the respondent in any way. The measure of disability used self-reported information on activities of daily living (ADLs), instrumental activities of daily living (IADLs) and mobility difficulties in order to build a dichotomous disability index. An examination of the relationship between variables allowed us to exclude those that were insensitive measures of disability, leaving us with the following items:

- difficulty bathing or showering;
- difficulty getting in and out of bed;
- difficulty dressing, including putting on shoes and socks;
- difficulty eating, such as cutting up food;
- difficulty doing work around house and garden;
- difficulty taking medications;
- difficulty managing money, for example paying bills, keeping track of expenses;

- difficulty preparing a hot meal;
- difficulty shopping for groceries;
- difficulty walking across a room;
- difficulty using the toilet, including getting up or down;
- difficulty climbing one flight of stairs without resting; and
- difficulty walking 100 yards.

The internal consistency of this scale was very good (Cronbach alpha = 0.88). Principal component analysis (PCA) was then used to construct a single underlying factor score (which explained about 44% of the variance) that was, not surprisingly, heavily skewed. This variable was then dichotomised at the mean score to provide a disability variable.

Finally, the measures of self-reported health, limiting long-standing illness and disability were applied to the life table functions, and then used to calculate three measures of healthy/disability-free life expectancy following the Sullivan method (Sullivan, 1971; see Imai and Soneji [2007] for a recent validation of this method).

All the analyses were done for men and women separately by five-year age group and were weighted using the ELSA wave 1 weights. It is worth noting that the estimates of life expectancy and of health are based on current profiles; they do not anticipate future changes in mortality and morbidity. This means, of course, that they do not account for either future increases in life expectancy (for example, that current 50-year-olds will, when they reach 60, have a longer life expectancy than current 60-year-olds), nor changes in health (for example, that current 50-year-olds may, when they reach 60, have better or worse health than current 60-year-olds). In order to account for such changes between age cohorts, we need longitudinal data covering a longer period than the four years currently available from ELSA.

Results

Figures 8.9 to 8.11 show life expectancy with and without the health condition for men and women and five-year age groups. All figures show the greater life expectancy of women at all ages, and that with advancing age an increasing proportion of life is spent with the health condition (the ratio of the pale to the dark part of each bar). For example, according to the self-rated health measure (Figure 8.9), men aged 50 to 54 are estimated to spend 28% of their remaining life with fair or poor health, compared with 38% for men aged 75 to 79; and for women aged 50 to 54 and 75 to 79 the figures are 27% and 35%, respectively. For limiting long-standing illness the figures are 35% and 48% for men and 36% and 48% for women; and for disability the figures are 21% and 36% for men and 27% and 46% for women.

These figures also show that while women have a longer life expectancy, for two of the measures the proportion of their life estimated to be spent in fair or poor health, or with a limiting long-standing illness, is similar to that for men; while for the disability measure the proportion of remaining life spent disability free is estimated to be lower for women compared with men.

Figure 8.9. Life expectancy with excellent/good health (healthy life expectancy) and with fair/poor health

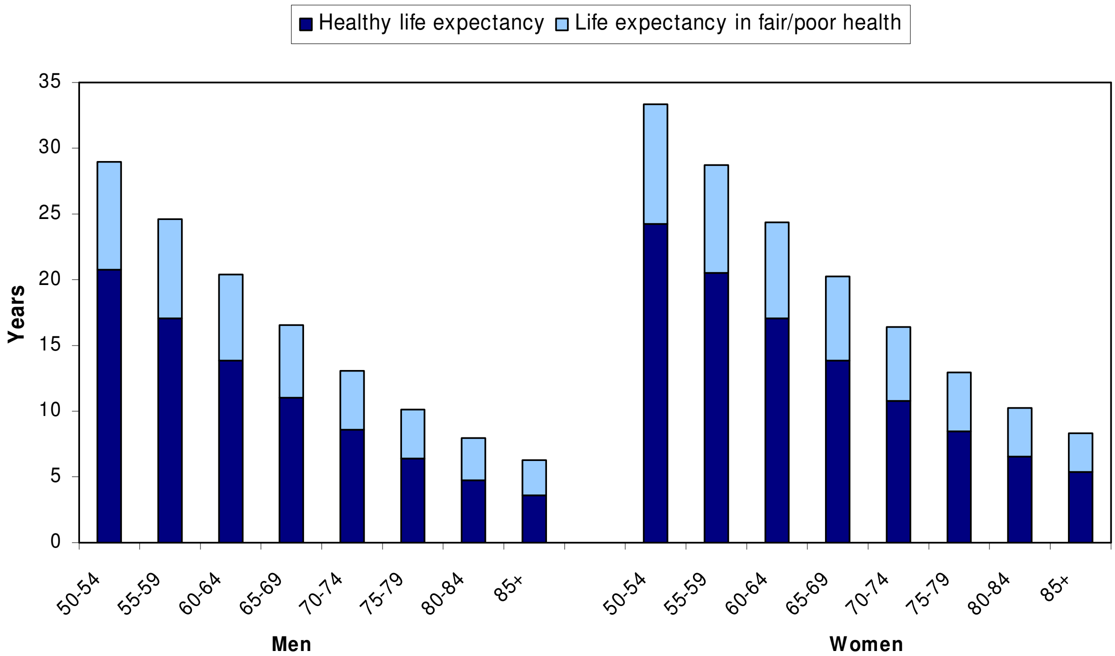


Figure 8.10. Life expectancy without and with limiting long-standing illness

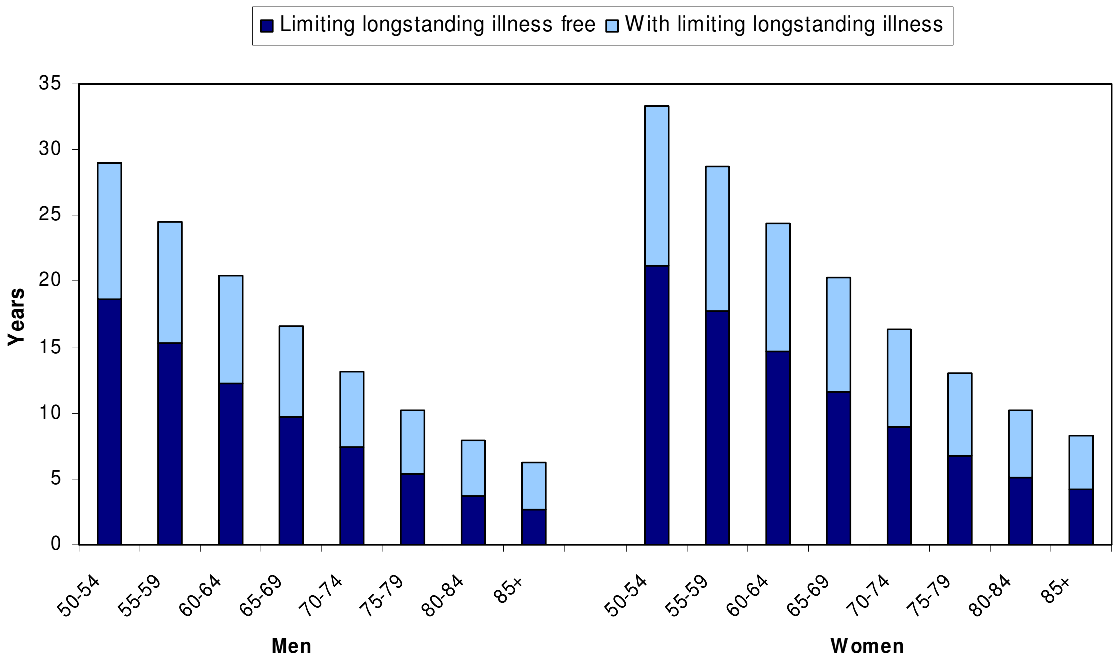
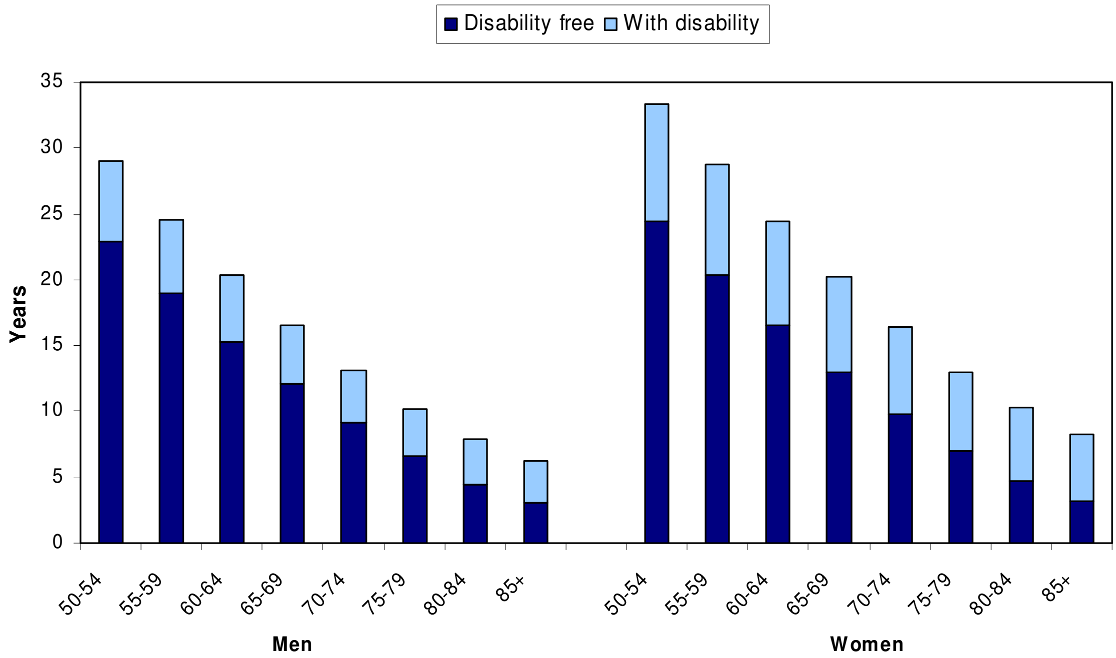


Figure 8.11. Life expectancy without and with disability



The figures also show that the three measures give different estimates of the number of years spent unwell or disabled. For example, men aged 50 to 54 are estimated to spend 8.2 years with fair or poor self-rated health, 10.3 years with a limiting long-standing illness and 6 years with a disability, while the figures for women are 9.1 years with fair or poor self-rated health, 12.1 years with a limiting long-standing illness and 8.9 years with a disability. This is not surprising, because they represent different concepts, with the general health measure perhaps reflecting broader well-being, the limiting long-standing illness measure perhaps reflecting the presence of disease requiring treatment, and disability being based on a direct measure of difficulty carrying out certain tasks and activities. As such, the three measures have varying implications for policy, with the disability measure perhaps being a more accurate assessment of social care needs, and the long-standing illness measure a more accurate assessment of clinical need.

8.6 Conclusions

In this chapter we have exploited the short-term potential of ELSA to examine factors relating to mortality at older ages and to estimate healthy life expectancy. The analyses we have conducted show the importance of socio-economic position for future mortality, illustrating the importance of the current policy focus on health inequalities. They also show the importance of lifestyle, although we need to be cautious when drawing conclusions about the strength of the causal relationship between behaviour and mortality when preceding health may be a driver of both behaviour change and subsequent mortality. The analysis of 'winter' deaths, another area for policy concern, confirms that the proportion of deaths occurring in the months December to

March is above average, with a significant proportion of deaths in these months attributable to a 'winter excess'. Analysis of the factors that might relate to this increased risk are no more than suggestive, because of limits to statistical power, but do raise the possibility that increasing age, not living with a spouse or partner and a lack of central heating in the home may all be important. Future waves of ELSA will enable a more thorough, and given the depth of the questionnaire coverage, unique examination of risk factors, including level of fuel poverty.

Although there is considerable potential to explore factors related to risk of mortality in the ELSA data, the cautions attached to the interpretations of findings (such as the strength of the relationship between health behaviours and risk of mortality, or the importance of wealth in predicting mortality risk in comparison with other indicators of socio-economic position) indicate the need to unpick carefully the complex processes that result in differences in risk of mortality across the population. The analyses presented here illustrate the need to consider, for example, the relationships between socio-economic position, health, health behaviours and mortality risk, and how these might vary across age groups. We also need to consider the other mechanisms through which socio-economic position might increase risk of mortality, for example psychosocial factors such as status, control and autonomy. And, of course, we need to consider the complex relationships between trajectories in different dimensions of socio-economics (education, employment, income, wealth and consumption), health, health behaviours and social life, and how these ultimately relate to risk of mortality. The ELSA data will, over time, provide the opportunity for such analyses as the sample ages. Nevertheless, at the moment we are able to demonstrate the significance of socio-economics to future mortality risk at even the oldest ages, with, for example, men and women aged 75 or older in the poorest wealth quintile being at almost twice the risk of mortality compared with their counterparts in the richest wealth quintile. This emphasises the need for policy around inequalities in health to consider such inequalities among the older population, as well as for children and adults of working age.

For the analysis of healthy life expectancy, we took advantage of the range of health markers available in the ELSA data. Most important here is that, in addition to measures based on self-rated general health and limiting long-standing illness, we were able to include an assessment of the respondent's ability to perform certain activities, giving a more direct assessment of level of disability. The three measures point to an increasing proportion of remaining life spent without good health with increasing age, but they also provide varying estimates of healthy, or disability-free, life expectancy, a finding that has important implications for the planning of health and social services. Again these analyses exploit the short-run potential of the ELSA data. The most important drawback of this short-run analysis is that estimates of life expectancy and health are treated as static across age cohorts. In the future, longitudinal data from ELSA will enable us to account for the possibility that levels of health, disability and (eventually) mortality will change across age cohorts – so, for example, that current 50-year-olds may not have the same level of health when they are 60 as current 60-year-olds. This will allow for much more accurate estimates of future healthy life expectancy.

Finally, it is worth noting that the analyses presented only cover those living in private households at the time of the wave 1 interview. Again, as the sample ages it will also become representative of those living in communal establishments, which is important for estimates of both mortality and healthy life expectancy.

Acknowledgements

James Nazroo's contribution to this chapter was supported by funding from the ESRC for the project 'Inequalities in health in an ageing population: patterns, causes and consequences' (RES-000-23-0590). We are grateful to our colleagues working on ELSA for their support when preparing this chapter and for useful comments on earlier drafts. We are also grateful for helpful suggestions provided by the consortium of government departments which part-funds ELSA.

References

Age Concern (2005), *Eight Older People every Hour Die during Winter in Britain* (http://www.ageconcern.org.uk/AgeConcern/6E014D9F8F0B4B569749D4035AC927A8.asp).

Aylin, P., Morris, S., Wakefield, J., Grossinho, A. Jarup, L. and Elliott, P. (2001), 'Temperature, housing, deprivation and their relationship to excess winter mortality in Great Britain, 1986–1996', *International Journal of Epidemiology*, vol. 30, pp. 1100–1108.

BBC (2003), *Cold Kills 'Thousands' in a Week* (http://news.bbc.co.uk/1/hi/uk/3342475.stm).

Beckett, M. (2000), 'Converging health inequalities in later life – an artifact of mortality selection?', *Journal of Health and Social Behaviour*, vol. 41, pp. 106–119

Bobak, M., Kristenson, H., Pikhart, H. and Marmot, M.G. (2004), 'The short life span in Russia is associated with high rates of disability. A comparison of Russian and Swedish community-based data', *British Medical Journal*, vol. 329, pp. 767–772.

Breeze, R., Sloggett, A. and Fletcher, A. (1999), 'Socioeconomic and demographic predictors of mortality and institutional residence among middle aged and older people: results from the longitudinal study', *Journal of Epidemiology and Community Health*, vol. 53, pp. 765–774.

Brunner, E.J., Shipley, M.J., Blane, D., Davey Smith, G. and Marmot, M.G. (1999), 'When does cardiovascular risk start? Past and present socioeconomic circumstances and risk factors in adulthood', *Journal of Epidemiology and Community Health*, vol. 53, pp. 757–764.

Carvel, J. (2006), 'Cold weather's 25,000 deaths toll is scandal, say charities', *The Guardian* (http://www.guardian.co.uk/society/2006/oct/28/health.medicineandhealth).

Cox, D.R. (1972), 'Regression models and life tables (with discussion)', *Journal of the Royal Statistical Society, Series B*, vol. 34, pp. 187–220.

Deaton, A.S. and Paxson, C.H. (1998), 'Aging and inequality in income and health', *American Economic Review*, vol. 88, pp. 248–253.

Department of Health (2005), *Tackling Health Inequalities: Status Report* (http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4117696).

Donaldson, G.C. and. Keatinge, W.R. (1997), 'Mortality related to cold weather in elderly people in southeast England, 1979–94', *British Medical Journal*, vol. 315, pp. 1055–1056.

Donaldson, G.C. and Keatinge, W.R. (2002), 'Excess winter mortality: influenza or cold stress? Observational study', *British Medical Journal*, vol. 324, pp. 89–90.

Donaldson, G.C., Rintamäki, H. and Näyhä, S. (2001), 'Outdoor clothing: its relationship to geography, climate, behaviour and cold-related mortality in Europe', *International Journal of Biometeorology*, vol. 45, pp. 45–51.

Duncan, D.O. (1961), 'Occupational components of educational differences in income', *Journal of American Statistical Association*, Dec., pp. 783–792.

Elo, I. and Preston, S. (1996), 'Educational differentials in mortality in the United States, 1979–1985', *Social Science and Medicine*, vol. 42, pp. 47–57.

Eurowinter Group (1997), 'Cold exposure and winter mortality from ischaemic heart disease, cerebrovascular disease, respiratory disease, and all causes in warm and cold regions of Europe', *Lancet*, vol. 349, pp. 1341–1346.

Feinstein, C.A. (2002), 'Seasonality of deaths in the US by age and cause', *Demographic Research*, vol. 6, pp. 469–486.

Fingerhut, L.A., Wilson, R.W. and Feldman, J.J. (1980), 'Health and disease in the United States', *Annual Review of Public Health,* vol. 1, pp. 1–36.

Fries, J.F. (1980), 'Ageing, natural death and the compression of morbidity', *New England Journal of Medicine*, vol. 303, pp. 130–135.

Gjonça, E. (2007), *Socioeconomic Determinants of Longevity in Denmark, England and Wales – A Comparative Study*, Odense: University Press of Southern Denmark.

House, J.S., Kessler, R.C. and Herzog, A.R. (1990), 'Age, socio-economic status and health', *The Milbank Quarterly*, vol. 68, pp. 383–411.

House, J.S., Lantz, P.M. and Herd, P. (2005), 'Continuity and change in the social stratification of aging and health over the life course: evidence from a nationally representative longitudinal study from 1986 to 2001/2002 (Americans' changing lives study)', *Journals of Gerontology*, vol. 60B, Special Issue II, pp. 15–26.

Hummer, R.A., Rogers, R.G. and Eberstein, I.W. (1998), 'Sociodemographic differentials in adult mortality: a review of analytic approaches', *Population and Development Review*, vol. 24, pp. 553–578.

Hurd, M.D. (1989), 'The economic status of the elderly', *Science*, vol. 244, pp. 659–664.

Imai, K. and Soneji, S. (2007), 'On the estimation of disability-free life expectancy: Sullivan's method and its extension', *Journal of the American Statistical Association*, vol. 102, pp. 1199–1211.

Independent (2003), 'Britain is a rich nation; its old people should not be dying of the cold', (http://www.independent.co.uk/opinion/leading-articles/britain-is-a-rich-nation-its-old-people-should-not-be-dying-of-the-cold-549145.html).

Kannisto, V., Lauritsen, J., Thatcher, R.A. and Vaupel, J.W. (1994), 'Reductions in mortality at advanced ages: several decades of evidence from 27 countries', *Population Development Review*, vol. 20, pp. 793–810.

Keatinge, W.R., Coleshaw, S.R.K. and Holmes, J. (1989), 'Changes in seasonal mortalities with improvement in home heating in England and Wales from 1964 to 1984', *International Journal of Biometeorology*, vol. 33, pp. 71–76.

Keatinge, W. and Donaldson, G. (2001), 'Winter deaths: warm housing is not enough', *British Medical Journal*, vol. 323, p. 166.

Khaw, K.T. and Woodhouse, P. (1995), 'Interrelation of vitamin C, infection, haemostatic factors, and cardiovascular disease', *British Medical Journal*, vol. 310, pp. 1559–1563.

Kitagawa, E. and Hauser, P. (1973), *Differential Mortality in the United States*: *A Study in Socioeconomic Epidemiology*, Cambridge, MA: Harvard University Press.

Manton, K., Corder, L. and Stallard, E. (1997), 'Chronic disability trends in elderly United States populations: 1982–1994', *Proceedings of National Academy of Sciences*, vol. 94, pp. 2593–2598.

Manton, K. and Gu, X. (2001), 'Changes in the prevalence of chronic disability in the United states black and non-black population above age 65 from 1982 to 1999', *Proceedings of National Academy of Sciences*, vol. 98, pp. 6354–6359.

Marmot, M. (2004), *Status Syndrome – How your Social Standing Directly Affects your Health and Life Expectancy*, London: Bloomsbury.

Marmot, M.G., Kogevinas, M. and Elston, M.A. (1987), 'Social/economic status and disease', *Annual Review of Public Health*, vol. 8, pp. 111–135.

Marmot, M.G., Shipley, M.J., Brunner, E.J. and Hemingway, H. (2000), 'Relative contribution of early life and adult socioeconomic factors to adult mortality in the Whitehall II study', *Journal of Epidemiology and Community Health*, vol. 55, pp. 301–307.

McDowall, M. (1981) 'Long term trends in seasonal mortality', *Population Trends*, vol. 26, pp. 16–19.

McMunn, A., Nazroo, J. and Breeze, E. (under review), 'Inequalities in health at older ages: a longitudinal investigation of onset of illness and survival effects in England'.

Mishra, G.D., Ball, K., Dobson, A.J. and Byles, J.E. (2004), 'Do socioeconomic gradients in women's health widen over time and with age?', *Social Science and Medicine*, vol. 58, pp. 1585–1595.

National Center for Health Statistics (NCHS) (2002), 'Table 1: deaths, percent of total deaths, and death rates for the 10 leading causes of death in selected age groups, by race and sex: United States, 2000', *National Vital Statistics Report*, vol. 50, pp. 13–48 (http://www.cdc.gov/nchs/fastats/pdf/nvsr50_16t1.pdf).

Office for National Statistics (ONS) (2005), *Excess Winter Deaths Highest for Five Years* (http://www.statistics.gov.uk/pdfdir/deaths1005.pdf).

Office for National Statistics (ONS) (2007), *Winter Mortality: Excess Winter Mortality Falls* (http://212.58.231.22/cci/nugget.asp?id=574).

Office for National Statistics (ONS) (2008), 'Health expectancies in the UK, 2004', *Health Statistics Quarterly*, vol. 37, pp. 48–51.

Preston, S.H. and Elo, I.T. (1995) 'Are educational differentials in mortality increasing in the United States?', *Journal of Aging and Health*, vol. 74, pp. 476–496.

Preston, S.H., Himes, C. and Eggers, M. (1989), 'Demographic conditions responsible for people ageing', *Demography*, vol. 26, pp. 691–704.

Preston, S.H. and Taubman, P. (1994), 'Socio-economic differences in adult mortality and health status', in L.G. Martin and J.H. Preston (eds), *Demography of Aging*, Washington DC: National Academy Press, pp. 279–318.

Rau, R. (2007), *Seasonality in Human Mortality. A Demographic Approach*, Heidelberg: Springer.

Smith, J.P. (1998), 'Socioeconomic status and health', *American Economic Review*, vol. 88, pp. 192–196.

Smith, J.P. and Kington, R. (1997), 'Demographic and economic correlates of health in old age', *Demography*, vol. 34, pp. 159–170.

Sullivan, D. (1971), 'A single index of mortality and morbidity', *Health Services and Mental Health Administration Health Reports*, vol. 86, pp. 347–354.

Van Rossum, C.T.M., Shipley, M.J., Hemingway, H., Diederick, G., Mackenbach, J.P. and Marmot, M.G. (2001), 'Seasonal variation in cause-specific mortality: are there high-risk groups? 25-year follow-up of civil servants from the first Whitehall study', *International Journal of Epidemiology*, vol. 30, pp. 1109–1116.

Vaupel, J.W. (1997), 'The remarkable improvements in survival at older ages', *Philosophical Transactions of the Royal Society of London – Series B: Biological Sciences*, vol. 352, pp. 1799–1804.

Wilkinson, P., Pattenden, S., Armstrong, B., Fletcher, A., Kovats, R.S., Mangtani, P. and McMichael, A.J. (2004), 'Vulnerability to winter mortality in elderly people in Britain: population based study', *British Medical Journal*, vol. 329, pp. 647–650.

Williams, D.R. (1990), 'Socio-economic differentials in health: a review and redirection', *Social Psychology Quarterly*, vol. 53, pp. 81–99.

Winkleby, M.A., Jatulis, D.A., Frank, E. and Fortmann, S.P. (1992), 'Socioeconomic status and health: how education, income and occupation contribute to risk factors for cardiovascular disease', *American Journal of Public Health*, vol. 82, pp. 816–820.

9. Methodology

Shaun Scholes *National Centre for Social Research*

Kate Cox *National Centre for Social Research*

Carli Lessof *National Centre for Social Research*

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

A summary of the chapter shows the following:

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

9.1 Sample design

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

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

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

---

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

9.2 Development of the wave 3 interview

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

Structure and content of the wave 3 interview

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

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

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

Box 9.3. Content of the ELSA interview at wave 3

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Life history interview

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

9.3 Fieldwork

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

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

9.4 Survey response

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

Response to main interview

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

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

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

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

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

Respondents in 2006–07, including proxies

	Number of respondents
Core member[a]	7,535
Core partner[b]	89
Younger partner	312
New partner	102
Unweighted N	*8,038*

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

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

Core member respondents in 2006–07

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

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

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

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

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

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

Table 9.4. Respondents, by sample type (Cohort 3)

Respondents in 2006–07, including proxies

	Number of respondents
Core member[a]	1,276
Younger partner	294
Older partner	142
New partner	21
Unweighted N	*1,733*

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

Response rates

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

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

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

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

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

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

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

Eligible core members but non-respondents in 2006–07

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

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

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

Non-respondents in 2006–07

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

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

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

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

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

Response to key sections

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

Table 9.7. Response rates to key modules

Respondents in 2006–07, self-completion excludes proxies

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

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

Profile of main interview respondents

Cohort 1

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

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

Table 9.8. Achieved sample of core members (Cohort 1), by age in 2006–07 and sex

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

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

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

Eligible core members in 2006–07

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

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

Eligible core members in 2006–07

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

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

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

Cohort 3

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

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

Respondents in 2006–07, including proxies

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

Profile of proxy respondents

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

Table 9.12. Proxy respondent sample (Cohort 1), by age in 2006–07 and sex

Proxy respondents in 2006–07, excluding those in institutions

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

9.5 Implications for analyses: weighting

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

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

Longitudinal analysis

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

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

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

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

[6] A more technical description of the weighting strategies can be found in the User Guide accompanying the wave 3 data.

Table 9.13. Comparison of wave 1 and wave 3 achieved samples of core members (Cohort 1), by age in 2002–03 and sex

Core member respondents in all three ELSA waves

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

Notes: [a]Weighted by the wave 1 weight. [b]Weighted by the wave 3 weight.

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

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

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

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

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

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

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

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

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

Core member respondents at each wave

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

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

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

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

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

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

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

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

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

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

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

Cross-sectional analysis

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

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

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

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

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

Cross-sectional weight for Cohort 1

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

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

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

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

Using the techniques of calibration weighting we calculated weighting factors that, when applied to the *combined* Cohort 1 sample, give estimates for the survey that match the profile of (weighted) core members who have taken part in all three waves on these five socio-demographic characteristics.

Cross-sectional weight for Cohort 3

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

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

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

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

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

Putting the cross-sectional weights together

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

[9] Age is defined here as age at 1 March 2006, immediately prior to the beginning of wave 3 fieldwork.

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

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

Table 9.15. Household population estimates

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

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

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

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

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

9.6 Response across the waves

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

Table 9.17. Components of longitudinal response rates for core members

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

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

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

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

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

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

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

At the other end of the spectrum, we can account for all losses of individuals since interviewers began to identify respondents for the HSE surveys in 1998, 1999 and 2001. A consideration of this kind provides a better indication of how representative the sample is of the population, since it measures the dropout at *every* stage from the origin of the sample at HSE (which we term wave 0) through to the wave 3 interview. On the other hand, it could be construed as unreasonable because it makes no allowance for the very large number of individuals who were ineligible for the study and could never have been interviewed (e.g., persons living in non-co-operating households at wave 0 were discarded from the wave 1 sampling frame as there was no available information about residents that would have made it possible to identify those who were born on or before 29 February 1952).

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

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

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

9.7 Conclusions

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

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

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

References

Belli, R.F., Lee, E.H., Stafford, F.P. and Chou, C. (2004), 'Calendar and question-list survey methods: association between interviewer behaviours and data quality', *Journal of Official Statistics*, vol. 20, no. 2, pp. 185–218.

Cheshire, H., Cox K., Lessof, C. and Taylor, R. (2006), 'Methodology', in J. Banks, E. Breeze, C. Lessof and J. Nazroo (eds), *Retirement, Health and Relationships of the Older Population in England: The 2004 English Longitudinal Study of Ageing*, London: Institute for Fiscal Studies.

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

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

Lepkowski, J.M. (1989) 'Treatment of wave nonresponse in panel surveys', in D. Kasprzyk, G. Duncan, G. Kalton and M.P. Singh (eds), *Panel Surveys*, New York: John Wiley & Sons, pp. 348–374.

Lynn, P., Purdon, S., Hedges, B. and McAleese, I. (1994), *The Youth Cohort Study: An Assessment of Alternative Weighting Strategies and their Effects*, Employment Department Research Series YCS Report no. 30.

Marmot, M., Banks, J., Blundell, R., Lessof, C. and Nazroo, J. (eds) (2003), *Health, Wealth and Lifestyles of the Older Population in England: The 2002 English Longitudinal Study of Ageing*, London: Institute for Fiscal Studies (http://www.ifs.org.uk/elsa/report_wave1.php).

Prior, G., Deverill, C., Malbut, K. and Primatesta, P. (eds) (2003), *Health Survey for England. The Health of Minority Ethnic Groups 2001, Vol. 2: Methodology and Documentation*, London: The Stationery Office.

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

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

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

Taylor, R., Conway, L., Calderwood, L. and Lessof, C. (2003), 'Methodology', in M. Marmot, J. Banks, R. Blundell, C. Lessof and J. Nazroo (eds), *Health, Wealth and Lifestyles of the Older Population in England: The 2002 English Longitudinal Study of Ageing*, London: Institute for Fiscal Studies (December 2003).

Vandecasteele, L. and Debels, A. (2007), 'Attrition in panel data: the effectiveness of weighting', *European Sociological Review*, vol. 23, no. 1, pp. 81–97.