Health inequalities among older people in Great Britain

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Abstract

This thesis aims to describe health inequalities among older people in Britain in the 1980s and 1990s and to assess whether various personal circumstances and experiences contribute towards this variation. Three sources of data are used: the Longitudinal Study; the first Whitehall cohort of male civil servants; and baseline quality of life information from the MRC Trial of the Assessment and Management of Older People in the Community (MRC Study). Housing tenure, car availability, and employment grade are the main socioeconomic measures used, but also social class and income.

Findings: People disadvantaged in mid-life socioeconomic circumstances continue to experience increased risks of mortality, insitutionalisation, poor self-reported health and functioning 20-30 years later. Smoking and cardio-respiratory factors in middle age partially accounted for the differentials found in the Whitehall Study. The MRC Study revealed worse prospects for five dimensions of health-related quality of life among people in rented homes compared to owner-occupied ones, even among those who were deemed independent. Symptoms of ill health, and health behaviours accounted for over 40% of the housing tenure differentials in quality of life among these independent people. Being in a deprived or densely-populated area was not as strong a discriminator of quality of life as personal housing-tenure. Finally, people whose socioeconomic circumstances become worse in late middle age have greater risks of poor health outcomes than those who stay advantaged. The findings on benefits of improvements in socioeconomic circumstances are more mixed and complicated by ill health leading to apparent upward socioeconomic mobility.

Conclusions: The three studies provide evidence of both long-term implications of socioeconomic position in mid-life and continuing relevance of socioeconomic position in old age. Although personal factors and health symptoms contribute to health inequalities in old age they are also seen as a possible product of socioeconomic position.

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Abbreviations used

BCM	Body care and movement scale of SIP
BRHS	British Regional Heart Study
CI	Confidence interval
CTSU	Clinical Trial Service Unit, Oxford University
EB	Elizabeth Breeze
ED	Enumeration District
EPESE	Epidemiologic Studies of the Elderly (USA)
GHS	General Household Survey
GP	General Practice or General Practitioner
HM	Home management scale of SIP
ICT	Information and Communication Technology Task Force
LS	Longitudinal Study
LSHTM	London School of Hygiene and Tropical Medicine
MOB	Mobility scale of SIP
MRC	Medical Research Council
NHANES	National Health and Nutrition Examination Survey (USA)
NHEFS	NHANES follow-up survey(USA)
NHIS	National Health Interview Survey (USA)
NHS	National Health Service (UK)
NHSCR	National Health Service Central Register
OR	Odds ratio
PGMS	Philadelphia Geriatric Morale Scale
RR	Risk ratio
s.e.p.	Socioeconomic position
SEC	Socioeconomic classification (Government 2001 classification)
SI	Social interaction scale of SIP
SIP	Sickness Impact Profile
SMR	Standardised mortality ratio
SSRU	Social Survey Research Unit, City University
UCL	University College London
UK	United Kingdom
USA	United States of America

Preface

I am indebted to my supervisor, Professor Astrid Fletcher, first for providing me the opportunity to work at the London School of Hygiene and Tropical Medicine and then for the opportunity to study for a PhD. She has been an invaluable source of guidance and support throughout. The contributions of several colleagues are acknowledged in my descriptions of sources and methods. I could not have done the work without the support of my husband who tolerated the long hours and looked after me. My mother has both encouraged me and been a superb example of how to age well. The possibility of retaining an active life is brought home to me by relatives and friends who, in their seventies and eighties, still work, play an active part as grandparent, play in orchestras, travel, do voluntary work, and much more. However, I have also known those who have been less fortunate and detected difficult times from questionnaires and death certificates pertaining to the studies I have worked on. I have for a long time been interested in health inequalities and am grateful for the chance to carry out research about their existence among older people. Finally, my thanks to all the people who contributed the data that I have used in this thesis.

1 Introduction and rationale

Why study health inequalities in old age?

Lily

"Lily lives in a one bedroomed modern bungalow in a charitable housing complex for older people. She is 74 years of age, ... [has] bad legs due to varicose veins, arthritis in her right hip ... going across into her spine, and a Parkinson's tremor. " These cause her considerable pain and severely limit her mobility. Lily, of working class background, attributes her ill health to stress (mainly an unhappy marriage) and now only one of her four children is within easy reach of her. "Lily tries to remain cheerful" but says "'Sometimes I have a little weep, on the quiet, nobody ever sees it'".[1]

1.1 *The ageing population*

By the time people reach old age, it might be considered too late to act concerning health inequalities. Indeed, most of the emphasis of research and policy on health inequalities has been, and will be, on early childhood and working age people. However, the growing numbers and percentages of older people mean that policies to cater for older age are no longer a minor consideration in budgeting. In 1999 15.7% of people in Great Britain were aged 65 years and over (9.3 million) and 7.4% (4.4 million) aged 75 years and over .[2] By 2020 there will be as many people aged 60 years and over as there are in their twenties and thirties.[3] The size of the actual and potential demand for services from older people in part forces Governments to consider policies relating to this age group. At the time of the Sutherland Commission in 1999 it was estimated that "2.2% of taxes from earnings, pensions and investments is spent on long-term care in residential settings and in people's homes.".[4] In the National Service Framework it was stated: "at any one time, older people occupy around two-thirds of hospital beds.".[5]

There is a greater will than ever before to develop technologies to help older people live independently in their homes, to improve treatments for degenerative conditions,

and to extend health promotion to older age groups. One negative spin-off of this could be greater health inequalities. It is well known that health promotion messages are often picked up first by people with higher education or the resources to buy into the way of life.[6] The Foresight Taskforce on applications of information and communication technology (ICT) advocated that people with functional impairments could use new technology to enhance their lives [7] but there is always a likelihood that it is those who already have privileges who benefit from the latest developments.

Awareness of the ageing population has encouraged governments to turn their attention to health and social care needs of older people. In 1999 The Royal Commission on Long-term Care[5] made controversial recommendations on state funding of both personal and health care – but the Government decided to limit this to health care.[8] Efforts at integrating health and social services have often failed. Resource allocation problems sometimes lead to age-based rationing, whether explicitly advocated or not .[9;10] The need for rationing is challenged [11] but the issue has not gone away. As a result, although treatments such as cataract operations and hip replacements can make a substantial difference to older people's lives, they are not always provided to meet need.[11] The 2001 National Service Framework for Older People was the first Government document to state the aim " to ensure that older people are never unfairly discriminated against in accessing NHS or social care services as a result of their age.".[5] However, it will not be easy to provide the extra attention to older people as GPs and others already feel overloaded[12] and a recent Help the Aged report reminds us that there is still substantial age discrimination.[13]

The following paragraphs show that people aged 65 years and over in Britain are not homogeneous. Where there are variations in socioeconomic circumstances there is scope for variations in health by socioeconomic group.

1.1.1 Demographic factors

Of those aged 65 years and over in England and Wales, 58% are women. About 60% of this age group are 'young old', i.e. age 65-74 years, just over 30% 75-84 years, and only 8% aged 85 years and over. Among women the equivalent percentages are just under 50%, 36%, and 15%. There were four times as many widowed women as

men because nearly half of the women were widowed and only 17% of the men. On the other hand, the majority of men (71%) were married compared with 40% of women, such that there were 27% more married men than married women aged 65 years and over.[2] Of those not in institutions, about a quarter of men and nearly half of women live alone.[14]

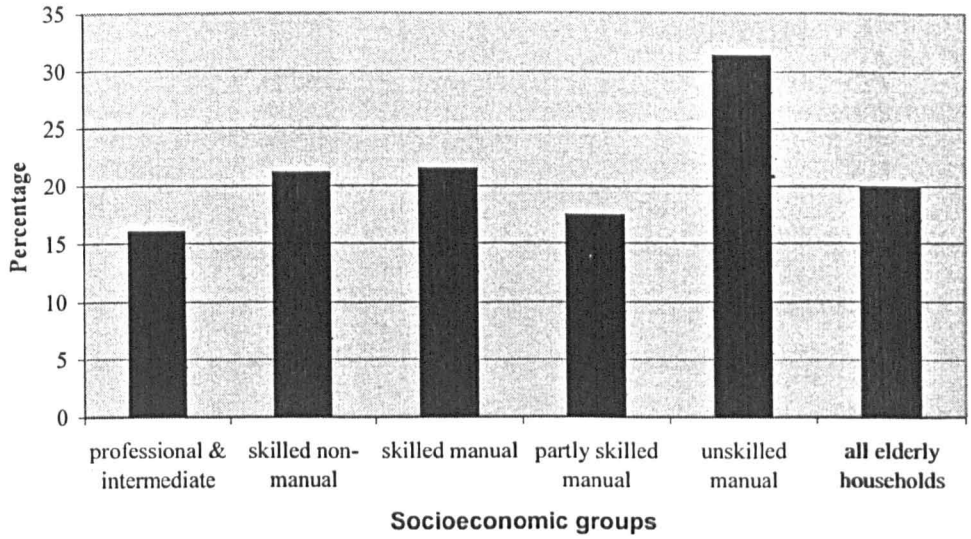
1.1.2 Housing

In 1991, 61.3% of people aged 65 years and over were in owner-occupation and 31.7% in local authority or housing association property compared with 69.8% and 22.4% of people of all ages, respectively .[15;16] The percentages of women in owner-occupation are smaller than for men (28.8% against 33.7%). These figures exclude people in institutions. Small percentages of people live in long-stay care institutions below the age of 85 years (1% of those aged 65-74 and 5% of those aged 75-84) but one in five people aged 85 years and over live in them.[17] Since the 1970s sheltered housing has become an important means of providing homes for people who feel they need some support. By 1998, 11% of people aged 75-84 years, and one in five people aged 85 years and over were in sheltered homes.[17] Now, a substantial proportion of sheltered homes for rent are provided by housing associations and private companies also sell purpose-built homes with services for older people.

Older people are disproportionately likely to have poor housing conditions. In 1996 one in five households in England that included someone aged 75 years and over (some 477000 households) were in poor housing[i] compared with 14% of all households .[18] This masks variation by socioeconomic group (Figure 1.1.1) and by housing tenure (Figure 1.1.2). There is a sub-group of owner-occupiers with homes in poor condition because they find it difficult to cope with management and maintenance of the property. Poverty among very old owner-occupiers, especially widowed women is not uncommon. Among owner-occupying households containing someone of age 85 years or more, 30% are in poor housing .[18]

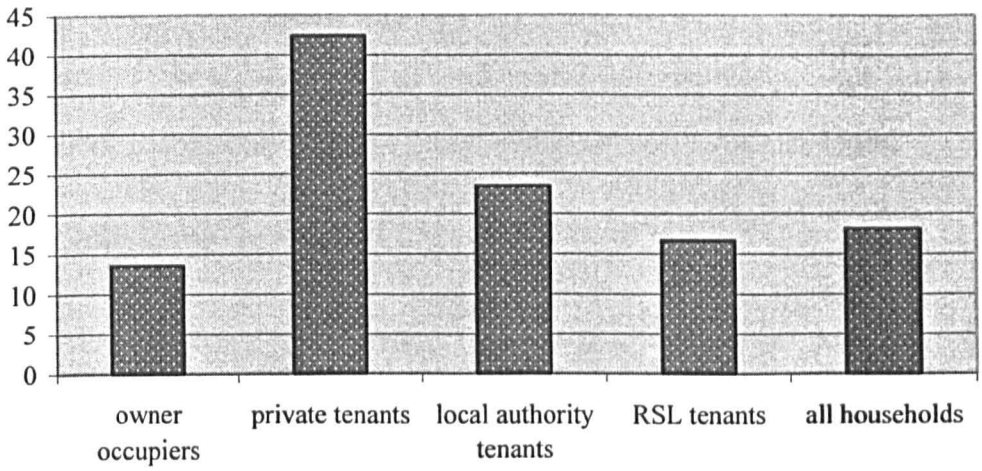
[i] Poor housing is defined as either statutorily unfit for habitation or requiring urgent repair amounting to at least £48 per square metre to bring it to a satisfactory condition or requiring essential modernization, e.g. it has a kitchen over 30 years old.

Figure 1.1.1.Percentage in poor housing by socioeconomic group of household (people aged 75 years and over)



Source DETR 1998. Survey of English Housing Conditions 1996. Table A7.31[18]

Figure 1.1.2. Percentage in poor housing by housing tenure (all ages)



Source DETR 1998. Survey of English Housing Conditions 1996. Table A7.37[18]

1.1.3 Income

In 1997-8 the average weekly income for a pensioner couple was £226 net if the man was aged 75 years or over and £274 net if he was below age 75 years. Pensioners living on their own received on average £132 net per week. Many pensioners were heavily reliant on state benefits (which accounted for half or more of the income of 71% of pensioner households) but many of those who were entitled to benefits such as Income Support or Housing Benefit or Council Tax Benefit did not claim them.[17]

In 1998/9, 56% of pensioners were in households in the bottom 40% of the household income distribution [19] and 23% had less than 50% of the mean income, rising to 28% of those aged over 80 years. However, the proportion below the 50% threshold was similar whether or not the pensioner was disabled and whether or not s/he was single or in a couple[ii].[19]

The previous paragraph illustrates that older people comprise a disproportionately large proportion of the low-income group. In addition to that, inequality in income has increased during the 1980s and 1990s within a context of growing average real income for pensioners. Most of the people included in the studies used in this thesis have been pensioners throughout this period. Those on the lowest fifth of pensioner incomes have not shared in the growth that those in the top three-fifths have enjoyed.[19] The better off can supplement their state benefits. Half of those in the bottom fifth of income do not receive any occupational pension compared with a quarter overall [19]; only about a tenth of those in the bottom quintile have investment income compared to around two-fifths of those in the top quintile. The poorest even lost out on state benefits because they did not qualify for the full state pension in 1991/1992 and the redistributive effect of state benefits was negligible .[19]

1.1.4 Mortality

Death rates continue to be greater for men than women in old age. Although the absolute difference in death rates between men and women is greater at older ages the ratio becomes closer to 1.0 (see Table 1A below).[2]

[ii] The household income used for comparison is equivalised to adjust for household composition.

Table 1A. Death rates by gender and age. England and Wales 1999

Deaths per 1000 population per annum. 1999 estimates[1]	Age (years) 65-69	70-74	75-79	80-84	85 and over
Men	23.9	40.6	66.3	108.1	187.9
Women	14.1	24.9	41.8	72.3	154.8
Difference	9.8	15.7	24.5	35.8	33.1
Ratio (women: men)	0.59	0.61	0.63	0.67	0.82

1. Source National Statistics 2001. Table 1[2]

Circulatory diseases are the most common cause of death for men and women (41% of deaths of both men and women aged 65 years and over). Deaths are more often attributed to malignant neoplasms than to respiratory diseases among men (26% compared to 19%) but the two causes both account for 19-20% of deaths for women.[2]

1.1.5 Self-reported Morbidity

Although women live longer, they are more likely to have impairments. Results from the MRC Cognitive Functioning and Aging Study found, for example, that 27% of women and 14% of men aged 80-84 years had two or three of functional impairment, cognitive impairment and self-reported physical illness. Among the 85-89 year age group the percentages were 42% and 26%.[20]

Some of the self-report measures show high levels of problems. In the 1991 Census, 45.7% of non-institutionalised people aged 75-84 years and 62.2% of people aged 85 years and over reported a limiting long-term illness (the question specifically asked them to include problems due to old age).[21] Over half of the household population reporting a limiting long-term illness was of pensionable age [15] compared with 18% of the total household population .[16] Nearly all those in an institution had a limiting long-term illness.[16]

Many of the statistics of health among older people that were available at the start of this thesis came from the General Household Survey (GHS). Among people in the community there is a sharp increase in the percentages needing help for locomotion

or self-care tasks with higher age. Whereas 8% of women and 5% of men aged 65-74 years needed help on at least one such task[iii], the equivalent percentages for people aged 75 years and over were 26% and 17%.[22]

1.2 *Why health inequalities should be looked at*

The health inequalities of concern to this thesis are "differences in prevalence or incidence of health problems between individual people of higher and lower socioeconomic status".[23] The purpose of identifying health inequalities is to open the way for consideration of how they can be reduced. Woodward and Kawachi[24] summarise four arguments for reducing health inequalities: inequalities are unfair (moral argument); they affect everyone (self-interest argument); they are avoidable; and they can be reduced cost-effectively. Older people were chosen for study because they are still relatively under-researched and there are many reasons for investing in their welfare: humanitarian; personal (we may benefit from improved conditions ourselves); benefits to society from extending and enhancing the usefulness of the last years; benefits to society of reducing the burden of ill health in the last years. Vincent attributed negative stereotyping of old age to 'structured dependency' in which age per se has become a criterion of certain expectations about, and by, older people – e.g. society expects people to stop work at a certain age. Echoing current research in social epidemiology, he saw the position of the older generations at any time as a product of their cumulative life courses; in any life course the individual and the networks, groups, generations and cohorts to which s/he belongs are interconnected .[25] Many researchers remark on the variability in health, fitness, and wellbeing of people in their 70s and beyond[26;27], and that some people move from disabled to able state even in old age.[28-30] Declining mean levels of physical function with age conceal a wide variety of individual trajectories.[31] A motivation for research into health inequalities is the knowledge that health problems are not automatic companions of old age.

[iii] Locomotion tasks were: going out of doors and walking down the road; getting up and down stairs and steps; getting around the house on the level; getting to the toilet; getting in and out of bed; getting in and out of a chair. Self-care tasks were: washing all over; dressing and undressing; washing face and hands; feeding self.

1.2.1 The potential for income inequality and society's responsibility

The wealth and income distribution of pensioners has been widening (See Section 1.1.3). The increasing proportion of older people and number of post-earning years per person means that neither Government nor Employers will fund decent pensions for all; people are expected to provide some of their pension for themselves. The Private Sector does not see its role as wealth distribution [32] so low earners are reliant on the State. The income diversity gives scope for substantial health inequalities.

There are two premises behind the belief that society has some responsibility for dealing with health inequalities. First, people do not usually choose relative disadvantage with respect to education, income, housing and other aspects of living conditions. Second these living conditions influence health. The Netherlands have taken a strong lead in advocating that society has a responsibility to provide the conditions within which an individual has the chance to look after their health if (s)he wishes.[33] Where possible we should seek the removal of society-wide barriers to good health, such as lack of material or educational resources, or find ways of compensating for these. One specific implication of this, picked out as "crucial" by Acheson and his Scientific Advisory Group is that "all policies likely to have an impact on health should be evaluated in terms of their impact on health inequalities".[34]

1.3 *Concern with health inequalities among older people in Britain*

There has been little official interest in health inequalities among older people until recently. The Black report contained five mentions of older generations. Amongst these was a comment that the relation between income and capacity to protect health is stronger in old age .[35] The Census had been used to produce decennial supplements on occupational mortality but the post-1991 Supplement [36] was an advance on others in including social classifications other than social class and also including morbidity. Thus, the alternative social classifications of housing tenure and car access, pioneered for this purpose by Fox et al[37] using the LS, were used to make socioeconomic mortality comparisons among people of pensionable age.[38] Morbidity

information relied on sample surveys to provide some analyses of differences across groups defined by the socioeconomic group of the Head of Household.[39] The Acheson Report on health inequalities [34] had a section on older people and hence the Government's response did also, with promises to improve pensions, to consider the Sutherland report on funding long-term care and the promise of the National Framework.[40] The Department of Social Security (now of Work and Pensions) reports on changes in distributions of income among people of pensionable age[19] and the Department of Trade and Industry has a Fuel Poverty programme for which the elderly are seen as one of the main beneficiary groups[41]. Laudably, The National Framework[5] sets out provision to cater for different religious and ethnic groups; however, it lacks special mention of differences between socioeconomic groups. There is still insufficient attention to this topic[42] and there is still much work to be done to see whether any effects of socioeconomic disadvantage on health that are experienced specifically in old age can be removed at late stages in life.

The data sources for looking at health inequalities among older people are limited. The LS and the Government's General Household Survey (GHS) have been the main sources of information. In the early 1980s there were around 4500 people aged 65 years and over in any one year of the GHS but reductions in sample size took place and in the early 1990s the numbers were down to 2500. The surveys are cross-sectional but cover a range of topics enabling linkage of socioeconomic measures and health. Blaxter set up the Health and Lifestyle survey to look, inter alia, at economic circumstances and health; there were 775 people aged 70 and over but even this number does not allow detailed analysis and in tables the oldest age category tends to be 60 years and over.[43]

Until recently there were no socioeconomically-diverse research cohorts who had reached old age. The earliest national cohort comprises people born in 1946 and is a major source of information on the lifecourse but cannot yet look at old age.[44] The study of people aged 75 years and over at the Melton Mowbray General Practice has not focussed on health inequalities partly because the population was relatively homogeneous in social class.[45] The Nottingham Longitudinal Study of Activity and Ageing selected over 14000 people aged 65 years and over but only one publication refers to socioeconomic variations.[46;47] The Study of Doctors took them through to

old age but clearly they were of the same social class.[48] During the last ten years, the members of the Whitehall cohorts and the British Regional Heart Study (BRHS)[49] became predominantly of retirement age and these studies are now being used to look at health inequalities in old age. Although the initial BRHS cohort was male, a female cohort, The British Womens Heart Study, was recruited in 2001.

1.4 *The aims and objectives of this thesis*

The aim of this thesis is to investigate the existence of health inequalities in old age in Great Britain and to explore some of the factors that might be contributing to these. Two specific aspects (transitions in socioeconomic status and area factors) have barely been touched on in previous research about older people.

The specific objectives are:

1. To describe how both morbidity and mortality in old age vary by socioeconomic status in middle age or old age; outcomes being studied are all-cause mortality, functional status, self-reported health and quality of life.
2. To investigate the influence of transitions in socioeconomic position between middle age and old age on health outcomes
3. To explore whether differences between socioeconomic groups in potential intermediate factors, such as perceived symptoms or lifestyle, partially account for health differentials in later life – circumstances both in middle age and old age are considered
4. To undertake some exploratory work on associations between deprivation levels and population density of geographic areas of residence and personal health outcomes.
5. To refine the description of health inequalities by using multiple measures of socioeconomic position

I use three sources of data to address these hypotheses. The Longitudinal Study is used to address objectives 1, 2 and 5. A resurvey of the first cohort of Whitehall civil servants is used to address hypotheses 1-3,5 (morbidity outcomes). The baseline quality of life component of a large MRC Trial of Assessment and Management of

Older People in the Community (MRC Study) is used to address all the hypotheses with respect to quality of life in old age.

1.5 *The structure of this thesis*

Chapter 2 gives an overview of theories of socioeconomic health inequalities and reviews the literature that touches on health inequalities among older people in the high-income countries. Chapter 3 describes the three data sources and the main methods of analyses. Chapters 4-8 give the results. Chapter 4 is devoted to the Longitudinal Study and longitudinal follow-up for mortality, moving into an institution and prevalence of limiting long-term illness. Chapter 5 reports on analyses using Whitehall cohort data, in particular on variations in chances of self-reported poor health and functioning in old age by employment grade in mid-life. Chapters 6-8 all employ quality of life data from the MRC Study. The first of these chapters concentrates on personal housing tenure in old age and it associations with five dimensions of quality of life. Chapter 7 is the only part of the report where environmental rather than personal factors are analysed – here deprivation scores and population density of the person's residence and of neighbouring areas are taken into consideration. Also, all the personal and area explanatory factors considered in Chapters 6 and 7 are brought together. There are two main components to Chapter 8. First, it investigates whether both socioeconomic position in mid-life and in older age are independently associated with poor quality of life in old age. Second, this is teased out further to look more directly at effects of transitions in socioeconomic position. Chapter 9 brings the results from all three data sources together, discusses the limitations and strengths of the data sets, and draws some conclusions.

2 Literature Review

2.1 *Theories of why socioeconomic position is associated with variation in health.*

The main theories proposed for health inequalities are described below. Chadwick, Rowntree, Booth and others recognized diseases of poverty, but gradations in ill health by socioeconomic position now require explanation other than infection or illness through overcrowding or poor hygiene.

The term health inequality rather than inequity is used in this thesis because it is necessary to know more about the processes by which the differences arise in order to judge whether they are unfair or unjust, which the term inequity implies. Some prefer the term 'patterning' because 'inequality' is also seen to have connotations of "unacceptable" or "unjust"[50] but here it is just meant to imply a systematic difference rather than a chance one. The definition quoted in Section 1.1 uses the term 'socioeconomic status' but the term 'socioeconomic position' is now more favoured by leading social epidemiologists[51] because it encompasses resource-based and prestige based measures.[52]

2.1.1 The Black Report

The Black Report listed four theoretical approaches to explanations of inequalities.[35] The first two refute inequality. One attributes the apparent differences by social class to an artefact of changes in class composition, e.g. that the least healthy are left in the diminishing group of unskilled jobs. However, this would not explain a gradient right across the classes. A second version of the artefact explanation states that it is not class per se but the composition of the class that matters[50] but this has been used more to explain differences between ethnic groups (that some groups are more deprived) or areas than between socioeconomic groups. A second approach attributes observed differences to selective mobility whereby the most vulnerable drift downwards or are left behind in the lower group and the sturdiest move upwards (reverse causation or health selection). This sparked a long debate.[53] Health selection

takes place[54] during working life. It can serve to constrain rather than extend differentials because people who move categories may have chances of poor health that are intermediate between that of the group they left and that of the group they joined.[55;56] Reverse causation is not now thought to account for major class differentials.[57] However, later in life when ill health develops it could still lead to changes in socioeconomic position and this possibility is discussed during the thesis. The third approach, a materialist or structuralist explanation, gives some credit to direct effects of absolute poverty but is more concerned with the way in which society is structured to limit opportunities for some. The fourth approach emphasizes individual behaviour in a cultural context. The theories given below assume that observed socioeconomic differences are not due to artefact.

2.1.2 Opportunity and direct exposure to hazard

One batch of arguments refers to the practical opportunities denied to people in a worse socioeconomic position and direct effects of exposure to hazards that are part of being in a particular socioeconomic position.[58]

- Poverty often limits opportunities for education and hence for learning how to promote health and deal with ill health. Poverty and inadequate education are barriers to obtaining the right environment and aids to sustain health.
- Those who have had manual jobs are more likely to have had exposure to hazardous working conditions.
- The home environment is also implicated. A survey of older people in Britain found that 25% were not using as much heat as they would like because of the cost.[59] Cold exacerbates risk of death from respiratory disease, heart disease or stroke. Successful adaptation of the house to accommodate changing needs will partly depend on having the income to pay for them.[60]

2.1.3 Health practices and behaviours

A second type of argument attributes differentials to behavioural factors. Differences in behaviour can exacerbate socioeconomic differentials, e.g. higher percentages of people in manual classes smoking, having a poor diet, and taking little exercise. At

one time, it was thought that individuals should take the responsibility for 'healthy' behaviour but Blane et al[61] have noted that intervention studies such as MRFIT did not 'improve' behaviour as hoped and the behaviour change that was achieved did not have the impact on mortality that was anticipated. Health-related behaviour is seldom chosen freely – it is heavily influenced by social status and cultural milieu.[62] In the USA a survey of poorer old people found substantial nutritional deficiencies; the subjects knew what they should be eating but could not afford such food.[63] Thus, although behaviour is relevant it may be part of a broader explanation.

2.1.4 Psychosocial stress

A third line of argument takes psychosocial stress to be a major pathway for poor health and poverty.

Two pathways to ill health are proposed:[62] a direct one whereby chronic stress causes changes to the neuroendocrine, metabolic, and immune systems;[64] an indirect one via adoption of risky behaviours. In Britain, the focus has been on coronary heart disease. For example, psychosocial stress, resulting from lack of job control and an effort-reward imbalance, has been used to explain differences in incidence of coronary heart disease according to grade at work.[65;66] However, it is still arguable whether the biological changes are sufficiently strong and long term to lead to chronic disease.[62] The pathways described by Brunner[64] could potentially give rise to greater vulnerability to cardiovascular disease, cancers, infection, and cognitive decline. Davey Smith[67] notes that not all diseases show greater prevalence in manual social classes and that, more generally, we should not assume that the same process leads to inequalities in all diseases.

The psychosocial theory of health damage is linked to the context in which people live to produce the theory that being in an area of marked income inequality creates stresses and hence poorer health. This theory sets out to answer why some societies (rather than individuals) are healthier than others .[68] Greater income inequality is associated with higher mortality from several broad causes of death.[69] Wilkinson argues that greater income inequality reduces social cohesion in poorer neighbourhoods and also leads to greater within-family stress .[68] This theory continues to be controversial.[70]

The psychosocial theories do not rule out some role for behaviour as an intermediate factor. The causes of death that Wilkinson [68] cites as being associated with lack of social cohesion are also often precipitated by lifestyle: chronic liver disease, cirrhosis, traffic accidents, infections and, for younger men, other injuries. The stressful effects of neighbourhood can be closely tied in with practical difficulties in maintaining a healthy lifestyle. Older people are more likely to fear becoming victims of crime than younger people.[34] Social contact will be limited if they do not get out or cannot afford transport. The environment can be unconducive to taking exercise, buying appropriate food and using health services. Interventions to make a housing estate in England safer led to greater perception of friendliness and a reduction in anxiety and depression.[71] Poorer housing estates are more likely to be near to busy roads or other sources of pollution and danger.

2.1.5 Life course approach

Many of these theories are woven together in the life-course approach. The life course approach "suggests that throughout the life course exposures or insults gradually accumulate through episodes of illness, adverse environmental conditions and behaviours, increasing the risk of chronic disease and mortality".[72] Early life circumstances may have direct effects on health or indirect effects via opportunities and lifestyle that in turn cause health problems. The proponents of the relative income psychosocial theory (2.1.3) and the life-course theory disagree in how health inequalities arise. For example, while accepting that changes in relative income will affect wellbeing and psychological distress, Davey Smith [73] argues that diseases with long latent periods are not going to be responsive to short-term changes in relative income and takes a structural approach. He considers that a history of lack of investment in services in areas of considerable inequality leads to ill health and higher mortality.

A Norwegian study found that economic hardship in childhood was a predictor of serious illness in old age for men after adjusting for own adult social class.[74] Davey Smith et al[75] developed a score of cumulative disadvantage taking into account father's social class, social class on first entering the labour force, and social class at

time of survey. The cumulative index is a stronger predictor of premature death than any one of the components and further enhanced by adding in deprivation category of residence and car use.

Refining this theory, the relative importance of different periods of life to different health conditions may vary. For example, both childhood and adulthood circumstances affect chances of heart disease but stroke and stomach cancer seem to be particularly sensitive to early life conditions.[67] Linking back to Section 2.1.3, Kuh and Ben-Shlomo find that several authors in their book conclude: "control of obesity and cessation of smoking are still the most effective means of reducing individual and population chronic disease risk".[76] Davey Smith observed that behaviour risk factors are more dependent on adulthood social position than parental social class so their modification is "dependent on the presence of social circumstances required for maintaining favourable health-related behaviours".[77]

Part of the life-long accumulation of disadvantage may be failure to develop adequate coping skills or feelings of self-efficacy. Antonovsky thought that a 'sense of coherence', by making sense of life, had a salutogenic effect .[1;62] A study of people age 25-74 found that a feeling of not being in control, neuroticism and not using problem-based coping skills explained about half of the association between childhood social class and self-rated poor health.[78] On the positive side, these arguments mean that if people in deprived circumstances have the psychological capacity to use their limited resources to best advantage, the outcome in terms of health can be relatively favourable. This has been the subject of research concerning childhood illness.[79] The UK policies targeted at social exclusion include elements aimed at improving the capacity and the self-esteem of the more deprived people.

2.1.6 The Barker hypothesis

The Barker hypothesis states that the environment during fetal and infant life programmes people from socioeconomically unfavourable backgrounds to be at an elevated risk of cardiovascular disease.[80] In this theory it is the programming in the womb that matters. The oldest cohorts for which birth weight and early data are available are now in their 70s and 80s so evidence for or against continuing impact

of the early environment into old age will accumulate over the coming years. A clear inverse relationship between birth weight and hypertension at age 70 was found in men of above median height but not in those of below median height.[81] Fetal growth rate rather than size at birth is thought to be aetiologically important.[82] It is not clear how much socioeconomic factors could be operating via poor fetal development and infant growth during the first year. For example, twin studies suggest that it is not maternal nutrition that accounts for blood pressure differences in later life by birth weight.[83]

2.1.7 Social relationships

A final contribution to variations in health by socioeconomic position may come from social relationships. Theories of effects of social relationships on health have been developed over several decades, not particularly in the context of socioeconomic position, but will be relevant if that position affects the types of relationships people can and do have. Berkman and Glass[84] are major contributors to work in this field. It is a complex topic. The main strands of argument they put forward are:

i) Supportive aspects of relationships facilitate health via emotional, instrumental and informational help
ii) Influence on behaviour comes through sharing norms with the people one socializes with
iii) Participation contributes to social cohesion (see 2.1.4) and Berkman and Glass cite a study in which social engagement helped maintain cognitive functioning in old age
iv) Negatively, social mixing can help to spread infectious illness
v) Membership of organisations or groups can open up opportunities which in turn can affect health

These dimensions of social relationships link into factors already mentioned, for example, via behaviours, via self-efficacy and self-esteem, and via the reduction of stress. The authors say that it is speculative whether social relationships can slow down ageing but note that blood pressure response to a challenge differs according to whether someone believes that they can call on someone for support or not.

An implication of most of the theories is that health inequalities will not be reduced substantially by expecting individuals to alter their lifestyles in a vacuum, nor would provision of health services alone suffice.

2.2 *Measures of socioeconomic position*

The theories have been described without discussion of how to measure socioeconomic position. In practice researchers still tend to use measures that are readily available or traditional. However, Bartley [personal communication Dec 2001] argues that the choice should be determined by prior theory and that "without clear definitions of forms of inequality, we have little hope of tracing the pathway through which social inequalities may affect the health of individual people". This section endeavours to fit the most commonly used measures of socioeconomic position in high-income countries into her structure.

2.2.1 Educational attainment

This can be measured by qualifications achieved but often the number of years is a proxy for this. Education is sometimes labelled cultural capital. Formal education is usually complete early in life (though the current idea of life-long learning may change this). Education could differentiate health in later life through influences on job opportunities, choice of health-behaviours and awareness of options for dealing with ill health or stress. It could thus be relevant to the behavioural, psychosocial, and life course theories.

2.2.2 Status measures

Status would be particularly pertinent to stress theories and relative inequalities. However, it has a place in life course theory since high status often opens up opportunities.

2.2.2.1 The Registrar General's Social Class

The classifications used through the twentieth century were largely based on occupational skill that was thought to carry status with it. Jones and Cameron [85]

argue that social class is tautologous because mortality rates were used to determine the classes and, indeed, the classification lacked a clear scientific rationale. However, despite changes in job composition of classes over time, social class is widely used for adults of working age and is negatively associated with many other health indicators besides all-cause mortality .[86] The continuing gradients over time despite major changes in economic prospects and in disease patterns are both a strength and a weakness. They are a strength because social class is reflecting some disadvantage that operates in a wide variety of diseases and macro-economic circumstances. They are a weakness because they conceal changes in the pathways. Social class can be seen in this light as a "dull and unresponsive measure".[87]

2.2.2.2 Cambridge Scale

The occupationally-based Cambridge Scale operationalises general aspects of social status and lifestyle that bring people together and is derived from studies of social mixing across jobs.[88]

2.2.2.3 Income

This is important as a means of access to resources and a source of prestige. It is not used as widely as other measures because it is difficult to measure and can change often over time. For older people, a measure of wealth is thought to be more appropriate as a better indicator of lifetime economic status and in practical terms as an indicator of the reserves they have to fall back on in hard times.[89] Classifications based on occupation are also sometimes used as proxies for income and thought to include an element of material conditions.

2.2.3 Structural measures

These are measures influenced in particular by the divide between ownership and working for someone, between managing and being managed.

2.2.3.1 The Erikson-Goldthorpe scale

This classification aims to group people who have similar sources and levels of income, amounts of job security and chances of economic advancement and degrees of autonomy [Bartley personal communication Dec 2001]. The scheme also explicitly takes into account autonomy and job security. This fits in with Karasek's theory that control over work is important in health.[90]

2.2.3.2 2001 Government Classification

The social classification adopted by the UK Government for the 2001 Census and other Government statistics was developed by Rose and O'Reilly.[91] It is based on the theory, advocated by Erikson and Goldthorpe, that employment relations are central to the variations in social behaviour and health. The new categories are not intended to form an ordinal scale.

2.2.4 Measures reflecting material circumstances

2.2.4.1 Housing tenure

This is used to represent material aspects of people's lives. In addition, studies have shown that owner-occupation is associated with self-esteem, a feeling of mastery and of ontological security.[92;93] For older people the positive aspects of owner-occupation include independence, achievement, and control over their homes.[94] The negative aspects include the financial burden and responsibility for maintenance.[94] Put into context of the environment, rented homes are associated with more stressors: both from housing conditions and from being in neighbourhoods where there is less security, and less trust in asking neighbours to help.[92]

2.2.4.2 Car ownership

In our car-dominated world, the number of cars is used as a measure of command over resources. For the retired age-groups, having one or more cars against having none is a sign of being materially better off but being without one does not necessarily imply lack of such resources and may result from ill health.

Income and wealth were discussed under measures of status but also imply command over resources

Different socioeconomic measures can yield different patterns, as shown by Bartley et al in an analysis of cardiovascular risk factors among working-age people. For example, only the Erikson-Goldthorpe scale correlated with high blood pressure and not the Cambridge scale.[88] Most of the differences came in the exact shape of the relationship and the similarities should not be ignored either.

2.3 *Evidence of health inequalities among older people*

The context of this thesis, and hence of the literature review, is high-income countries. Searches were made for English-language publications on Medline, PubMed, Embase (social science), Web of Science, SIGLE, the Erasmus University database of references on health inequalities, and the Centre for Ageing and Policy Studies AgeInfo database. The main search terms were health, ineq*, old* or elder*, socioecon*, morbid*, function*, disability, "self-rated health", self-reported, and mortality. References from articles and books were followed up where possible and some searches done on author. Hand searches were done of the Journal of Epidemiology and Community Health and European Journal of Public Health from 1994, and of Age and Ageing from 1999. The review was restricted to papers including self-reported outcomes (i.e. did not consider clinical conditions); in practice, most of the health inequalities research about older people has been on the kinds of outcomes used in this thesis. A review paper of risk factors for functional status decline in community-living people only made brief mention of socioeconomic factors, citing three studies one of which was confined to Catholic nuns.[95] Hitherto, there is no English language information from some major European countries (e.g. France and Germany), although a project currently underway is gathering data to compare health inequalities across 11 EU countries [SEdHA project][iv]. The studies are heterogeneous in many respects: age and gender coverage, socioeconomic measures used, study design, and measure of inequality. Also many were not primarily about socioeconomic position.

[iv] This a project funded by the EU of which the chief investigator is Professor Johan Mackenbach of Erasmus University, Rotterdam

The tables of results have been divided geographically for three main reasons. First, as the data used in this thesis were all collected in Great Britain, it was of interest to see what was known specifically about Britain. Second, there has been a long tradition of research on older people and ageing in the USA. The National Institute of Aging, along with other institutes of health has plans to reduce health disparities among older people [http://www.nia.nih.gov/strat-planhd/2000-2005/]. Although race and gender probably have higher profile than socioeconomic position per se, there is still a substantial body of research on health differentials by socioeconomic position. It was considered sensible to tabulate the information for the USA separately from Europe because they tend to use education and income (not widely used in Great Britain) and historically its service provision has been more insurance-based and had less emphasis on services paid by taxes and free at source. (Canada is included with the USA although it has differences in welfare provision and culture). Information from Europe and the small amount of information from countries outside Europe and North America are put together as there was too little information on any one country. Appendix tables 2.3.A1 – 2.3.A3 give results for Britain, North America and the rest of Europe respectively. They are ordered by year of publication with all morbidity results given first, followed by mortality results. Further comments on the literature, including more about their findings, are made in the Discussion chapter in the light of results from the three studies used in this thesis.

2.3.1 Sources of information

Tables 2.3.1-2.3.3 give a simplified summary of results for the outcome measures that are closest to the ones used in this thesis, according to the socioeconomic measure used. In Britain, the General Household Survey and Longitudinal Study are the main sources of information, supplemented by the nationwide Disability Survey and some geographically localized studies (see Section 1.3). The USA has the advantage that the Federally-funded National Institute of Aging has supported several studies, including the Established Populations for Epidemiologic Studies of the Elderly (EPESE), the Longitudinal Study of Aging (LSOA) with its supplement on Aging (SOA), and the Alameda County Study. Researchers can use information from studies that were primarily about older people, some samples being selected

initially for that purpose (e.g. the Duke OARS study and Massachusetts Health Care Panel Study), and some (such as EPESE and SOA) being off-shoots from studies that covered a wider age range. Data on mortality in relation to socioeconomic position is sparse in North America, compared to Britain, because no socioeconomic information is recorded on death certificates. The data from other high-income countries mainly come from Scandinavia with some information from the Netherlands, Italy, Spain and Israel. Finland has a long record of research on health inequalities and good national information linking Census data, tax records, and mortality. Morbidity information comes from a mix of surveys especially designed to collect information about older people and ones covering a broad age range; several of the data sources are confined to sub-areas of the country.

2.3.2 Evidence that older people in 'lower' socioeconomic groups have worse health and higher mortality

Most of the analyses in Britain showed that higher percentages of people in the most advantaged socioeconomic position had the best self-reported health, best functioning, and the lowest mortality rates (Table 2.3.1). Only one morbidity study had a longitudinal element and found that being a manual worker still carried a disadvantage seven years later, regardless of baseline health.[96] Some of the null results occurred where models already contained other health factors (e.g. Jagger et al[97] and institutions or Salas with respect to self-reported health) or other measures of socioeconomic position (e.g. Arber and Ginn 1993).[98]

In North America lack of education appears to be a disadvantage for limiting long-term illness,[99] for self-reported health, [89;100-102], and for limited physical functioning and the early stages of physical limitations (mobility). [103-105] It was not so clearly a disadvantage for mortality (Table 2.3.2).[106;107] Income is variously measured and some studies focused on the low-income groups compared to the rest. In Canada, Cairney and Arnold[100] found that lack of adequate income was most consistently associated with the outcomes they measured (including some specific items like respiratory problems). In the Manitoba study, a null result for socioeconomic factors occurred with respect to successful ageing but the model also contained many other

health factors including self-assessed health at baseline so the role of socioeconomic factors may have been hidden.[108]

The studies on moving into an institution from the United States[109-112] at best found weak evidence that people with inadequate incomes were more likely to stay in an institution for at least 6 months.

The results for other high-income countries are mixed (Table 2.3.3). This may reflect the heterogeneity of studies and populations. There were adverse outcomes for workers relative to non-manual staff for limiting long-term illness and poor self-assessed health in Finland;[113] in Sweden this was also true for difficulties in self-reported functioning and mobility difficulties and for measured performance (all Parker et al 1999) and in both Sweden and Finland for all-cause mortality.[114-116] For men (but not for women) occupation was clearly associated with general limitation in daily activities in Norway,[74] and with poor functioning in Finland.[113] In other cases there were marginal or non-existent associations between social class and self-reported health[117;118] or difficulties in functioning.[119]

Education had a negative association with self-reported health in Spain,[120] and also with functioning in Italy,[119] in Sweden,[121] and in Japan.[122] There were strong associations between some dimensions of quality of life and education in Spain.[120;123] In several countries education was negatively associated with all-cause mortality. Kempen et al[124] in the Netherlands found only weak associations for the outcomes they looked at (self-reported poor health, functioning, and quality of life) but covered a very broad age span (age 57 years and over) and substantially under-represented the less educated. Interestingly, there were conflicting results for general health in Spain, one paper reporting an association with education only for men,[120] and the other for women.[123] Rautio et al[125] found that difficulties in functioning were only linked to education for women in Finland.

Lower income was accompanied by worse health outcomes [74;115;122;126] except in a Finnish Study.[127] Housing tenure is only mentioned in three papers. Dahl and Birkelund[74] and Liang[122] found no association with poor self-reported health in

Norway and Japan respectively but people in rented homes in Sweden had higher mortality rates.[128]

Pinquart et al[129] did a meta-analysis of studies that looked at the influences of socioeconomic position, social network and competence on subjective well-being in later life. The age-range covered was somewhat wider than the one in this thesis (mean age had to be at least 55 years) and was not necessarily confined to high income countries. Analyses using the Philadelphia Geriatric Morale Scale (used in this thesis) were included with those covering life satisfaction in general. The meta-analysis included 205 estimates of effect of income or education on life satisfaction and it was deduced that that the mean effect size was 0.17, significant but modest; because there was considerable heterogeneity of effect size the mean effect size may not be a good guide to the situation in Britain.

Overall, significant associations between a measure of socioeconomic position and a health outcome far outnumbered lack of such associations, at least in bivariate models. This balance might reflect publication bias but, given that the papers reviewed were not confined to those with the primary purpose of looking at socioeconomic factors, there is little reason to think that the bias would be strong. Nevertheless, several studies report some exceptions to associations (either by outcome or by gender or age subgroup). There will always be less power in analyses of sub-groups than of the whole and most researchers did not attempt tests of interaction by subgroup. Also, many of the studies with mixed results by outcome, or by socioeconomic position included several variables in their models, so the explanations for these mixed results could be complex.

2.3.3 Independence of different socioeconomic factors

Some of the analysis using the GHS or LS found that up to four indicators of socioeconomic position could simultaneously be significant in models[98;130] (Table 2.3.1). Indeed, the Longitudinal Study, being so large, has provided opportunity to show how multiple socioeconomic factors (occupation, housing tenure and car availability) jointly predict mortality more powerfully than one on its own.[38;131] In

contrast, at best one socioeconomic measure remained significantly associated with self-rated health in Salas' study, but the model included several other factors that may also have been intermediate factors between socioeconomic position and outcome.[132]

Several of the studies carried out in North America used more than one socioeconomic measure with varied results as to whether their combined predictive power was greater than that of one alone. On the positive side, two or more measures (usually education and income) were independent factors for prevalence of either mobility or mental impairment,[133] for onset of impairment,[29;134-136] for self-reported good health,[100;102;137] and for mortality.[106] This applied only to some sub groups in age for self-reported health and functional health.[89] On the negative side, at least one socioeconomic factor ceased to be significant in combined models (sometimes already adjusted for several other factors) for prevalence of, and transitions to, disability[28], for heart disease, respiratory symptoms or sleeping problems[100], spending time in institution[110] and mortality [106]. Robert and House[89] showed that liquid assets was significantly associated with three outcomes among the 75-84 age group at a bivariate level but not for self-rated health when adjusted for three other measures of socioeconomic position.

Education was more dominant than income in one longitudinal study of disability, [105] whereas income appeared to be more dominant in another study[104] and possibly in the EPESE study[138]. Lack of adequate income was clearly dominant for self-rated health in one Canadian study[100] and possibly in another[137]. Usui et al[139] found that education was not associated with life satisfaction in a model involving several other factors but the lack of significance was not due to the mediation of income (which was significant). Pinquart and Sorensen[129] found significantly greater effect sizes of income over education on self-reported well-being – the number of studies involved in this particular analysis is not given but they were extracting results from 286 articles. Their hypothesis was that high income increases availability of options and that education, although increasing awareness of options, is insufficient without the income (or, presumably, wealth) to secure them. In addition, they surmised that education might be less of an advantage in old age than middle age because it may no longer be deployed in a professional (and, perhaps, an income-generating)

capacity. Robert and House[89] observed that liquid assets seemed to become more important than income in older age.

In those European studies where it is clear that two or more socioeconomic measures were in the same model and each had had significant bivariate associations, they remained significantly associated with mortality in two countries (at least before adjustment for health factors)[115;116;128], but not in other cases .[140;141] Both education and income were significant for both functioning and mortality in Japan[122]. In the Norwegian study, occupation ceased to be significant for serious illness in the presence of income.[74] In the Dutch study, out of three socioeconomic measures, only household income remained statistically significant for men in the presence of the other two and none of them did for women.[141] The authors hypothesize that one reason for this might be that income is a more accurate indicator of current (rather than past) socioeconomic status and that women's estimate of household income could be less accurate than men's. Three studies concerning morbidity tried including two or more socioeconomic measures simultaneously. Both occupation and education remained jointly significant for disability in Italy[119] but only education (not occupation and income) for Beland and Zunzunegui[126] with respect to functioning. Rautio et al[125] had mixed results with respect to education and the non-standard socioeconomic measure of perceived financial situation, education remaining significant for more outcomes for women than men. The last two studies were confined to small geographical areas and the simultaneous variation in all three measures might be small or else common environmental factors might help to offset differences due to individual socioeconomic circumstances.

2.3.4 Explanatory factors

2.3.4.1 Health Behaviour

To be a mediating factor between socioeconomic position and health or mortality, lifestyle factors would both need to be risk factors in themselves and to be associated with socioeconomic position. Although the search for literature was less exhaustive with respect to these separate associations, some information was gathered to help guide the analysis. The systematic literature review of potential risk factors for functional status decline by Stuck et al [95] included smoking, low levels of physical

activity and no alcohol among the factors for which there was highest strength of evidence. Several studies have shown associations between smoking in old age and mortality[142-145] via both cardiovascular disease and cancer, although there are exceptions.[146;147] In the Massachusetts Health Care Panel Study, lifestyle behaviours were generally not strong factors for five-year mortality or incidence of disability.[148;149] Physical activity has protective effects against several chronic physical and mental diseases.[150] In old age, the type of activity that brings endurance benefits will be less intense than at younger ages[151] and there are other aspects of exercise that may be very important– such as resistance training for functioning among weaker old people ,[152] and social interactions improving well being. With respect to the latter, three broad categories of activity (social, fitness and productive) were all protective against mortality among those aged 65 years and over in the EPESE study, even if not physically energetic.[153] In the same study moderately active walking was also protective.[154] Diet is also likely to be relevant but is rarely measured and was not available for the studies used in this thesis.

Although adverse health behaviours are more common among those in disadvantaged socioeconomic groups in middle age, we should not automatically assume that it also applies to old age. The high-risk people are more likely to have died before reaching old age. Also, habits can change, either because of the stage of life (e.g. doing less physical activity) or changes in cultural acceptability (e.g. giving up smoking). There is remarkably little information on this, especially in Britain (e.g. there are no separate figures for older people in the General Household Survey or Health Survey for England and no analysis by socioeconomic position in the Survey of Physical Activity in Later Life[151]). Lasheras et al [123] found that percentages of smokers were higher among low educated women in their small Spanish sample. Amaducci et al [119] reported the converse in Italy and noted that this was unusual. Lasheras[123] also noted a less healthy diet among those with fewer than nine years' education. A sample from the MacArthur research Network on Successful Aging Community study, aged 70-79 years, were high-functioning and yet educational level was associated with several risk factors including smoking, alcohol consumption and physical activity.[155] The advantage of looking at this subset is that it is unlikely that poor health had affected behaviour; however, it would also be reassuring to know that these patterns applied to the whole non-institutional population of older people.

Cairney[137] reported that people aged 55 years and over with low income or least education were most likely to be smokers, not to drink alcohol, and not to take exercise. They also had lower self-esteem and less social support. Lubben et al[156] did not compare the poor with the non-poor but found high prevalence of risky behaviours among a sample of elderly poor in California, for example 21% smoking, 50% taking physical exercise less than once a week, and over a third being too light or too heavy.

Only researchers using socioeconomic measures as primary exposures are likely to present enough information to indicate whether other factors account for associations between their primary exposures and the outcomes. Even though most of the analyses concerning British populations focused on socioeconomic variation, the researchers did not attempt to see whether lifestyle or other non-sociodemographic factors accounted for differentials. The only study that included several factors was localized and small.[157] Six of the North American papers mentioned lifestyle variables alongside socioeconomic ones but only two explicitly consider them as mediators. Cairney and Arnold[100] show models adjusted just for socio-demographic and socioeconomic factors and then ones additionally adjusted for church attendance, being sedentary, smoking, drinking and weight. In a later study on a different data set Cairney[137] attributed some of the effect to a combination of lifestyle and psychosocial factors. House et al[158] based hypotheses about the relative size of health inequalities with age on the assumption that lifestyles and environmental exposures are on the causal pathway. Health behaviours were only mentioned in three of the studies from the rest of Europe[118;119;121] but only one of these (Damian) explicitly showed the mediating effect. The conclusions from these studies are mentioned in Chapter 9.

2.3.4.2 Health conditions

Many longitudinal studies (especially North American ones) adjust for baseline values of the health indicator used at follow up. It is not surprising that these baseline values often strongly predict later values of the same health measure. If socioeconomic factors at baseline are not significant for functioning at follow-up or change in functioning between baseline and follow-up then it could be argued that the socioeconomic factors do not continue to worsen functioning in old age. It does

not rule out the possibility that socioeconomic factors were influential at an earlier period and partly responsible for health limitations already existing at baseline. If socioeconomic factors are significantly associated with later functioning despite adjustment by baseline functioning level then socioeconomic factors could still be operating to affect health (directly or indirectly) during that interim period.

Comorbidity is a predictor of functional decline and, even at a crude level, there is increasing risk of functional decline in old age with increasing number of conditions.[134] Stuck et al[95] in their systematic review of risk factors for functional status decline, reported that the evidence was strongest for cognitive impairment, lower extremity functional limitation (e.g. walking, climbing, stooping), and vision impairment. They also listed 67 self-reported or clinical conditions reported as significantly associated with functional decline in at least one paper; unfortunately they judged that the variability in definitions and ways of modelling did not justify these conditions being given a rating in terms of strength of evidence. Lindgren et al[159] only looked at a limited range of factors correlated with perceived general health in a cross-sectional study and reported that self-reported vision and hearing problems were not associated with perceived health; mobility and doing various daily activities were positively associated with it while sleeping problems were negatively associated. If the parameters for socioeconomic factors are closer to null values after adjustment for comorbidity then those socioeconomic factors may be affecting the way that other illness or symptoms in turn influences functioning.

Few of the studies show estimates of socioeconomic effects on self-perceived health or functioning before and after adjustment for other perceived health problems or clinical health conditions. Only Camacho et al[160] and Smith and Kington[135] did this while Newacheck[161] used sub-group analysis to argue that poorer people had more restricted activity or bed disability days because they were more likely to have chronic conditions and these conditions in turn had a greater impact on activity. As an incidental part of his analysis, Rogers[162] showed models in which the (small) education effect on mortality disappeared after adjustment for self-reported health (rather than for self-reported disability or chronic disease). In the European studies, Rautio et al[125] showed education and poverty coefficients, if significant, before and after adjustment for chronic disease and Beland and Zunzunegui[126] mentioned the

effects of adding in successive variables. One other study showed mortality models before and after adjustment for health but other factors had also been included in the second model (e.g. marital status).[128] Several authors showed multivariate models that include socioeconomic factors and other factors – these allow limited conclusions as discussed Chapter 9.

2.3.4.3 Health selection

This is a major issue in socioeconomic studies and those of older people. The evidence sought here is whether poor health or functioning leads to a change in socioeconomic position which in turn affect observed socioeconomic differentials in health. Of the studies reviewed, only two specifically try to look at this. Smith and Kington[135] are supporters of the early life influences on long-term health, using as evidence correlations between lack of functional limitation and each of the survival of the participant's parents, siblings and children. They seek evidence for reverse causation by breaking down sources of income into several categories and making skilful use of cross-sectional data. Older people receiving some earnings were less likely to have functional limitations and those receiving some welfare income were more likely to do so –the amounts barely mattered. The authors then surmised that relatively good health enabled people to keep earning and relatively poor health led to welfare. Individuals receiving a pension were less likely to have functional limitation but they again argued that these are the consequence of past health and employment history. They argued that spouse's income was less likely to be influenced by the participant's past health history and that lack of an association between spouse's income and functional limitation was counter to the hypothesis that income affects health. These conclusions assume that spouses share income and, perhaps more importantly, ignore the possibility of a two-way influence between personal income and health. Maddox and Clarke[29] found that there was a two-way process for disability and poverty. Their study is the only one that specifically looked at transitions in socioeconomic status at an older age and subsequent functioning or health.

2.3.5 Weaknesses or gaps in the studies cited

The literature is increasing in volume monthly but the number of papers focusing specifically on socioeconomic variations in self-reported morbidity and mortality is still quite small. I found 13 items from Britain, 18 in North America, and 19 from other countries. They cover a variety of outcomes, measures of socio-economic position and study designs such that it would be difficult to pool them into a meta-analysis. These are supplemented by papers that include socioeconomic position either as one factor in a general exploration of risk factors for an outcome or as a classificatory variable to obtain a better estimate of their main exposure. Although the papers focusing on socioeconomic exposures should be the ones able to tell us most about health inequalities, they are often the ones with little information to help us understand what factors might be mediating or lying behind the socioeconomic variations. All the papers are about observational studies.

The mortality studies tend to be more powerful in terms of numbers than the morbidity studies because they can use routine data but their disadvantage is the lack of information on people's health behaviours or environment that could help us to understand what part socioeconomic factors might play in influencing mortality. Several of the morbidity studies have small numbers of people in the older age groups tending to limit the scope for identifying socioeconomic variations.[109;112] The Manitoba Longitudinal Study of Aging was of a reasonable size but excluded the most disadvantaged group in terms of economic resources (native residents).[108] On the other hand, one small study found clear health deficits for the socioeconomically disadvantaged.[160] In other cases the sample size was sufficient for simple models but did not have much power to adjust for explanatory variables,[102;117;163;164] and the socioeconomic effect had to be strong to remain statistically significant.[165] In localized studies,[118;123-126;166-168] the community can be homogeneous in socioeconomic position,[97;157;169] or some shared features of the environment might have reduced the differentials by individual socioeconomic factors .

Even if the number of older people in the study was substantial, the researchers did not always model the health outcomes relative to socioeconomic position. In the earliest studies, the statistical tools were not available and many of the papers from

the 1980s do not use any statistical tests. In Britain hitherto there has been very little use of statistical tests in deciding whether observed socioeconomic differences in health among older people could be chance results or a more definite reality. In papers from other countries, statistical testing is more commonly used but the form of association between socioeconomic status and the health variable may be over-simplified. For example, it is sometimes assumed without checking that there is a log-linear trend for income[74;89;133] or for education.[89;101;125]

Very few papers about Britain add in potential explanatory factors to see what might account for socio-economic differences and, as seen in the previous sub-sections, there is generally a dearth of information explicitly demonstrating whether or not health behaviours or illnesses and diseases are mediating factors. There is also little about psychosocial factors. Although only two studies addressed the question of reverse causation directly, several of the authors using education as their exposure justified this by saying that educational achievement must precede health status in old age. Others were aware that, by using cross-sectional information, they could not be sure of the chronological sequence of events.

Also, in Britain, only three of the studies with self-reported health outcomes were longitudinal.[96;97;170] Two of these have the disadvantages of being geographically localized with little variation in socioeconomic factors or in having small numbers of the older age ranges in the follow-up. Longitudinal studies can have the advantage over cross-sectional ones of giving a more accurate picture of the sequence of events through time and hence of taking account of health selection. In cross-sectional studies it is often more difficult to check whether a supposed "exposure" and "outcome" are in fact linked because they are both influenced by a third, prior, factor.

Hitherto most of the focus of long-term influences of socioeconomic position on health has been on outcomes in middle age, and it has often been difficult to tell to what extent socioeconomic position continues to have an effect in old age or whether the 'damage' had already been done earlier and people did not suffer further health disadvantage into old age. This thesis cannot fully answer these questions but sets out to add further information.

Key points

- Different theories of health inequality put emphasis on different factors: material, psychosocial, opportunity. There are also reasons that health should be influential on socioeconomic circumstances rather than the consequence of them. The life-course theory accepts that influences work both ways leading to cumulative poor health and poor socioeconomic conditions for some
- The measures of socioeconomic position reflect the theories- some are more material (housing tenure, income), some reflect prestige (social class, income), some opportunity (education) or power structures (Erikson-Goldthorpe occupational scale)
- Given the variety of measures and outcomes and the pathways that could be explored the number of studies specifically looking at health inequalities in old age is still small
- Papers that include measures of socioeconomic factors in relation to mortality or morbidity (mostly self-reported indicators) do not uniformly find associations among older people, but the majority show them for at least some sub-groups, those with the less privileged socioeconomic circumstances being more likely to have the adverse health outcome
- At any one time multiple measures of socioeconomic position can be more discriminating of health or mortality than a single measure on its own
- There is little evidence about lifestyle factors and how they vary with socioeconomic position in old age; few studies consider them as mediating variables (none in Britain)
- The baseline measure of functioning or morbidity is a powerful predictor of later measures of the same health facet. Co-morbidity is often included in models but not usually examined as an intermediate factor between socioeconomic position and the health outcome.
- The issue of health selection (reverse causation) is mentioned in many studies but only specifically explored in two of the studies reviewed

Table 2.3.1 Markers of socioeconomic position and outcomes for older people in Great Britain

Outcome	Socioeconomic factor (s.e.p)	References	Summary None/some/negative/positive [1]; Comment
Limiting long-term illness	Occupation: social class	Victor 1989[171]	Negative
Self-reported poor or good health	Occupation: social class or socioeconomic group [seg] or manual/non-manual	Taylor & Ford 1983[166] Victor 1989[171] Blaxter 1990[43] Arber & Ginn 1993[98] Swain 1993[96] Falaschetti et al 2002[172]	Higher social class or s.e.g. most likely to be in good health or least likely to be in poor health. Blaxter only found small differences for women. Attenuation after adjustment for other measures of socioeconomic position [Arber]. Manual workers still at a disadvantage 7 years after baseline [Swain]
	Housing tenure	Evandrou & Victor 1989[173] Arber & Ginn 1993[98] Salas 2002[132]	Owner occupiers least likely to report poor health [Evandrou] This persists after adjustment for other s.e.p. for women , in one study [Arber] but in another not –however already adjusted for multiple health factors) [Salas]
	Car availability	Salas 2002[132]	Lack of car strongly associated with poor health for women even after adjustment for other s.e.p. and health factors
	Income	Arber & Ginn 1993[98] Salas 2002[132]	Negatively associated [both] but only for men once adjusted for other s.e.p. [Salas]

Table 2.3.1 continued

Outcome	Socioeconomic factor (s.e.p)	References	Summary
Difficulties in functioning	Occupation: social class or socioeconomic group	Taylor & Ford 1983[166] Blaxter 1990[43] Arber & Ginn 1993[98] Jagger et al 1993[97] Hirani & Malbut 2002[174]	Not consistently strong. Blaxter found that differentials disappeared over age 70 years. Arber showed an association but not a trend. Manual classes more likely to have severe disability [Harani]. Study where no association was fairly homogeneous [Jagger]
	Housing tenure	Evandrou & Victor 1989[173] Arber & Ginn 1993[98] Grundy et al 1999[170]	GHS analysis found that owner-occupiers were least likely to have a disability [Evandrou], but one other reported this only persisted for women when adjusted for s.e.g.[Arber]. In Disability study, gender-age subgroups varied as to which renters group worst [Grundy]
	Car ownership or availability	Arber & Ginn 1993[98]	Lack of car only associated with greater chance of functioning limitations for men after s.e.g. taken into account.
	Income – usually household or family	Arber & Ginn 1993[98]	Negative
Morale	Occupation – social class	Taylor & Ford 1983[166] Blaxter 1990[43]	Not clear association; localised study [Taylor]. Class differences in psychosocial wellbeing substantial and greater than at younger ages [Blaxter]
Moving into an institution	Occupation- social class	Grundy 1992 [males][130] Jagger et al 1993[97] Grundy & Glaser 1997[175]	Generally negative but married men aged 75 years and over least likely to be in an institution [Grundy]. No association [but adjusted for baseline health status] [Jagger]
	Housing tenure	Grundy 1992[130] Grundy & Glaser 1997[175]	Owner-occupiers had least chances of transition – the relative chances in the other tenures varied by gender

Table 2.3.1 continued

Outcome	Socioeconomic factor (s.e.p)	References	Summary
Mortality (mainly all-cause) Life expectancy	Occupation – social class	Goldblatt 1990[131] Shahtahmasebi 1992[157] Harding 1995[176] Hattersley 1997[177] Smith & Harding 1997[38] Jagger & Clarke 1998[169]	Negative. Strong trend for employment grade. Harding found association for some of the major causes only and Shahtahmasebi only for survivors to age 75 years. Not a significant factor in a homogeneous community [Jagger]
	Employment grade	Marmot & Shipley 1996[178]	
	Housing tenure [and car availability]	Fox & Goldblatt 1982[179] Goldblatt 19901990[131] Shahtahmasebi 1992[157] Filakti & Fox 1995[180] Marmot & Shipley 1996 [car][178] Smith & Harding 1997[38] Salas 2002[132]	Clear associations except for Salas where many health and lifestyle variables included. Household measures had stronger associations than occupational ones [Goldblatt]. Relation between car and mortality did not weaken with age to the same extent as that between employment grade and mortality [Marmot & Shipley] but some variation by gender [LS papers, Salas]
	Education	Neale et al [181] Salas 2002[132]	None [Salas models included many factors]
	Income	Shahtahmasebi 1992[157] Salas 2002[132]	None

1. Negative association means that higher socioeconomic position associated with lower chances of poor health/functioning or mortality and vice versa. Does not necessarily imply a trend across all the categories. A positive association means a higher socioeconomic position being more likely to have a good health outcome.

Table 2.3.2 Socioeconomic position and outcomes for older people in North America.

Outcome	Socioeconomic factor (s.e.p)	References	Summary
Limiting long-term illness or general limitation of daily activities	Education	Liao et al 1999[99]	Negative
	Combined education and income	House et al 1990[158]	Association was significant for age group 65-74 years, not for age 75 years and over
Self-reported poor or good health	Occupation	Cairney & Arnold 1996[100]	Positive re good health
	Housing Tenure	Robert & House 1996[89]	Up to age 65-74 years only. The combined factors of liquid assets and housing tenure did not explain self-reported ill health better than the 'traditional' measures of education and occupation.
	Education	Cairney & Arnold 1996[100] Robert & House 1996[89] Ross & Wu 1996[101] Veenstra 2000[102] Cairney 2000[137]	Negative for poor health or positive for good health [but for Robert & House only up to age 65-74 years]. Psychosocial variables reduced odds ratio by a third but still significant [Cairney]
	Income	Robert & House 1996 [also liquid assets][89] Veenstra 2000[102] Cairney 2000[137]	Negative for both income and liquid assets up to age 75-84 [Robert] Some association but not a clear trend [Veenstra]. See comment above [Cairney]
	Poverty/income inadequacy	Cairney & Arnold 1996[100]	Reduced chance of good health

Table 2.3.2 continued

Outcome	Socioeconomic factor (s.e.p)	References	Summary
Difficulties in functioning [self-report]	Occupation	Berkman & Gurland 1998	None but already adjusted for education and income
	Housing Tenure	Robert & House 1996[89]	Yes up to age 75-84 years
	Education	Palmore et al 1985[103] Keil et al 1989[182] Maddox & Clark 1992[104] Rogers et al 1992[28] Camacho et al 1993[160] Hubert et al 1993[105] Maddox et al 1994[29] Robert & House 1996[89] Ross & Wu 1996[101] Smith & Kington 1997[135] Berkman & Garland 1998[136]	Negative for most of the reports of prevalence of, or change to, impairment. For Keil only applied to white women (even after adjusted for other risk factors) and Robert did not have a clear-cut association. Ceased to be significant for decline in functioning after adjustment for other factors [Palmore] but stronger than income for Hubert. Education not associated with improvement in functioning [Rogers]
		Harris et al 1989[165] Strawbridge et al 1996[163]	Positive association with continued physical ability at 6/7 years [Harris, Strawbridge]
	Income	Hubert et al 19933[105] Robert & House 1996 [also liquid assets][89] Smith & Kington 1997[135] Berkman & Garland 1998[136]	Liquid assets & housing tenure were better predictors than income and education up to age 75-84 years. Some sources of income preventive, others not, and others affected by disability [Smith]. Income factor attenuated jointly by social, demographic factors and other s.e.p. [Berkman].
		Guralnik & Kaplan 1989[183] Strawbridge et al 1996[163]	Positive association high physical functioning
	Combined education and income	House et al 1990[158]	Negative for age 65-74 years, but null for age 75 years and over

Table 2.3.2 continued

Outcome	Socioeconomic factor	References	Summary
	Poverty/income inadequacy	Maddox & Clark 1992[104] Rogers et al 1992[28] Kaplan 1992[27] Maddox et al 1994[29]	Not clearly associated in two studies [Rogers, Kaplan]; poverty dominated over education in stable-income group who had been employed [Maddox '92];but transitions to poverty not always predict short-term transitions to disability [Maddox '94]
Mobility problems	Housing tenure	Forbes et al 1991[133]	Yes
	Education	Harris et al 1989[165] Guralnik et al 1993[134] Melzer et al 2001[167]	Negative. Not reach significance for some subgroups [Melzer, Guralnik] – marginal for women in total [Guralnik]. (Melzer did not find an association for recovery from difficulties)
	Income	Guralnik et al 1993[134]	Negative
	Poverty/inadequate income	Forbes et al 1991[133] Kaplan 1992[27]	Negative. Stronger than housing tenure [Forbes]. Also applied to subgroup with incident disease [Kaplan]
Moving into an institution	Education	Vicente et al 1979[110] Palmore 1976[109] Branch & Jette 1982[111] Brock 1985[112]	Negative bivariate [Palmore] but not for Vicente. None in models adjusted for prior physical & mental difficulties [Branch] or social support [Brock– small sample] or marital status & race [Palmore]
	Poverty/inadequate income	Vicente et al 1979[110] Palmore 1976[109] Branch & Jette 1982[111]	Of the three studies only some association with stays of over 6 months for Vicente
Mortality / life expectancy	Occupation – social class	Moore & Hayward 1990[106] Berkman & Gurland 1998[136]	Patterns differ for longest-held or lifetime occupation; [Moore]. Accounted for by education/income [Berkman]
	Education	Moore & Hayward 1990[106] Rogot et al 1992[107] Rogers 1995[162]	Marginal for Rogers, accounted for by occupation and income for Moore & Hayward but present for Rogot [bivariate]
	Income	Branch & Jette 1984[148] Moore & Hayward 1990[106] Rogot et al 1992[107] Backlund et al 1996[184]	Negative but only for men in Rogot and only for women in Branch

Table 2.3.3 Socioeconomic position and outcomes for older people in other high-income countries

Outcome	Socioeconomic factor (s.e.p)	References	Summary
Limiting long-term illness or general limitation of daily activities	Occupation – social class	Dahl & Birkelund 1997[74] Rahkonen & Takala 1998[113]	Workers had greater prevalence of LLTI [Rakhonen] but occupation was only significant for men [Dahl] and then only before adjustment for other measures or s.e.p.
	Housing tenure	Dahl & Birkelund 1997[74]	None (already adjusted for other s.e.p.)
	Income	Dahl & Birkelund 1997[74]	Negative
Self-reported poor or good health	Occupation – social class	Thorslund & Lundberg 1994[117] Rahkonen & Takala 1998[113] Damian et al 1999[118]	Mixed results. Workers & farmers having high risk [Rakhonen]; Manual under age 85 years increased risk [Damian]; not significant [Thorslund]
	Housing tenure	Liang et al 2002	Renters more likely to have poor outcome
	Education	Reijneveld & Gunning-Schepers 1995[185] Kempen et al 1999[124] Regidor et al 1999[120] Lasheras et al 2001[123] Liang et al 2002[122]	Mixed results – Applied to both genders in one study [Reinjeveld]; only clear association for women [Lasheras] and not associated in third (already adjusted for income and other factors) [Liang]. For multi-item SF20/SF36 measures: Weak association [Kempen], men only {Regidor]
	Income	Liang et al 2002[122]	Negative
Difficulties in functioning (self-report)	Occupation – social class	Parker et al 1994[164] Rahkonen & Takala 1998[113] Amaducci et al 1998[119] Beland & Zunzunegui 1999[126]	An association was found but not a trend [Parker]; it was clear for men but marginal for women [Rakhonen]. Not an obvious difference between white collar and blue collar workers [Amaducci]. The association disappeared in a model including other measures of demographic and s.e.p.[Beland]
	Housing tenure	Liang et al 2002[122]	None

Table 2.3.3 continued

Outcome	Socioeconomic factor (s.e.p)	References	Summary
Difficulties in functioning (self-report) (cont.)	Education	Parker et al 1996[121] Amaducci et al 1998[119] Beland & Zunzunegui 1999[126] Rautio et al 2001[125] Liang et al 2002[122]	Mixed results. Amaducci and Liang found a negative association, as did Rautio but for women only. Education effect remained after adjustment for income & occupation but disappeared after inclusion of health variables [Beland]. For Parker it was accounted for by smoking & prior health.
	Income	Beland & Zunzunegui 1999[126] Liang et al 2002[122]	Negative. The association disappeared in a model including other measures of demographic and s.e.p. [Beland] but not in Japanese study [Liang]
	Perceived financial situation	Rautio et al 2001	Negative (association with IADL accounted for by chronic diseases among women)
Mobility difficulties	Occupation – social class	Parker et al 1994[164]	Yes
	Education	Parker et al 1996[121] Sakari-Rantala et al 1995[127]	The effect was accounted for by smoking and prior health in one study [Parker] but persisted in model adjusted for health and home factors in the other
	Income	Sakari-Rantala et al 1995[127]	None
Measured performance	Occupation – social class	Parker et al 1994[164] Thorslund & Lundberg 1994[117]	Yes
	Education	Parker et al 1996[121] Rautio et al 2001[125]	For men only [Parker et al] but only for some measures [Rautio et al]. Rautio found a consistent association for women across different measures.
Quality of life	Education	Kempen et al 1999 (SF-20)[124] Regidor et al 1999 (SF-36)[120] Lasheras et al 2001 (happiness)[123]	Strong association for both men and women [Lasheras]. Weak associations [Kempen]. After adjustment for sociodemographic factors both men and women had significant associations for 4 out of 8 dimensions [Regidor]

Table 2.3.3 continued

Outcome	Socioeconomic factor (s.e.p)	References	Summary
Mortality [mainly all-cause]/ life expectancy	Occupation – social class	Olausson 1991[114] Martelin 1994[115] Martelin et al 1998[116] Korten et al 1999[147] Van Rossum 2000[141]	Class I/II had lowest rates but not trend [Olausson], occupational differences exist [Martelin 94 and 98]– stronger for men and for younger old [Martelin 94]. Only a differential for men but not independent of income and education [Van Rossum]. No association in Australia [Korten]
	Education	Martelin 1994[115] Sundquist & Johannsson 1997 Amaducci et al 1998[119]	Mainly negative associations in simple models [Amaducci, Martelin 94 & 98, Regidor, Sundquist, Van Rossum, Regidor]. Tendency for those with no education to have higher rates in Spain but more robust in Madrid than Barcelona [Borrell, Regidor]. Education ceased to be significant after adjustment for material factors and employment [Manor] or for income [Van Rossum]; alternatively explained by disability age and gender [Amaducci] or through pathway of poor health [Liang]. No association in Australia [Korten]. Education effect persisted over time for women not men and for younger old rather than older old [Liang]
	Income	Martelin 1994[115] Van Rossum 2000[141] Martikainen et al 2001[188] Liang et al 2002[122]	Negative association for both genders [all]. After adjustment for education, only remained significant for men in one study [Van Rossum] but barely affected in another [Martikainen]. Attenuated by social factors & disappeared when health factors added [Liang]
	Housing tenure	Sundquist & Johannsson 1997[128] Liang et al 2002[122]	Yes in one study [Sundquist] but not in another even at bivariate level [Liang]
	Other	Martelin 1994[115] Manor et al 1999[140]	Strong negative association with material circumstances of housing & car ownership even in models with several factors [both]. Lower mortality rates if employed [Manor]

3 Data Sources and Methods

3.1 *Longitudinal Study*

Investigator: Astrid Fletcher (LSHTM). Funding: Department of Health

The Longitudinal Study (LS) links data from successive censuses since 1971 with routinely collected vital registration data from the National Health Service Central Register (NHSCR).[189] At any one time the study represents a one per cent sample of the England and Wales population. Mortality data were taken from the NHSCR and other data from the Censuses of 1971, 1981 and 1991. Of the members of all ages selected from the 1971 Census, 97% were identified on the NHSCR and 92% at the 1981 Census [189] and 90% on the 1991 Census (personal communication Brian Dudgeon SSRU, 2001). At the time of the analyses, the Office for National Statistics and the Centre for Longitudinal Studies (then at City University) administered the Study.

3.1.1 Outcomes

Three outcomes from the Longitudinal Study are used:

- Mortality for the period up to end of 1992
- Being in an institution in 1991. An institution, as defined in the Census, is any establishment where individuals live communally rather than in separate households. It excludes sheltered housing if more than half the people living in the complex possess facilities for cooking their own meals. For the older age group, institutional residence usually refers to a residential home or a nursing home.
- Reporting a limiting long-term illness (LLTI) at the 1991 Census. This is defined as answering "yes" to the following question: *"Do you have any long-term illness, health problems or handicap which limits your daily activities or the work you can do? (Include problems which are due to old age)".*

3.1.2 Socioeconomic classification used

The Census information on socioeconomic position that we used comprises:

- Social class (according to the 1971 classification)[190] derived from current occupation or, if not currently working, most recent occupation. Currently married women were assigned their husband's social class since many women did not work. In the Census widows and divorcees are not asked about their ex-husband's occupation.
- Housing tenure. In the analyses people not in institutions have been grouped into the two categories of owner-occupation and renting. Numbers would have been too small to use a finer division for analysis of outcomes by changes in socioeconomic status.
- Car availability, defined as the number of vehicles owned or normally available for use by one or more members of the household.

In the analyses, primacy was given to the housing tenure and car availability measures because these are strong discriminators of mortality among people of retirement age.[131]

3.1.3 Procedures

Having gained permission of the custodians of the LS, the data was extracted from the full Longitudinal Study datasets by Andy Sloggett, who undertook all the computing. He is an authorised user of the LS data sets and was experienced in dealing with this data. The extraction took place in a way that avoided identification of individuals. EB specified the analyses in consultation with Astrid Fletcher and Andy Sloggett and wrote up the results. Two papers have been published.[191;192]

3.1.4 Analysis strategy

Analyses were undertaken separately for men and for women and also for age groups 55-64 years and for 65-74 years (age in 1971). These age groups were chosen because during the following decade they would respectively be passing through the early years of retirement and the years when health can be expected to deteriorate

quite rapidly. We hypothesised that predictors could vary in late middle age and early old age.

Two demographic factors were included which may indicate the presence of psychological and practical support (*de facto* marital status and whether living alone) because these can affect the outcomes and be related to socioeconomic position.[193-195]

The populations and main analyses are defined below.

a) *Mortality*

Baseline (1971) characteristics were used as predictors of death up to the end of 1992 for everyone alive in April 1971 including those in institutions. Inter-census changes in socioeconomic and demographic factors were used as potential predictors of mortality for deaths after April 1981 for people living in the community in both 1971 and 1981.

b) Living in an institution

The relative risk of survivors at the 1991 census being in an institution in 1991 was estimated (i) according to characteristics at the 1971 census and (ii) according to inter-census changes in socioeconomic and sociodemographic circumstances. People living in institutions in 1971 or 1981 and those who had died by 1991 were excluded.

c) Limiting long-term illness (LLTI)

These analyses were confined to people who were alive and in the community in 1991 (i.e. not in the residential care of an institution), by which time they would be aged 75-94 years. Otherwise the analyses were as for institutions but with self-reported LLTI as the outcome.

3.1.5 Statistical methods

Maximum likelihood multivariate logistic regression was used for all models .[196;197] The reference groups were those thought least likely to have the three outcomes. Models were run adjusting the odds ratio for each factor for age alone (by inserting a

variable designating five-year age-groups) and then including all the factors with age to see which factors were independently associated with the outcomes. Models shown are ones adjusted for all factors unless otherwise specified. For the models using baseline factors there was adequate power to analyse by combinations of housing tenure and car availability and of marital status and living arrangements but the four variables were kept separate for the models of change. The analyses in Chapter 4 are constrained by the work done for the Department of Health. Once that was complete, no further extraction of data could take place. Additional points specific to the outcomes are given below.

a) Mortality

All mortality models included five-year time periods as well as age. The more usual survival analysis technique of Cox's proportional hazards model was not used because of technical difficulties at the time of analysis in incorporating person-years exposure. Instead, inclusion of five-year time bands allowed for absolute risk levels to vary over time while assuming that odds ratios remained constant. As a high percentage of people died within the period covered, risk ratios were also calculated by hand and used in the tables where the level of the parameter value is the main interest. Odds ratios are retained where the purpose of the table is to show whether there are differences between parameter values in two models.

Analyses were also undertaken separately for the early and later deaths in case selection of those in poor health into certain socioeconomic and demographic groups accounted for variation in mortality risk between them.

b) Living in an institution

It was not possible to adjust for health selection by excluding those who moved into institutions in the early years because date of the move was not known. As the outcome is not very common the odds ratios are presumed to be close in value to the risk ratios.

c) *Limiting long-term illness*

The population for analysis of this outcome was smaller than for the other two outcomes, particularly for the older age groups. For these older age groups some

categories were combined to avoid problems of small numbers but so that the main hypothesis could still be tested. For the transition models the groups who changed status were kept separate, however small, meaning that the power to detect differences was reduced. As LLTI was common among this population the odds ratios do not always approximate risk ratios and risk ratios were derived from logit models for the tables giving main results (as for mortality). However, the logit models needed to estimate risk ratios from odds ratios were only run for the fully adjusted models. As a consequence, odds ratios rather than risk ratios are used in tables comparing partially and fully adjusted parameters.

3.2 *Whitehall Resurvey*

Investigators: Astrid Fletcher, David Leon (LSHTM), Rory Collins, Robert Clarke, Linda Youngman (Clinical Trials Service Unit, Oxford University), Michael Marmot (University College, London). Funding: British Heart Foundation

The Whitehall Study is a prospective study of 19019 male civil servants working for London-based Departments who were aged 40-69 at the time of their initial screening in 1967-70 (baseline). The original epidemiological aims of the study were to identify risk factors for cardiovascular and respiratory disease.[198;199] Participants had a clinical screening involving measurements of blood pressure, height, weight, lung function and heart function (via an electrocardiogram). They also completed questionnaires about their jobs, smoking habits, and various symptoms (notably angina and symptoms of diabetes). One subsample was asked about walking to work, gardening, and walking around at work; another subsample was asked about leisure activity. Participants were flagged with the National Health Service Central Register after the first screening so that mortality could be monitored. A major finding from the initial study was the marked gradient in mortality by grade of employment in the Civil Service with the clerical and manual grades having notably higher rates than professional and executive grades who, in turn, fared worse than the most senior administrative grades.[200] The resurvey was designed to look at risk factors for cardiovascular deaths in old age, in particular in relation to the combination of exposure levels for blood pressure and cholesterol in middle age and old age. In addition it provided the opportunity to collect

information on various aspects of morbidity in old age and to see whether the socioeconomic factors measured in middle age were predictive of these.

At the baseline in 1967-70, 99% were identified on the NHSCR. Response varied by grade, being 87% in the administrative grades, 81% in professional and 85% in executive grades, 74% in clerical grades, and 58% in manual grades.

By 1995, when the resurvey was planned, about 10000 of the original cohort were known to have died and 600 were lost to follow up. The remaining 8400 men were distributed among 96 health authorities in England and Wales, 141 in Scotland, and 21 in Northern Ireland.[201] Although 75% were resident in 28 health authorities in South-East England the cost of face-to-face interviews would have been prohibitive and telephone numbers were not known. Hence a postal survey was designed. The survey aims were:

- To establish the associations between long-term measures of blood pressure and cholesterol and deaths from cardiovascular disease
- To quantify the associations between risk factors in old age and subsequent mortality from cardiovascular disease
- To estimate relative risks of morbidity in old age by socioeconomic status in middle age.
- To establish whether socioeconomic status in old age either moderated or exacerbated the effects of socioeconomic status in middle age on mortality in old age.

Both the third and fourth aims are pertinent to the theme of this thesis. However, analyses of mortality in old age required accumulation of death data at least until January 2002 and could not be included in this thesis.

3.2.1 Pilot Study for the Resurvey

Before attempting to contact all survivors, a pilot study tested the feasibility of conducting a re-survey.[201] Robert Clarke of the Clinical Trials Service Unit at Oxford University (CTSU) designed the Study under the guidance of the Steering Group. CTSU administered the fieldwork both at the pilot study and main study. They took a random sample of 401 members of the cohort resident in three health

authorities areas (Bromley, Oxford and Lambeth, Southwark and Lewisham) that were purposively chosen to reflect a variety of socioeconomic levels. The NHSCR has a record of the General Practitioner (GP) with whom the study member is registered and hence the health authority in which he is likely to live. CTSU asked these health authorities to provide addresses for the study participants in their area. An address-enhancement computer software package improved the completeness of the addresses. Just before the mailing, the vital status of those selected was checked with the NHSCR to minimise the chance of addressing a letter to someone who had already died. It was considered important to avoid distressing bereaved relatives.

The three participating institutions (Oxford, University College London, and London School of Hygiene and Tropical Medicine) gave ethical consent to the study. Written consent from individuals was sought at the same time as completion of the questionnaire. If no response was received within a month of posting the questionnaire and consent form, the administrators sent a second questionnaire. Where this failed to elicit response, CTSU sent a third copy by recorded delivery that required the Royal Mail to obtain a signed acknowledgement of receipt of the letter. Using this service helped to establish whether the addresses were accurate.

The questionnaire contained questions on medical history, smoking, alcohol consumption, socioeconomic and demographic circumstances, social support, activities of daily living, current medications, and self-assessed current health. The pilot contained two experimental components in a factorial design, of which one is of particular importance to the assessment of health inequalities. Income is rarely included in surveys because of its sensitivity but in a random half of the questionnaires, the following questions were included that were designed not to be intrusive:

- " *Do you (or, if married, your wife) have any income besides your own Civil Service Pension and State Pensions?*" Yes/No
- If yes, "*approximately what percentage of your total (joint) income do these other sources of income account for?*" Less than 20%/ 20-50%/ over 50%
- "*Taking all sources of income into account, what is the average total net income after tax received by you (and your wife)?*" The weekly and annual

amounts given are equivalent. Bands of annual income given were: £0-5199/ £5200-10399 / £ 10400-15599 / £15600 – 20799 / £20800 or more

The other experiment involved an "informant" questionnaire that the study member was asked to pass on to someone who knew him well. The structured questionnaire asked this informant to assess behavioural changes during the previous year that might reflect deterioration in the participant's memory or mental state.[202]

3.2.1.1 Results of the pilot study

Addresses were obtained for all 401 study members selected for the pilot and affirmed to be alive by NHSCR.[201] Of these, 96% were assessed to be accurate on the basis of either receipt of a completed questionnaire, a direct refusal, or the signed receipt of the second reminder. Completed questionnaires were received from 73% of those approached. The second and third reminders were worthwhile in that they boosted response rate from 55% to 67% and then to 73% respectively. The inclusion of the additional questions on income did not affect response (73% response in both arms) but the inclusion of the informant questionnaire did (76% response for the control arm and 70% for the experimental arm). Response rate declined steeply with age from 82% of those aged 74-79 years at the time of the pilot to 53% of those aged 85 years and over. Also, the response was considerably lower among clerical and manual grades (44%) than among other grades (81%).

3.2.2 Main Resurvey

The design changed little from the pilot study. The 'informant' questionnaire was not used but the income questions were retained. Minor amendments improved the layout of the questionnaires. As response was differential by age and grade at the pilot, two measures were taken to obtain at least a subset of the information from people who otherwise would not respond. At the second reminder, a short two-sided questionnaire replaced the full 16-side questionnaire. For those who did not respond to the second reminder, telephone numbers were obtained from Directory Enquiries where possible. Telephone interviews collected the same information as the short questionnaire.

3.2.2.1 Response results

At the time of the re-survey there were 8537 men whose death had not been notified to the research team. Of these, 6168 completed a full questionnaire (72%) and 873 a short one (10%), 209 of the latter by telephone. Response rate was assessed by baseline characteristics. Response to the full questionnaire was lowest among the lower grades, older men, smokers, those with increasing cough or wheeze at baseline, and obese men (Table 3.2.1). It did not vary by evidence of heart disease at baseline, by hospital admissions for other than cardio-respiratory disease, or by quintile of diastolic blood pressure. The boost from the short questionnaire was disproportionately high among people from lower grades. Response was most strongly associated with grade and age. Response rates to the full questionnaire were 80% for administrative staff and 55% for clerical and manual employees. Only 64% of men aged 80 years and over at the time of resurvey participated compared with 77% of younger ones. Other response rate differences within grades were probably too small in percentage or numbers to bias the results (Table 3.2.2) although there was lower response among current smokers at baseline and among the small group of clerical/manual staff with increasing cough or wheeze at baseline (two thirds of them smokers).

3.2.3 Outcome measures

This thesis uses four measures of self-perceived morbidity that can also be seen as indicators of health-related quality of life:

Poor general health

Those rating their health poor or very poor on a 6-point scale ranging from very good to very poor.

Poor mental health

Score less than 65% of the maximum on the mental health instrument from the Short Form 36 (SF36)[203] that is a widely used measure of quality of life. For each of five component items the six options were scored 1-6, 1 being worst.

Poor physical performance

Scores less than 40% of the maximum on the physical performance instrument from the SF36 that asks people to state whether their health limits their activity. For each of the ten component items, scores of 1, 2, and 3 were assigned respectively to the answers: "*limited a lot*", "*limited a little*", and "*limited not at all*".

Disability

Inability to do at least one of five ADLs, or activities of daily living, (cutting toe nails, dressing, cooking a hot meal, going up or down steps, doing light housework and simple repairs). These are a subset of the scale used in Townsend's Poverty Survey.[204] Response options were that: they "*can do it with no difficulty*"; they "*can do it with some difficulty*"; and they were "*unable to do it*". Those with no wish nor need to do the activity should answer according to what they "*could do if they had to*".

The last three outcomes were only available for those who completed the full questionnaire. The score thresholds for the second and third outcomes were chosen to approximate the lowest deciles. The SF36 indices were scored as recommended.[205] Some partial answers could be used for the two SF36 items and the disability scale. For the SF36 scales, a total score was imputed if less than half the answers were missing. Initially, the answers given were scored and summed. This sum was then inflated by the inverse of the proportion of missing answers (e.g. if 3 out of 10 answers were missing for physical performance, the initial score was multiplied by 10/7). This imputation assumes that they would have scored their average known score on the missing items. For the disability indicator, missing answers were treated as if the person had no difficulty - if all five items were blank, no indicator was assigned.

3.2.4 Socioeconomic classifications used

The baseline socioeconomic classifications used are employment grade within the Civil Service (administrative, professional/executive and clerical/manual grades), car ownership, and, measured retrospectively at re-survey, housing tenure. The main indicator is employment grade.

3.2.5 Procedures

All investigators plus Martin Shipley (UCL) and EB participated in the Steering Group, which was responsible for the design and implementation of the protocol. Robert Clarke was mainly responsible for document development (assisted by EB) and for the design. The CTSU administered the fieldwork and created the initial database. EB merged this with the baseline data and created the derived variables necessary for analysis, then ran the analyses and wrote up the results concerned with health inequalities. UCL provided statistical general advice. One paper on the socioeconomic aspects of the study has been published.

3.2.6 Analysis strategy

The analyses in chapter 5 start by showing the variation in chances of each poor morbidity outcome by employment grade in basic models adjusted only for age. Then potential explanatory factors are introduced: first, some baseline health factors in case prior ill health explains later ill health; second, smoking and physical activity as factors that could be adverse for health and also associated with employment grade. I then explore whether housing tenure and car availability in mid-life further discriminate between groups with respect to the morbidity outcomes in addition to employment grade. Finally, in an attempt to see whether socioeconomic circumstances in older age have an additional association to those in middle age, I refine the models by adding in separately their income level at time of resurvey and change in employment grade between baseline and leaving the Civil Service. I also test whether the effects of presumed changes in socioeconomic position had different effects according to employment grade at baseline.

3.2.7 Statistical methods

Chi-square tests were used to test for bivariate associations. Logistic regression was used to estimate the magnitude of relative risk for an outcome, using Stata 5 for Windows 3.1[206] and Stata 6 for Windows NT/97/98.[207] All models were adjusted for age at re-survey (less than 75 years, 75-79 years, 80 years and over). An ordered outcome logit model was used to predict number of adverse outcomes by employment grade. Unless otherwise specified, potential explanatory factors were

only retained in models shown in Chapter 5 if they were significantly associated with the outcome in this sample.

3.2.8 Reliability of the results

Having a pilot study and the main resurvey allowed us to compare answers for 207 men who took part in both. The median time interval between the two surveys was 20 months (range 16-27 months). Consistency over time was measured by a reliability index for continuous variables and by the kappa statistic for categorical variables .[208] For ordered categorical variables a weighted kappa statistic was used. Overall, the consistency of self-reported information covered by the questionnaires was good.

Tables 3.2.3 and 3.2.4 show the results for the variables used in this thesis. Of the 205 giving answers both times to the question on general health, about 5% changed answers from 'very good/good' health to 'average/poor/very poor' and a similar percentage did the reverse. Three-quarters reported good health both times and 15% not good health both times. A quarter of men increased the number of ADLs for which they said they had difficulty or worse and 9% decreased the number. There were small decreases in the mean adjusted scores for mental health and physical performance (Table 3.2.4). There was some regression to the mean for the mental health score (regressing resurvey measurement on pilot measurement and adjusting for age yielded a parameter of 0.72) but not for the physical performance score that was more highly skewed to the best score (the regression parameter being 0.94). The kappa scores for general health and number of disabilities are fair but genuine changes in health status were expected over a time lapse of 20 months among this age group. It is reassuring in terms of validity of the answers that there was more reported deterioration than improvement in activities of daily living and likewise in the physical performance score. However, reporting better health the second time is not necessarily an inconsistency. Positive changes may result from a feeling that they should minimise their health problems to avoid being labelled old,[1] as part of an adjustment to reduced activity,[1] or because survival accompanies a more positive attitude to health.

As part of the analyses we looked at self-reports of cardiovascular disease. The kappa scores were high except for stroke but there were worrying inconsistencies. At least as many participants changed responses concerning a disease from "yes" to "no" between the pilot and the resurvey as changed their responses in the reverse direction. For example, four of the 25 saying they had had a heart attack did not repeat this at the resurvey. 'Forgetting' a heart attack or stroke could happen if the event was minor and the doctor did not make much of it.

The kappa scores for socioeconomic items were good. Nevertheless, 14% of the answers for income were a category higher at resurvey than pilot and 16% a category lower. Changes in answers to the two questions about income (overall band and sources of income) were uncorrelated. These changes were not explained by gain or loss of a partner (who might have contributed income) or by retirement between surveys. Kappa values of over 0.9 were obtained for employment grade and age at leaving the Civil Service, and reason for leaving.

We could not assess directly whether there was a subset of cognitively impaired men who were responsible for the less plausible differences in answers. The only indicator of some kind of difficulty in coping with the questionnaire was a question about receiving help to answer the questions. Seventeen men had help at one or other of the two time points but excluding these from the analysis did not make a substantive difference to the results.

Our conclusion was that the information was sufficiently good to be highly informative about morbidity in old age in relation to circumstances in middle age.

3.3 *The MRC Trial of Assessment and Management of Older People in the Community (MRC Study)*

Investigators: Astrid Fletcher (LSHTM), Dee Jones (University of Wales College of Medicine), Christopher Bulpitt (Imperial College), Alistair Tulloch (Oxford University). Funding for the Trial: Medical Research Council. Funding for analyses of baseline quality of life by socioeconomic position: Economic and Social Research Council.

This trial was developed in response to concerns about the effectiveness of routine screening of people aged 75 years and over in the general practice setting.[209] From 1990, GPs contracts included a requirement to offer an annual health check to patients in this age group. The emphasis was on functioning and disability rather than on disease. The guidelines were vague but required them to cover the following dimensions as appropriate: sensory function; mobility; mental condition; physical condition including continence; use of medicines; social environment.

Although there had been five previous UK trials of multi-dimensional screening in primary care,[210-212;212-214] the power of the studies was fairly low and the follow-up short so the conclusions which could be drawn were weak. This trial was designed to provide a more comprehensive answer concerning the impact of different forms of screening on mortality, hospital admissions, admissions to long-term care in institutions, and quality of life. A further dimension, not previously studied systematically, was the relative benefit of management of health problems by a primary care team and by a geriatric evaluation team. The cost effectiveness of each approach was also to be estimated. A protocol paper has been submitted for publication.[215]

3.3.1 Design

The cluster-randomised trial had a 2-stage design, with general practices as the unit of randomisation. The first stage was designed to evaluate case-finding. There were two aspects to this. First, comparisons between three modes of administration of a brief health assessment questionnaire and second, comparisons between targeted screening (a subsequent detailed examination dependent on answers to the brief

assessment) and universal screening (detailed assessment of all patients). The aim of the second stage was to evaluate the management of patients identified from the detailed assessment as having clinical problems requiring further investigation. Practices are equally randomised to the primary care team, or the local multidisciplinary geriatric team balanced across the Stage 1 randomization.
Assessments.

The brief assessment questionnaire, developed in conjunction with Wallace and Williams (who have published the binary response version of the questionnaire),[216] covers all the areas specified in the GP contract.

The Detailed assessment covered the same areas as the brief assessment but in greater depth (e.g. whispered voice test for hearing and Glasgow acuity cards for vision). Additional questions include more detailed assessment of symptoms (e.g. respiratory symptoms, possible angina). Finally some biological and anthropometric measurements were taken. The detailed assessment was conducted by nurses and usually took place in general practice surgeries but nurses made home visits where the patient was unable to get into the surgery.

3.3.2 Study sample

The trial was conducted in practices recruited through the MRC GP Research Framework and selected to be representative of the joint tertiles of Jarman and Standard Mortality Ratios (SMRs) in UK practices. To be eligible for recruitment, practices must have had the agreement of the local geriatrician to participate (prior to randomization), and have list sizes of between 200 and 700 of patients aged 75 years and over. Eligible patients were aged 75 years and over in the year the practice undertook the assessments, excluding anyone in long-term care or with terminal illness. Patients in residential or sheltered accommodation were included. However, the size criterion was waived when there was difficulty recruiting; also changes in some practices led to their numbers moving outside this range. Allocation to groups was by a computer generated randomization list, stratified by Jarman and SMR tertile as practices were recruited to the trial.

3.3.3 Quality of Life Component

Health-related quality of life was measured on a subset of the participants at baseline and up to twice more over a 36-month period. Twenty-four practices were to be assigned to quality of life measurement, spread across the nine strata. The baseline measurement took place just prior to the assessments; data from the follow-up quality of life assessments could not be used for this thesis as they were not available at the time of the ESRC funding.

There were three quality of life questionnaires, each one used in one third of the selected practices. This thesis uses the quality of life measures that were common to all three because they were considered the key measures (see outcomes below). These were four dimensions from the Sickness Impact Profile (SIP)[217] and the Philadelphia Geriatric Morale Scale (PGMS).[218]

The questionnaires included information on marital status, main person lived with, main housing tenure during adult life, current housing tenure, occupation, and also on informal and formal help received.

As an additional component of the inequality analyses, postcodes were attached to patients' addresses and these in turn linked to small-area data made available on Geographic Information Systems. Characteristics of the Enumeration District (ED) in which the individual lived and the areas surrounding it could then be used to look at whether area deprivation or density is an additional predictor of quality of life to personal socioeconomic circumstances or even eclipsed personal circumstances. Interactions between area and personal measures were also explored.

3.3.4 Response to baseline quality of life

The trial had three fewer practices participating than hoped as three practices dropped out too late to be replaced. Quality of Life was randomly assigned to 23 of these practices distributed across the Jarman/SMR tertiles as follows.

Table 3.3A Distribution of Quality of Life practices by Jarman and SMR tertile

SMR (tertiles within Jarman tertile)	JARMAN Highest deprivation	Medium deprivation	Lowest deprivation	
Highest	3	3	2	8
Middle	4	1	2	7
Lowest	3	1	4	8
	10	5	8	23

The baseline quality of life interviews took place between January 1995 and December 1998. In total, 9573 people on the age-sex registers of the 23 practices were eligible for the MRC Trial and of these quality of life questionnaires were analysed for 8734 (91%). An additional 147 people were interviewed but subsequently found to be ineligible and omitted from the results presented here. Within practices questionnaires were analysed for between 87% and 94% of eligible people. There were 81 (<1%) people for whom our colleagues at Cardiff reported co-operation but questionnaires were not used in the analyses; 14 of these had wrongly been labelled as belonging to a later round; for 32 we only had their occupation or use of services which had been entered on separate databases; the remainder were missing. Non-response among eligible people numbered 758 (8%) of which 686 were refusals, 59 had no record and 13 had other reasons (not found, could not be interviewed). Women aged 80 years and over at the time of invitation to the MRC Trial were least likely to respond (88% compared with 91% of men and younger women) (Table 3.3.1). There were brief assessments for 6405 people, 73% of those with quality of life information. Among the remaining 27%, the main reasons for being without a brief assessment were refusal (60%) and administrative reasons for not inviting patients (28%).

3.3.5 Outcome measures

The quintiles with the worst scores on:

- Home management (HM)
- Mobility (MOB)
- Body care and movement or Self care (BCM)

- Social interaction (SI)
- Philadelphia Geriatric Morale Scale (Morale)

The first three are SIP dimensions referring largely to physical functioning. The fourth is also a SIP dimension. The PGMS was intended to capture more of the individual's emotional response to their circumstances.

People could choose one of three responses in the Sickness Impact Profile (SIP): "yes, and due to health"; "yes, and not due to health"; and "no". The scores used in this thesis include any "yes" answers, whether due to health or not. The item answers were weighted using British weights from the Lambeth Disability Study[219] the total converted into a percentage of the maximum. Higher scores mean lower quality of life. Scores could range from 0 (high morale) to 17 (low morale) on the Philadelphia Geriatric Morale Scale. Missing answers were assumed to mean absence of a problem but those who had no answers to a scale were not given a score.

3.3.6 Socioeconomic classification used

The main socioeconomic classification used for the results from this study combines housing tenure with an indicator of dependency since it is known that some changes in housing tenure occurring in later life result from difficulties in coping with daily life. For example, older people may move from rented to owner-occupied accommodation when they move in with a son or daughter. Also, most sheltered housing is in the rented sector. These two changes could dilute the differences in quality of life by housing tenure. The classification used, called housing tenure-dependency, has a category for people in sheltered housing or residential homes; all others in owner-occupied or rented accommodation are subdivided into the 'independents' who live alone or with spouse and the 'dependents' who live with others. While this scheme will lead to some misclassification we believe it will considerably reduce any dilution of tenure effect resulting from health selection. It also enables us to test whether tenure effects differ between those who are in dependent situations or not. This categorisation is discussed further in Section 7.1.

Area measures were Carstairs scores [220] and population density derived from small-area data available as part of the national small area statistics scheme.

3.3.7 Procedures

The fieldwork for the quality of life interviews was organised by Dr Dee Jones and her team at Cardiff University; they trained the interviewers, monitored response, and kept General Practices informed of who had participated. Assessment fieldwork was the responsibility of the practice nurses under the co-ordination of the General Practice Research Framework headquarters team. Professor Chris Bulpitt's team at Hammersmith Hospital scanned the data until 2000, after which time members of the team at the London School of Hygiene and Tropical Medicine scanned the final batches of data. EB was involved in cleaning the assessment and follow-up data. She supervised the social class coding, which was done at LSHTM, and edited the baseline quality of life data. Thereafter, EB created the databases used in this thesis by merging information from the quality of life interviews, the occupational coding, the brief assessments, and then creating derived variables as necessary. Chris Grundy extracted the area information and linked it to the individuals' identifiers. Paul Wilkinson and Astrid Fletcher were co-investigators for the ESRC-funded analyses and provided valuable guidance and ideas on the approach to take in analysis. EB undertook the analyses reported in this thesis. The institutions involved and the Local Research Ethics Committees covering each general practice gave ethical approval for the study. Patients did not complete consent forms for the quality of life and assessments since they consented in answering the questions and the assessments were their annual screening for the year the practice took part in the trial.

3.3.8 Analysis strategy

As so little is known about national distributions of quality of life among older people in Great Britain, the variations in chances of poor quality of life by gender, age and marital status are presented first in Chapter 6. All subsequent models are adjusted by these factors.

In the remainder of Chapter 6 potential explanatory factors are added into models to understand better (within the limitations of cross-sectional data) how socioeconomic position might be leading to different prospects for quality of life. Health problems and lifestyle factors are seen as intermediate variables that may be more prevalent in one tenure group than another and account for differences in quality of life. Social contact and availability of help are seen as possible mediating factors, particularly for Morale, in affecting the way that people cope with their situation. Several explanatory factors are only available for those with brief assessments (70% subsample) or those who had detailed assessments and were in the universal arm (36% subsample). An assessment is made of whether the associations between housing tenure and quality of life differ substantially in these subsets compared to the full set. Analyses seeking explanations of tenure differentials use health, lifestyle and social contact information from the brief assessment. As the detailed assessment had different information, this is used as well but in a more exploratory manner, as the information was available for a much smaller number of people. The comparisons between owners and renters are restricted to the 'independent' group for analyses using the detailed assessment.

The criterion used to assess whether other factors explain any tenure differentials is a shift closer to 1.0 in the odds ratio for renters once additional factors are added in to the models.

In Chapter 7, I introduce Carstairs deprivation score and population density of the Enumeration District (ED) of residence and an indicator of whether adjacent EDs are on average more or less deprived than the home ED. First, they are analysed on their own for associations with the quality of life outcomes and then in conjunction with housing level-dependency and each other to see how many of the factors contribute independently to the outcomes. I also test for interactions between area measures and housing tenure-dependency.

Having covered all the explanatory factors, I end Chapter 7 by bringing several of them together in one model to see whether their cumulative effect accounts for the tenure differentials and also to assess which factors have the strongest impact on the associations between housing tenure-dependency and quality of life.

Chapter 8 concerns multiple measures of personal socioeconomic position. First, as in Chapter 7, I see how many, and which, of three measures of socioeconomic position in mid life and of housing tenure-dependency in late life, have statistically significant associations with quality of life even after adjusting for the others. Finally, to assess effect of transitions in socioeconomic position on quality of life, I analyse the relative chances of poor quality of life first by combinations of housing tenure in middle age and old age, then by combinations of social class (referring to circumstances in middle age) and housing tenure in old age.

3.3.9 Statistical methods

No normally-distributed transformation of the highly-skewed SIP quality of life scores could be found, so the "worst" quintile was compared with the remaining four-fifths of participants. The PGMS scores had a flatter distribution but again were not amenable to a simple transformation so were also divided into the worse quintile and remaining 80% of scores. These dichotomies selected out groups with much poorer quality of life than their peers.

Multivariate logistic regression was used to estimate odds ratios for being in the worst quintile according to socioeconomic status or other exposure category. Stata 6 was used with the "svy" suite of commands designed for multi-stage clustered samples.[207] This allows for clustering within practices by estimating semi-robust confidence intervals that take into account the intra-cluster correlation within practice.

All models are adjusted for gender, for age (2.5 year age bands up to age 87.5 years). Apart from the analyses concerning Carstairs scores and population density, the models were also adjusted for two factors that were part of the design of the study: tertiles of Jarman deprivation score and tertiles of standardised mortality ratio (SMR) within these tertiles.

In most cases the same models are used for all five outcomes so that comparisons can be made between them. Thus, factors are often displayed even if they are not

statistically significant factors for a particular outcome. To minimise the weakening of power by loss of partial information separate 'missing' categories were created for variables where 100 or more people did not have answers. The results for 'missing' categories are not always presented. The odds ratios for the missing value groups tended to be similar to the following categories for that factor: those taking 3 or more medicines, those who were incontinent, those without respiratory problems, and those without swollen legs. The missing value for alcohol tended to be similar to the group who had 1-7 drinks.

Study populations for tables in Chapter 3

Table Numbers	Data source	Dates of fieldwork	Study population
3.2.1, 3.2.2,	Whitehall Resurvey	1997-8	Survivors of a cohort of men in London-based Civil Service Departments and aged 40-69 years in 1967-70 (aged 65-97 years at resurvey)
3.2.3, 3.2.4	Whitehall Resurvey	1997-8	Men who took part in a pilot for the resurvey in 1995 and again in the main resurvey
3.3.1	MRC Study	1995-9+	Men and women aged 75 years and over registered in 23 general practices in Great Britain.. Eligible for health screening check for those aged 75 years and over. Exclusions: in a nursing home or too ill to take part.

Further notes:
+Fieldwork took place during 1995-9, the year depending on which General Practice the person belonged to.
*People could be aged 74 years at the time of the quality of life interview provided that they would be aged 75 years when they had an assessment by the General Practice (see pp77-8)

Table 3.2.1. Response to the Whitehall re-survey 1997/8 by selected characteristics

Selected characteristics	Total invited to take part	Completed full questionnaire No.	(%)	Completed short questionnaire No.	(%)	Chi square test for heterogeneity p-value
Age at re-survey						
Less than 75	3009	2316	(77)	262	(9)	
75-79	2917	2236	(77)	272	(9)	
80 and over	2537	1616	(64)	339	(13)	0.000
At baseline:						
Employment grade						
Administrative	553	443	(80)	23	(4)	
Professional/executive	6684	5052	(76)	657	(10)	
Clerical/other	1226	673	(55)	193	(16)	0.000
Smoking status						
Never	2070	1588	(77)	186	(9)	
Ex-smoker	3344	2496	(75)	318	(10)	
Pipe/cigar	330	249	(75)	28	(8)	
Cigarette smoker	2715	1832	(67)	341	(13)	0.000
Evidence cardiovascular disease						
No	7080	5353	(76)	746	(11)	
Yes	1104	813	(74)	127	(11)	0.366
Respiratory symptoms						
No phlegm	6343	4666	(74)	638	(10)	
Persistent cough/wheeze	1058	748	(71)	110	(10)	
Increasing cough/wheeze	405	267	(66)	56	(14)	
Hospital admission in past	645	481	(75)	69	(11)	0.008
Hospital admissions for other than cardio-respiratory disease (ever)						
Less than 4	7656	5583	(73)	804	(10)	
4 or more	807	585	(72)	69	(9)	0.075
BMI						
< 30 kg/m2	8218	6004	(73)	839	(10)	
>= 30 kg/m2	244	163	(67)	34	(14)	0.068
Quintiles of diastolic bp						
Le 73 mm Hg	1965	1460	(74)	181	(9)	
74-80 mm Hg	1988	1467	(74)	202	(10)	
81-86 mm Hg	1728	1258	(73)	186	(11)	
87-95 mm Hg	1641	1189	(73)	169	(10)	
>= 96 mm Hg	1137	792	(70)	135	(12)	0.21
Total	8463	6168	(73)	873	(10)	

Table 3.2.2. Percentage completing the full Whitehall resurvey questionnaire in 1997/8 by grade and potential confounder

Selected characteristics	Admin		Professional/ Executive		Clerical/Manual	
Age at re-survey						
Less than 75	170/199	(85)	1937/2453	(79)	209/357	(59)
75-79	169/205	(82)	1860/2372	(78)	207/340	(61)
80 and over	104/149	(70)	1255/1859	(68)	257/529	(49)
At baseline (1967-70):						
Smoking status						
Never	149/182	(82)	1300/1654	(79)	139/234	(59)
Ex-smoker	161/204	(79)	2112/2741	(77)	223/299	(56)
Pipe/cigar	35/40	(88)	200/268	(75)	14/22	(64)
Cigarette smoker	97/125	(77)	1439/2020	(71)	296/570	(52)
Evidence cardiovascular disease						
No	391/479	(82)	4385/5607	(78)	577/994	(57)
Yes	52/58	(90)	665/878	(76)	96/168	(57)
Respiratory symptoms						
No phlegm	342/435	(79)	3835/5049	(76)	489/859	(57)
Persistent cough/wheeze	42/53	(79)	607/817	(74)	99/188	(53)
Increasing cough/wheeze	13/13	(100)	209/293	(71)	45/99	(45)
Hospital admission in past	45/51	(88)	396/518	(76)	40/76	(53)
Evidence cardiovascular disease						
No	392/487	(80)	4594/6089	(75)	597/1080	(55)
Yes	51/66	(77)	458/595	(77)	76/104	(52)
BMI						
< 30 kg/m2	438/543	(81)	4923/6498	(76)	643/1177	(55)
>= 30 kg/m2	5/10	(50)	128/185	(70)	30/49	(61)
Quintiles of diastolic bp						
Le 73 mm Hg	130/162	(80)	1167/1523	(77)	163/280	(58)
74-80 mm Hg	88/110	(80)	1241/1606	(77)	138/272	(51)
81-86 mm Hg	89/116	(77)	1036/1381	(75)	133/231	(57)
87-95 mm Hg	89/103	(86)	955/1278	(75)	145/260	(56)
>= 96 mm Hg	47/62	(76)	651/893	(73)	94/182	(52)

Table 3.2.3. Kappa values for similarity of answers at pilot and resurvey: Whitehall study

Topic	n	Categories Variables in bold are those thought to be most subjective or most liable to change between pilot and resurvey	Kappa * if weighted	95% confidence interval
Income	95	Per annum: > £20,800, >£15,600 , >£10,400,		
	96	<= £10,400[1]	0.82*	0.66, 0.98
		% extra income over state & occupational pension: >50%, 20-50%, <20%, none[1]	0.67*	0.53, 0.81
	207	Housing tenure: owner; council/housing authority; other	0.83	0.71, 0.93
Retirement from Civil Service	206	Grade left Civil Service: unified, professional/executive, clerical/manual	0.92	0.80, 1.04
	206	Reason for leaving: retirement age, medical retirement, voluntary early retirement, compulsory redundancy, moving to another job, other	0.90	0.81, 1.00
	208	Age left (years): under 55, 55-59, 60, 61-65, over 65	0.94	0.81, 1.04
	207	Whether had paid job for at least 6 months after leaving Civil Service[2]	0.73	0.61, 0.85
Health	208	**Good, very good, average, poor or very poor (4 categories)**	0.58*	0.48, 0.68
	209	Whether reported heart attack or not	0.78	0.50, 1.06
	209	Whether reported angina or not	0.91	0.76, 1.05
	209	Whether reported stroke or not	0.41	0.31, 0.59
	207	No. activities of daily living cannot do or has difficulty doing: 0,1,2,3-5	0.58*	0.49, 0.70

1. Pre-specified categories
2. Paid job determined by an algorithm – see text

Table 3.2.4. Reliability of mental health and physical performance scores from the SF36: Whitehall Study

		At pilot			Difference in values: re-survey minus pilot measure		
		Median	5th centile	95th centile	Mean	95 % CI	Reliability index
Mental health score [1]	199	26.25	19.00	30.00	-0.40	-0.77, -0.03	0.71
Physical performance score [2]	203	28.00	17.00	30.00	- 0.92	-1.31, -0.53	0.79

1. The mental health scores could range from 5 to 25 (5 being worst). People were asked how frequently they experienced five emotions (being down, being in the dumps, being nervous, being happy, being calm). The score was adjusted for incomplete answers.
2. The physical performance scores could range from 10 to 30 (10 being worst). People were asked if they were limited a lot/ a little/ not at all by their health in ten activities. The score was adjusted for incomplete answers.

Table 3.3.1. Response rates to the quality of life baseline interview by gender and age at time of invitation to the MRC Study brief assessment

Number (percentage) of group in response category

Response	Agegroup at first invitation to brief assessment (years)[1]									
	74-79		80-84		85-89		90+		Total	
Men										
QOL scores	1675	(90.9)	1003	(90.9)	486	(90.7)	107	(87.7)	3271	(90.7)
Some response, no qol scores[2]	6	(0.3)	4	(0.4)	3	(0.6)	0	(0.0)	13	(0.4)
No response	162	(8.8)	97	(8.8)	47	(8.8)	15	(12.3)	321	(8.9)
	1843		1104		536		122		3605	
Women										
QOL scores	2316	(90.3)	1781	(89.6)	956	(89.5)	408	(86.3)	5461	(89.6)
Some response, no qol scores[2]	6	(0.2)	8	(0.4)	3	(0.3)	4	(0.8)	21	(0.3)
No response	242	(9.4)	199	(10.0)	109	(10.2)	61	(12.9)	611	(10.0)
	2564		1988		1068		473		6093	

1. Assessments took place 1995-1999
2. Some components of the quality of life questionnaire on database (e.g. occupation, demographic information) but insufficient to assign scores

4 The Longitudinal Study-Results

The Longitudinal Study, having the advantage of both being very large and longitudinal, could be used to address questions about differential outcomes in relation to socioeconomic status during the last years of working-age and early years of retirement age. Moreover, as socioeconomic status was measured both in 1971 and 1981, the health outcomes could be compared for those who had changed position during that period.

4.1 *Description of the Longitudinal Study (LS) sample*

4.1.1 Circumstances in 1971

There were 43092 men and 51278 women aged 55-74 years in the LS sample in 1971. Their characteristics are shown in the columns labelled A in Table 4.1.1. Analyses of mortality by change in socioeconomic and demographic circumstance were confined to the 60% of men and 73% of women in the community in both 1971 and 1981. Their baseline characteristics differed little from those of the sample in Table 4.1.1 except that men staying in the community were more likely to be in a household with access to a car (61% compared with 56% for men aged 55-64 in 1971 and 44% compared with 37% for older men) and older men were more likely to be in owner-occupied accommodation (58% against 52%). Analyses of institutional residence in 1991 were further restricted to those still alive in 1991 (41% of men and 54% of women who were in the community in 1981). The 1971 characteristics of this group of 10464 men and 20062 women are shown in the columns labelled B. Finally, to be included the analysis of limiting long-term illness (LLTI), people had not only to be alive in 1991 but also to be in the community (i.e. not in the residential care of an institution), leaving 10020 men and 18163 women (column C). These survivors came disproportionately from the more privileged groups. In 1991 the selected cohorts were aged between 75 and 94 years old.

4.1.2 Inter-Census changes in circumstances

Between 1971 and 1981 the most common changes experienced were losing a spouse and starting to live alone, (both affecting over 20% of women but smaller proportions of men) (column A, Table 4.1.2). Widowhood accounted for 79% of the losses for men and 92% for women. About 1 in 9 men and women changed housing tenure. About 1 in 6 men and 1 in 5 women changed household car availability, more losing than gaining it. The percentages of survivors to 1991 who had experienced change were similar but higher percentages had remained in the privileged socioeconomic groups (columns B and C).

4.2 *Relative 21-year mortality risks by socioeconomic position in 1971*

By the end of 1992, 70% of men aged 55-64 (the younger group) and 93% of those aged 65-74 (the older group) had died. The equivalent figures for women were 49% and 84%.

After adjusting for age, time period, and the other sociodemographic variables, the excess risk of dying experienced by people in households renting accommodation and without access to a car in 1971 was of the order of 33-44% relative to those in owner-occupied homes with a car available (Table 4.2.1). Most groups with intermediate socioeconomic circumstances had an excess risk of about 14-20%, a little higher for younger men. Women and older men living in institutions were at greatest risk of dying among the tenure categories. There was only a clear inverse association between social class and mortality among younger men. People not classified to a social class generally had higher risk of dying in the 21-year period than those who could be classified to one.

For men there were marginal excess risks of dying if single or widowed and living alone in 1971 but greater excess risk if living with others or if divorced or separated. For women there was little association between 21-year mortality and sociodemographic characteristics except an increased risk for older widowed women living with others.

The parameters for both socioeconomic position and demographic circumstances tended to be further from 1.0 before mutual adjustment than afterwards. This suggests that, for example, part of the excess risk of being in rented housing without a car is due to a person's marital status and living arrangement (alone or not).

Table 4.2.2 compares odds ratios for mortality for the first 4.5 years compared with the remainder of the period. There are three types of health selection that this could reveal. Negative health selection occurs when ill health leads to a change in socioeconomic or sociodemographic position. In older age change can be to a worse socioeconomic position (thereby exaggerating real socioeconomic effects) or to a better one (thereby underestimating the real effects). Positive health selection occurs when relatively good health enables someone to change their position. Finally, people who remain in a particular socioeconomic or sociodemographic group might be the fittest (e.g. sicker ones having left the work force), which one might call survival selection (although the losses are not necessarily through death). With the first type of health selection, one would expect excess mortality rates for the group to fall over time; with the other two types one would expect group mortality to be more favourable in earlier than later years.

For those in institutional residence, younger men with no social class, and older men without a car, the odds ratios for mortality after 1975 were lower than for the period up to 1975 (suggesting some earlier negative health selection), but the odds ratios remained substantially greater than 1.00 and statistically significant. The excess odds were statistically significant only in the first period for older men renting with a car and older divorced men not living alone (the latter again suggesting negative health selection). Mortality rate was statistically significantly raised only in the later period for older divorced men living alone (positive health selection) and for men in manual social classes (survival selection). The risk ratios were substantial in both periods for those in rented housing without a car, only the older men having lower risk ratios in the later than in the earlier period (possibly survival selection).

4.3 *Do changes in socioeconomic position in one decade alter the relative risk of mortality in the next?*

In general, being disadvantaged in 1971 and in 1981 was associated with an increased risk of dying between 1981 and December 1992 compared with those who were advantaged in both years (Table 4.3.1). For all but older men, moving from owner-occupied into rented accommodation carried statistically excess mortality risk compared to those who were in owner-occupation at both Census times. The excess risk was particularly high for women aged 65-74 in 1971 (26%, 95%CI 14-39%). These people's mortality risk was no better than the risk for people who were in rented accommodation in both years. Men who lost household access to a car carried increased mortality risk at least as high as those without access to a car at either Census. Losing access to a car was less important for younger women and unimportant for older women.

Including changes in sociodemographic factors attenuated many of the parameters for socioeconomic factors because changes in marital status or living arrangements can accompany a change in socioeconomic position. These factors were also of some importance for mortality risk. Risk ratios for people who lost their spouse between Censuses were similar to the ratios for people who had lost their spouse before 1971. People starting to live alone had 10-20% lower risk of mortality than people who were with others at both Censuses, fairly similar to the situation for people alone in both years.

Those whose socioeconomic circumstances had 'improved' tended to have similar risk of mortality to people who remained in more fortunate circumstances. However, gaining access to a car between Censuses carried greater risk for men.

Dividing the follow-up period into two led to wider confidence intervals (table 4.3.2). While the models for the earlier and later periods are remarkably similar on the whole there are some results that were consistent with poor health leading to change in socioeconomic group. The risk ratios were significantly different from 1.0 (or marginally so) in the earlier period but not in the later period for older people who 'gained' a car, for older women who moved into owner-occupation and for

younger women who moved out of owner-occupation. Also, the risk ratio was noticeably attenuated in the later period for younger men who were no longer in a household with access to a car. Positive health selection might account for changes in risk ratios between the two periods for older women who became alone. There are also a few more unexpected differences in the two periods: risk ratios closer to 1.0 in the later period for younger women who became alone, and for men who lived alone at both Censuses. Also, younger single men had noticeably greater excess mortality risk after 1984 than before.

However, some genuine effects of changes in socioeconomic position seem possible because the relative risk of mortality remained significantly raised in the later period for men who lost access to a car. The risk ratios for mortality were similar (and greater than 1.0) in both periods for younger men who moved into, or remained in, rented accommodation. The risk ratios tended to be lower in the later period than in the earlier period for women who had moved into, or remained in, rented accommodation but was only statistically insignificant for younger women who moved into rented accommodation. Having changed address was seen as a possible indicator of health selection on the assumption that for many people moves were motivated by a need to find somewhere where it was easier to cope. However, having moved either in the year before the Census or in the nine years before that neither had an impact on mortality nor acted as a confounder for the other factors (Appendix Table 4.3.A1).

4.4 *Relative risk of being in an institution in 1991 by socioeconomic circumstances 20 years earlier*

Proportionately more women than men were in institutions in 1991; 6% of women aged 55-64 in 1971 and 23% of those aged 65-74 compared with 3% and 14% of men in these age groups ($p<0.001$). Having the double socioeconomic disadvantage of rented accommodation and a household without access to a car carried a 90% excess risk of institutionalisation for men and 40-45% excess risk for women (Table

4.4.1)[v]. A single disadvantage also tended to imply a lower, but significant, excess risk.

The most striking differences for those aged 55-64 in 1971 were by marital status. It was particularly noticeable that being single was an important predictor of long-term risk (2-3 fold excess risk) compared with being married, irrespective of living alone or not. Being widowed, divorced or separated was also a disadvantage for younger men but this was not the case for younger women. There were fewer differences by marital status and living arrangements in the older cohorts but the high-risk groups appeared to differ for men and women. There is evidence that demographic factors were acting as confounders for socioeconomic ones. Surprisingly, the parameters for housing tenure and car availability were *further* from 1.0 for older men after adjustment than before.

4.5 *Relative risk of being in an institution at the 1991 Census by changes in circumstances between 1971 and 1981*

Living in rented accommodation at both Census dates was associated with an increased risk for both men and women in the younger age group (55 to 64 years in 1971) (Table 4.5.1). For both men and women and both age groups, lack of availability of a car at both Census dates increased risk by around 30% to 80%. Moving out of owner occupation into rented accommodation was a significant risk factor for women but not for men (although the point estimates were of the order of 20-30% increase for men). Loss of household access to a car was associated with an increased risk of institutional residence for the younger cohort.

Older men moving into owner-occupied accommodation had increased risk of being in an institution in 1991. Otherwise the risks of institutional residence for groups experiencing improvements in socioeconomic circumstances between 1971 and 1981 were not statistically different from those who were in the more favourable circumstances in both Census years.

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[v] Some limited analyses were done with the outcome of being in an institution in 1981. percentages were small (less than 1% of men and women aged 55-64 years in 1971. 4.5% of women and 2.6% of men aged 65-74 years in 1971). Nevertheless, older people renting and with car already showed increased risk of being in an institution.

Men who had lost a spouse between Censuses as well as those who had not been married at either Census had greatly increased risk of being in an institution in 1991 but younger men who became alone had decreased risk. Once adjusted for socioeconomic position, few changes in demographic situation carried significantly different risks of being in an institution in 1991 for women. Parameters for socioeconomic factors tended to be closer to 1.0 in the fuller model than the simpler one (the converse was true for some sociodemographic factors). The information is not available to show which factors had the strongest confounding effect but, it is possible, for example, that men who moved out of owner-occupation were more likely to be bereaved or single men.

4.6 *Relative risk of reporting a limiting long-term illness in 1991 by socioeconomic circumstances 20 years earlier*

A higher proportion of women than of men reported LLTI (47% of women and 44% of men aged 75-84 years in 1991 and 65% and 60% respectively of women and men aged 85-94 years). There was greater variation in risk ratios for LLTI by housing tenure and car availability than by socio-demographic variables (Table 4.6.1). People aged 55-64 years and living in rented homes without a car in 1971 had approximately 20-25% greater risk of reporting LLTI 20 years later compared to those living in owner occupation with a car. Younger people with intermediate socioeconomic status had an increased risk of 10-20%. For older people the excess risk of LLTI among the most disadvantaged socioeconomic group was close to 10% and there was no excess risk in the intermediate groups. In the younger age group social classes IV-V had a small excess risk, unclassified men a substantial one and unclassified women a moderately increased risk. Older women in social class IIIM had the lowest risk of LLTI.

Variation in risks of LLTI by marital status was fairly small but, in contrast to the previous outcomes, being single appeared to have some advantage for men. The results for women were complex. The differences between unadjusted and adjusted models (Appendix Table 4.6.A1) were small for this outcome, unlike in the models for mortality and moving into an institution.

4.7 *Relative risk of reporting a limiting long-term illness in 1991 by changes in socioeconomic circumstances between 1971 and 1981*

For men aged 75-84 years in 1991 ceasing to be in a household with access to a car between 1971 and 1981 was associated with a 26% (95% CI 16-36%) increased risk of LLTI whereas for women the excess risk was 12% (Table 4.7.1). For people aged 85-94 years in 1991 earlier loss of a car did not have a statistically significant effect but the results were consistent with a small excess risk. The observed excess risk from moving out of owner occupation in all groups was 10-20% but was only statistically significant among older women. Fully adjusted and simpler models had similar odds ratios (Appendix Table 4.7.A1).

4.8 *Summary*

The Longitudinal Study has the advantages of large numbers and a longitudinal perspective. Both of these enable us to see that there are clear long-term adverse associations between a lower socioeconomic status and all-cause mortality or, for survivors into very old age, chances of either moving into an institution or reporting a limiting long-term illness. As expected, men had higher risks of death than women but, among the survivors, women had higher risks both of being in an institution and of having a limiting long-term illness in 1991.

The combination of renting and no car in 1971 clearly designated groups who were at increased risk of all outcomes, except for older men with respect to limiting long-term illness but this was a very select group who survived until age 85-94 in the community. All four gender-age groups were at excess risk of mortality or institutionalisation if deprived of one of these privileges (though it varied whether lack of owner-occupation or car was important) and younger men and women were at excess risk of limiting long-term illness.

'Downward' moves from owner occupation to renting carried increased risks of all three outcomes for women (albeit marginal for younger women with respect to limiting long-term illness). For men the only significantly raised risk was found for mortality in the younger cohort but the point estimates for this group suggested some

increased risk for moving into an institution as well. In all the situations where the relative risk for a downward tenure move was statistically significant the risk was similar to, or greater than, that for people in rented homes at both censuses. Loss of a car carried statistically significant excess risk of all three outcomes for younger men and women and also of mortality for older men, and for men the excess risk was of similar magnitude to that of people who were without a car in 1971. Thus deterioration in socioeconomic position carried some disadvantages. It was also seen that those who remained in the less privileged positions performed worse on these outcomes than those who remained in the privileged positions.

With one exception, people who moved 'upwards' to owner-occupation had no greater risk of any outcome than those already in owner-occupation. However, men who 'gained' household access to a car had a greater risk of mortality compared to those already with access in 1971. The point estimate for the gainers was also high for younger men with respect to moves into an institution. These may have been due to health selection. No statistical tests were done to compare the 'gainers' with those who were in the less privileged socioeconomic position in both 1971 and 1981. Improvement in socioeconomic position seemed to put people in a position without substantially worse risks of the outcomes than the people who were privileged at both censuses.

There were fewer significant results for limiting long-term illness partly because of smaller numbers, partly because it was a more common outcome. As the population for this analysis had all lived to at least age 85 years, there may also have been a survivor effect that flattened out socioeconomic differentials.

In Chapter 9 some of the issues that could affect interpretation will be discussed, such as health selection, possible misclassification of socioeconomic position, the restriction of information on institutions and limiting long-term illness to one point in time, and the limited number of potential confounders that were available.

Key points

- Being in a rented home and without a car in late middle age and early old age carried increased long-term risks of all outcomes compared to people in owner-occupied homes with a car. The risk ratios (after adjustment of other factors) were 1.3-1.4 for 21-year mortality, 1.9 for men, and 1.4-1.5 for women, for being in an institution 20 years later, and 1.1-1.3 for having a limiting long-term illness 20 years later (but not significant for older men).
- Ceasing to be in a household with access to a car carried significantly increased risks of all three outcomes for younger men and women and of mortality for older men.
- Changing from owner-occupation to renting carried increased risk of all three outcomes for women, and of mortality for younger men
- There is evidence of some distortion of socioeconomic differentials arising from negative health selection (e.g. ill-health leading to change to owner-occupation) but this does not account for most of the major differentials found.

Study populations for tables in Chapter 4

Table Numbers	Data source	Date	Study population
4.1.1	Longitudinal Study	1971	Col A – men and women aged 55-74 years in 1971 Col B – men and women aged 55-74 in 1971 who were in the community in 1971 and 1981 and alive in 1991 Col C – as Col B and also in the community in 1991
4.1.2	Longitudinal Study	1971	Col A – men and women aged 55-74 years in 1971 and in the community in both 1971 and 1981 Col B – as Col A and alive in 1991 Col C – as Col B and also in the community in 1991
4.2.1, 4.2.2	Longitudinal Study	1971	Men and women aged 55-74 years in 1971
4.3.1, 4.3.2	Longitudinal Study	1971	Men and women aged 55-74 years in 1971 and in the community in both 1971 and 1981
4.4.1	Longitudinal Study	1971	Men and women aged 55-74 in 1971 who were in the community in 1971 and 1981 and alive in 1991
4.5.1	Longitudinal Study	1971	Men and women aged 55-74 years in 1971, in the community in both 1971 and 1981, and alive in 1991
4.6.1, 4.7.1	Longitudinal Study	1971	Men and women aged 55-74 in 1971 who were in the community in 1971, 1981 and 1991

Table 4.1.1 Baseline characteristics of A) all men and women in the 1971 Longitudinal Study sample, B) those in the community in 1971 and 1981 and alive in 1991, C) as B and in the community in 1991

Characteristic in April 1971	Age 55-64 years			Age 65-74 years		
MEN	A	B	C	A	B	C
Housing tenure/car availability	%	%	%	%	%	%
Owner-occupied, car	36	45	45	27	38	40
Owner-occupied, no car	15	13	13	25	24	23
Rented, car	20	21	21	10	12	12
Rented, no car	27	21	21	36	26	25
In institution	1	-	-	2	-	-
Social Class[1]	%	%	%	%	%	%
I/II	22	27	28	18	24	24
IIIN	11	11	11	11	15	15
IIIM	33	34	34	27	27	28
IV/V	29	25	25	31	28	27
Unclassified[2]	6	2	2	12	6	6
Marital status/whether alone	%	%	%	%	%	%
Married/cohabiting	87	89	89	81	87	87
Single, alone	3	2	2	2	2	{ 3
not alone	4	3	3	3	2	{ ..
Widowed, alone	2	2	2	7	5	{ 9
not alone	2	1	1	5	3	{...
Divorced/separated, alone	1	1	1	1	1	{...
not alone	2	2	2	1	1	{...
N	26222	8947	8715	16870	1517	1305
WOMEN	A	B	C	A	B	C
Housing tenure/car availability	%	%	%	%	%	%
Owner-occupied, car	31	35	36	20	25	27
Owner-occupied, no car	20	20	19	30	31	30
Rented, car	15	16	16	7	7	8
Rented, no car	32	29	29	41	37	35
In institution	1	-	-	2	-	-
Social Class[1]	%	%	n.a.	%	%	n.a.
I/II	18	20		13	17	
IIIN	13	14		9	11	
IIIM	24	25		14	16	
IV/V	26	25		19	20	
Unclassified[2]	19	16		44	36	
Marital status/whether alone	%	%	%	%	%	%
Married/cohabiting	70	72	72	48	54	55
Single, alone	4	4	4	6	6	{11
not alone	5	4	4	6	5	{...
Widowed, alone	9	8	8	24	22	22
not alone	8	7	7	12	9	9
Divorced/separated, alone	2	2	2	2	2	{..3
not alone	2	3	3	1	2	{...
N	28383	15458	14605	22895	4604	3558

1 Social Class derived from occupation at the Census or most recent occupation. Currently married women have been assigned the social class of their husband, other women their own social class

2 Those who could not be assigned a class either because of inadequate information or because they did not have an occupation

Table 4.1.2 Inter-census changes in socioeconomic and demographic circumstances for people: A) in the community in 1971 and 1981, B) also alive in 1991, C) as B but still in the community

Transition factor 1971-1981	Age 55-64 years, 1971			Age 65-74 years, 1971		
MEN	A	B	C	A	B	C
Housing tenure	%	%	%	%	%	%
Owner-occupied in 1971 and 1981	50	55	55	52	58	59
Moved into owner-occupation	7	6	7	5	4	4
Moved out of owner-occupation	4	3	3	6	5	4
Rented in 1971 and 1981	40	36	35	38	34	33
Car availability:	%	%	%	%	%	%
Available in 1971 and 1981	49	57	57	30	40	42
Gained availability	6	5	5	5	4	4
Lost availability	11	9	9	13	10	10
No car in either year	34	29	29	52	46	44
Marital status	%	%	%	%	%	%
Married in 1971 and 1981	77	81	81	64	70	73
Formed relationship	2	2	3	2	3	3
Marriage ended after 1971	11	9	9	21	17	15
Single throughout	5	4	4	4	2	{..9
Marriage ended before 1971	5	4	4	10	7	{...
Living arrangements	%	%	%	%	%	%
Not alone in 1971and 1981	85	87	87	76	80	82
Ceased to be alone	1	1	1	2	1	2
Became alone	9	8	8	15	13	11
Alone in 1971 and 1981	4	4	4	7	6	6
N	18383	8934	8715	7319	1514	1303
WOMEN	A	B	C	A	B	C
Housing tenure	%	%	%	%	%	%
Owner-occupied in 1971 and1981	48	51	51	47	52	53
Moved into owner-occupation	6	6	6	5	5	5
Moved out of owner-occupation	5	4	4	6	4	4
Rented in 1971 and 1981	40	40	39	42	39	38
Car availability:	%	%	%	%	%	%
Available in 1971 and 1981	33	36	37	17	20	21
Gained availability	6	5	6	6	6	6
Lost availability	16	15	15	13	13	14
No car in either year	45	43	42	64	61	59
Marital status	%	%	%	%	%	%
Married in 1971 and 1981	48	50	51	23	26	27
Formed relationship	2	2	2	1	1	1
Marriage ended after 1971	23	22	22	28	28	28
Single throughout	8	8	8	11	12	11
Marriage ended before 1971	19	18	17	37	33	33
Living arrangements	%	%	%	%	%	%
Not alone in 1971and 1981	63	64	65	44	44	46
Ceased to be alone	2	1	2	4	3	3
Became alone	22	22	22	25	26	25
Alone in 1971 and 1981	13	8	12	27	27	26
N	23584	15437	14591	13577	4599	3554

Table 4.2.1 Risk ratio (RR), 95% confidence intervals (CI) and p values for mortality 1971-1992 by baseline socioeconomic and demographic circumstances by age.

Characteristic in 1971 MEN	Age 55-64 years in 1971 RR[1]	Adj[2] RR	95% CI	p	Age 65-74 years in 1971 RR[1]	Adj[2] RR	95% CI	p
Housing tenure/car availability								
Owner-occupied, car	1.00	1.00			1.00	1.00		
Owner-occupied, no car	1.34	1.26	(1.19, 1.32)	*0.00*	1.21	1.19	(1.13, 1.24)	*0.00*
Rented, car	1.25	1.21	(1.16, 1.27)	*0.00*	1.15	1.12	(1.05, 1.19)	*0.00*
Rented, no car	1.59	1.44	(1.38, 1.50)	*0.00*	1.41	1.36	(1.31, 1.42)	*0.00*
In institution	1.97	1.25	(1.07, 1.47)	*0.01*	1.99	1.59	(1.37, 1.81)	*0.00*
Social Class3[2]								
I/II	1.00	1.00			1.00	1.00		
IIIN	1.17	1.10	(1.03, 1.17)	*0.00*	1.05	0.98	(0.92, 1.05)	*0.71*
IIIM	1.24	1.12	(1.07, 1.17)	*0.00*	1.23	1.11	(1.05, 1.17)	*0.00*
IV/V	1.42	1.20	(1.15, 1.26)	*0.00*	1.24	1.08	(1.02, 1.14)	*0.01*
Unclassified[4]	2.57	2.21	(2.07, 2.36)	*0.00*	1.41	1.24	(1.16, 1.32)	*0.00*
Marital status/whether alone								
Married/cohabiting	1.00	1.00			1.00	1.00		
Single, alone	1.26	1.12	(1.01, 1.24)	*0.03*	1.17	1.11	(0.99, 1.23)	*0.07*
not alone	1.34	1.14	(1.04, 1.25)	*0.00*	1.33	1.21	(1.09, 1.34)	*0.00*
Widowed, alone	1.17	1.07	(0.96, 1.20)	*0.21*	1.10	1.06	(0.99, 1.14)	*0.08*
not alone	1.29	1.24	(1.11, 1.38)	*0.00*	1.26	1.26	(1.16, 1.36)	*0.00*
Divorced/separated, alone	1.26	1.16	(1.02, 1.32)	*0.02*	1.20	1.15	(0.98, 1.33)	*0.08*
not alone	1.31	1.19	(1.04, 1.35)	*0.01*	1.51	1.36	(1.15, 1.59)	*0.00*

Table 4.2.1 continued

Characteristic in 1971 WOMEN	Age 55-64 years in 1971 RR[1]	Adj[2] RR	95% CI	p	Age 65-74 years in 1971 RR[1]	Adj[2] RR	95% CI	p
Housing tenure/ car availability								
Owner-occupied, car	1.00	1.00			1.00	1.00		
Owner-occupied, no car	1.21	1.15	(1.09, 1.22)	*0.00*	1.12	1.14	(1.08, 1.19)	*0.00*
Rented, car	1.19	1.15	(1.09, 1.22)	*0.00*	1.17	1.14	(1.06, 1.22)	*0.00*
Rented, no car	1.48	1.38	(1.32, 1.45)	*0.00*	1.31	1.33	(1.27, 1.39)	*0.00*
In institution	2.05	1.81	(1.53, 2.12)	*0.00*	2.75	2.67	(2.39, 2.96)	*0.00*
Social Class[3]								
I/II	1.00	1.00			1.00	1.00		
IIIN	1.02	0.96	(0.90, 1.03)	*0.27*	1.04	0.99	(0.92, 1.06)	*0.78*
IIIM	1.19	1.09	(1.03, 1.16)	*0.00*	1.19	1.10	(1.04, 1.18)	*0.00*
IV/V	1.29	1.13	(1.07, 1.20)	*0.00*	1.17	1.05	(0.98, 1.11)	*0.14*
Unclassified[4]	1.57	1.38	(1.30, 1.48)	*0.00*	1.30	1.17	(1.11, 1.24)	*0.00*
Marital status/whether alone								
Married/cohabiting	1.00	1.00			1.00	1.00		
Single, alone	1.09	1.02	(0.94, 1.12)	*0.61*	1.02	0.96	(0.90, 1.04)	*0.32*
not alone	1.10	0.98	(0.90, 1.07)	*0.72*	1.09	0.96	(0.88, 1.03)	*0.24*
Widowed, alone	1.18	0.99	(0.92, 1.05)	*0.71*	1.06	0.93	(0.88, 0.98)	*0.01*
not alone	1.20	1.05	(0.98, 1.12)	*0.20*	1.29	1.19	(1.13, 1.26)	*0.00*
Divorced/separated, alone	1.19	0.94	(0.82, 1.08)	*0.40*	1.08	0.93	(0.81, 1.07)	*0.32*
not alone	1.27	0.96	(0.84, 1.10)	*0.59*	1.24	0.99	(0.85, 1.14)	*0.85*

1. Adjusted for five-year age and time bands
2. Adjusted for five-year age and time bands and the other factors listed
3. See note 1 for Table 4.1.1
4. See note 2 for Table 4.1.1

Table 4.2.2. Comparison of odds ratios (OR) for mortality during the first 4.5 years of follow-up and the subsequent period by baseline socioeconomic and demographic circumstances by age.

Characteristic in 1971	MEN								WOMEN							
	Age 55-64 years in 1971				Age 65-74 years in 1971				Age 55-64 years in 1971				Age 65-74 years in 1971			
	1971-5		1976-92		1971-5		1976-92		1971-5		1976-92		1971-5		1976-92	
	OR[1]	p	OR[1]	p	OR[1]	p	OR[1]	p	OR[1]	p	OR[1]	p	OR[1]	p	OR[1]	p
Housing tenure/ car availability																
Owner-occupied, car	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Owner-occupied, no car	1.34	*0.00*	1.25	*0.00*	1.32	*0.00*	1.17	*0.00*	1.18	*0.03*	1.15	*0.00*	1.09	*0.15*	1.16	*0.00*
Rented, car	1.18	*0.00*	1.23	*0.00*	1.31	*0.00*	1.07	*0.14*	1.19	*0.03*	1.15	*0.00*	1.13	*0.15*	1.16	*0.00*
Rented, no car	1.44	*0.00*	1.47	*0.00*	1.65	*0.00*	1.32	*0.00*	1.38	*0.00*	1.40	*0.00*	1.38	*0.00*	1.34	*0.00*
In institution	1.29	*0.13*	1.26	*0.02*	2.03	*0.00*	1.47	*0.00*	2.37	*0.00*	1.72	*0.00*	4.95	*0.00*	1.91	*0.00*
Social Class[2]																
I/II	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
IIIN	1.03	*0.75*	1.13	*0.00*	1.00	*0.66*	0.98	*0.66*	0.91	*0.32*	0.99	*0.27*	0.93	*0.38*	1.01	*0.90*
IIIM	1.02	*0.75*	1.15	*0.00*	1.02	*0.75*	1.18	*0.00*	1.07	*0.41*	1.10	*0.00*	1.20	*0.02*	1.09	*0.04*
IV/V	1.09	*0.17*	1.25	*0.00*	0.94	*0.30*	1.17	*0.00*	1.13	*0.14*	1.14	*0.00*	1.01	*0.89*	1.06	*0.11*
Unclassified[3]	3.02	*0.00*	1.97	*0.00*	1.21	*0.01*	1.28	*0.00*	1.52	*0.00*	1.37	*0.00*	1.21	*0.01*	1.18	*0.00*
Marital status/whether alone																
Married/cohabiting	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Single, alone	1.13	*0.30*	1.13	*0.03*	1.11	*0.35*	1.13	*0.14*	0.86	*0.11*	1.05	*0.29*	0.92	*0.31*	0.98	*0.59*
not alone	1.15	*0.01*	1.15	*0.00*	1.18	*0.13*	1.27	*0.00*	0.87	*0.11*	1.01	*0.90*	0.85	*0.07*	1.00	*0.99*
Widowed, alone	1.12	*0.36*	1.06	*0.21*	1.09	*0.20*	1.06	*0.27*	0.97	*0.08*	0.99	*0.81*	0.90	*0.05*	0.94	*0.04*
not alone	1.09	*0.00*	1.30	*0.00*	1.37	*0.00*	1.24	*0.00*	1.05	*0.10*	1.05	*0.26*	1.26	*0.00*	1.17	*0.00*
Divorced/separated, alone	1.20	*0.06*	1.16	*0.02*	0.82	*0.22*	1.37	*0.00*	0.97	*0.17*	0.94	*0.40*	0.98	*0.91*	0.91	*0.30*
not alone	1.30	*0.07*	1.16	*0.01*	1.66	*0.00*	1.25	*0.10*	0.99	*0.16*	0.96	*0.55*	0.88	*0.41*	1.03	*0.79*

1. Adjusted for five-year age and time bands and the other factors listed
2. See note 1 for Table 4.1.1
3. See note 2 for Table 4.1.1

Table 4.3.1 Risk ratio (RR), 95% confidence intervals, and p values for mortality 1981-1992 by inter-census changes in socioeconomic and demographic circumstances

Transition factor 1971-1981 MEN	Age 55-64 years in 1971 RR[1]	Adj RR[2]	95% CI	p	Age 65-74 years in 1971 RR[1]	Adj RR[2]	95% CI	p
Housing tenure								
Owner-occupied in 1971 and1981	1.00	1.00			1.00	1.00		
Moved into owner-occupation	1.11	1.07	(0.98, 1.17)	*0.06*	1.05	1.02	(0.88, 1.17)	*0.76*
Moved out of owner-occupation	1.33	1.19	(1.06, 1.33)	*0.00*	1.12	1.04	(0.91, 1.19)	*0.54*
Rented in 1971 and 1981	1.34	1.20	(1.15, 1.26)	*0.00*	1.11	1.04	(0.97, 1.10)	*0.29*
Car availability:								
Available in 1971 and 1981	1.00	1.00			1.00	1.00		
Gained availability	1.27	1.22	(1.09, 1.31)	*0.00*	1.33	1.26	(1.10, 1.43)	*0.00*
Lost availability	1.51	1.43	(1.34, 1.52)	*0.00*	1.35	1.36	(1.25, 1.47)	*0.00*
No car in either year	1.43	1.32	(1.26, 1.39)	*0.00*	1.28	1.27	(1.20, 1.35)	*0.00*
Marital status								
Married in 1971 and 1981	1.00	1.00			1.00	1.00		
Formed relationship	0.95	0.92	(0.78, 1.09)	*0.35*	0.95	0.91	(0.72, 1.14)	*0.44*
Marriage ended after 1971	1.25	1.28	(1.23, 1.47)	*0.00*	1.16	1.22	(1.10, 1.35)	*0.00*
Single throughout	1.15	1.13	(1.00, 1.40)	*0.05*	1.06	1.14	(0.96, 1.33)	*0.13*
Marriage ended before 1971	1.29	1.28	(1.14, 1.44)	*0.00*	1.14	1.25	(1.10, 1.41)	*0.00*
Living arrangements								
Not alone in 1971 and 1981	1.00	1.00			1.00	1.00		
Ceased to be alone	1.09	1.08	(0.87, 1.32)	*0.49*	1.12	1.11	(0.86, 1.39)	*0.43*
Became alone	1.20	0.88	(0.79, 0.98)	*0.02*	1.12	0.91	(0.79, 1.03)	*0.12*
Alone in 1971 and 1981	1.17	0.88	(0.76, 1.01)	*0.08*	1.05	0.83	(0.70, 0.97)	*0.02*

Table 4.3.1 continued

Transition factor 1971-1981 WOMEN	Age 55-64 years in 1971 RR[1]	Adj RR[2]	95% CI	P	Age 65-74 years in 1971 RR[1]	Adj RR[2]	95% CI	p
Housing tenure								
Owner-occupied in 1971 and1981	1.00	1.00			1.00	1.00		
Moved into owner-occupation	1.10	1.06	(0.97, 1.18)	*0.20*	1.04	1.00	(0.89, 1.12)	*0.99*
Moved out of owner-occupation	1.22	1.17	(1.05, 1.31)	*0.01*	1.26	1.26	(1.14, 1.39)	*0.00*
Rented in 1971 and 1981	1.30	1.22	(1.16, 1.28)	*0.00*	1.16	1.14	(1.08, 1.19)	*0.00*
Car availability:								
Available in 1971 and 1981	1.00	1.00			1.00	1.00		
Gained availability	1.18	1.08	(0.97, 1.19)	*0.18*	1.11	1.04	(0.93, 1.17)	*0.46*
Lost availability	1.16	1.13	(1.05, 1.21)	*0.00*	0.99	1.01	(0.92, 1.10)	*0.91*
No car in either year	1.31	1.21	(1.14, 1.28)	*0.00*	1.13	1.12	(1.05, 1.20)	*0.00*
Marital status								
Married in 1971 and 1981	1.00	1.00			1.00	1.00		
Formed relationship	1.03	1.03	(0.87, 1.22)	*0.76*	0.90	0.89	(0.38, 1.13)	*0.34*
Marriage ended after 1971	1.13	1.22	(1.13, 1.32)	*0.00*	1.05	1.12	(1.03, 1.22)	*0.01*
Single throughout	1.10	1.13	(1.03, 1.24)	*0.01*	1.05	1.15	(1.05, 1.25)	*0.00*
Marriage ended before 1971	1.20	1.22	(1.13, 1.52)	*0.00*	1.13	1.26	(1.17, 1.35)	*0.00*
Living arrangements								
Not alone in 1971 and 1981	1.00	1.00			1.00	1.00		
Ceased to be alone	1.17	1.03	(0.87, 1.20)	*0.75*	1.09	1.00	(0.86, 1.15)	*0.98*
Became alone	1.04	0.80	(0.74, 0.87)	*0.00*	0.98	0.89	(0.82, 0.97)	*0.01*
Alone in 1971 and 1981	1.13	0.89	(0.81, 0.98)	*0.02*	0.99	0.79	(0.73, 0.86)	*0.00*

1. Adjusted for five-year age and time bands
2. Adjusted for five-year age and time bands and all other factors in the table

Table 4.3.2 Risk ratio (RR) and p values for early (1981- 4) and late (1985-92) mortality by inter-census changes in socioeconomic and demographic circumstances

Transition factor 1971-1981	MEN								WOMEN							
	Age 55-64 years in 1971				Age 65-74 years in 1971				Age 55-64 years in 1971				Age 65-74 years in 1971			
	1981-1984		1985-1992		1981-1984		1985-1992		1981-1984		1985-1992		1981-1984		1985-1992	
	RR[1]	p	RR[1]	p	RR[1]	p	RR[1]	p	RR[1]	p	RR[1]	p	RR[1]	p	RR[1]	p
Housing tenure																
Owner-occupied in 1971 and1981	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Moved into owner-occupation	1.09	*0.32*	1.06	*0.23*	0.96	*0.71*	1.05	*0.51*	1.12	*0.33*	1.05	*0.34*	1.27	*0.02*	0.91	*0.11*
Moved out of owner-occupation	1.18	*0.15*	1.18	*0.01*	1.08	*0.43*	1.01	*0.88*	1.51	*0.00*	1.09	*0.14*	1.28	*0.01*	1.21	*0.00*
Rented in 1971 and 1981	1.20	*0.00*	1.18	*0.00*	1.06	*0.23*	1.01	*0.71*	1.35	*0.00*	1.15	*0.00*	1.20	*0.00*	1.09	*0.00*
Car availability:																
Available in 1971 and 1981	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Gained availability	1.19	*0.07*	1.15	*0.00*	1.43	*0.00*	1.10	*0.19*	1.18	*0.16*	1.05	*0.42*	1.22	*0.06*	0.98	*0.67*
Lost availability	1.58	*0.00*	1.32	*0.00*	1.29	*0.00*	1.28	*0.00*	1.15	*0.10*	1.12	*0.00*	0.96	*0.63*	1.02	*0.70*
No car in either year	1.31	*0.00*	1.29	*0.00*	1.27	*0.00*	1.19	*0.00*	1.28	*0.00*	1.18	*0.00*	1.15	*0.03*	1.09	*0.01*
Marital status																
Married in 1971 and 1981	1.00		1.00		1.00		1.00		1.00				1.00		1.00	
Formed relationship	0.96	*0.80*	0.92	*0.36*	0.87	*0.48*	0.95	*0.66*	0.92	*0.70*	1.05	*0.60*	1.05	*0.83*	0.85	*0.22*
Marriage ended after 1971	1.20	*0.11*	1.08	*0.20*	1.13	*0.36*	1.10	*0.26*	1.25	*0.04*	1.10	*0.07*	1.21	*0.03*	1.10	*0.03*
Single throughout	1.14	*0.18*	1.30	*0.00*	1.30	*0.00*	1.11	*0.06*	1.27	*0.01*	1.20	*0.00*	1.25	*0.01*	1.06	*0.19*
Marriage ended before 1971	1.46	*0.00*	1.19	*0.01*	1.35	*0.00*	1.12	*0.08*	1.23	*0.02*	1.21	*0.00*	1.35	*0.00*	1.18	*0.00*
Living arrangements																
Not alone in 1971and 1981	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Ceased to be alone	1.08	*0.68*	1.06	*0.59*	1.00	*0.99*	1.13	*0.32*	0.81	*0.28*	1.00	*0.97*	0.93	*0.55*	1.03	*0.71*
Became alone	0.85	*0.12*	0.91	*0.09*	0.91	*0.30*	0.93	*0.26*	0.74	*0.00*	0.86	*0.00*	0.78	*0.00*	0.95	*0.22*
Alone in 1971 and 1981	0.76	*0.05*	0.94	*0.40*	0.73	*0.01*	0.93	*0.39*	0.87	*0.17*	0.90	*0.03*	0.75	*0.00*	0.84	*0.00*

1. Models adjusted for five, year time and age bands and all other factors listed

Table 4.4.1 Risk ratios (RR), 95% confidence intervals, and p values for being in an institution at the 1991 census by socioeconomic and demographic circumstances in 1971

Characteristic in 1971	Age 55-64 years in 1971				Age 65-74 years in 1971			
MEN	RR[1]	Adj RR[2]	95% CI	p	RR[1]	Adj RR[2]	95% CI	*p*
Housing tenure and car availability								
Owner-occupied, car	1.00	1.00			1.00	1.00		
Owner-occupied, no car	1.69	1.54	(1.05, 2.26)	*0.03*	1.56	1.73	(1.15, 2.59)	*0.01*
Rented, car	1.47	1.47	(1.03, 2.09)	*0.03*	1.16	1.24	(0.72, 2.12)	*0.44*
Rented, no car	2.16	1.89	(1.34, 2.67)	*0.00*	1.74	1.94	(1.28, 2.94)	*0.00*
Social Class[3]								
I/II	1.00	1.00			1.00	1.00		
IIIN	1.29	1.13	(0.73, 1.75)	*0.60*	0.91	0.76	(0.45, 1.29)	*0.31*
IIIM	0.97	0.79	(0.55, 1.14)	*0.21*	0.82	0.63	(0.39, 1.00)	*0.05*
IV/V	1.62	1.13	(0.78, 1.62)	*0.53*	1.31	0.93	(0.60, 1.46)	*0.76*
Unclassified[4]	2.42	1.76	(0.94, 3.29)	*0.08*	1.63	1.27	(0.70, 2.30)	*0.42*
Marital status/whether alone								
Married/cohabiting	1.00	1.00			1.00	1.00		
Single, alone	3.27	2.67	(1.50, 4.75)	*0.00*	0.46	0.42	(0.10, 1.80)	*0.24*
not alone	3.98	3.54	(2.17, 5.77)	*0.00*	2.84	3.00	(1.19, 7.57)	*0.02*
Widowed, alone	1.80	1.59	(0.76, 3.29)	*0.22*	1.54	1.44	(0.79, 2.62)	*0.23*
not alone	2.32	2.34	(1.12, 4.88)	*0.02*	2.36	2.52	(1.21, 5.25)	*0.01*
Divorced/separated, alone	3.15	2.73	(1.35, 5.53)	*0.00*	0.77	0.69	(0.08, 5.59)	*0.73*
not alone	2.79	2.83	(1.41, 5.69)	*0.00*	1.09	0.99	(0.28, 3.44)	*0.99*

Table 4.4.1 continued

Characteristic in 1971 WOMEN	Age 55-64 years in 1971 RR[1]	Adj RR[2]	95% CI	p	Age 65-74 years in 1971 RR[1]	Adj RR[2]	95% CI	p
Housing tenure and car availability								
Owner-occupied, car	1.00	1.00			1.00	1.00		
Owner-occupied, no car	1.54	1.26	(1.03, 1.55)	*0.02*	1.37	1.25	(1.02, 1.54)	*0.03*
Rented, car	1.03	1.01	(0.79, 1.28)	*0.96*	0.95	0.98	(0.71, 1.36)	*0.91*
Rented, no car	1.76	1.45	(1.20, 1.75)	*0.00*	1.49	1.39	(1.13, 1.71)	*0.00*
Social Class[3]								
I/II	1.00	1.00			1.00	1.00		
IIIN	1.28	1.10	(0.84, 1.44)	*0.48*	1.27	1.16	(0.88, 1.53)	*0.28*
IIIM	1.28	1.26	(0.99, 1.60)	*0.06*	1.06	1.00	(0.77, 1.30)	*0.98*
IV/V	1.48	1.34	(1.06, 1.70)	*0.02*	1.07	0.97	(0.75, 1.25)	*0.82*
Unclassified[4]	2.08	1.85	(1.44, 2.38)	*0.00*	1.22	1.23	(0.97, 1.57)	*0.09*
Marital status/whether alone								
Married/cohabiting	1.00	1.00			1.00	1.00		
Single, alone	2.61	2.41	(1.86, 3.12)	*0.00*	1.78	1.54	(1.17, 2.04)	*0.00*
not alone	1.90	1.73	(1.30, 2.30)	*0.00*	1.27	1.15	(0.85, 1.57)	*0.37*
Widowed, alone	1.43	1.07	(0.84, 1.36)	*0.60*	1.20	0.96	(0.78, 1.19)	*0.74*
not alone	1.05	0.85	(0.63, 1.13)	*0.26*	0.65	0.59	(0.43, 0.80)	*0.00*
Divorced/separated, alone	1.57	1.08	(0.67, 1.74)	*0.74*	1.26	0.99	(0.58, 1.66)	*0.96*
not alone	1.60	1.11	(0.74, 1.68)	*0.62*	0.61	0.52	(0.26, 1.05)	*0.07*

1 Adjusted for age

2 Also adjusted for the other variables listed

3 Currently married women have been assigned the social class of their husband, other women their own social class.

4 Those who could not be assigned a class either because of inadequate information or because they did not have an occupation

Table 4.5.1 Risk ratios (RR), 95% confidence intervals, and p values for being in an institution at the 1991 census by inter-census changes in socioeconomic and demographic factors

Transition factor 1971-1981	Age 55-64 years in 1971				Age 65-74 years in 1971			
MEN	RR[1]	Adj RR[2]	95% CI	p	RR[1]	Adj RR[2]	95% CI	p
Housing tenure								
Owner-occupied in 1971 and1981	1.00	1.00			1.00	1.00		
Moved into owner-occupation	1.23	1.09	(0.64, 1.87)	*0.75*	1.84	2.04	(1.02, 4.06)	*0.04*
Moved out of owner-occupation	1.65	1.20	(0.61, 2.39)	*0.59*	1.49	1.29	(0.64, 2.59)	*0.47*
Rented in 1971 and 1981	1.70	1.42	(1.06, 1.89)	*0.02*	1.29	1.06	(0.75, 1.50)	*0.74*
Car availability:								
Available in 1971 and 1981	1.00	1.00			1.00	1.00		
Gained availability	1.54	1.34	(0.75, 2.39)	*0.33*	1.21	1.07	(0.47, 2.44)	*0.87*
Lost availability	1.77	1.56	(1.03, 2.37)	*0.04*	1.23	1.18	(0.66, 2.09)	*0.57*
No car in either year	2.00	1.61	(1.18, 2.18)	*0.00*	1.74	1.77	(1.21, 2.60)	*0.00*
Marital status								
Married in 1971 and 1981	1.00	1.00			1.00	1.00		
Formed relationship	1.59	1.76	(0.73, 4.24)	*0.21*	0.72	1.21	(0.32, 4.59)	*0.78*
Marriage ended after 1971	4.14	4.95	(3.06, 8.00)	*0.00*	1.77	2.04	(0.84, 4.97)	*0.12*
Single throughout	2.23	3.08	(1.93, 4.91)	*0.00*	2.23	1.92	(1.11, 3.31)	*0.02*
Marriage ended before 1971	3.54	4.59	(2.70, 7.82)	*0.00*	2.40	3.49	(1.76, 6.85)	*0.02*
Living arrangements								
Not alone in 1971 and 1981	1.00	1.00			1.00	1.00		
Ceased to be alone	1.74	0.86	(0.30, 2.46)	*0.77*	0.32	0.24	(0.03, 2.21)	*0.21*
Became alone	1.75	0.54	(0.33, 0.90)	*0.02*	2.31	1.23	(0.69, 2.18)	*0.69*
Alone in 1971 and 1981	2.91	0.61	(0.34, 1.08)	*0.09*	1.62	0.55	(0.25, 1.23)	*0.15*

Table 4.5.1 continued

Transition factor 1971-1981 WOMEN	Age 55-64 year in 1971 RR[1]	Adj RR[2]	95% CI	p	Age 65-74 years in 1971 RR[1]	Adj RR[2]	95% CI	p
Housing tenure								
Owner-occupied in 1971 and1981	1.00	1.00			1.00	1.00		
Moved into owner-occupation	0.86	0.86	(0.60, 1.23)	*0.41*	1.09	1.03	(0.73, 1.46)	*0.87*
Moved out of owner-occupation	2.01	1.73	(1.28, 2.33)	*0.00*	1.52	1.43	(1.02, 2.00)	*0.04*
Rented in 1971 and 1981	1.42	1.23	(1.06, 1.43)	*0.01*	1.22	1.10	(0.94, 1.29)	*0.23*
Car availability:								
Available in 1971 and 1981	1.00	1.00			1.00	1.00		
Gained availability	1.30	1.20	(0.84, 1.72)	*0.32*	1.20	0.99	(0.68, 1.44)	*0.95*
Lost availability	1.54	1.36	(1.07, 1.73)	*0.01*	1.15	1.04	(0.78, 1.38)	*0.81*
No car in either year	2.00	1.58	(1.31, 1.90)	*0.00*	1.57	1.32	(1.06, 1.64)	*0.01*
Marital status								
Married in 1971 and 1981	1.00	1.00			1.00	1.00		
Formed relationship	1.24	1.24	(0.71, 2.18)	*0.45*	0.63	0.35	(0.15, 0.85)	*0.02*
Marriage ended after 1971	2.51	1.98	(1.52, 2.57)	*0.00*	1.68	1.19	(0.90, 1.58)	*0.23*
Single throughout	1.41	1.18	(0.91, 1.53)	*0.22*	1.22	1.02	(0.77, 1.35)	*0.90*
Marriage ended before 1971	1.53	1.16	(0.90, 1.50)	*0.26*	1.16	0.75	(0.57, 0.98)	*0.03*
Living arrangements								
Not alone in 1971 and 1981	1.00	1.00			1.00	1.00		
Ceased to be alone	1.15	0.92	(0.54, 1.59)	*0.78*	1.80	2.58	(1.63, 4.08)	*0.00*
Became alone	1.43	1.07	(0.83, 1.37)	*0.60*	1.33	1.19	(0.91, 1.55)	*0.20*
Alone in 1971 and 1981	1.92	1.22	(0.94, 1.59)	*0.13*	1.49	1.50	(1.16, 1.94)	*0.00*

1 Adjusted for age
2 Also adjusted for other factors shown

Table 4.6.1 Risk ratios (RR), 95% confidence intervals, and p values for having a long-standing illness at the 1991 Census by socioeconomic and demographic circumstances in 1971

People in the community in 1971, 1981 and 1991

Characteristic in 1971	MEN						WOMEN					
	Age 55-64 years in 1971			Age 65-74 years in 1971			Age 55-64 years in 1971			Age 65-74 years in 1971		
	Adj RR[1]	95% CI	*p*	Adj RR[1]	95% CI	*p*	Adj RR[1]	95% CI	*p*	Adj RR[1]	95% CI	*p*
Housing tenure/car availability												
Owner-occupied, car	1.00			1.00			1.00			*1.00*		
Owner-occupied, no car	1.20	(1.11, 1.29)	*0.00*	1.04	(0.91, 1.16)	*0.59*	1.12	(1.05, 1.18)	0.00	*1.03*	(0.96, 1.10)	*0.33*
Rented, car	1.10	(1.02, 1.17)	*0.01*	0.96	(0.80, 1.11)	*0.62*	1.19	(1.12, 1.26)	0.00	*1.02*	(0.92, 1.12)	*0.67*
Rented, no carr	1.22	(1.14, 1.31)	*0.00*	1.09	(0.96, 1.21)	*0.17*	1.26	(1.20, 1.32)	0.00	*1.09*	(1.03, 1.15)	*0.01*
Social Class[2]												
I/II	1.00			1.00			1.00			*1.00*		
IIIN	1.03	(0.94, 1.13)	*0.46*	0.94	(0.78, 1.09)	*0.43*	0.96	(0.87, 1.06)	0.42	*0.89*	(0.75, 1.03)	*0.13*
IIIM	1.02	(0.95, 1.09)	*0.66*	1.05	(0.91, 1.18)	*0.46*	1.03	(0.91, 1.15)	0.65	*0.79*	(0.61, 0.95)	*0.02*
IV/V	1.08	(1.00, 1.17)	*0.04*	1.06	(0.92, 1.19)	*0.41*	1.05	(0.96, 1.15)	0.24	*0.91*	(0.77, 1.04)	*0.20*
Unclassified[3]	1.55	(1.35, 1.75)	*0.00*	0.99	(0.76, 1.20)	*0.90*	1.17	(1.08, 1.25)	0.00	*0.95*	(0.84, 1.06)	*0.43*
Marital status/whether alone												
Married/cohabiting	1.00			1.00			1.00			*1.00*		
Single, alone	0.87	(0.70, 1.07)	*0.19*	{0.59	(0.37, 0.85)	*0.00*	1.06	(0.95, 1.18)	0.30	*{0.98*	(0.89, 1.07)	*0.69*
not alone	0.82	(0.68, 0.99)	*0.04*	{.....			0.96	(0.86, 1.07)	0.48	*{.....*		
Widowed, alone	0.95	(0.75, 1.16)	*0.63*	{1.00	(0.83, 1.16)	*0.99*	1.03	(0.95, 1.11)	0.49	*0.98*	(0.91, 1.05)	*0.53*
not alone	0.96	(0.75, 1.19)	*0.73*	{.....			1.09	(1.00, 1.18)	0.04	*1.08*	(0.99, 1.16)	*0.08*
Divorced/separated, alone	1.04	(0.81, 1.29)	*0.76*	{.....			1.20	(1.02, 1.38)	0.03	*{0.99*	(0.84, 1.12)	*0.86*
not alone	1.00	(0.81, 1.20)	*0.98*	{.....			0.94	(0.82, 1.07)	0.33	*{.....*		

1 Adjusted for 5 year age bands and the other variables listed

2 Currently married women have been assigned the social class of their husband, other women their own social class.

3 Those not assigned a class either because of inadequate information or because they did not have an occupation.

Table 4.7.1 Risk ratios (RR), 95% confidence intervals, and p values for having a longstanding illness at the 1991 census by inter-census changes in socioeconomic factors

People in the community in 1971, 1981 and 1991

Transition factor 1971-1981	MEN						WOMEN					
	Age 55-64 years in 1971			Age 65-74 years in 1971			Age 55-64 years in 1971			Age 65-74 years in 1971		
	Adj RR[1]	95%CI	*p*	Adj RR[1]	95%CI	*p*	Adj RR[1]	95%CI	*p*	Adj RR[1]	95%CI	*p*
Housing tenure												
Owner-occupied in 1971 and1981	1.00			1.00			1.00			1.00		
Moved into owner-occupation	0.98	(0.87, 1.09)	*0.71*	0.95	(0.69, 1.19)	*0.68*	1.16	(1.06, 1.25)	*0.00*	0.89	(0.75, 1.03)	*0.13*
Moved out of owner-occupation	1.12	(0.95, 1.29)	*0.16*	1.20	(0.95, 1.40)	*0.12*	1.11	(0.99, 1.22)	*0.06*	1.20	(1.05, 1.34)	*0.01*
Rented in 1971 and 1981	1.09	(1.02, 1.15)	*0.01*	1.04	(0.92, 1.15)	*0.52*	1.15	(1.10, 1.20)	*0.00*	1.08	(1.02, 1.15)	*0.01*
Car availability:												
Available in 1971 and 1981	1.00			1.00			1.00			1.00		
Gained availability	1.09	(0.96, 1.21)	*0.17*	1.05	(0.80, 1.28)	*0.70*	0.98	(0.89, 1.08)	*0.75*	0.95	(0.80, 1.09)	*0.46*
Lost availability	1.26	(1.16, 1.36)	*0.00*	1.08	(0.91, 1.24)	*0.35*	1.12	(1.05, 1.19)	*0.00*	1.06	(0.95, 1.16)	*0.26*
No car in either year	1.24	(1.17, 1.31)	*0.00*	1.08	(0.97, 1.19)	*0.16*	1.15	(1.10, 1.21)	*0.00*	1.06	(0.97, 1.14)	*0.18*
Marital status												
Married in 1971 and 1981	1.00			1.00			1.00			1.00		
Formed relationship	0.91	(0.83, 1.11)	*0.05*	0.98	(0.61, 2.32)	*0.94*	0.95	(0.84, 1.14)	*0.89*	1.03	(0.91, 1.15)	*0.19*
Marriage ended after 1971	0.97	(0.84, 1.12)	*0.70*	1.15	(0.94, 1.33)	*0.16*	1.04	(0.86, 1.04)	*0.31*	1.14	(1.03, 1.24)	*0.01*
Single throughout	0.83	(0.69, 1.00)	*0.35*	{.....			0.99	(0.96, 1.12)	*0.24*	0.83	(0.57, 1.09)	*0.59*
Marriage ended before 1971	0.97	(0.80, 1.15)	*0.73*	{0.87	(0.61, 1.11)	*0.28*	1.03	(0.96, 1.12)	*0.35*	1.09	(0.99, 1.19)	*0.08*
Living arrangements												
Not alone in 1971and 1981	1.00			1.00			1.00			1.00		
Ceased to be alone	0.92	(0.67, 1.22)	*0.59*	0.70	(0.31, 1.17)	*0.22*	1.05	(0.89, 1.22)	*0.56*	1.03	(0.83, 1.22)	*0.74*
Became alone	1.05	(0.89, 1.20)	*0.57*	0.80	(0.57, 1.14)	*0.11*	0.89	(0.82, 0.97)	*0.01*	0.86	(0.74, 0.97)	*0.01*
Alone in 1971 and 1981	1.11	(0.90, 1.32)	*0.32*	1.16	(0.84, 1.42)	*0.31*	0.97	(0.88, 1.06)	*0.47*	0.93	(0.83, 1.04)	*0.21*

1 Adjusted for 5 year age bands and other factors shown.

5 Whitehall cohort of male civil servants - results

The Longitudinal Study (LS) showed that there are long-term associations between socioeconomic position and both mortality and morbidity but the roles of personal behavioural or prior-health factors could not be explored. The Whitehall Study, like the Longitudinal Study, is longitudinal but has some data about health, smoking and physical activity at the time of first screening. Also, in the Whitehall Study there are more measures of morbidity at resurvey. Although the population covered by the Whitehall Study, being all male and all ex-civil servants, is more restricted than that covered by the Longitudinal Study, it is still sufficiently diverse to explore socioeconomic differences in morbidity. Moreover, employment grade probably reflects a more clear-cut hierarchy in income and status than housing tenure and car availability, used in the LS analyses. The data source and analysis strategy are described in Section 3.2.

5.1 *Description of the sample*

At initial screening, 7% of the resurvey respondents had been in administrative posts (or high grades), 12% in clerical or manual posts (lower grades) and 81% in the professional or executive posts (middle grades). The survivors had been relatively privileged in 1970 with nearly 90% in owner-occupation then (reported retrospectively at the resurvey so possibly exaggerated) and over 80% having a car. The median age of respondents at resurvey was 76.6 years (range 67-97 years) and the median follow-up time 28.8 years (range 26.3-30.5 years).

The four outcomes discussed in this chapter are all self-reported: poor or very poor general health; a low mental health score; a low physical performance score; disability (inability to do at least one of five activities of daily living). These were explained more fully in Section 3.2.3

Table 5.1.1 shows the prevalence of characteristics considered to be either potential confounders of associations between employment grade and the four morbidity outcomes or on the causal pathway between them. Part (i) shows characteristics at

resurvey and part (ii) shows characteristics measured at the time of screening in the late 1960s (baseline). The choice of variables is explained in the sections that follow.

Owing to selective mortality, the percentages in the highest quintiles of blood pressure (defined using the whole baseline sample) had diminished. Only small percentages of resurvey participants had been obese or diabetic at baseline. Seven out of ten men had been smokers at baseline although only one in eight reported smoking at the resurvey (not shown). Among the subsample asked about walking to work, most walked for at least ten minutes and most of those asked about leisure activity (a different subset) said they were at least moderately active.

Income after retirement (Table 5.1.1i), housing tenure and car availability in mid-life (Table 5.1.1ii) were correlated strongly with employment grade. Baseline smoking and lack of physical activity were inversely associated with grade, as was production of phlegm (but this was offset to some extent by greater proportions of more senior staff having hospital visits for respiratory disease). Of the clinical indicators, only prevalence of high systolic blood pressure and of high BMI were inversely associated with grade. Total cholesterol was positively associated with grade.

5.2 *Prevalence of poor health and functioning*

The outcomes were chosen to pick out groups who were at the worst extreme in this sample. The rarest was poor general health (6%) and the most common was disability (11%). Three of the outcomes were not available for those who only completed the short questionnaire. As a result of missing answers 4% of those completing a long questionnaire were not assigned a mental health score, 3% were not given a physical performance score, and under 1% excluded from the disability analyses. Seventy-five people were excluded from the physical performance score because of inconsistent answers (e.g. they said they were limited a little in vigorous activities but a lot in moderate activities or a little walking half a mile and a lot walking 100 yards). Table 5.2A summarizes the numbers without information and the prevalence of each morbidity outcome.

Table 5.2A Numbers with poor self-reported health outcomes at the Resurvey, 1997/8 and reasons for omission from analyses

	Number (%) with poor outcome	Number of people without scores, by type of questionnaire			
		Full			Short[1]
	Base = those assigned a score	No information	Partial information	Inconsistent	
General health	389/6864 (5.6%)	-	69	-	8
Mental health	484/5926 (8.2%)	58	184	-	873
Physical performance	562/5978 (9.4%)	77	38	75	873
Disability	693/6136 (11.3%)	32	-	-	873

1. Three outcomes were not asked on the short questionnaire

Seventy-nine percent of respondents did not experience any of the outcomes. There were marked contrasts in health between those fulfilling the outcome criteria and others. The median and inter-quartile range of number of medicines reported was 5 (3,7) for those reporting poor health and 3 (1,4) for those not doing so[vi]. Two thirds of people with poor mental health score rated low on at least one of five items, only 5% of the rest did. Nearly all men rating as poor physical performers (94%) were severely limited in at least 3 activities whereas only 29% of those without a poor score were severely limited in any activities. Figures 5.2.1a-c show the proportions answering the component items of the scores adversely according to whether they had a poor score or not.

[vi]The question asked was "please list the names of all medications (tablets, capsules, liquids, injections etc) including over the counter preparations (such as vitamins and aspirin) that you have taken during the last month"

Figure 5.2.1 a) Differences in responses to component items of the SF36 Mental Health Scale by whether assigned to poor mental health category or not

Percentage reporting that "good bit of time/ most of the time/ all the time" for nervous, in dumps, and down-hearted. Percentage reporting "none of the time/ little of the time" for calm, happy.

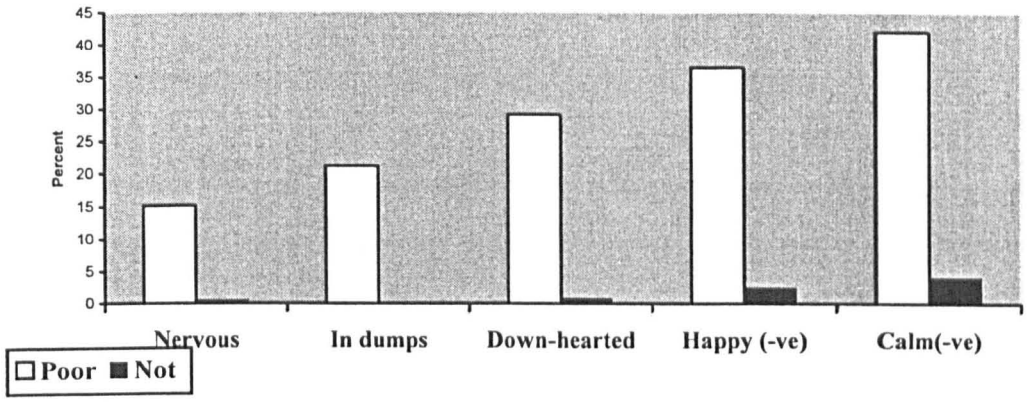


Figure 5.2.1 b) Differences in responses to component items of the SF36 Physical Performance Scale by whether assigned to poor physical performance category or not

Percentage reporting that "severely limited by their health"

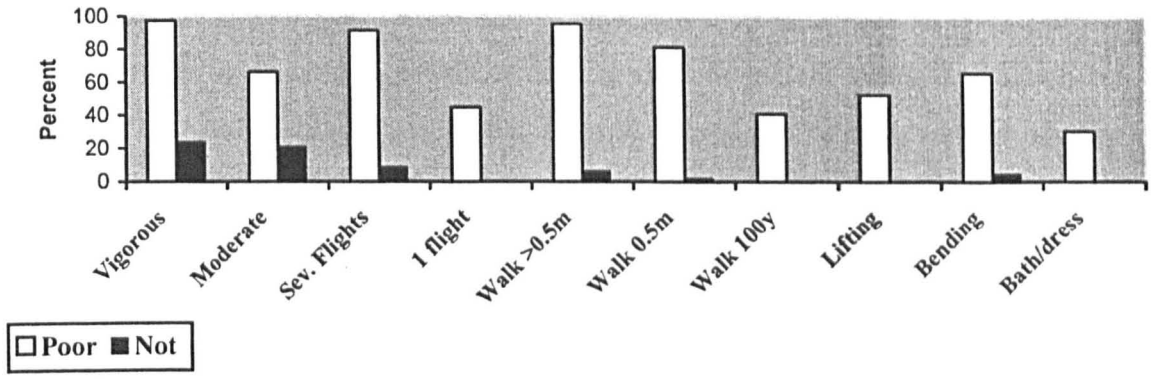
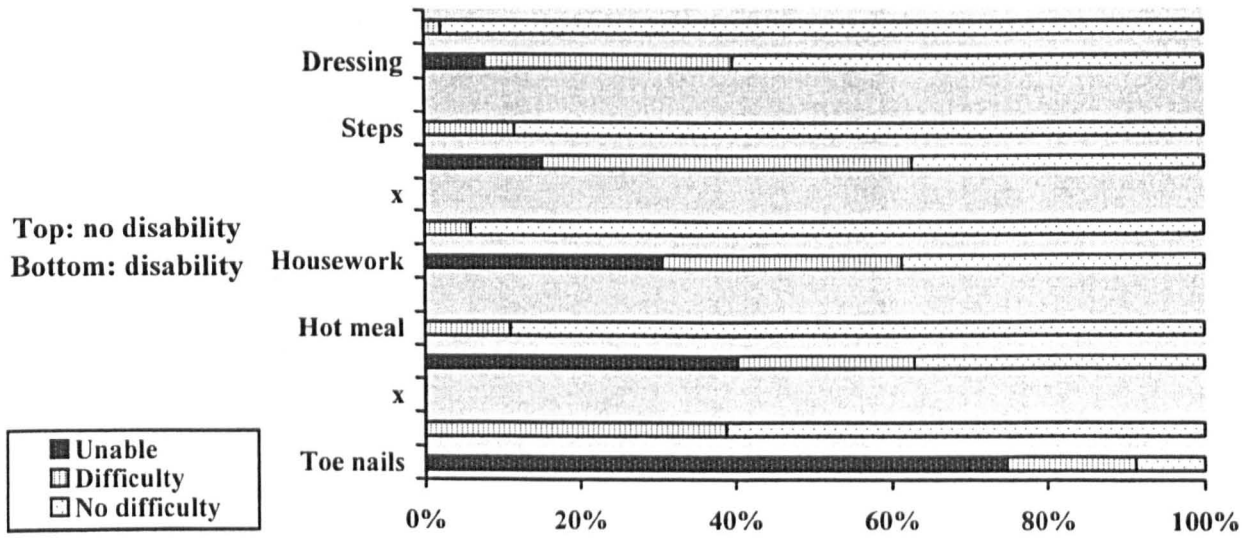


Figure 5.2.1 c) Percentage distribution of ability to do each activity of daily living by whether assigned to disability category or not



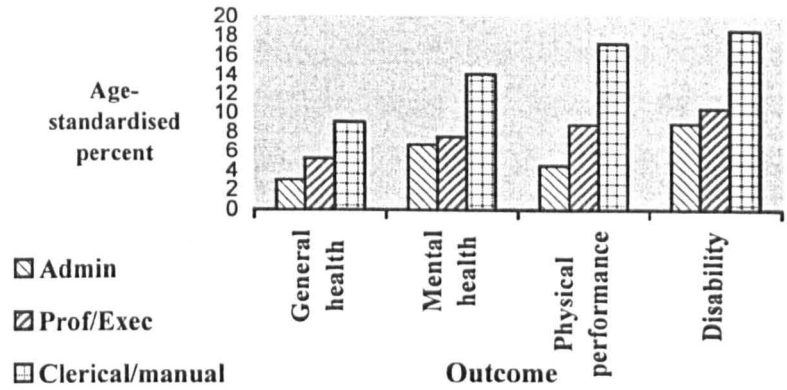
5.3 *Effects of employment grade in middle age on morbidity in old age and potential explanatory factors*

5.3.1 Estimates adjusted for demographic factors

Lower grades were at greatest risk of an adverse outcome for nearly all of the component items of the scores (Appendix Table 5.3.A1), the differentials being greatest for the more severe physical limitations. Compared to the high grades, staff in middle grades had a statistically significant excess risk of eight of the physical performance activities.

Figure 5.3.1 shows that higher percentages of the lower grades experienced each of the morbidity outcomes. Lower grades had over four times the risk of poor physical performance compared with staff in high grades, three times the risk of poor general health, and two to two and a half times the risk of poor mental health or a disability (Table 5.3.1). Staff in middle grades had a statistically significant excess risk of poor general health and poor physical performance compared to the administrative grades. The association between employment grade and outcome was similar for men in each of three age groups (less than 75 years, 75-79 years, 80 years or more). There was a statistically significant interaction between age and employment grade in the association with poor physical performance with the odds ratio for the clerical manual category being greater in the middle age group than in the others (not shown). However, the overall pattern was of the same kind and subsequent models assumed commonality across age groups.

Figure 5.3.1 Prevalence of poor self-reported outcomes in 1997/8 by employment grade at baseline (1967-70). Male Whitehall Civil Servants



It was thought that marital status might be relevant to some outcomes, both because of practical support in keeping healthy and because of psychological effects of having support. Clerical and manual staff were much more likely to be unmarried at baseline than the other grades (and were at an age when (re-)marriage was relatively unlikely). It was a factor for mental health with unmarried men having 1.5 (95% CI 1.0, 2.0) times the odds of poor mental health than married men. Addition of this factor altered the odds ratio for clerical/manual staff from 2.2 to 2.0. Marital status was retained in the subsequent models for the mental health outcome.

There was substantial overlap between the outcomes. An ordered logit model adjusted for age predicted that 13% of administrative staff would have one of the four adverse subjective outcomes, 4% would have two and 2% would have three or four. The percentages with one or more adverse outcomes were similar for professional and executive staff but were nearly doubled for clerical and manual staff, being 22%, 9% and 5% respectively.

5.3.2 Health in mid-life

For this thesis, a person was considered to have pre-existing heart disease if they had at least one of the following recorded at the first screening: an abnormal ECG; self-reported symptoms of angina, claudication or potential myocardial infarction [221]; medication for high blood pressure; a hospital admission for a heart condition. I adjusted for clinical risk factors for cardio-respiratory disease because they are in

turn associated with later disability [222-224] and could lead to more general problems of functioning and poor health. The factors considered as potential confounders in the analyses were: being in the top quintile of systolic or diastolic blood pressure, or total cholesterol (assessed from the whole 1960s cohort); a body mass index of 30 kg/m^2 or greater; blood sugar level greater than 96mg/dl; persistent or increasing duration of cough/phlegm together with hospital admissions for respiratory disease. Finally, four or more hospital admissions for other reasons was used as a proxy for a history of disease prior to initial screening.

Table 5.3.2 shows that there was generally little change in the estimated grade effects after adjusting for health variables. The greatest impact was seen for poor general health with a reduction from 3.1 to 2.8 in the odds ratio for clerical and manual staff compared with administrative staff, a reduction of 12% in the excess odds[vii].

Footnotes to Table 5.3.2 list the health factors that were significant for the various outcomes and the parameters for these are shown in Appendix Table 5.3.A2. High BMI was significant for all the outcomes (although only marginally so for some). However, obesity in middle age was rare in this cohort so was unlikely to have much of a confounding effect. Respiratory symptoms were risk factors for all but mental health, otherwise the health risk factors varied. Of the cardiovascular risk factors measured in middle age only high BMI affected mental health score.

5.3.3 Health behaviours in mid-life

The only health behaviour recorded for everyone was cigarette smoking. It was considered relevant here because it is associated with self-rated health at bivariate level,[225] has long-term implications for mortality[226] even after allowing for biological risk factors,[145] and can cause debilitating respiratory disease. In the UK smoking has been inversely associated with various indicators of socioeconomic position at least since 1973.[227] This was a significant factor for all four outcomes, as seen in Table 5.3.3. Ex-smokers and all four categories of current smoker had significantly raised

[vii] Odds ratio reduced from 3.06 to 2.81 so reduction of excess = (3.06-2.81)/(3.06-1.00) = 25/206

chances of poor physical performance. Ex-smokers also had increased chance of poor mental health and those who had smoked ten or more cigarettes were clearly at increased risk of all four outcomes.

Table 5.3.3 shows that cigarette smoking was a stronger confounder than the health variables. Addition of the smoking variable reduced the excess odds ratio comparing clerical/manual staff with administrative staff by 14-16% for three of the outcome and by 20% for poor general health. Health factors and cigarette smoking combined reduced the differential for lower grades by 29% for poor general health, 20-21% for poor physical performance and for disability and 17% for poor mental health.

Appendix Table 5.3.A3 suggests that smoking was partly responsible for the respiratory problems that in turn contribute to the poor general health and physical functioning at resurvey. The odds ratios for people who had phlegm are closer to 1.0 after adding in smoking.

Self-reports of physical activity in middle age were also considered potential confounders because, although the long-term effects from middle age into old age are not known, walking and various forms of exercise are known to protect against heart disease and poor mental health[228]at least in the short term. There were four aspects of physical activity measured at the original screening of the cohort, as seen in Table 5.1.1ii. Three of these were available for about two-thirds of the cohort survivors – this subsample being of similar age distribution to the cohort as a whole but containing a smaller percentage of clerical and manual staff (10% against 12% for the whole resurvey sample). The fourth, leisure activity, was available for about one-third of the survivors and was based on a different sample – mostly the ones who were not asked the first three questions. This subsample therefore over-represented clerical and manual staff compared with the whole resurvey sample (16% against 12%). The prevalence of each outcome was similar in both subsamples to that in the whole sample. The leisure activity variable was derived from questions about the specific activities undertaken and people were categorised into no activity at all/ inactive/moderately active and active on the basis of the energy expenditure involved in the specific pastime.

Of the four factors, the only ones that remained significant when adjusted for employment grade were summer gardening with respect to all but poor general health, walking around at work for poor mental health, and leisure activity for poor general health. Addition of gardening to the models only altered the odds ratios for lower grade staff slightly. Activity at work accounted for about 20% of the excess risk for poor mental health among clerical and manual staff (but the absolute change in odds ratio was not large). Addition of leisure activity attenuated the odds ratios for lower grade staff for poor general health by just over 10% but the confidence intervals are wide so conclusions tentative (Table 5.3.4).

The absolute reduction in odds ratios for employment grades on addition of activity was similar whether or not health and smoking had been taken into account (Table 5.3.4). These analyses may not give a very good indication of the role of physical activity because of weaknesses in the information: leisure activity was only available for a third of the sample; the one-off measurement may not be representative of long-term activity; and gardening and activity at work could be proxies for other dimensions of socioeconomic position (income to afford a garden and status hierarchy at work).

5.4 *Additional socioeconomic factors in middle age that could influence morbidity*

Additional socioeconomic measures available were housing tenure, measured retrospectively at resurvey, and car availability measured on two-thirds of the sample (see Table 5.1.1). Table 5.4.1 column 2 shows that in models only adjusted for age (and marital status where significant) housing tenure was associated with all four outcomes in addition to employment grade. However, the patterns differed. Men in the privately rented sector were most likely to have poor general health whereas men in the social sector (local authority and housing association property) were most likely to have poor mental health or poor physical performance. There was not much difference between the two sectors with respect to disability. Comparing columns 2 and 3 of Table 5.4.1, it is seen that entering housing tenure reduces the odds ratios for lower grades (because renting was only common among this group) but the excess risk for people in these grades remains substantial. For each outcome, the

housing tenure category with the highest unadjusted odds ratio was most affected by adjustment for employment grade.

Both factors remained important after adjusting for health (column 4) but after the further addition of smoking, housing tenure ceases to be a clear factor (it is marginal for general health) whereas employment grade remains predictive of three poor outcomes and, like housing tenure, is marginal for general health where the p-value is 0.06. This attenuation of the tenure parameters is partly because clerical and manual staff in rented housing were more likely to smoke ten or more cigarettes a day than those in owner-occupation (41% and 28% respectively).

Car ownership was not additionally associated with any of the outcomes in models adjusted for age, employment grade and housing tenure.

5.5 *Additional influence on morbidity of socioeconomic status in old age*

There were several socioeconomic measures at resurvey: employment grade on leaving the civil service, housing tenure, car availability, income, having a paid job after leaving the Civil Service, and central heating. Of these, income and grade are used in these analyses, assuming that they would tend to precede development of morbidity in old age. Changes in housing tenure are looked at more closely in the quality of life analyses (Chapter 8) where better account can be taken of health selection. Car availability in old age is strongly influenced by age and the numbers lacking any central heating were too small in some cells to include in the model.

Two aspects of income were measured (level of annual income and percentage of income received in addition to pensions) and the prevalence of each outcome varied inversely with both these measures (Table 5.5.1). In models adjusted for age (and marital status where significant), men with an income of less than £10400 per annum had nearly two and half times the odds of poor general health, poor mental health and disability as men with £20800 or more (Table 5.5.1). The odds ratio for physical performance was 3.1 (95% CI 2.3, 4.1). On the other hand men who received 20% or more of their income from sources other than pensions were about half as likely to

have three of the outcomes and three quarters as likely to have poor mental health as men with no additions to their pensions.

Although having a job after leaving the Civil Service might both boost income and be a sign of relatively good health, it was associated only with disability after adjusting for age and grade. Those who definitely or probably did not have a paid job after leaving had 1.25 the odds (95% CI 1.0,1.6) of disability compared with those who did have a job. After adding in income, the p value became 0.07 but the odds ratio was only slightly diminished to 1.22 (1.0, 1.5).

The main interest of this section is whether income in old age is independently associated with the outcomes in addition to employment status in middle age, and the extent to which it modifies the associations between employment status and the outcomes. The questions addressed are:

- In the full models adjusted for health factors and smoking as well as age, does income have an effect additional to employment status
- Is the effect of employment grade altered when adjusted for income
- Is the effect of income different in different grades

In the full models, income level was additionally significant to employment grade for all but poor general health. Percentage extra income was additionally significant to employment grade for all but poor mental health (Table 5.5.2). Both income measures were simultaneously associated with poor physical performance and with disability in addition to employment grade. The association between employment grade and each poor outcome was attenuated once significant income variables were added in. This was particularly marked for poor mental health where the odds ratio pertaining to lower grade staff changed from 1.8 (1.1, 2.8) without income to 1.1(0.7, 1.9) and employment grade ceased to be significant when income level was added. Income level generally had a more marked effect than the source of income, reducing the excess risk pertaining to clerical grades by a half or more.

It was hypothesised that a low income might have more serious consequences for men in middle and higher grades than for those in lower grades at baseline because it implied some form of deterioration in circumstances. To simplify the analyses, a

dichotomy of low income (less than £10400) and the remainder was used to test for interactions. Administrative staff were omitted from these analyses as only a handful of them had low incomes. The p-value for the interaction was less than 0.10 for poor physical performance and disability and the results are consistent with a greater effect of low income among the professional and executive staff than among the clerical and manual staff (Table 5.5.3).

The other major change in status that could be examined was a change in employment grade. Only upward moves in employment grade were considered as so few (1%) went down in grade. The effect of an upward move in grade could only be explored for middle and lower grades. Staffs in the British Council or Diplomatic Service were also omitted from the analyses as they were all in one category. Table 5.5.4 shows that, except for general health, moving up a grade was an additional predictor of the outcome and there is the suggestion of a protective effect. Men who were in the clerical and manual grades both at baseline and on leaving the Civil Service clearly had the highest chance of poor mental health, poor physical performance and disability. In the last row the odds ratios are re-worked to give direct comparisons between those who moved up a grade category and those who did not. Tests for interaction between baseline employment grade and grade change give some support to the hypothesis that promotion had a greater beneficial effect among those who started in the lower grades than those who started in the middle grades; the evidence is strongest for poor mental health for which the p value for interaction was 0.07.

To obtain an idea of the cumulative impact of various measures of socioeconomic position some models were run that took into account employment grade and housing tenure in 1970 and whether or not the participant had a low income in 1997/8 at the time of resurvey. Only age was taken into account apart from socioeconomic position, so as not to overload the models. In these models, the largest group (middle grades in owner-occupation without a low income) was taken as the reference group to increase the stability of the model. All the administrative staff were treated as one group because few of them rented homes at baseline or had low incomes. Figures 5.5.1a-d shows the proportions with the outcomes that are predicted by these models. The figures are broken down by age because poor

physical performance and disability increased sharply with age. It can be seen that the range of percentages with poor outcomes varies widely by sub-group – for example among those aged 80 years or more 18% of administrative staff would have a disability but 39% of the small group of clerical/manual staff in rented accommodation with a low income. Interestingly, according to these models someone in a professional or executive grade would fare as badly for all but mental health as someone in a lower grade if they had a low income and were in rented accommodation. Yet the clerical/manual staff who had the advantages of owner-occupation and not a low income were still substantially more likely to have each outcome than their counterparts in the professional/executive grades.

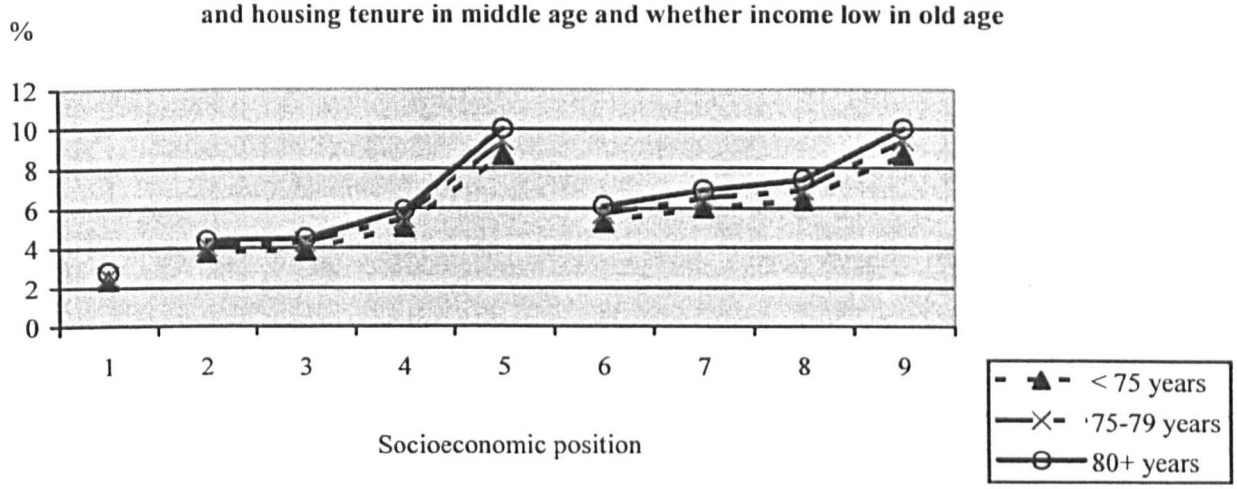
5.6 *Does self-reported cardiovascular disease contribute to poor morbidity?*

Higher percentages of men who reported angina, a heart attack or a stroke were also assessed as having the adverse outcomes (Table 5.6.1). The percentage differences were greatest between those who reported a stroke and those who did not. There was also a large difference in the percentages reporting poor general health according to whether or not they had had a heart attack.

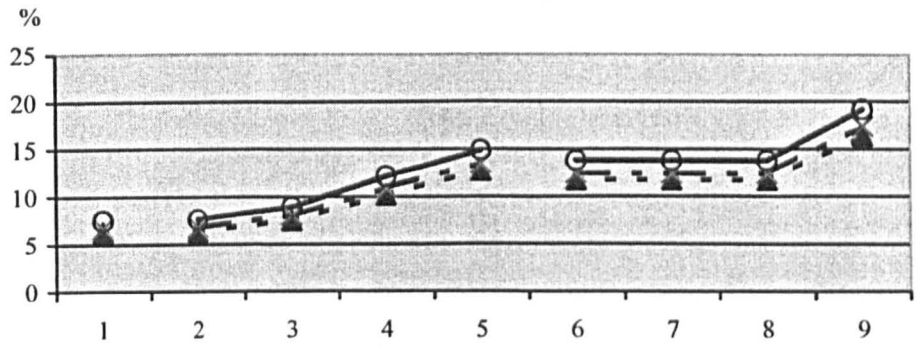
It was hypothesised that men in the lower grades might feel in worse health and have more physical difficulties partly because they had had a cardiovascular disease. When these self-reported diseases were added to the models adjusted for age, significant baseline health factors, and smoking, stroke was clearly most strongly related to all the outcomes, as expected. It did not help to explain grade differentials because, as seen in Table 5.1.1, prevalence of reported stroke did not vary by grade. Although inversely associated with grade as well as positively associated with two or three of the outcomes, neither heart attack nor angina explained any of the grade differentials either (Table 5.6.2), once baseline factors were taken into account.

Figure 5.5.1 a-d) Predicted prevalence of poor self-reported outcomes in 1997/8 by age, and cumulative index of socioeconomic position

a) Predicted prevalence of poor general health within current age groups by grade and housing tenure in middle age and whether income low in old age

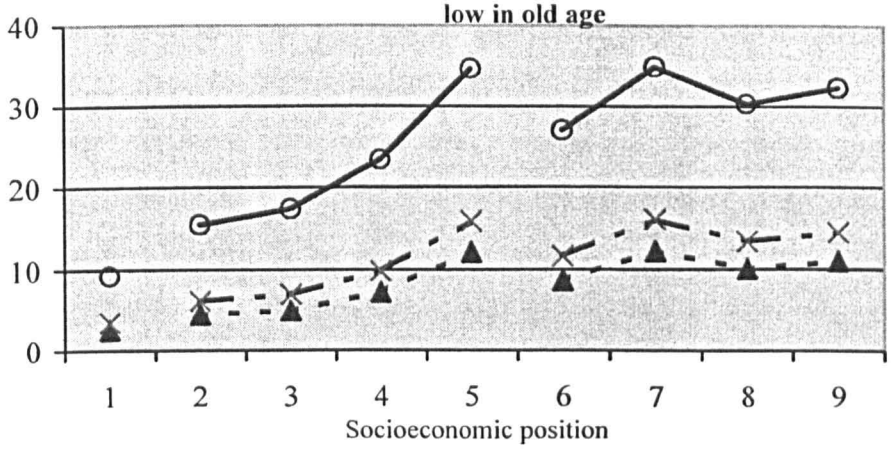


b) Predicted prevalence of poor mental health within current age groups by grade and housing tenure in middle age and whether income low in old age



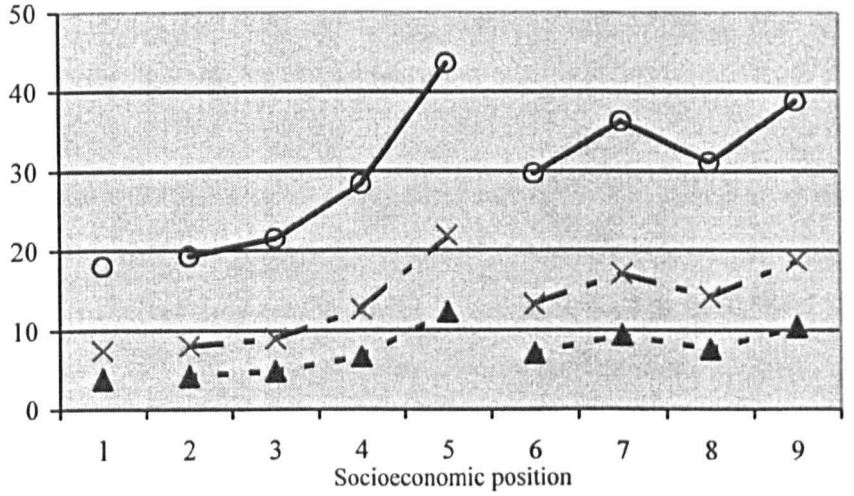
%

c) Predicted prevalence of poor physical performance within current age groups by grade and housing tenure in middle age and whether income low in old age



%

d) Predicted prevalence of disability within current age groups by grade and housing tenure in middle age and whether income low in old age



General key for socioeconomic position:

1= Administrative
2 = Professional/executive, owner-occupier, not low income
3= Professional/executive, renter, not low income
4 = Professional/executive, owner-occupier, low income
5= Professional/executive, renter, low income
6 = Clerical/manual, owner-occupier, not low income
7= Clerical/manual, renter, not low income
8 = Clerical/manual, owner-occupier, low income
9= Clerical/manual, renter, low income

5.7 *Response bias*

As response was substantially less for the lower grades than for the middle or higher grades, it is possible that the grade differentials are distorted. Three of the outcomes were not available for men who completed the short form, who were disproportionately from the lower grades and older age groups. The parameters for employment grade in Table 5.4.1 with respect to general health differ from those shown in Table 5.3.1 because the model is confined to those who completed a full questionnaire. This is brought out clearly in a comparison between columns 2 and 3 for general health in Table 5.7.1. When confined to men who completed the main questionnaire, the odds ratio comparing clerical and manual grades with administrative grades is 2.0 (1.1, 3.8) but when those with the short form are included it increases to 2.5 (1.4, 4.5). The confidence intervals are wide but it is possible that men who only did the short form were not only more likely to be in lower grades than the other respondents but, within the lower grades, were particularly likely to be in bad health.

To obtain some idea of possible response bias, I imputed an outcome first for those who completed the short form and then for non-responders to the survey (excluding anyone who had died by the time of the survey). I used a crude method of assuming that a man had the poor outcome if they belonged to at least one of the health or smoking categories that carried an odds ratio of 1.5 or more for the relevant outcome compared to the reference group. For example, men with a BMI of 30 kg/m2 at baseline would be assumed to have all the outcomes, as would those who smoked ten or more cigarettes. The exact assumptions are given in the footnote to Table 5.7.1. Having imputed the outcome, the prevalence of the outcomes by grade could be imputed for the full sample of responders and for all those alive and approached for the resurvey (Appendix Table 5.7.A1). The resulting estimates are very high in some instances, e.g. 52% of clerical and manual survivors having a disability and 34% having poor mental health but these will be exaggerated since not everyone with the risk factors would in reality have the outcome.

When these imputed outcomes were used in models with the same adjustments as the models used for people with known outcomes, there is a general suggestion that the estimated grade differentials may be under-estimates, except for physical performance where they are very substantial anyway (Table 5.7.2). Although the imputations may be biased upwards, the exercise gives some reassurance that grade differentials in the earlier part of this chapter are unlikely to be over-estimates.

5.8 *Summary*

The survivors of the 1960s Whitehall cohort participating in the resurvey were mostly in good health, only 21% having any of the morbidity outcomes.

Each of four self-reported morbidity outcomes were more prevalent among lower Civil Service employment grades than among high grades nearly 30 years after screening. Lower and other grades had a fourfold risk of low physical performance limited by health, threefold risk of poor health and more than twofold risk of poor mental health and disability. The Whitehall Study adds to the evidence from the Longitudinal Study that health inequalities persist in old age.

Differentials in old age by socioeconomic status were partially explained by pre-existing ill health in middle age (the health factors available being risk factors for cardiovascular disease). Smoking at baseline was a confounder and when combined with health factors the differentials between lower and higher grades were reduced by 29% for general health, 20-21% for physical performance and for disability and 17% for poor mental health. There was a little evidence of the explanatory powers of physical activity measures but conclusions hindered by the loss of power arising from availability of data only for a subsample.

Housing tenure in middle age was associated with the outcomes in addition to employment grade before all the other baseline factors were taken into account. Men in the social housing sector had the highest chance of three of the outcomes but men in the privately rented sector had the highest odds of poor general health. Greater prevalence of smoking among renters within the clerical manual group partly

explained these differentials that were marginally significant for general health after adjustment for employment grade, baseline health and smoking and not significant for other outcomes.

Using the information on income levels at time of resurvey, it appears that a substantial part of the disadvantage of lower employment grades in middle age for poor mental and physical health (not general health) in old age was accounted for by low income or lack of additions to pensions in old age. There were two indications that it is not just socioeconomic position in mid-life that influences health in old age. First, there was some indication that a low income had a greater effect on the physical outcomes among the middle-grades than among the low grades. This low income is more likely to reflect deterioration in circumstances for the middle grades than for the lower grades. Secondly, moving up a grade category between baseline and leaving the Civil Service appeared to reduce the chances of poor mental health, poor physical performance or a disability compared to those who did not.

Before concluding that socioeconomic position in middle age causes morbidity in old age other explanations need to be considered and this will be done in the discussion chapter. Response bias has been discussed and is judged to lead to under-estimates rather than over-estimates of health inequalities. The possibility of other biases or health selection is considered further in Chapter 9.

Key points

- Lower grades had over four times the risk of poor physical performance compared with staff in high grades, three times the risk of poor general health, and two to two and a half times the risk of poor mental health or a disability
- Health factors and cigarette smoking reported at baseline jointly reduced the differential for lower grades by 29% for general health, 20-21% for physical performance and for disability and 17% for poor mental health. The contribution of physical activity could not be well assessed
- Being in local authority or housing association property in mid-life increased chances of disability, poor mental health and poor physical performance in old age, after taking account of employment grade and health. People in privately rented homes were most likely to report poor general health. However, smoking differentials by tenure accounted for much of the effect of housing tenure
- A substantial part of the disadvantage of lower employment grades in middle age for poor mental and physical health (not general health) in old age was accounted for by low income or lack of additions to pensions in old age
- There is some indication that socioeconomic position in later life as well as in mid-life is relevant for mental health and physical functioning in old age

Study populations for tables in Chapter 5

Table Numbers	Data source	Date	Study population
5.1.1, 5.3.1, 5.3.2, 5.3.3	Whitehall Resurvey	1997-8	Survivors of a cohort of men in London-based Civil Service Departments and aged 40-69 years in 1967-70 (aged 65-97 years at Resurvey)
5.3.4	Whitehall Resurvey	1997-8	As above but in the baseline sub-samples that included physical activity questions
5.4.1, 5.5.1, 5.5.2, 5.5.4, 5.6.1, 5.6.2,	Whitehall Resurvey	1997-8	Those of the resurvey cohort who completed the full questionnaire (see note below)
5.7.1	Whitehall Resurvey	1997-8	Specified at the head of each column

Further notes:
All outcomes self-reported. General health, mental health and physical performance questions taken from the SF36 instrument. Disability defined as unable to do at least one of five specified activities of daily living.
6168 men completed a full questionnaire which included all four outcome measures; a further 873 men completed a short questionnaire that included the general health measure only
Those who were missing values on key variables were omitted unless otherwise specified

Table 5.1.1. Percentage distribution of the characteristics of respondents to the 1997-98 Whitehall Re-survey by employment grade at baseline

Men who completed a full questionnaire

i) Characteristics at resurvey	Employment grade				
	Total	Administ-rative	Professional/ executive	Clerical /manual	Rank test p-value (trend)
	n=6168	n= 443	n= 5052	n= 673	
Age at re-survey:					
< 75 years	37.6	38.4	38.3	31.1	
75-79 years	36.3	38.1	36.8	30.8	
80 or more years	26.2	23.5	24.8	38.2	<0.01
Retirement					
Had paid job after leaving Civil Service	24.0	44.9	22.9	18.7	<0.01
Had risen one grade category	n=5780	n=431	n=4695	n=654	
	39.5	-	41.1	54.0	<0.01
Net income at re-survey (per annum)	n=5922	n=431	n=4863	n=628	
£20,800 or more	29.4	78.2	28.0	7.3	
£15,600-£20,799	27.2	16.9	30.3	10.0	
£10,400-£15,599	31.6	3.9	33.6	34.9	
less than £10400 .	11.8	0.9	8.2	47.8	<0.01
Income in addition to pensions	n=6065	n=434	n=4973	n=658	
None	29.5	11.5	28.6	48.3	
Up to 20%	42.5	43.5	44.0	30.5	
20% or more	28.0	44.9	27.4	21.1	<0.01
Cardiovascular disease diagnosed					
Angina	14.4	11.3	14.4	16.0	0.04
Heart attack	11.6	10.2	11.3	14.8	0.01
Stroke	7.8	7.2	7.9	7.6	0.15
ii) Characteristics at baseline					
Health at baseline					
Had cardiovascular disease	13.2	11.7	13.2	14.3	0.22
Top quintile of:					
systolic blood pressure	12.2	7.2	12.2	15.5	<0.01
diastolic blood pressure	12.8	10.6	12.9	14.0	0.12
total cholesterol [1]	19.0	23.3	18.9	16.4	0.03
BMI > 30 kg/m^2	2.6	1.1	2.5	4.5	<0.01
Blood sugar > 96 mg/dl [2]	4.1	3.9	4.0	5.0	0.29
Respiratory symptoms:	%	%	%	%	
No respiratory problem	75.7	77.4	76.0	72.7	
Persistent phlegm	12.1	9.5	12.0	14.7	
Increasing phlegm	4.3	2.9	4.1	6.7	
Hospital for respiratory disease	7.8	10.2	7.8	5.9	0.13
Ever had 4 or more hospital admissions, (not cardiovascular or respiratory)	9.5	11.5	9.1	11.3	0.75

continued

Table 5.1.1 continued

ii) Characteristics at baseline	Employment grade				Rank test p-value (trend)
	Total	Adminis-trative	Professional/ executive	Clerical /manual	
	n=6168	n= 443	n= 5052	n= 673	
Health behaviours at baseline					
Never smoked	25.8	33.7	25.7	20.7	
Ex-smoker	40.5	36.4	41.8	33.2	
Smoked 1-9 cigarettes or pipe/cigar	12.9	16.1	12.7	12.4	
10-19 cigarettes	11.6	6.1	10.8	20.7	
20 or more	9.3	7.7	8.9	13.1	<0.01
Physical activity	n=4250	n=317	n=3538	n=395	
Walking around at work (not sedentary/standing)	8.6	1.3	7.6	23.0	<0.01
Gardening					
At least two hours in summer	79.2	76.0	81.2	60.0	<0.01
Walked to work – time of journey:	%	%	%	%	
0-9 minutes	18.7	21.5	18.2	20.8	
10-19 minutes	43.9	44.0	43.9	43.8	
20 or more minutes	37.4	34.5	37.9	35.4	0.91
Leisure activity:	n=2200	n= 141	n= 1739	n= 320	
None	20.6	18.4	20.0	24.7	
Inactive	8.1	5.7	7.5	12.5	
Moderately active	43.2	39.0	44.7	36.9	
Active	28.1	36.9	27.8	25.9	<0.01
Socioeconomic position					
Housing tenure in middle age					
In owner-occupation	87.9	95.2	90.8	61.1	
Local authority/housing association	5.9	0.5	4.3	21.5	
Other rented	6.2	4.3	4.9	17.4	<0.01
No car[3]	17.1	6.0	14.3	51.1	<0.01
Not married	9.0	4.7	7.7	21.7	<0.01

1. Bases are smaller because some did not have blood samples taken. Numbers in each grade were 434, 4871, 652 respectively
2. As for cholesterol. Numbers in each grade were 463, 5670, 854 respectively
3. Bases are smaller because the question was only asked of a subsample. Numbers in each grade were 331, 4009, 505 respectively

Table 5.3.1 Odds ratios (95% confidence intervals) for poor outcomes by baseline employment grade.

Baseline grade	General health[1] (n=6950)	Mental health[1] (n=5921)	Physical performance[1] (n=5968)	Disability[1] (n=6079)
Administrative	1.00	1.00	1.00	1.00
Professional/Executive	1.75 (1.0, 3.0)	1.10 (0.7, 1.6)	2.04 (1.3, 3.3)	1.22 (0.9, 1.7)
Clerical/Manual	3.06 (1.7, 5.5)	2.19 (1.4, 3.4)	4.32 (2.6, 7.2)	2.36 (1.6, 3.5)
p-value[2]	<0.001	<0.001	<0.001	<0.001

1. Adjusted for age at resurvey
2. Maximum likelihood log-likelihood ratio test for whole factor

Table 5.3.2 Odds ratios (95% confidence intervals) for poor outcomes by baseline employment grade before and after adjusting for baseline health.

Baseline grade	General health (n=6950)		Physical performance (n=5968)	
	Before adjustment	After adjustment[1]	Before adjustment	After adjustment[2]
Administrative	1.00	1.00	1.00	1.00
Professional/Executive	1.75 (1.0, 3.0)	1.70 (1.0, 2.9)	2.04 (1.3, 3.3)	2.02 (1.3, 3.3)
Clerical/Manual	3.06 (1.7, 5.5)	2.81 (1.6, 5.1)	4.32 (2.6, 7.2)	4.11 (2.5, 6.9)
p-value[3]	<0.001	<0.001	<0.001	<0.001
	Mental health (n=5921)		**Disability (n=6079)**	
	Before adjustment [4]	After adjustment[5]	Before adjustment	After adjustment[6]
Administrative	1.00	1.00	1.00	1.00
Professional/Executive	1.08 (0.7, 1.6)	1.07 (0.7, 1.6)	1.22 (0.9, 1.7)	1.19 (0.8, 1.7)
Clerical/Manual	2.02 (1.3, 3.1)	1.99 (1.3, 3.1)	2.36 (1.6, 3.5)	2.26 (1.5, 3.4)
p-value[3]	<0.001	<0.001	<0.001	<0.001

1. Adjusted for evidence of heart disease, bmi>30kg/m2, high diastolic blood pressure, respiratory symptoms, four or more admissions to hospital (other than cardio-respiratory)
2. Adjusted for bmi>30kg/m2, respiratory symptoms, four or more admissions to hospital (other than cardio-respiratory
3. Maximum likelihood log-likelihood ratio test for whole factor
4. Also adjusted for marital status
5. Adjusted for bmi>30kg/m2
6. Adjusted for bmi>30kg/m2, respiratory symptoms, high blood sugar count, high cholesterol and high diastolic blood pressure

Table 5.3.3 Odds ratios (95% confidence intervals) for poor outcomes by baseline employment grade before and after adjusting for baseline cigarette smoking in addition to health.

	General health (n=6950)		**Physical performance** (n=5968)	
	Before adjustment	After adjustment	Before adjustment	After adjustment
Baseline grade				
Administrative	1.00	1.00	1.00	1.00
Professional/Executive	1.71 (0.99, 2.96)	1.62 (0.9, 2.8)	2.02 (1.3, 3.3)	1.93 (1.2, 3.1)
Clerical/Manual	2.84 (1.58, 5.11)	2.47 (1.4, 4.5)	4.11 (2.5, 6.9)	3.67 (2.2, 5.2)
p-value[1]	<0.001	0.001	<0.001	<0.001
Smoking at baseline				
Never smoked		1.00		1.00
Ex-smoker		1.22 (0.90, 1.66)		1.85 (1.40, 2.44)
Pipe/cigar or 1- 9 cigarettes/day		1.32 (0.90, 1.96)		1.71 (1.21, 2.42)
10-19 cigarettes/day		1.83 (1.27, 2.64)		2.37 (1.69, 3.33)
20 or more a day		2.81 (1.96, 4.02)		3.20 (2.27, 4.51)
p-value[1]		<0.001		<0.001
	Mental health (n=5921)		**Disability** (n=6079)	
	Before adjustment	After adjustment	Before adjustment	After adjustment
Baseline grade				
Administrative	1.00	1.00	1.00	1.00
Professional/Executive	1.07 (0.7, 1.6)	1.03 (0.7, 1.5)	1.19 (0.8, 1.7)	1.16 (0.8, 1.7)
Clerical/Manual	1.99 (1.3, 3.1)	1.85 (1.2, 2.9)	2.26 (1.5, 3.4)	2.07 (1.4, 3.1)
p-value[1]	<0.001	<0.001	<0.001	<0.001
Smoking at baseline				
Never smoked		1.00		1.00
Ex-smoker		1.29 (1.01, 1.66)		1.16 (0.92, 1.45)
Pipe/cigar or 1- 9 cigarettes/day		0.96 (0.67, 1.36)		1.28 (0.96, 1.72)
10-19 cigarettes/day		1.48 (1.07, 2.05)		1.79 (1.34, 2.38)
20 or more a day		1.57 (1.12, 2.22)		1.78 (1.30, 2.42)
p-value[1]		0.013		<0.001

1. Maximum likelihood log-likelihood ratio test for whole factor

Table 5.3.4 Odds ratios (95% confidence intervals) for poor outcomes by baseline employment grade before and after adjusting for baseline physical activity

Baseline grade	Models adjusted for age		Also adjusted for significant health factors, and cigarette smoking	
	Before adjustment	After adjustment	Before adjustment	After adjustment
General health (n=2485)				
Baseline grade				
Administrative	1.00	1.00	1.00	1.00
Professional/Executive	2.47 (0.8, 7.9)	2.36 (0.7, 7.6)	2.34 (0.7, 7.6)	2.30 (0.7, 7.5)
Clerical/Manual	4.90 (1.5, 16.1)	4.47 (1.4, 14.8)	4.19 (1.2, 14.2)	3.92 (1.2, 13.3)
p-value[1]	<0.001	0.002	0.005	0.010
Leisure activity				
No activity		1.00		1.00
Inactive		1.00 (0.5, 1.8)		0.96 (0.5, 1.8)
Fairly active		0.72 (0.5, 1.1)		0.71 (0.5, 1.1)
Active		0.47 (0.3, 0.8)		0.48 (0.3, 0.8)
p-value[1]		0.023		0.039
Mental health (n=4076)[2]				
Baseline grade				
Administrative	1.00	1.00	1.00	1.00
Professional/Executive	1.11 (0.7, 1.7)	1.07 (0.7, 1.7)	1.06 (0.7, 1.7)	1.03 (0.7, 1.6)
Clerical/Manual	1.79 (1.0, 3.1)	1.62 (0.9, 2.8)	1.64 (1.0, 2.8)	1.50 (0.9, 2.6)
p-value[1]	0.022	0.069	0.047	0.12
Activity at work				
Sit or stand		1.00		1.00
Walk around		1.52 (1.1, 2.2)		1.48 (1.0, 2.1)
p-value[1]		0.025		0.035
Baseline grade				
Administrative	1.00	1.00	1.00	1.00
Professional/Executive	1.11 (0.7, 1.7)	1.14 (0.7, 1.8)	1.06 (0.7, 1.7)	1.09 (0.7, 1.7)
Clerical/Manual	1.78 (1.0, 3.0)	1.71 (1.0, 2.9)	1.64 (1.0, 2.8)	1.58 (0.9, 2.7)
p-value[1]	0.022	0.056	0.047	0.11
Gardening				
yes		1.00		1.00
no		1.53 (1.2, 2.0)		1.52 (1.2, 2.0)
p-value[1]		0.002		0.002
Physical performance (n=4114)				
Baseline grade				
Administrative	1.00	1.00	1.00	1.00
Professional/Executive	2.29 (1.3, 4.2)	2.34 (1.3, 4.2)	2.12 (1.2, 3.9)	2.15 (1.2 3.9)
Clerical/Manual	4.44 (2.3, 8.5)	4.22 (2.2, 8.1)	3.77 (2.0, 7.3)	3.58 (1.8, 6.9)
p-value[1]	<0.001	<0.001	<0.001	<0.001
Gardening				
yes		1.00		1.00
no		1.38 (1.1, 1.8)		1.34 (1.0, 1.7)
p-value[1]		0.017		0.032

Table 5.3.4 continued

Baseline grade	Models adjusted for age		Also adjusted for significant health factors, and cigarette smoking	
	Before adjustment	After adjustment	Before adjustment	After adjustment
Disability (n=4183)				
Baseline grade				
Administrative	1.00	1.00	1.00	1.00
Professional/Executive	1.11 (0.7, 1.7)	1.13 (0.7, 1.7)	1.05 (0.7, 1.6)	1.06 (0.7, 1.6)
Clerical/Manual	2.25 (1.4, 3.6)	2.18 (1.4, 3.5)	1.93 (1.2, 3.1)	1.87 (1.2, 3.0)
p-value[1]	<0.001	<0.001	<0.001	<0.001
Gardening				
yes		1.00		1.00
no		1.23 (1.0, 1.6)		1.24 (1.0, 1.6)
p-value[1]		0.095		0.092

1. Maximum likelihood log-likelihood ratio test for whole factor
2. Also adjusted for marital status

Table 5.4.1 Separate and combined effects of baseline employment grade and housing tenure in middle age on poor health outcomes: odds ratios (95% confidence intervals), and p values.

1	2	3	4	5
Employment grade and housing tenure[1]	**Adjusted for age, not other s.e.p.[2]**	**Adjusted for age and for other s.e.p**	**As col 3 plus baseline health measures**	**As col 4 plus baseline smoking.**
General health (n=6062)				
Administrative	1.00	1.00	1.00	1.00
Professional/Executive	1.46 (0.8, 2.6)	1.46 (0.8, 2.6)	1.44 (0.8, 2.6)	1.39 (0.8, 2.5)
Clerical/Manual	2.56 (1.4, 4.8)	2.32 (1.2, 4.4)	2.16 (1.1, 4.1)	1.99 (1.0, 3.8)
p-value[3]	0.001	0.011	0.029	0.062
Owner-occupier	1.00	1.00	1.00	1.00
Local authority/ha	1.19 (0.7, 2.0)	0.99 (0.6, 1.6)	0.98 (0.6, 1.6)	0.87 (0.5, 1.5)
Other	2.14 (1.5, 3.1)	1.89 (1.3, 2.8)	1.73 (1.2, 2.6)	1.60 (1.1, 2.4)
p-value[3]	0.001	0.011	0.036	0.067
Mental health (n=5902) (also adjusted marital status)				
Administrative	1.00	1.00	1.00	1.00
Professional/Executive	1.07 (0.7, 1.6)	1.05 (0.7, 1.6)	1.04 (0.7, 1.5)	1.01 (0.7, 1.5)
Clerical/Manual	1.97 (1.3, 3.1)	1.76 (1.1, 2.8)	1.73 (1.1, 2.7)	1.64 (1.0, 2.6)
p-value[3]	<0.001	0.001	0.002	0.003
Owner-occupier	1.00	1.00	1.00	1.00
Local authority/ha	1.85 (1.3, 2.6)	1.56 (1.1, 2.2)	1.56 (1.1, 2.2)	1.48 (1.0, 2.1)
Other	1.28 (0.9, 1.8)	1.16 (0.8, 1.7)	1.14 (0.8, 1.7)	1.11 (0.8, 1.6)
p-value[3]	0.002	0.049	0.051	0.11
Physical performance (n=5948)				
Administrative	1.00	1.00	1.00	1.00
Professional/Executive	2.03 (1.3, 3.3)	2.00 (1.2, 3.2)	1.99 (1.2, 3.2)	1.90 (1.2, 3.1)
Clerical/Manual	4.24 (2.5, 7.1)	3.78 (2.3, 6.3)	3.60 (2.1, 6.1)	3.35 (2.0, 5.7)
p-value[3]	<0.001	<0.001	<0.001	<0.001
Owner-occupier	1.00	1.00	1.00	1.00
Local authority/ha	1.90 (1.4, 2.6)	1.46 (1.0, 2.1)	1.53 (1.1, 2.2)	1.36 (1.0, 1.9)
Other	1.57 (1.1, 2.2)	1.32 (0.9, 1.8)	1.26 (0.9, 1.8)	1.16 (0.8, 1.6)
p-value[3]	<0.001	0.043	0.037	0.21
Disability (n=6057)				
Administrative	1.00	1.00	1.00	1.00
Professional/Executive	1.21 (0.8, 1.7)	1.19 (0.8, 1.7)	1.17 (0.8, 1.7)	1.14 (0.8, 1.6)
Clerical/Manual	2.33 (1.6, 3.5)	2.07 (1.4, 3.1)	1.98 (1.3, 3.0)	1.88 (1.2, 2.8)
p-value[3]	<0.001	<0.001	<0.001	<0.001
Owner-occupier	1.00	1.00	1.00	1.00
Local authority/ha	1.74 (1.3, 2.4)	1.41 (1.0, 1.9)	1.43 (1.0, 2.0)	1.33 (1.0, 1.8)
Other	1.64 (1.2, 2.2)	1.41 (1.0, 1.9)	1.35 (1.0, 1.8)	1.29 (1.0, 1.8)
p-value[3]	<0.001	0.018	0.029	0.094

1. Housing tenure measured retrospectively
2. s.e.p = socieconomic position
3. Maximum likelihood log-likelihood ratio test for whole factor

Table 5.5.1 Prevalence of poor outcome and odds ratios (95% confidence intervals) for morbidity outcomes by income factors, adjusted for age

	General health[1] (n=5851)		Mental health[1] (n=5702)		Physical performance[1] (n=5744)		Disability[1] (n=5884)	
Income per annum in 1997/8[2]	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)
£20,800 or more	3.1	1.00	5.9	1.00	5.8	1.00	8.0	1.00
£15, 600-£20,799	4.1	1.37 (0.9, 2.0)	6.3	1.05 (0.8, 1.4)	7.3	1.25 (0.9, 1.7)	9.5	1.18 (0.9, 1.5)
£10,400-£15,599	5.0	1.66 (1.2, 2.3)	9.4	1.64 (1.3, 2.1)	10.4	1.75 (1.4, 2.3)	11.7	1.41 (1.1, 1.8)
Less than £10,400	6.8	2.27 (1.5, 3.4)	14.0	2.49 (1.8, 3.4)	18.9	3.08 (2.3, 4.1)	20.6	2.33 (1.8, 3.0)
p-value[3]		0.001		<0.001		<0.001		<0.001
Additional income[4]	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)
None	5.8	1.00	9.8	1.00	13.9	1.00	15.9	1.00
Up to 20%	4.7	0.78 (0.6, 1.0)	7.5	0.77 (0.6, 1.0)	7.6	0.55 (0.4, 0.7)	9.0	0.57 (0.5, 0.7)
20% or more	3.0	0.51 (0.4, 0.7)	7.2	0.74 (0.6, 0.9)	7.2	0.49 (0.4, 0.6)	9.7	0.59 (0.5, 0.7)
p-value[1]		<0.001		0.032		<0.001		<0.001

1. The odds ratios were estimated with one of the income factors in the model only
2. Income for couple, where married
3. Maximum likelihood log-likelihood ratio test for whole factor
4. Percentage income which in addition to state and occupational pensions

Table 5.5.2 Odds ratios (95% confidence intervals) for poor outcomes by baseline employment grade and income at resurvey

1	All models adjusted for age, health measures and smoking[1] 2	3	4	5
Outcome/ baseline employment grade and income	**Model with employment grade only**	**Model with employment grade and income level**	**Model with employment grade and extra income**	**Model with all three measures**
General health (n=5840)				
Employment grade				
Administrative	1.00		1.00	-
Professional/Executive	1.58 (0.9, 2.9)		1.48 (0.8, 2.8)	
Clerical/Manual	2.39 (1.2, 4.7)		2.15 (1.1, 4.3)	
p-value[2]	0.021		0.044	
Extra income				
None			1.00	
Up to 20%			0.88 (0.7, 1.2)	
20% or more			0.62 (0.4, 0.9)	
p-value[2]			0.021	
Mental health (n=5698) also adjusted marital status				
Employment grade				
Administrative	1.00	1.00	-	-
Professional/Executive	1.02 (0.7, 1.5)	0.84 (0.6, 1.3)		
Clerical/Manual	1.76 (1.1, 2.8)	1.13 (0.7, 1.9)		
p-value[2]	0.001	0.12		
Income level in 1997/8	-			
£20,800 or more		1.00	-	-
£15, 600-£20,799		1.04 (0.8, 1.4)		
£10,400-£15,599		1.56 (1.2, 2.0)		
Less than £10,400		2.02 (1.4, 2.9)		
p-value[2]		<0.001		
Physical performance (n=5735)				
Employment grade				
Administrative	1.00	1.00	1.00	1.00
Professional/Executive	1.88 (1.2, 3.0)	1.56 (0.9, 2.6)	1.74 (1.1, 2.8)	1.57 (1.0, 2.6)
Clerical/Manual	3.33 (2.0, 5.6)	2.05 (1.2, 3.6)	2.85 (1.7, 4.8)	2.06 (1.2, 3.6)
p-value[2]	<0.001	0.026	<0.001	0.026
Income level in 1997/8				
£20,800 or more		1.00	-	1.00
£15, 600-£20,799		1.08 (0.8, 1.4)		1.02 (0.8, 1.4)
£10,400-£15,599		1.41 (1.1, 1.9)		1.24 (0.9, 1.7)
Less than £10,400		2.20 (1.6, 3.1)		1.83 (1.3, 2.6)
p-value[2]		<0.001		0.002
Extra income				
None			1.00	1.00
Up to 20%			0.63 (0.5, 0.8)	0.69 (0.6, 0.9)
20% or more			0.59 (0.5, 0.8)	0.70 (0.5, 0.9)
p-value[2]			<0.001	0.003

Table 5.5.2 continued

Outcome/ baseline employment grade and income	Model with employment grade only	Model with employment grade and income level	Model with employment grade and extra income	Model with all three measures
Disability (n=5831)				
Employment grade				
Administrative	1.00	1.00	1.00	1.00
Professional/Executive	1.11 (0.8, 1.6)	0.96 (0.7, 1.4)	1.04 (0.7, 1.5)	0.96 (0.7, 1.4)
Clerical/Manual	1.99 (1.3, 3.0)	1.40 (0.9, 2.2)	1.72 (1.1, 2.6)	1.38 (0.9, 2.2)
p-value[2]	<0.001	0.022	<0.001	0.026
Income level in 1997/8			-	
£20,800 or more		1.00		1.00
£15, 600-£20,799		1.11 (0.9, 1.4)		1.06 (0.8, 1.4)
£10,400-£15,599		1.28 (1.0, 1.6)		1.15 (0.9, 1.5)
Less than £10,400		1.82 (1.3, 2.5)		1.54 (1.1, 2.1)
p-value[2]		0.001		0.051
Extra income		-		
None			1.00	1.00
Up to 20%			0.63 (0.5, 0.8)	0.67 (0.5, 0.8)
20% or more			0.66 (0.5, 0.8)	0.74 (0.6, 1.0)
p-value[2]			<0.001	0.001

1. Parameters not given if income variable p-value >0.10
2. Maximum likelihood log-likelihood ratio test for whole factor

Table 5.5.3 Odds ratios (95% confidence intervals) showing different association of income with poor morbidity outcome according to employment grade at baseline, adjusted for age, health at baseline, and smoking

	Physical performance (n=5317)		Disability (n= 5406)	
Income at resurvey	Professional/ executive grade	Clerical/manual grade	Professional/ executive grade	Clerical/manual grade
£10400 vs higher	2.10 (1.6, 2.8)	1.31 (0.8, 2.1)	1.82 (1.4, 2.4)	1.12 (0.7, 1.7)

Table 5.5.4. Models showing effects on morbidity outcomes of moving up a grade category between middle age and leaving the civil service: odds ratios (95% confidence intervals).

Grade category at baseline combined with grade on leaving the civil service	General health[1] (n=5717)	Mental health[1] (n=5557)	Physical performance[1] (n=5602)	Disability[1] (n=5700)
Administrative at baseline	1.00	1.00	1.00	1.00
Professional/executive at baseline				
- administrative on leaving	1.41 (0.8, 2.6)	0.94 (0.6, 1.5)	1.70 (1.0, 2.8)	0.98 (0.7, 1.4)
- other	1.38 (0.8, 2.5)	1.24 (0.8, 1.9)	1.98 (1.2, 3.2)	1.20 (0.8, 1.7)
Clerical/manual at baseline				
- higher category on leaving	1.67 (0.8, 3.5)	1.30 (0.8, 2.3)	2.72 (1.5, 4.9)	1.73 (1.1, 2.7)
- same category	2.20 (1.1, 4.4)	2.93 (1.8, 4.9)	4.48 (2.6, 7.8)	2.39 (1.5, 3.7)
p-value for adding in rise in grade (log likelihood ratio test)	0.68	<0.001	0.037	0.049
Higher grade category on retirement (vs same/lower)				
Professional/executive at baseline		0.76 (0.6, 1.0)	0.86 (0.7, 1.1)	0.82 (0.7, 1.0)
Clerical/manual at baseline		0.42 (0.3, 0.6)	0.61 (0.4, 0.9)	0.72 (0.5, 1.1)

1. Adjusted for age at resurvey, health and smoking at baseline

Table 5.6.1 Prevalences of outcomes by self-reported experience of cardiovascular disease.

	Reported angina[1]		Reported heart attack[1]		Reported stroke[1]	
	No % with outcome	Yes % with outcome	No % with outcome	Yes % with outcome	No % with outcome	Yes % with outcome
Poor general health	4.6	11.5	4.2	15.5	4.5	17.8
Poor mental health	7.8	10.0	7.8	10.5	7.7	13.0
Poor physical performance	8.2	16.3	8.2	18.3	7.9	28.0
Disability	10.9	13.2	10.5	17.0	9.5	32.2

1. Percentages exclude cases where whole section not answered; otherwise a missing answer assumed to be negative for angina, heart attack or reported stroke

Table 5.6.2 Odds ratios (95% confidence intervals) for poor outcomes by employment grade before and after adjusting for self-reported experience of cardiovascular disease

Baseline grade	General health[1] (n=6934) Before adjustment	After adjustment	Physical performance[1] (n=5957) Before adjustment	After adjustment
Administrative	1.00	1.00	1.00	1.00
Professional/Executive	1.62 (0.9, 2.8)	1.58 (0.9, 2.8)	1.92 (1.2, 3.1)	1.92 (1.2, 3.1)
Clerical/Manual	2.47 (1.4, 4.5)	2.45 (1.3, 4.5)	3.65 (2.2, 6.1)	3.75 (2.2, 6.4)
p-value[2]	0.002	0.002	<0.001	<0.001
Reported angina		1.68 (1.3, 2.2)		1.64 (1.3, 2.1)
Reported heart attack		2.67 (2.1, 3.5)		1.65 (1.3, 2.1)
Reported stroke		3.93 (3.0, 5.1)		4.08 (3.2, 5.2)
	Mental health[1] (n=5911) Before adjustment	After adjustment[3]	**Disability[1]** (n=6068) Before adjustment	After adjustment[3]
Administrative	1.00	1.00	1.00	1.00
Professional/Executive	1.02 (0.7, 1.5)	1.02 (0.7, 1.5)	1.16 (0.8, 1.7)	1.16 (0.8, 1.7)
Clerical/Manual	1.79 (1.1, 2.8)	1.79 (1.1, 2.8)	2.08 (1.4, 3.1)	2.15 (1.4, 3.3)
p-value[1]	<0.001	<0.001	<0.001	<0.001
Reported angina		Ns		Ns
Reported heart attack		Ns		1.36 (1.1, 1.7)
Reported stroke		1.73 (1.3, 2.3)		3.96 (3.2, 5.0)

1. All models adjusted for age at resurvey, health and smoking at baseline
2. Maximum likelihood log-likelihood ratio test for whole factor
3. Cardiovascular variable omitted from variable if not significant association (indicated by Ns)

Table 5.7.1 Estimating possible implications of non-response bias. Odds ratios (95% confidence intervals) for morbidity outcomes with and without assumptions about outcomes among those for whom the information is missing

Baseline grade	Those with main questionnaire and outcome[1]	All with main and short questionnaire and outcome[1]	Assuming outcome among respondents with incomplete information[1]	Assuming outcome also among non-respondents who were alive at resurvey[1]
General health[2]	n=6085	n=6950	n=7027	n=8228
Administrative	1.00	1.00	1.00	1.00
Professional/Executive	1.38 (0.8, 2.5)	1.62 (0.9, 2.8)	1.76 (1.0, 3.0)	1.28 (0.9, 1.8)
Clerical/Manual	2.03 (1.1, 3.8)	2.47 (1.4, 4.5)	2.61 (1.5, 4.7)	2.31 (1.6, 3.4)
Mental health[3]	n=5921		n=7036	n=8531
Administrative	1.00		1.00	1.00
Professional/Executive	1.03 (0.7, 1.5)		1.35 (0.9, 1.9)	1.26 (0.9, 1.7)
Clerical/Manual	1.85 (1.2, 2.9)		2.33 (1.6, 3.5)	2.28 (1.6, 3.2)
Physical performance[4]	n=5968		n=7031	n=8520
Administrative	1.00		1.00	1.00
Professional/Executive	1.93 (1.2, 3.1)		2.00 (1.4, 2.8)	1.45 (1.2, 1.8)
Clerical/Manual	3.67 (2.2, 6.2)		4.12 (2.9, 5.9)	3.35 (2.6, 4.3)
Disability[5]	n=6079		n=6976	n=8541
Administrative	1.00		1.00	1.00
Professional/Executive	1.16 (0.8, 1.7)		1.30 (0.9, 1.8)	1.25 (0.9, 1.7)
Clerical/Manual	2.07 (1.4, 3.1		2.21 (1.5, 3.2)	2.13 (1.5, 2.9)

1. All models adjusted for age, health as in Table 5.3.2, and smoking
2. Assumes that has poor general health in non-respondent to general health but at baseline had high bmi or increasing phlegm or had been hospitalised 4 or more times for diseases other than cardio-respiratory or smoked 10 or more cigarettes a day.
3. Assumes that has poor mental health if mental health score unavailable but if at baseline was not married or had high bmi or smoked 10 or more cigarettes a day.
4. Assumes that has poor physical performance if physical performance score not available but if at baseline had high bmi or increasing phlegm or had been hospitalised 4 or more times for diseases other than cardio-respiratory or was other than a never-smoker
5. Assumes that has disability if activities of daily living unavailable but if at baseline was diabetic or had high bmi or smoked 10 or more cigarettes a day.

6 MRC Study – Results for quality of life and housing tenure-dependency

The MRC Study has the advantage over the Whitehall cohort of covering men and women from the general population and not being confined to a particular employer or part of Britain. The data available have the advantage over the Longitudinal Study of including information on health and social factors and some information on behaviours relevant to morbidity and quality of life. The limitation of the data used in this chapter is that they are cross-sectional. However, most of the issues raised in Chapter 1 can be addressed using the information from this Study. Three of the Sickness Impact Profile (SIP) outcomes used refer to daily self-care, mobility or instrumental activities and overlap to some extent with the SF36 physical performance and Townsend disability measures used for the Whitehall cohort. The social interaction dimension of SIP is not covered elsewhere. The Philadelphia Geriatric Morale Scale (PGMS) has particular interest in capturing emotions and reactions specific to old age. The sample size for the sections covering individual explanatory factors is similar to that of the Whitehall cohort (6405 with a brief assessment compared with 6168 with full Whitehall questionnaires).

The data source and analysis strategy are described in Chapter 3.3. As different models use different subsets of individuals, the housing tenure parameters can vary from section to section. In the following chapters, abbreviations are used for the SIP dimensions: home management (HM), mobility (MOB), body care and movement (BCM), and social interaction (SI). The PGMS dimension is labelled Morale.

6.1 *Composition of sample*

Nearly two-thirds of participants were women and the median age was 79.6 years for men 80.9 years for women. Over one-fifth of the sample were aged 85 and over. Three quarters of men aged less than 80 years and over half of those aged 80 years and over were married at the time of interview; for women the equivalent proportions were one third and just over one sixth. The proportions widowed were the mirror image of this, being over one sixth of younger men and nearly three-quarters of older women.

The categorization into housing tenure-dependency was introduced in Section 3.3. The *a priori* justification was: i) that a deterioration in health can lead to changes in living circumstances thereby also altering the observed association between housing tenure and quality of life; ii) that even if the housing tenure does not change as a result of greater dependency, the tenure differentials in quality of life could differ for those in more- and less- dependent situations. The information available from the study did not enable either those in sheltered accommodation or those in residential homes to fit neatly into a socioeconomic dimension. Although people in sheltered accommodation are predominantly in rented accommodation (88% of those identified in this study) this can be misleading because sometimes there may not be the option to buy if one wants certain kinds of sheltered facilities. Many of those in sheltered housing had previously been in owner-occupation (28% had moved from owner-occupation in to rented accommodation). Thus, the first decision was to separate out people in supported accommodation – there were too few in residential homes to keep them separate from people in sheltered accommodation (see Appendix Table 6.1.A1). For the remainder, a broad distinction was made between i) those living alone or with a spouse and ii) others. Grundy's classification [229], derived also with the need for support in mind, is similar but she was able to distinguish between those living only with their spouse and those living with others as well, which I could not do. The largest group of older people living with others are living with sons or daughters. Grundy and Harrop[230] noted that older people living in households headed by sons or daughters were more likely to be in owner-occupied homes than those living alone and attributed this partly to generational differences in housing tenure norms. Also, it was possible that the level of dependency needed before people live with sons and daughters might vary by tenure – if, for example, there is more space to accommodate parents in owner-occupied homes. In the MRC Study, 30% of older people living in owner-occupied homes with sons or daughters had previously been in rented homes compared with 18% of others in owner-occupation. Other studies have shown that frail people are particularly likely to live with children and that hospitalization can precipitate a move in with children.[231] The numbers of people who lived either with relatives other than spouse or children or with non-relatives were too small to keep separate and were included with people

living with sons or daughters. Hence, the following tenure-dependency categories were adopted:

- 'Independent' (living alone or with spouse and not in supported accommodation) and in owner occupied housing
- 'Independent' and in rented housing
- 'Dependent' (living with someone other than spouse and not in supported accommodation) and in owner occupied housing
- 'Dependent' and in rented housing
- Supported housing, comprising sheltered accommodation and residential homes

The largest group (53% of those with known tenure-dependency), were owner-occupiers living alone or with spouse. At the other end of the dependency spectrum, 16% were in supported housing, comprising sheltered housing (13%) and residential homes (3%). 'Independent' people in owner-occupation were most likely to be male (43% compared with 38% of 'Independents' in rented homes and roughly a quarter of other groups). Independent people in owner-occupation also had the youngest median age (79.1 years for men and 79.8 years for women), and were least likely to be widowed. The median age for their counterparts in rented accommodation was 0.7 years greater. Among the 'Dependent' groups, on the other hand, those in owner-occupied homes were older than those in rented homes. Percentages married were particularly low among the 'Dependents'. Details of the sample composition are given in Appendix Table 6.1.A2.

6.2 *Quality of life (QOL) scores*

Scores were highly skewed towards low ones or good quality of life (Table 6.2.1). A quarter of participants rated zero on the BCM dimension; half this proportion had zero scores on the other three dimensions. Only 6% of people had zero scores for Morale. The overall median scores were 26.8% for HM, 21.4% for MOB, 7.5% for BCM, and 11.9% for SI. The median for Morale was 5, just under one-third of the maximum score. Percentage scores are not comparable across dimensions – the score is likely to be higher for a dimension with 10 items (e.g. HM and MOB) than for one with 23 (BCM) that covers the most basic self-care activities.

As explained in Section 3.3.9, poor quality of life for each dimension was defined as being in the worst quintile of the score distribution, thereby identifying a group who were noticeably more likely to have any one of the problems identified in the instruments (see Appendix Table 6.2.A1). To be in the worst quintile the participants had said yes to at least 5/10 of the HM items, 4/10 of the MOB items, 5/21 of the BCM items and 4/19 of the SI items.

6.3 *Quality of life scores by demographic factors*

The median and inter-quartile quality of life scores increased with age for both men and women. Women tended to score higher on all dimensions than men of similar age, the contrast being most marked for BCM and HM (Figure 6.3.1, Appendix Table 6.3.A1). The pattern of median scores by marital status varied by outcome. In particular, married men had relatively low (good) median scores for SI and HM. Also, married women scored better than widowed and single women on all the SIP outcomes but did not have the best Morale score (Figure 6.3.2, Appendix Table 6.3.A1 – results not adjusted for age).

Figure 6.3.1 Median quality of life scores by gender and age[1]

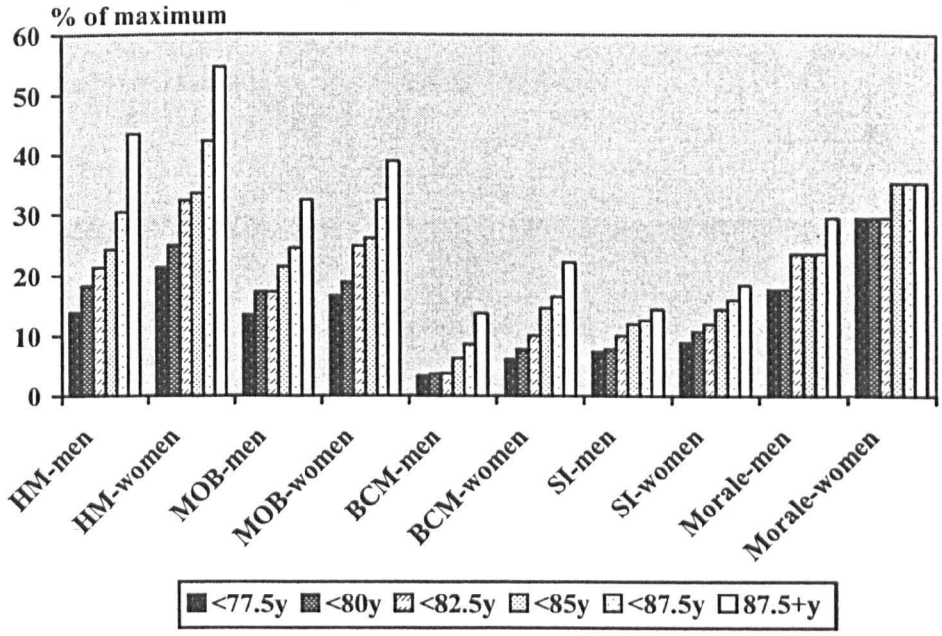
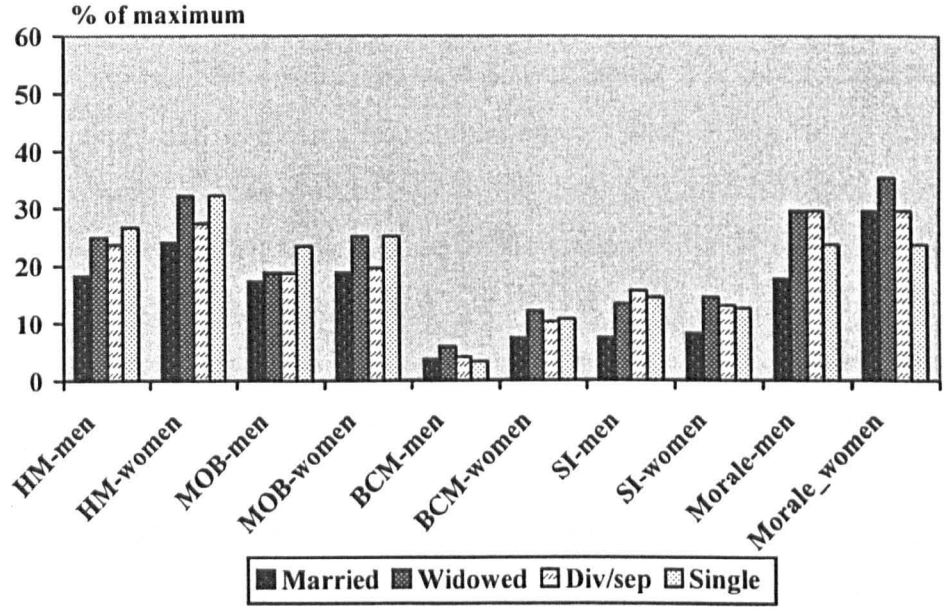


Figure 6.3.2 Median quality of life scores by gender and marital status[1]



1.People eligible for a 75+ year health screening check by their General Practice and not in a nursing home nor too ill to take part

In logistic regression models without socioeconomic variables, age is very strongly associated with the three SIP outcomes that concern physical functioning (Table 6.3.1 Model 1). The age trend is not as strong but still clear for SI whereas the chance of poor Morale rises less steeply and continuously with age. Gender had the strongest association with Morale whereas it was not significant for SI. In Table 6.3.1, model 2 also includes marital status. It is seen that marital status is only

significant for SI and Morale, married people being least likely to have poor SI and formerly-married people most likely to have poor Morale. The age gradient for poor SI is shallower after adjusting for marital status.

6.4 *Quality of life by housing tenure-dependency in old age*

Median scores on the three SIP dimensions concerned with physical functioning were higher (worse) for 'Dependent' than 'Independent' groups (those living alone or with spouse) (Table 6.4.1). However, this was not so apparent for SI and Morale. Median scores of people in rented accommodation appear to be worse than those of people in owner-occupation in the 'independent' categories, but less consistently so in the 'Dependent' category. However, when the worse quintiles of scores are picked out (Table 6.4.2) the tenure differentials appear to be more general (BCM for 'Dependent' women being the exception) and in some cases marked.

Having adjusted for gender, age, and marital status, it is confirmed that people in the 'Dependent' and supported housing categories tend to fare worse than those in the 'Independent' groups with respect to the three SIP dimensions concerning physical functioning and that the distinction by 'dependency' for SI was weaker (Table 6.4.3). There are signs that 'Dependent' people had lower chance of poor Morale than 'Independents'. In this and subsequent tables the reference group comprises 'independent' people in owner-occupied accommodation, unless otherwise specified.

Among 'Independents', people in rented accommodation had 1.5 to 1.7 times the odds of poor quality of life of those in owner-occupied accommodation for each outcome (Table 6.4.3). Among 'Dependents' the odds ratios were more varied and the confidence intervals wider; for HM and BCM, the differences between tenures were not statistically different from 1.0. However, for the other three dimensions the odds ratios were similar for 'Independents' and 'Dependents'.

The decision to stratify by dependency was confirmed by analyses testing for differences in associations in quality of life and tenure by dependency. When 'Dependents' included those in sheltered accommodation as well as those living with

someone other than spouse, clear interactions were found between dependency and tenure for the three physical SIP outcome scores (interaction terms of 0.5-0.7 and $p<0.10$) such that tenure effects were smaller among 'Dependents' than among 'Independents'. There were not such clear interactions between the 'Independents' and 'Dependents' once sheltered accommodation was put into a separate category. Nevertheless, it was decided to retain the full housing tenure-dependency categorization as a guard against bias through health selection.

While associations between housing tenure-dependency and quality of life did not vary substantially with gender, there were statistically significant interactions between tenure-dependency and age with respect to HM and MOB. The main differences of interest were greater tenure differentials among 'Independents' in the younger than the older age groups (Table 6.4.4). For HM, the odds ratios were 2.4 (95% CI 2.0, 3.0) for younger people and 1.4 (95% CI 1.1, 1.8) for older people. For MOB the equivalent figures were 1.9 (95% CI 1.3, 2.8) and 1.4 (95% CI 1.1, 1.9). However, the absolute differences in prevalence of low scores did not differ by age group. Among the younger 'Independents', 7% of owner-occupiers and 14% of renters had high HM scores; among older 'Independents' the percentages were 18% and 24% (these figures are not adjusted for other differences in composition of the younger and older people). For MOB the equivalent percentages were 7% and 12% for younger people and 16% and 22% for older people. Among 'Dependent' people, the converse was found for MOB – the tenure differential was greater for people aged 80 years and over than for younger ones.

It was planned in advance to test for interactions between tenure-dependency and both gender and age. These analyses were considered to be exploratory rather than definitive. The interactions are not therefore used in subsequent analyses

6.5 *Personal factors that may contribute to differentials in quality of life by socioeconomic status – information from the brief assessment*

6.5.1 Differences between people who did and did not have a brief assessment

Several of the personal factors to be examined were reported as part of the brief assessment, undertaken by 70% of those with quality of life questionnaires. This subsample was more likely to be male (39% compared to 32% without an assessment), to be younger, and to be 'Independent' in owner-occupation (Appendix Table 6.5.A1). People who did a brief assessment were much less likely to be in the worst quintiles of quality of life than those who did not (Table 6.5.1) but the difference was less marked for Morale than for the other dimensions.

The odds ratios for the QOL outcomes by tenure-dependency among the subsample with a brief assessment were generally slightly lower than for the full sample (Table 6.5.2). There were exceptions to this among 'Dependents' for whom tenure differentials with respect to SI and Morale were greater for the subset with a brief assessment than for the full sample. Among 'Dependents' with poor SI and Morale scores, the response rate to the brief assessment was higher if they were in owner-occupation than in rented homes but the converse was true for 'Dependents' with good scores.

6.5.2 Health problems

To explain variation in quality of life by housing tenure, a third factor has to be associated both with quality of life and with housing tenure. The health problems considered most likely to fulfil these criteria were difficulties with hearing[232;233] and vision,[95;234] urinary incontinence,[235;236] severe shortness of breath when sitting or talking,[236] swelling of the lower legs and problems with everyday memory, although the information about variation by socioeconomic position [237-239] was insufficient to confirm this aspect. Number of prescribed medicines was included as a general indicator of health problems.

Health problems were generally least common among the 'independent' people in owner-occupied homes but were not always more prevalent among people in rented rather than owner-occupied homes in the 'Dependent' categories (Appendix Table 6.5.A2). Those with health problems were much more likely to rate poorly on QOL scores than the sample as a whole (Appendix Table 6.5.A3).

Table 6.5.3 shows the tenure effects before (Model 1), and after (Model 2), adjusting for all health problems combined. The association between tenure and quality of life is attenuated by about a third for the 'Independents' on the SIP dimensions and 45% on the Morale dimension. Attenuation was slight for 'Dependents'. This is consistent with the smaller variations by tenure in prevalence of health problems among 'Dependents' than among 'Independents'. For 'Independents' differentials between owner-occupiers and renters remained statistically significant for HM, BCM and was marginal for SI and Morale. For 'Dependents' the two outcomes – SI and Morale - which had significant tenure differentials before adjustment, retained them. Severe shortness of breath had the most consistent small effect on the odds ratios for all outcomes (a reduction of 0.07 to 0.10 in the odds ratio for tenure among 'Independents' depending on the outcome). Self-reported hearing impairment had a similar confounding effect to severe shortness of breath on SI, Morale, and MOB and swollen legs on the three physical SIP dimensions. Number of medicines attenuated the odds ratios for supported accommodation but not that comparing renter and owner-occupier 'Independents'(analyses not shown).

There were few exceptions to the six health factors being independent risk factors for the five quality of life outcomes (Table 6.5.4). Hearing problems were not associated with poor HM, or swollen lower legs with Morale. Urinary incontinence was at best weakly associated with poor Morale once other health factors were taken into account.

6.5.3 Health behaviours

Three health behaviours were reported in the brief assessment: current cigarette smoking (usual number smoked daily), current alcohol consumption (number of drinks the previous week), and self-assessment of physical activity compared with other people of their own age. Smoking, lack of physical activity, and to a lesser extent, heavy drinking have been reported as barriers to high quality of life in old age.[143;151;240;241] Physical activity was only considered in relation to SI and Morale, as many of the components of the physical SIP instruments could be considered as physical activity. Only one in ten were smokers at the time of the brief assessment but over half had alcoholic drinks. One in five reported that they were not very, or not at all, active. Smoking and physical inactivity were more common, and drinking alcohol less common, among people in the rented sector than among those in the owner-occupied sector (Appendix Table 6.5.A4).

Inclusion of current smoking and alcohol consumption (Model 2 compared to Model 1) modestly reduced the owner-occupier/renter differentials among 'Independents' but barely made a difference for outcomes among 'Dependents' (Table 6.5.5). Alcohol had a greater confounding effect than smoking (not shown) leading to reductions in excess odds among 'Independent' renters for three outcomes. It is not clear why the confounding effects were not stronger, particularly among 'Dependents'.

Self-perceived physical activity was strongly negatively associated with poor SI and Morale; the physically inactive had about seven times the odds of poor scores as the very active. It attenuated the tenure differentials for renters compared to owner-occupiers by about a third of the excess (eg reduction from 34% excess odds to 21% for SI) but among 'Dependents' the tenure differentials were still strong for SI and Morale (Table 6.5.5 Model 3). This attenuation could arise not only because of disadvantages of less activity but also if the self-reported activity measure is influenced by people's feeling of control over their lives.

Cigarette smoking was a significant factor for all but BCM (Table 6.5.6 Model 2). Alcohol consumption was a significant independent factor for all five measures, the

main division being between non-drinkers and drinkers. Addition of self-reported physical activity attenuated the odds ratios for smoking category and alcohol consumption category, particularly reducing the apparent advantage for Morale among the drinkers. Non-drinkers were more likely than drinkers to say they were not very, or not at all, active (27% against 17%) and likewise with smokers and non-smokers (27% against 22%). The least active group comprised smoking non-drinkers (33% being not very, or not at all, active). This demonstrates how different adverse health behaviours tend to cluster.

6.5.4 Social contacts

It was anticipated that social contacts might be reducing the tenure differentials in quality of life by being more common among people in rented accommodation. In the brief assessment participants were asked how frequently they saw friends, neighbours or relatives other than those they lived with. Nearly half had daily contact and only 5% rare contact.

Frequency of contact was similar for 'Independent' owner-occupiers and renters but rare contact reported by more renters than owner-occupiers among the 'dependent' groups (Appendix Table 6.5.A5). Only people who rarely saw friends and family were at a clear disadvantage with respect to the HM, MOB and BCM dimensions while there was a negative association between frequency of seeing relatives and poor SI and Morale scores. This factor did not explain the tenure differentials at all for 'Independents' and even among 'Dependents' it did not attenuate the tenure differentials by more than 0.1 (Table 6.5.7).

6.5.5 Help received

As for social contact, we hypothesized that practical help received might buffer against the adverse effects of health problems on Morale. Help received is closely correlated with physical difficulties reflected in the physical SIP dimensions. During the quality of life interview, participants were asked whether they received regular help from relatives or friends with looking after themselves or their home. They were also asked whether they had used various services. For some services the reference period was a week (nurse, bath assistant, home help, laundry, meals on wheel, day

centre, luncheon club, day hospital); for the remainder it was a month. The questions changed during the fieldwork period. This report uses questions asked for the majority of the period thereby omitting use of services information for 13% of the sample.

There were 21 services listed. Hospital inpatient, outpatient and casualty visits have been omitted from this analysis. The remainder have been grouped into treatment services (nurse, doctor, therapists, chiropodist, day hospital), personal care services (home help, laundry, meals on wheels, bath assistant, private paid help, private agency help), services with a socialising element as well as personal care (day centre and luncheon club) and ones intended to cater for social problems (social work and voluntary organisations). As the types of service provided by private agencies and voluntary organisations are not known it is likely that there is some misclassification. For the modeling, a combined variable was created, determined by a mixture of the size of cells (in particular combining receipt of social services and going to clubs which were rare) and an indication of whether services received were purely medical or might have a more holistic approach and be effective for Morale.

As expected, the 'Dependent' groups were far more likely to be receiving informal help, particularly from household members than 'Independent' groups (Appendix Table 6.5.A6). Renters among the 'Independents' were more likely to receive help from a child not in the same house and less likely to be without help than owner-occupiers. The differences by tenure were smaller among 'Dependents'. Percentages receiving treatment, defined in these broad terms, were similar across tenure groups but owner-occupiers slightly more likely to receive a combination of treatment and personal care.

To allow for the influence of poor physical functioning on both help received and Morale, the model included a factor that identified people belonging to the worst quintile of at least one of the three 'physical' SIP dimensions. People in this group were four times as likely to have poor Morale as those outside it (Table 6.5.8). Adding in the help factors did not substantially alter the observed associations between tenure-dependency and low Morale.

Recipients of informal help, particularly from spouse or child in the house, were more likely to have poor Morale. Recipients of formal services, except those who only received personal care, also had statistically significant increased odds of poor Morale compared with non-users. The worse Morale with informal help appeared to be largely independent of formal help received (comparing Models 2 and 3 in Table 6.5.8).

6.5.6 Summary

Most potential explanatory variables were from the brief assessment so the analyses in this section were limited to the 6385 people who completed this. They were less likely to have poor quality of life outcomes than the larger sample and the tenure differentials were generally a little lower (odds ratios ranging from 1.4 to 1.7 among 'Independents') than for the full sample except for the differentials for 'Dependents' with respect to SI and Morale where the odds ratios were 2.0. The odds ratios comparing renting with owner-occupation among the 'Dependents' were not statistically significant for the three physical SIP dimensions.

A set of seven self-reported health problems attenuated the tenure differentials more among 'Independents' than among 'Dependents', partly because there were fewer differences in prevalence of health problems between owner-occupiers and renters among the latter group. Although not drinking was a factor for worse quality of life on all five outcomes, and smoking was a factor for four of them, they jointly had a modest effect on the tenure differentials among 'Independents' and negligible effect for 'Dependents'. Self-reported physical activity, modeled for SI and Morale only, was responsible for further attenuation of the tenure differential and reduced the excess chance of poor SI and Morale by about a third. Frequency of seeing relatives and friends outside the household varied little by tenure and did not account for any of the tenure differentials in quality of life. Finally, help received from formal or informal services did not mediate the tenure differentials in Morale (the one outcome for which it was assessed) even after allowing for whether a person was in poor physical condition as a proxy for need of services.

6.6 *Explanatory factors from the detailed assessment*

6.6.1 Differences between the subsamples who completed the detailed assessment and fuller samples

The detailed assessment replicated much of the information in the brief assessment but had two advantages: some objective measures were used whereas the brief assessment was entirely the participant's self-report of their symptoms; some topics were explored in more depth than during the brief assessment. Information from the detailed assessment does not constitute the main source of potential intermediate factors for quality of life differentials because it is available for only half the sample. Analyses using the detailed assessment have to be confined to people registered with the 12 practices assigned to the universal arm. In the targeted arm, only people who fulfilled certain "need" criteria on the brief assessment progressed to a detailed one and hence the detailed assessments are not representative.

In the following sub-sections, the detailed assessments are used with the following four aims:

- To see whether objective assessments of vision and hearing lead to similar conclusions about the influence of vision and hearing problems on quality of life and differentials therein
- To see whether health factors that are not available on the brief assessment, particularly diagnosed diseases, are of relevance
- To use a different categorisation of smoking to see whether it provides better explanation of tenure differentials
- To use availability of someone to confide in as an alternative measure of social support and to consider whether other social problems may be explanatory factors

However, it was anticipated that the smaller numbers would only allow fairly tentative conclusions.

There were 4449 people in the quality of life database who were in practices from the universal arm of whom 3171 (70.5%) had a detailed assessment. Of these 3110

also had a brief assessment (88% of those with a brief assessment in the universal arm). However, in the context of the total quality of life sample, there were detailed assessments for only 36% of the full sample with quality of life data and 49% of those who also had brief assessment data.

Compared with the full quality of life sample, the subset with detailed assessments had a higher percentage of men (40% against 37%) but a similar percentage aged less than 80 years (50%). A slightly higher percentage of the subset was classified as 'Independent' from the quality of life interview (55% against 52%). Percentages of sub-categories with the detailed assessment are shown in Appendix Table 6.6.A1

The sample of people who had detailed assessments were less likely to have poor quality of life than those who did not. The odds ratios for having a poor score ranged from 0.62 to 0.74 depending on the outcome (Table 6.6.1). The unstandardised prevalences of poor quality of life are summarised in Table 6.6A below

Table 6.6A Prevalence of poor quality of life scores by availability of assessment data

People eligible for a 75+ year health screening check by their General Practice and not in a nursing home nor too ill to take part

Percentage with poor score in	HM	MOB	BCM	SI	Morale
Full sample	20.6 (1801/8727)	16.9 [1] (1471/8727)	20.0 (1745/8716)	20.4 (1776/8723)	21.0 (1830/8696)
Those with brief assessment	17.1 (1095/6401)	14.4 (920/6400)	17.1 (1093/6392)	17.7 (1131/6398)	19.4 (1239/6392)
Those with detailed assessment	16.3 (517/3171)	13.7 (435/3170)	15.3 (486/3168)	16.8 (533/3169)	17.1 (541/3168)

1. This was less than 20% because 229 people had a score that was on the threshold used for the cut-off and in the initial creation of variables these were assigned to the main group.

In the detailed assessment subset 'Independent' people in rented homes only had significantly higher chance of poor score than those in owner-occupied homes for BCM and SI; Morale was borderline (Table 6.6.2). Although, through lack of power, three of the associations between housing tenure among 'Independents' and quality of life were not statistically significant, models including other factors are shown. If

the odds ratios changed substantially after addition of a factor it would still provide some clue concerning contributors to tenure differentials.

The models adjusted for each set of explanatory variables from the brief assessment (discussed in Section 6.5) were re-run on the subset with information from detailed assessments (not shown) and the overall conclusion is that the subset is not substantially different from the larger 'Independent' group with brief assessments. There were signs that the dependent groups were different with respect to tenure differentials, but the confidence intervals very wide. This reinforced the decision not to look at tenure differentials among 'Dependents' in the following section. Surprisingly, the effects of health and other variables were not necessarily diluted in the subset even though it was expected that the people with worse health and health-related quality of life would be the ones who were lost to further follow-up.

6.6.2 Health factors

The detailed assessment contains a wealth of information on health, ranging from clinical assessments of disease, biochemical indicators (blood analytes and urine samples), external assessments of vision and hearing deficits, to self-reported symptoms (many replicated from the brief assessment). It was decided to select diseases expected to be the source of symptoms that could impair quality of life and indicators of potentially severe restrictions on activity. Where 5% or more of respondents had not given an answer, a separate category has been established. The factors are defined in the text box.

Health factors defined:
Visual impairment: vision < 6/12 binocular vision using the Bailey-Lovie chart
Hearing impairment: failed whispered voice test
Cancer– ever told by a doctor that had cancer (excluding skin cancer). This included all cancers even if treated several years previously. In many cases the date of the cancer and the success of the treatment were not known.
Diseases of the circulatory system- ever told has diabetes or that the respondent had experienced a heart attack or stroke. It was planned to confine these events to those reported within 12 months of assessment but the numbers were too small and it was thought that there could be long-lasting effects, especially of stroke. Possible angina was categorized according to Cook's definition using the Rose Angina Questionnaire[309], i.e. self-report of chest pain that goes away on resting
Symptoms: Severe incontinence, i.e. reported that wet self more than just a few drops or soiled self at least 3 times a week. Phlegm refers to usually bringing up phlegm first thing in the morning in winter or during the day or at night in the winter for at least 3 months in the year. People who reported being short of breath walking with people of own age on level ground were assumed to be less severely affected than those who reported being short of breath on talking. Doctor's diagnosis of emphysema, pneumonia or asthma.
Number of medications refers to "medicines that you are currently taking" – the nurse doing the screening listed each one and counted up the number of different medications.

Of these health factors, the 'Independent' people in owner-occupation were clearly at an advantage with respect to hearing, vision, absence of shortness of breath, and absence of asthma (Appendix Table 6.6.A2) and also took fewer medicines on average. Similar percentages of 'Independent' owner-occupiers and renters had experienced heart attack or stroke, smaller percentages than in the supported group. The remaining six health indicators chosen did not vary substantially by housing tenure.

Only shortness of breath, pneumonia, or taking a high number of medicines were strongly associated with poor Morale. Hearing or vision problems, severe incontinence, having had a stroke, shortness of breath, and number of medicines were most consistently associated with the SIP outcomes (Appendix Table 6.6.A3). Diabetes, emphysema, pneumonia, asthma, and ever having been diagnosed with cancer were generally not strongly associated with the QOL outcomes

As the small numbers of people limited the number of parameters that could sensibly be estimated, parsimonious models were used. Health indicators that were not associated with both housing tenure-dependency and quality of life in the preceding analyses were excluded from models.

After inclusion of the health factors that were associated with both housing tenure and quality of life, all the odds ratios comparing 'Independent' renters with owner-occupiers were closer to 1.0. However, the parameter for BCM and SI remained statistically greater than 1.0 (Table 6.6.3). Shortness of breath was the health factor that accounted for most of the attenuation in the odds ratios for being in rented compared with owner-occupied accommodation and even this was minor for Morale. The other factors only marginally, if at all, altered the odds ratio (not shown).

In the models adjusted for demographic factors and housing tenure-dependency, having had a stroke, but not having had a heart attack, was associated with all the SIP outcomes whereas neither cardiovascular event was associated with poor Morale (the time lapse may have removed initial effects on Morale). Taking several medications was associated with all the physical outcomes and Morale in the multivariate models (Table 6.6.4)

6.6.3 Health behaviours

The same three types of behaviour were reported for the detailed assessment as for the screening assessment: smoking, alcohol consumption, and physical activity. However, a series of questions on history of smoking enabled a classification by pack-years of smoking (one pack year = smoking 20 cigarettes a day for one year). These calculations were derived from ages started and stopped smoking (or current age if still smoking) and questions about number of cigarettes smoked a day. They assumed that consumption was stable during a person's smoking career. The activity and alcohol consumption information was the same as on the brief assessment questionnaire.

People who were in rented accommodation had more pack-years of cigarette smoking than those in owner-occupation (Appendix Table 6.6.A4). Pack years of

smoking were not strongly associated with any of the outcomes in univariate analyses (Appendix Table 6.6.A5). Hence this analysis was not pursued further

6.6.4 Social support, and experience of life events

During the detailed assessment participants were asked if there was anyone they could talk to about private matters or at times of stress or worry – "someone who you can really count on or feel at ease with" – and, if so, who. Having a confidante was strongly associated with high physical functioning and vitality in the Nurses' Health Study [242] and more strongly associated with availability of instrumental or emotional support than presence of spouse or contacts with children or others[243] so might be a more appropriate social support measure than the factor used in Section 6.5.4. More than one person could act as confidante but answers were categorised hierarchically, assigning priority respectively to spouse, other relatives and others. This assumes that a spouse tends to be closer than others.

It was anticipated that experience of an upsetting event such as illness of a loved one or separation from them could make the need for social support all the greater and the helpful effect of having a confidante may not appear as strong unless such events are taken into account. The separation may take place in many ways and the means of separation was not specified; some examples are through death or break-up of a household when one member moves into care. Seven per cent of those with a detailed assessment had experienced both illness of, and separation from, a loved one during the year prior to assessment. A further 7% had experienced separation only and 10% illness only. Assuming that separation would be more harmful than illness, a three-category variable was created which separated out people who had only experienced illness from those who had experienced both events or only separation.

Only 5% of people lacked a confidante altogether (Appendix Table 6.6.A6). Almost by definition the person taking the role of confidante was likely to differ between 'Independents' and 'Dependents' because the latter were less likely to have a spouse. However, even among the 'Independents', those in the rented sector were less likely to rely on their spouse than those in the owner-occupied sector (again, partly because the percentages currently married differed, being 45% and 55% respectively). People

who cited their spouse as confidante had the lowest prevalence of poor MOB, SI or Morale (Appendix Table 6.6.A7). At the other extreme, 30% of those with no confidante had poor SI or poor Morale compared with 17% of the total sample.

Experience of illness of, or separation from, a loved one was neither associated with housing tenure nor strongly with quality of life outcomes and was omitted from the models of tenure differentials (Appendix Tables 6.6.A6 6.6.A7).

In the multivariate models, having a confidante was not a significant factor for the physical SIP outcomes (Table 6.6.5 Model 2) but those who confided in their spouse were least likely to have poor SI or Morale and those lacking a confidante most likely to do so. Presence of a confidante was a minor confounder of the associations between housing tenure among 'Independents' and poor SI (Model 2). Adding in presence of a confidante did not alter the odds ratio for renters versus owner-occupiers but further reinforced the 'protective' effect on Morale of being in the 'Dependent' but not supported home situation.

6.6.5 Summary

The subset of people in the universal arm (12 practices) who had a detailed assessment comprised only just over a third of the full sample and under a half of those with brief assessments in all 23 practices. They were less likely to have poor quality of life but remarkably similar to the subset with brief assessments in terms of the potential health explanatory variables explored in Section 6.6. They were less likely to be 'dependent', less likely to smoke, more likely to drink and were less active. Only tenure differentials among 'Independents' are discussed in this section. The tenure differentials were a little lower than those found for the group who had a brief assessment (odds ratios ranging from 1.3 to 1.7) and the confidence intervals much wider because of the small sample size. Nevertheless, tenure differentials for BCM and SI were still significant and the central estimates sufficiently large to obtain some idea whether potential explanatory factors measured during the detailed assessment could be relevant.

The health factors included clinical measures and diagnosed diseases as well as some symptoms. Shortness of breath was the one factor that consistently accounted for some of the differentials between 'Independent' renters and owner-occupiers. Several of the indicators, including diagnosed cancer, emphysema, pneumonia or asthma were not associated with poor quality of life.

Additional information on history of smoking cigarettes was not useful in this subset because percentages with poor quality of life did not vary substantially by smoking category.

New measures were available for social explanatory factors – the presence or relationship of a confidante, and experience of life events. Experience of life events, as measured, was not associated with quality of life. Having a confidante, especially one's spouse was associated with lower chances of poor SI and poor Morale, after adjusting for tenure-dependency but had little impact on the tenure differentials in these outcomes.

The information on the detailed assessment did not enable us to explain the tenure differentials among 'Independents' much better but does suggest that symptoms may be more important than diagnosed diseases and that presence of a confidante could be important if it varied more sharply by housing tenure.

6.7 *Summary*

People in rented homes were more likely to have poor quality of life, whether in the form of physical functioning, SI, or Morale. These differentials were found for all five quality of life outcomes for the 'Independent' people who lived alone or with their spouse and for three quality of life dimensions for 'Dependent' people, but not for the most basic self-care (BCM) nor for the dimensions where one would expect co-residents to take over responsibility from the older generation (HM). In terms of explanatory factors the picture differed for the 'Independent' and 'Dependent' groups. Co-morbidity accounted for a substantial part of the tenure differentials among Independents and health behaviours for a lesser amount. (The self-reported activity measure was a strong factor but suffered from difficulties in interpretation.)

Neither of these groups were strong intermediate factors for the 'Dependent' groups. Tenure differentials were not mediated at all for either 'Independents' or 'Dependents' by social relations with people outside the household or by formal and informal help received (help was only analysed for the Morale outcome). More objective or fuller self-reported information available on the detailed assessment did not help to explain the tenure differentials to any greater extent, although the power to detect differentials and changes therein was considerably less for this subset.

Key points

- Among 'Independents', people in rented accommodation had 1.5 to 1.7 times the chance of poor quality of life of those in owner-occupied accommodation for each of five quality of life dimensions; they were of similar magnitude for 'Dependents' with respect to three dimensions but smaller for HM and BCM.
- A set of seven self-reported health problems jointly attenuated the tenure differentials among 'Independents' by at least a third
- Current smoking and alcohol consumption attenuated the tenure differentials modestly. Differences in percentage perceiving themselves as inactive partially accounted for tenure differentials in SI and Morale but it is not clear what this reported perception meant (physical activity was only assessed for SI and Morale).
- Lack of external social contact and receipt of formal and informal help received did not explain tenure differentials (only Morale was analysed for formal help).
- Using disease diagnoses or clinical measures of vision and hearing rather than self-reported health problems did not appear to have any advantage in explaining tenure differentials.

Study populations for tables in Chapter 6

Table Numbers	Data source	Dates of fieldwork+	Study population
6.2.1, 6.3.1, 6.4.1, 6.4.2, 6.4.3, 6.4.4	MRC Study	1995-9	Men and women aged 75 years and over* registered in 23 general practices in Great Britain. Exclusions: in a nursing home or too ill to take part. Main analyses are for men and women combined
6.5.1, 6.5.2	MRC Study	1995-9	As above but comparisons of subsets with and without a brief assessment
6.5.3, 6.5.4, 6.5.5, 6.5.6, 6.5.7, 6.5.8	MRC Study	1995-9	The subset who had a brief assessment.
6.6.1, 6.6.2	MRC Study	1995-9	Comparisons between the subsets of the main study population who did, or did not, have a detailed assessment
6.6.3, 6.6.4, 6.6.5	MRC Study	1995-9	The subset who had a detailed assessment.

Further notes:
+Fieldwork took place during 1995-9, the year depending on which General Practice the person belonged to.
*People could be aged 74 years at the time of the quality of life interview provided that they would be aged 75 years when they had an assessment by the General Practice (see pp77-8)
Cases with missing values on key variables were omitted from analyses unless otherwise specified

Table 6.2.1 Median and inter-quartile ranges of quality of life scores for whole population

Quality of life Dimension	Yes, due health Median (interquartile range)[1]		Yes, not due health Median (interquartile range)[1]		Yes, all reasons Median (interquartile range)[1]		Percentage of scores which are zero
HM (n=8727)	12.7	(0.0, 42.9)	0.0	(0.0, 10.9)	26.8	(10.9, 47.2)	12.9
MOB (n=8727)	0.0	(0.0, 25.1)	7.9	(0.0, 17.2)	21.4	(7.9, 33.8)	11.9
BCM (n=8716)	6.7	(0.0, 19.4)	0.0	(0.0, 0.0)	7.9	(0.0, 20.6)	25.8
SI (n= 8723)	0.0	(0.0, 9.9)	5.4	(0.0, 10.9)	11.9	(5.2 19.6)	11.4
Morale (n-8696)	na		na		5	(2, 8)	5.6

1. The Sickness Impact Profile dimensions (all but Morale) are expressed in terms of percentage of the maximum score. The range for the Psychiatric Geriatric Morale Scale (Morale) is 0-17. A higher score means worse quality of life

Table 6.3.1 Odds ratios (95% confidence intervals) for being in the worst quintiles of quality of life scores by gender and age
Model 1 without adjusting for marital status, model 2 with adjustment for marital status

		HM (n=8598)[1]			MOB (n=8598)[1]			BCM (n=8598)[1]		
		(1)	(2)		(1)	(2)		(1)	(2)	
Gender	Female vs male	1.2	1.2	(1.0, 1.4)	1.5	1.5	(1.3, 1.8)	1.7	1.7	(1.4, 2.0)
	p-value			0.14			<0.001			<0.001
Age	<77.5 years	1.0	1.0		1.0	1.0		1.0	1.0	
	77.5, <80.0 years	1.3	1.3	(1.1, 1.5)	1.4	1.4	(1.1, 1.8)	1.2	1.2	(1.0, 1.4)
	80.0, <82.5 years	1.9	1.8	(1.5, 2.2)	2.0	2.0	(1.6, 2.5)	1.6	1.6	(1.3, 2.0)
	82.5, <85.0 years	2.8	2.6	(2.2, 3.4)	2.5	2.5	(1.9, 3.2)	2.5	2.4	(2.0, 3.0)
	85.0, <87.5 years	4.1	3.9	(3.1, 4.8)	3.6	3.6	(2.8, 4.6)	2.8	2.8	(2.2, 3.0)
	87.5 years or more	8.1	7.7	(6.1, 9.5)	7.1	7.0	(5.5, 9.0)	5.1	5.0	(3.9, 6.4)
	p-value			<0.001			<0.001			<0.001
Marital status	Married		1.0			1.0			1.0	
	Formerly married		1.2	(1.0, 1.5)		0.9	(0.9, 1.3)		1.0	(0.9, 1.2)
	Single		1.0	(0.8, 1.4)		1.4	(0.7, 1.2)		0.9	(0.7, 1.2)
	p-value			0.069			0.59			0.39

		SI (n=8596)[1]			Morale (n=8572)[1]		
		(1)	(2)		(1)	(2)	
Gender	Female vs male	1.1	0.9	(0.8, 1.0)	1.9	1.8	(1.5, 2.0)
	p-value			0.15			<0.001
Age	<77.5 years	1.0	1.0		1.0	1.0	
	77.5, <80.0 years	1.3	1.3	(1.0, 1.6)	1.3	1.3	(1.0, 1.5)
	80.0, <82.5 years	1.6	1.5	(1.2, 1.9)	1.3	1.3	(1.1, 1.5)
	82.5, <85.0 years	2.1	1.9	(1.5, 2.3)	1.5	1.4	(1.2, 1.6)
	85.0, <87.5 years	2.5	2.2	(1.7, 2.8)	1.4	1.3	(1.1, 1.6)
	87.5 years or more	3.7	3.1	(2.5, 3.9)	1.7	1.5	(1.3, 1.9)
	p-value			<0.001			0.002
Marital status	Married		1.0			1.0	
	Formerly married		1.8	(1.5, 2.1)		1.4	(1.2, 1.6)
	Single		1.6	(1.3, 2.0)		0.9	(0.7, 1.1)
	p-value			<0.001			<0.001

1. Adjusted for tertiles of Jarman and SMR.

Table 6.4.1 Median and inter-quartile quality of life scores by current housing tenure –dependency

	Number	HM		MOB		BCM		SI		Morale	
Men											
'Independent'											
Owner-occupied	1955	15.9	(5.4, 32.2)	16.6	(7.2, 26.1)	3.3	(0.0, 11.7)	7.9	(2.5, 15.2)	3	(2, 6)
Rented	678	24.2	(8.6, 48.5)	18.8	(7.9, 32.3)	6.3	(0.0, 18.3)	12.3	(6.2, 21.0)	4	(2, 7)
'Dependent'											
Owner-occupied	154	30.4	(10.9, 60.4)	19.6	(7.9, 31.0)	3.7	(0.0, 16.1)	10.0	(4.1, 17.2)	4	(2, 7)
Rented	73	32.2	(19.5, 65.2)	25.4	(17.2, 38.9)	9.4	(0.0, 23.5)	12.3	(7.0, 21.3)	5	(3, 8)
Supported housing	348	32.8	(18.2, 65.2)	25.1	(14.2, 38.9)	10.0	(2.6, 24.0)	14.4	(7.4, 23.3)	5	(3, 8)
Women											
'Independent'											
Owner-occupied	2569	23.6	(10.9, 42.9)	18.8	(7.9, 32.3)	7.3	(0.0, 16.9)	11.0	(5.0, 17.9)	5	(2, 8)
Rented	1113	31.1	(15.9, 43.7)	25.1	(10.9, 37.5)	11.4	(3.3, 24.0)	14.2	(7.4, 21.0)	6	(3, 9)
'Dependent'											
Owner-occupied	475	42.9	(21.7, 68.0)	27.8	(17.2, 41.1)	13.7	(3.6, 30.6)	12.1	(4.6, 20.0)	5	(3, 8)
Rented	182	43.7	(24.9, 75.8)	33.2	(21.4, 46.4)	14.4	(3.6, 35.4)	14.4	(7.0, 26.7)	6	(3, 9)
Supported housing	1027	43.7	(32.0, 75.8)	32.3	(18.8, 44.7)	19.4	(7.8, 34.4)	16.7	(9.9, 23.0)	6	(3, 10)

Table 6.4.2 Percentages with scores in the worst quintile of the quality of life indices by current housing tenure- dependency and gender

	HM	MOB	BCM	SI	Morale
Men					
'Independent'					
Owner-occupied	11.4	9.2	10.9	14.1	11.6
Rented	21.0	14.0	17.0	23.6	17.3
'Dependent'					
Owner-occupied	26.4	16.1	16.8	20.6	13.0
Rented	30.1	20.6	21.9	24.7	21.9
Supported housing	34.1	21.8	23.2	31.0	22.1
Women					
'Independent'					
Owner-occupied	13.0	12.6	15.4	16.0	21.5
Rented	19.0	18.9	23.6	24.4	29.6
'Dependent'					
Owner-occupied	39.6	26.5	32.9	22.1	19.4
Rented	44.8	33.7	35.3	34.2	26.9
Supported housing	40.2	32.8	39.4	29.8	31.8

Table 6.4.3.Odds ratios (95% confidence intervals) for being in the worst quintiles of quality of life scores by housing tenure-dependency

Housing tenure-dependency	HM[1] (n=8598)		MOB[1] (n=8958)		BCM[1] (n=8598)		SI[1] (n=8596)		Morale[1] (n=8572)	
'Independent'										
Owner-occupied	1.0		1.0		1.0		1.0		1.0	
Rented	1.7	(1.4, 2.1)	1.6	(1.2, 2.1)	1.7	(1.4, 2.0)	1.6	(1.3, 2.0)	1.5	(1.3, 1.8)
'Dependent'										
Owner-occupied	3.4	(2.8, 4.0)	2.0	(1.5, 2.7)	2.2	(1.8, 2.8)	1.1	(0.9, 1.5)+	0.8	(0.7, 1.0)+
Rented	4.4	(3.1, 6.2)	3.1	(2.1, 4.5)	2.7	(2.0, 3.8)	2.0	(1.5, 2.6)	1.3	(1.0, 1.7)
Supported housing	3.7	(2.6, 4.2)	2.6	(2.0, 3.2)	2.7	(2.2, 3.3)	1.7	(1.4, 2.1)	1.6	(1.3, 1.9)
Rented vs owner-occupied among:										
'Independents'	1.7	(1.4, 2.1)	1.6	(1.2, 2.1)	1.7	(1.4, 2.0)	1.6	(1.3, 2.0)	1.5	(1.3, 1.8)
'Dependents'	1.3	(0.9, 1.9)+	1.5	(1.1, 2.1)	1.2	(0.9, 1.8)+	1.7	(1.2, 2.4)	1.6	(1.2, 2.3)

+ Wald p-value >0.05

1. Adjusted for gender, age, marital status, tertiles of Jarman and SMR

Table 6.4.4 Odds ratios (95% confidence intervals) for being in the worst quintiles of quality of life scores by housing tenure-dependency with separate estimates where there are interactions with age

	HM (n=8598)[1]				MOB (n=8958)[1]			
Housing tenure-dependency	Age <80 years		Age 80 or more years		Age <80 years		Age 80 or more years	
'Independent'								
Owner-occupied	1.0		1.0		1.0		1.0	
Rented	2.4	(2.0, 3.0)	1.4	(1.1, 1.8)	1.9	(1.3, 2.8)	1.4	(1.1, 1.9)
'Dependent'								
Owner-occupied	3.4	(2.3, 4.9)	3.7	(3.0, 4.7)	1.8	(1.0, 3.2)	2.1	(1.5, 2.8)
Rented	3.9	(2.4, 6.4)	5.4	(3.6, 8.0)	2.1	(1.2, 3.6)	3.6	(2.5, 5,2)
Supported housing	3.6	(2.6, 5.0)	3.5	(2.6, 4.5)	3.3	(2.3, 4.7)	2.3	(1.8, 3.0)
Rented vs owner-occupied among:								
'Independents'	2.4	(2.0, 3.0)	1.4	(1.1, 1.8)	1.9	(1.3, 2.8)	1.4	(1.1, 1.9)
'Dependents'	1.1	(0.7, 2.0)+	1.5	(1.0, 2.2)+	1.1	(0.6, 1.9)+	1.8	(1.2, 2.5)

1. Adjusted for gender, age, marital status, tertiles of Jarman and SMR. + Wald p-value>0.05

Table 6.5.1 Odds ratio (95% confidence interval) for being in the worst quintile of the quality of life scores for those who had a brief assessment compared with those who did not.

Outcome	OR[1]	95% CI
HM	0.55	(0.47, 0.64)
MOB	0.65	(0.55, 0.76)
BCM	0.62	(0.56, 0.68)
SI	0.65	(0.57, 0.73)
Morale	0.79	(0.72, 0.87)

1. Adjusted for gender, age, marital status, housing tenure-dependency, and tertiles of Jarman and SMR

Table 6.5.2 Odds ratios (95% confidence intervals) for being in worst quintile of quality of life score comparing people in rented and owner-occupied accommodation, by whether had a brief assessment

Outcome and sub-group	All[1] (n=8598)		Had brief assessment[1] (n=6300)		Did not have brief assessment[1] (n=2298)	
'Independents'						
HM	1.7	(1.4, 2.1)	1.6	(1.2, 2.0)	2.0	(1.5, 2.7)
MOB	1.6	(1.2, 2.1)	1.5	(1.1, 2.2)	1.7	(1.2, 2.3)
BCM	1.7	(1.4, 2.0)	1.7	(1.4, 2.0)	1.6	(1.2, 2.2)
SI	1.6	(1.3, 2.0)	1.5	(1.2, 1.8)	1.9	(1.4, 2.5)
Morale	1.5	(1.3, 1.8)	1.4	(1.1, 1.7)	1.7	(1.3, 2.3)
'Dependents'						
HM	1.3	(0.9, 1.9)+	1.3	(0.9, 1.8)+	1.2	(0.6, 2.8)+
MOB	1.5	(1.1, 2.1)	1.2	(0.8, 1.8)+	1.9	(1.1, 3.4)
BCM	1.2	(0.9, 1.8)+	1.4	(0.9, 2.2)+	0.9	(0.6, 1.4)+
SI	1.7	(1.2, 2.4)	2.0	(1.3, 3.1)	1.2	(0.7, 2.2)+
Morale	1.6	(1.2, 2.3)	2.0	(1.2, 3.3)	1.1	(0.7, 1.7)+

+ Wald p-value >0.05

1. Adjusted for gender, age, marital status and tertiles of Jarman and SMR

Table 6.5.3 Odds ratios (95% confidence intervals) for rented compared to owner-occupied accommodation, before and after adjusting for health problems

Model 1 before, and Model 2 after, adjusting for self-reported health problems

Outcome and sub-group	Model 1[1]		Model 2[1]	
'Independents'				
HM	1.62	(1.3, 2.0)	1.41	(1.1, 1.8)
MOB	1.53	(1.1, 2.2)	1.32	(0.9, 1.9)+
BCM	1.71	(1.4, 2.1)	1.47	(1.2, 1.9)
SI	1.45	(1.1, 1.8)	1.29	(1.0, 1.6)
Morale	1.40	(1.1, 1.7)	1.22	(1.0, 1.5)
'Dependents'				
HM	1.25	(0.9, 1.8)+	1.20	(0.8, 1.8)+
MOB	1.23	(0.8, 1.8)+	1.14	(0.8, 1.7)+
BCM	1.37	(0.9, 2.2)+	1.30	(0.8, 2.1)+
SI	1.96	(1.3, 3.0)	1.91	(1.2, 2.9)
Morale	1.99	(1.2, 3.3)	1.95	(1.2, 3.4)

+ Wald p-value >0.05

1. Adjusted for gender, age, marital status, and tertiles of Jarman and SMR

Table 6.5.4. Odds ratios (95% confidence intervals) for being in the worst quintile of quality of life by housing tenure-dependency and health problems

Model 1 before, and Model 2 after, adjusting for self-reported health problems

	HM[1] (n=6105)				MOB[1] (n=6104)				BCM[1] (n=6104)			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
Housing tenure-dependency												
'Independent'												
Owner-occupied	1.0		1.0		1.0		1.0		1.0		1.0	
Rented	1.6	(1.3, 2.0)	1.4	(1.1, 1.8)	1.5	(1.1, 2.2)	1.3	(0.9, 1.9)+	1.7	(1.4, 2.1)	1.5	(1.2, 1.9)
'Dependent'												
Owner-occupied	3.3	(2.6, 4.2)	3.2	(2.5, 4.2)	2.2	(1.6, 2.9)	2.0	(1.5, 2.7)	2.0	(1.5, 2.6)	1.8	(1.3, 2.4)
Rented	4.2	(2.8, 6.2)	3.9	(2.6, 5.9)	2.7	(1.9, 3.9)	2.3	(1.6, 3.4)	2.7	(1.8, 4.1)	2.3	(1.4, 3.7)
Supported housing	3.1	(2.5, 3.8)	2.3	(1.8, 3.0)	2.3	(1.8, 3.0)	1.7	(1.3, 2.3)	2.5	(2.0, 3.1)	1.8	(1.4, 2.4)
p-value for factor		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001
Health problems												
Vision problem[2]			1.9	(1.5, 2.5)			1.8	(1.4, 2.2)			1.5	(1.1, 2.0)
Hearing problem[2]			1.1	(0.9, 1.4)			1.6	(1.4, 2.3)			1.4	(1.0, 2.0)
Severe shortness of breath[2]			2.0	(1.6, 2.5)			1.8	(1.4, 2.3)			2.0	(1.5, 2.6)
Swollen lower legs[2]			1.8	(1.5, 2.2)			2.1	(1.4, 2.7)			1.9	(1.4, 2.6)
Urinary incontinence[2]			2.2	(1.7, 2.8)			2.1	(1.5, 2.9)			3.2	(2.4, 4.1)
Number of medicines (cf none)												
One or two			1.8	(1.4, 2.3)			1.4	(1.0, 2.0)			2.2	(1.7, 2.9)
Three or more			3.9	(3.2, 4.7)			3.3	(2.3, 4.8)			4.8	(3.7, 6.2)
Memory problems[2]			2.1	(1.7, 2.5)			1.3	(1.0, 1.7)			2.1	(1.6, 2.8)

Table 6.5.4 continued

	SI[1] (n=6103) Model 1		Model 2		Morale[1] (n=6102) Model 1		Model 2	
Housing tenure-dependency								
'Independent'								
Owner-occupied	1.0		1.0		1.0		1.0	
Rented	1.4	(1.1, 1.8)	1.3	(1.0, 1.6)	1.4	(1.1, 1.7)	1.2	(1.0, 1.5)+
'Dependent'								
Owner-occupied	1.0	(0.7, 1.4)+	0.9	(0.6, 1.2)+	0.8	(0.6, 1.0)+	0.6	(0.5, 0.9)
Rented	1.9	(1.3, 2.7)	1.6	(1.2, 2.3)	1.5	(1.1, 2.1)	1.3	(0.9, 1.8)+
Supported housing	1.7	(1.3, 2.2)	1.3	(1.0, 1.8)+	1.6	(1.3, 2.0)	1.2	(1.0, 1.6)+
p-value for factor		0.001		0.018		0.003		0.075
Health problems								
Vision problem[2]			1.5	(1.2, 1.8)			1.6	(1.2, 2.1)
Hearing problem[2]			1.5	(1.1, 2.1)			1.6	(1.3, 2.1)
Severe shortness of breath[2]			1.7	(1.3, 2.3)			2.3	(1.9, 2.8)
Swollen lower legs[2]			1.5	(1.1, 1.9)			1.2	(0.9, 1.6)
Urinary incontinence[2]			1.7	(1.3, 2.2)			1.4	(1.0, 1.9)
Number of medicines (cf none)								
One or two			1.3	(1.0, 1.6)			1.6	(1.2, 2.1)
Three or more			1.8	(1.5, 2.3)			2.8	(2.1, 3.6)
Memory problems[2]			1.7	(1.3, 2.2)			1.7	(1.3, 2.2)

.+ Wald p-value >0.05. Shown only for tenure parameters

1. Adjusted for gender, age, marital status, tertiles of Jarman and SMR
2. Odds ratio in presence of the problem compared to absence thereof

Table 6.5.5. Odds ratios for rented compared to owner-occupied accommodation before and after adjusting for health behaviours

Model 1 before adjusting for health behaviours;
Model 2 after adjusting for smoking and alcohol consumption;
Model 3 after adjusting for these and physical activity (SI and Morale only)

Outcome and sub-group	Model 1[1]		Model 2[1]		Model 3[1]	
'Independents'						
HM	1.56	(1.2, 2.0)	1.44	(1.2, 1.8)		
MOB	1.50	(1.0, 2.2)	1.38	(1.0, 2.0)+		
BCM	1.68	(1.4, 2.1)	1.55	(1.3, 1.9)		
SI	1.45	(1.2, 1.8)	1.34	(1.1, 1.6)	1.21	(1.0, 1.5)
Morale	1.43	(1.1, 1.8)	1.34	(1.1, 1.7)	1.23	(1.0, 1.5)
'Dependents'						
HM	1.27	(0.9, 1.9)+	1.21	(0.8, 1.8)+		
MOB	1.28	(0.9, 1.9)+	1.20	(0.8, 1.8)+		
BCM	1.46	(0.9, 2.3)+	1.40	(0.9, 2.3)+		
SI	2.10	(1.4, 3.2)	1.94	(1.2, 3.0)	1.77	(1.2, 2.7)
Morale	2.08	(1.3, 3.4)	1.97	(1.2, 3.3)	1.78	(1.0, 3.1)

+ Wald p-value for category >0.05

1. Adjusted for gender, age, marital status and tertiles of Jarman and SMR

Table 6.5.6. Odds ratios (95% confidence intervals) for being in the worst quintile of quality of life scores by housing tenure-dependency and health behaviours

Model 1 before adjusting for health behaviour;
Model 2 after adjusting for smoking and alcohol consumption;
Model 3 after adjusting for these and physical activity (SI and Morale only)

	HM[1] (n=6219)				MOB[1] (n=6218)				BCM[1] (n=6218)			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
Housing tenure-dependency												
'Independent'												
Owner-occupied	1.0		1.0		1.0		1.0		1.0		1.0	
Rented	1.6	(1.2, 2,0)	1.4	(1.1, 1.8)	1.5	(1.0, 2.2)	1.4	(1.0, 2.0)+	1.7	(1.4, 2.1)	1.5	(1.3, 1.9)
'Dependent'												
Owner-occupied	3.3	(2.6, 4.2)	3.1	(2.4, 4.0)	2.1	(1.6, 2.8)	2.0	(1.5, 2.8)	1.9	(1.4, 2.5)	1.8	(1.4, 2.4)
Rented	4.2	(2.8, 6.2)	3.7	(2.5, 5.6)	2.7	(1.9, 3.8)	2.4	(1.7, 3.4)	2.7	(1.8, 4.1)	2.5	(1.7, 3.8)
Supported housing	3.0	(2.4, 3.6)	2.9	(2.4, 3.6)	2.3	(1.8, 2.9)	2.1	(1.7, 2.7)	2.4	(2.0, 3.0)	2.3	(1.9, 2.9)
p-value for factor		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001
Cigarette consumption												
None			1.0				1.0				1.0	
1-9 a day			1.8	(1.3, 2.5)			1.5	(1.1, 2.2)			1.3	(0.9, 1.9)
10 or more a day			1.2	(0.9, 1.7)			1.4	(0.9, 2.2)			1.0	(0.7, 1.3)
p-value for factor				0.002				0.048				0.29
Alcohol consumed last week												
Non-drinker			1.0				1.0				1.0	
Occasional drinker			0.7	(0.6, 0.9)			0.7	(0.5, 0.9)			0.9	(0.7, 1.1)
1-7 drinks			0.6	(0.5, 0.7)			0.6	(0.5, 0.7)			0.6	(0.5, 0.7)
8-14 drinks			0.6	(0.5, 0.8)			0.4	(0.3, 0.6)			0.4	(0.3, 0.6)
15 or more			0.6	(0.4, 0.9)			0.5	(0.3, 0.8)			0.4	(0.3, 0.6)
p-value for factor				<0.001				<0.001				<0.001

Table 6.5.6 continued

	SI[1] (n=6188)						Morale[1] (n=6185)					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
Housing tenure-dependency												
'Independent'												
Owner-occupied	1.0		1.0		1.0		1.0		1.0		1.0	
Rented	1.5	(1.2, 1.8)	1.3	(1.1, 1.6)	1.2	(1.0, 1.5)+	1.4	(1.1, 1.8)	1.3	(1.1, 1.7)	1.2	(1.0, 1.5)
'Dependent'												
Owner-occupied	0.9	(0.7, 1.3)+	0.9	(0.7, 1.3)+	0.8	(0.5, 1.1)+	0.7	(0.6, 1.0)	0.7	(0.5, 1.0)	0.6	(0.5, 0.8)
Rented	1.9	(1.4, 2.7)	1.8	(1.3, 2.5)	1.3	(0.9, 1.9)+	1.5	(1.1, 2.2)	1.4	(1.0, 2.0)	1.1	(0.7, 1.7)+
Supported housing	1.7	(1.4, 2.1)	1.6	(1.3, 2.0)	1.2	(1.0, 1.5)+	1.7	(1.4, 2.0)	1.6	(1.3, 2.0)	1.3	(1.0, 1.6)
p-value for factor		<0.001		0.001		0.036		0.001		0.004		0.030
Cigarette consumption												
None			1.0		1.0				1.0		1.0	
1-9 a day			1.6	(1.1, 2.4)	1.5	(1.0, 2.2)			1.5	(1.2, 2.0)	1.4	(1.1, 1.8)
10 or more a day			1.8	(1.5, 2.2)	1.6	(1.3, 2.0)			1.5	(1.2, 1.7)	1.3	(1.1, 1.5)
p-value for factor				<0.001		<0.001				<0.001		<0.001
Alcohol consumed last week												
Non-drinker			1.0		1.0				1.0		1.0	
Occasional drinker			0.8	(0.6, 1.0)	0.8	(0.6, 0.9)			0.8	(0.6, 1.0)	0.8	(0.6, 1.1)
1-7 drinks			0.7	(0.6, 0.8)	0.8	(0.7, 0.9)			0.7	(0.6, 0.8)	0.8	(0.7, 1.0)
8-14 drinks			0.5	(0.3, 0.7)	0.5	(0.4, 0.7)			0.7	(0.5, 0.9)	0.8	(0.6, 1.0)
15 or more			0.6	(0.4, 0.9)	0.7	(0.5, 1.0)			0.6	(0.4, 0.9)	0.7	(0.5, 1.1)
p-value for factor				<0.001		0.003				0.005		0.21
Self-reported physical activity												
Very active					1.0						1.0	
Fairly active					2.4	(1.9, 2.9)					3.1	(2.5, 3.8)
Not very/ not at all active					7.9	(6.3, 9.9)					7.4	(5.5, 10.1)
p-value for factor						<0.001						<0.001

NS p>0.05 for the factor .+ Wald p-value >0.05. Shown only for tenure parameters

1. Adjusted for gender, age, marital status and tertiles of Jarman and SMR

Table 6.5.7. Odds ratios (95% confidence intervals) for being in the worst quintile of quality of life scores by housing tenure-dependency and social contact

Model 1 before adjusting for frequency of external social contact;
Model 2 after adjusting frequency of external social contact

	HM[1] (n=6211)				MOB[1] (n=6211)				BCM[1] (n=6210)			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
Housing tenure-dependency												
'Independent'	1.0		1.0		1.0		1.0		1.0		1.0	
Owner-occupied	1.6	(1.2, 2.0)	1.6	(1.2, 2.0)	1.5	(1.1, 2.2)	1.5	(1.1, 2.2)	1.7	(1.4, 2.1)	1.7	(1.4, 2.1)
Rented												
'Dependent'	3.3	(2.6, 4.1)	3.2	(2.5, 4.0)	2.1	(1.6, 2.8)	2.1	(1.6, 2.7)	1.9	(1.4, 2.5)	1.9	(1.4, 2.5)
Owner-occupied	4.1	(2.8, 6.1)	3.8	(2.6, 5.6)	2.8	(2.0, 3.8)	2.5	(1.8, 3.4)	2.8	(1.8, 4.2)	2.6	(1.7, 3.9)
Rented	3.0	(2,4, 3.7)	3.0	(2,4, 3.6)	2.2	(1.7, 2.9)	2.2	(1.7, 2.9)	2.4	(2.0, 3.0)	2.4	(1.9, 3.0)
Supported housing												
Rented vs owner-occupied												
'Independent'	1.58	(1.2, 2.0)	1.56	(1.2, 2.0)	1.53	(1.1, 2.2)	1.52	(1.1, 2.2)	1.69	(1.4, 2.1)	1.68	(1.4, 2.1)
'Dependent'	1.26	(0.9, 1.9)+	1.21	(0.8, 1.8)+	1.29	(0.9, 1.9)+	1.22	(0.8, 1.9)+	1.46	(0.9, 2.4)+	1.40	(0.9, 2.3)+
p-value for factor		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001
Sees people outside the household												
Daily			1.0				1.0				1.0	
Two-four times a week			0.9	(0.8, 1.1)			1.0	(0.8, 1.2)			1.0	(0.8, 1.3)
Less than twice a week			1.1	(0.9, 1.4)			1.2	(0.9, 1.6)			1.2	(0.9, 1.6)
Rarely			1.8	(1.3, 2.4)			2.0	(1.4, 3.1)			1.8	(1.2, 2.8)
p-value for factor				0.001				0.014				0.013

Table 6.5.7 continued

	SI[1] (n=6209)				Morale[1] (n=6206)			
	Model 1		Model 2		Model 1		Model 2	
Housing tenure-dependency								
'Independent'								
Owner-occupied	1.0		1.0		1.0		1.0	
Rented	1.5	(1.2, 1.8)	1.5	(1.2, 1.8)	1.4	(1.2, 1.8)	1.4	(1.2, 1.8)
'Dependent'								
Owner-occupied	1.0	(0.7, 1.3)+	0.9	(0.6, 1.2)+	0.7	(0.6, 1.0)	0.7	(0.5, 0.9)
Rented	2.0	(1.4, 2.8)	1.7	(1.2, 2.5)	1.5	(1.1, 2.2)	1.3	(0.9, 2.0)+
Supported housing	1.7	(1.3, 2.1)	1.7	(1.3, 2.1)	1.7	(1.4, 2.0)	1.7	(1.4, 2.1)
Rented vs owner-occupied								
'Independent'	1.47	(1.2, 1.8)	1.46	(1.2, 1.8)	1.43	(1.2, 1.8)	1.44	(1.2, 1.8)
'Dependent'	2.06	(1.3, 3.2)	1.94	(1.3, 3.0)	2.03	(1.3, 3.3)	1.90	(1.2, 3.1)
p-value for factor		<0.001		<0.001		<0.001		0.002
Sees people outside the household								
Daily			1.0				1.0	
Two-four times a week			1.0	(0.9, 1.2)			1.3	(1.0, 1.7)
Less than twice a week			1.9	(1.5, 2.4)			2.0	(1.6, 2.4)
Rarely			2.4	(1.7, 3.2)			3.3	(2.3, 4.6)
p-value for factor				<0.001				<0.001

.+ Wald p-value >0.05. Shown only for tenure parameters

1. Adjusted for gender, age, marital status and tertiles of Jarman and SMR

Table 6.5.8. Odds ratios (95% confidence intervals) for being in the worst quintiles of Morale score by housing tenure-dependency and help received

Model 1 before adjusting for help received;
Model 2 after adjusting for informal help received.;
Model 3 after adjusting for informal and formal help received

Morale[1] (n=8567)	Model 1		Model 2		Model 3	
Housing tenure-dependency						
'Independent'						
Owner-occupied	1.0		1.0		1.0	
Rented	1.4	(1.2, 1.6)	1.4	(1.1, 1.6)	1.4	(1.2, 1.7)
'Dependent'						
Owner-occupied	0.6	(0.5, 0.8)	0.5	(0.3, 0.6)	0.5	(0.4, 0.7)
Rented	0.9	(0.7, 1.2)+	0.7	(0.5, 1.0)	0.8	(0.6, 1.0)
Supported housing	1.1	(0.9, 1.4)+	1.2	(1.0, 1.4)+	1.2	(1.0, 1.4)+
Rented vs owner-occupied						
'Independent'	1.38	(1.2, 1.6)	1.37	(1.1, 1.6)	1.39	(1.2, 1.7)
'Dependent'	1.55	(1.0, 2.3)	1.55	(1.0, 2.4)	1.57	(1.0, 2.4)
p-value for factor		0.001		<0.001		<0.001
Regular help received from:						
No-one			1.0		1.0	
Spouse			1.6	(1.1, 2.5)	1.6	(1.1, 2.4)
Child in same house[2]			1.7	(1.3, 2.4)	1.7	(1.3, 2.4)
Child not in same house[2]			1.2	(1.0, 1.5)	1.2	(1.0, 1.5)
Other person in house[3]			1.6	(1.0, 2.5)	1.6	(1.0, 2.5)
Other person not in house[3]			1.4	(1.2, 1.7)	1.3	(1.1, 1.6)
Not known			0.8	(0.6, 1.3)	0.8	(0.6, 1.3)
p-value for factor				0.005		0.004
Service use						
Did not use any services					1.0	
Used:						
selected treatment services only					1.6	(1.4, 1.8)
selected personal care services only					1.3	(1.0, 1.7)
both treatment and personal care, not other					1.6	(1.3, 2.1)
social services or club & treatment or personal care					1.9	(1.5, 2.4)
social services or club, not treatment or personal care					1.7	(1.1, 2.8)
Not known					1.2	(0.9, 1.7)
p-value for factor						<0.001
In worse quintile for a SIP physical functioning dimension[4]	4.2	(3.6, 4.8)	3.7	(3.1, 4.4)	3.5	(2.9, 4.1)

.+ Wald p-value >0.05. Shown only for tenure parameters

1. Adjusted for gender, age, marital status, tertiles of Jarman score and tertiles of SMR
2. Child includes son, daughter, son-in-law, daughter-in-law
3. 'Other' includes any other relative, friend or neighbour
4. In worst quintile for one of : HM, MOB, BCM. The odds ratio compares those in this situation with those who are not

Table 6.6.1. Odds ratio (95% confidence interval) for being in the worst quintile of the quality of life scores by whether had a detailed assessment.

Outcome	OR[1]	
HM	0.65	(0.49, 0.86)
MOB	0.74	(0.58, 0.93)
BCM	0.62	(0.50, 0.77)
SI	0.69	(0.55, 0.87)
Morale	0.71	(0.57, 0.89)

1. Adjusted for gender, age, marital status, housing tenure-dependency, and tertiles of Jarman and SMR

Table 6.6.2. Odds ratios (95% confidence intervals) comparing 'Independent' people in rented and owner-occupied accommodation for being in the worst quintile of quality of life score by whether had a detailed assessment

	All[1] (n=8598)		**Had detailed assessment[1]** (n=3103)		**Did not have detailed assessment[1]** (n=5495)	
'Independents'						
HM	1.7	(1.4, 2.1)	1.5	(0.9, 2.2)+	1.9	(1.5, 2.3)
MOB	1.6	(1.2, 2.1)	1.5	(0.8, 2.8)+	1.6	(1.3, 2.1)
BCM	1.7	(1.4, 2.0)	1.7	(1.3, 2.4)	1.7	(1.4, 2.0)
SI	1.6	(1.3, 2.0)	1.6	(1.2, 2.1)	1.6	(1.4, 2.0)
Morale	1.5	(1.3, 1.8)	1.3	(1.0, 1.8)+	1.6	(1.4, 1.9)

+ Wald p-value >0.05

1. Adjusted for gender, age, marital status and tertiles of Jarman and SMR

Table 6.6.3. Odds ratios (95% confidence intervals) for rented compared to owner-occupation among 'Independents' before and after adjusting for health problems on the detailed assessment

Model 1 before adjusting for health problems measured on the detailed assessment; Model 2 after adjusting for health indicators

Outcome	Model 1		Model 2	
'Independents'				
HM	1.5	(0.9, 2.3)+	1.2	(0.7, 2.1)+
MOB	1.5	(0.8, 2.7)+	1.2	(0.6, 2.4)+
BCM	1.7	(1.3, 2.2)	1.5	(1.0, 2.1)
SI	1.5	(1.1, 2.0)	1.3	(0.6, 1.3)
Morale	1.3	(1.0, 1.7)+	1.2	(0.8, 1.6)+

+ Wald p-value >0.05

1. Adjusted for gender, age, marital status, and tertiles of Jarman and SMR

Table 6.6.4. Odds ratios (95% confidence intervals) for being in the worst quintile of quality of life score by housing tenure-dependency and health problems from the detailed assessment

Model 1 before adjusting for health problems measured on the detailed assessment;
Model 2 after adjusting for selected health problems

	HM[1] (n=2767)				MOB[1] (n=2766)				BCM[1] (n=2766)			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
Housing tenure-dependency												
'Independent'												
Owner-occupied	1.0		1.0		1.0		1.0		1.0		1.0	
Rented	1.5	(0.9, 2.3)+	1.2	(0.7, 2.1)+	1.5	(0.8, 2.7)+	1.2	(0.6, 2.4)+	1.7	(1.3, 2.2)	1.5	(1.0, 2.1)
'Dependent'	3.3	(2.3, 4.7)	3.2	(2.2, 4.7)	1.8	(1.2, 2.7)	1.7	(1.2, 2.5)	1.5	(1.0, 2.3)+	1.4	(0.9, 2.2)+
Supported housing	3.2	(2.0, 5.1)	2.4	(1.4, 4.0)	2.0	(1.4, 3.0)	1.5	(1.0, 2.1)	2.3	(1.4, 3.8)	1.6	(1.0, 2.8)+
p-value for factor		<0.001		<0.001		0.006		0.021		0.011		0.15
Physical health problems												
Vision <6/12 binocular[2]			1.7	(1.2, 2.4)			2.0	(1.5, 2.8)			1.6	(1.3, 2.0)
Hearing –failed test[2]			0.9	(0.7, 1.1)			1.3	(0.9, 1.8)			1.1	(0.9, 1.4)
Shortness of breath												
None			1.0				1.0				1.0	
Walking			2.7	(1.9, 4.0)			2.7	(2.0, 3.7)			3.2	(2.0, 4.9)
Talking			3.7	(2.3, 6.1)			3.1	(1.7, 5.8)			3.8	(2.0, 7.0)
Not known			5.0	(2.7, 9.2)			5.0	(3.1, 7.9)			5.9	(3.4, 10.5)
Asthma			1.3	(0.8, 1.9)								
Ever diagnosed with												
Heart attack[2]			0.9	(0.6, 1.4)			1.0	(0.8, 1.4)			1.1	(0.6, 1.9)
Stroke[2]			3.1	(1.7, 5.6)			1.9	(1.5, 2.4)			3.1	(2.1, 4.4)
Number of medications												
None or one			1.0				1.0				1.0	
Two or three			1.3	(0.7, 2.4)			1.3	(0.9, 1.8)			1.6	(1.0, 2.5)
Four-six			1.8	(1.0, 3.3)			2.0	(1.5, 2.7)			2.3	(1.4, 3.7)
Seven or more			1.9	(1.0, 3.8)			1.8	(1.0, 3.2)			2.5	(1.4, 4.3)
Not known			1.0	(0.6, 1.7)			1.4	(0.9, 2.1)			0.9	(0.4, 2.0)

Table 6.6.4 continued

	SI[1] (n=2766) Model 1		Model 2		Morale[1] (n=2765) Model 1		Model 2	
Housing tenure-dependency								
'Independent'								
Owner-occupied	1.0		1.0		1.0		1.0	
Rented	1.5	(1.1, 2.0)	1.3	(0.9, 1.9)+	1.3	(1.0, 1.7)+	1.2	(0.8, 1.6)+
'Dependent'	1.0	(0.6, 1.5)+	0.8	(0.6, 1.3)+	0.6	(0.4, 0.9)	0.6	(0.4, 1.9)+
Supported housing	1.3	(1.0, 1.9)+	1.0	(0.7, 1.4)+	1.3	(0.8, 2.0)+	1.0	(0.7, 1.6)+
p-value for factor		0.059		0.20		0.14		0.11
Physical health problems			1.3	(0.9, 1.9)			1.3	(1.0, 1.7)
Vision <6/12 binocular[2]			1.6	(1.3, 1.9)			1.2	(0.9, 1.7)
Hearing –failed test[2]								
Shortness of breath			1.0				1.0	
None			2.5	(1.8, 3.4)			1.7	(1.2, 2.5)
Walking			3.3	(2.1, 5.3)			2.7	(1.7, 4.1)
Talking			2.3	(1.0, 5.4)			1.3	(0.6, 3.0)
Not known								
Asthma								
Ever diagnosed with								
Heart attack[2]			1.4	(0.9, 2.2)			1.2	(0.9, 1.7)
Stroke[2]			1.9	(1.4, 2.6)			1.0	(0.6, 1.8)
Number of medications			ns					
None or one			1.0				1.0	
Two or three			1.2	(0.9, 1.6)			1.5	(1.2, 2.1)
Four-six			1.3	(1.0, 1.8)			2.0	(1.3, 2.8)
Seven or more			1.4	(0.9, 2.2)			1.7	(1.2, 2.4)
Not known			0.8	(0.4, 1.7)			0.9	(0.5, 1.8)

+ Wald p-value >0.05. Shown only for tenure parameters

1. Adjusted for gender, age, marital status, tertiles of Jarman and SMR
2. Odds ratio in presence of the problem compared to absence thereof.

Table 6.6.5. Odds ratios (95% confidence intervals) for being in the worst quintile of quality of life score by housing tenure-dependency and social situation

Model 1 before adjusting for social situation; Model 2 after adjusting for availability of a confidante

	HM[1] (n=2949)				MOB[1] (n=2948)				BCM[1] (n=2948)			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
Housing tenure-dependency												
'Independent'												
Owner-occupied	1.0		1.0		1.0		1.0		1.0		1.0	
Rented	1.4	(0.9, 2.1)+	1.4	(1.0, 2.1)+	1.5	(0.8, 2.7)+	1.5	(0.8, 2.7)+	1.7	(1.3, 2.2)	1.7	(1.3, 2.3)
'Dependent'	3.1	(2.5, 3.9)	3.4	(2.6, 4.8)	2.0	(1.4, 2.7)	2.0	(1.4, 2.7)	1.7	(1.2, 2.3)	1.7	(1.2, 2.5)
Supported housing	3.1	(2.0, 4.9)	3.2	(2.1, 5.0)	2.3	(1.5, 3.6)	2.3	(1.6, 3.5)	2.5	(1.7, 3.7)	2.5	(1.6, 3.9)
p-value for factor		<0.001		<0.001		<0.001		<0.001		0.006		0.010
Confidante												
Spouse			1.0				1.0				1.0	
Other relative			0.8	(0.5, 1.1)			1.0	(0.8, 1.3)			0.9	(0.6, 1.4)
Other			0.8	(0.5, 1.4)			0.8	(0.5, 1.5)			1.1	(0.6, 1.9)
None			1.0	(0.6, 1.5)			1.2	(0.7, 1.9)			0.9	(0.5, 1.9)
p-value for factor				0.39				0.67				0.85

Table 6.6.5 continued

	SI[1] (n= 2948) Model 1		Model 2		Morale[1] (n=2948) Model 1		Model 2	
Housing tenure-dependency								
'Independent'								
Owner-occupied	1.0		1.0		1.0		1.0	
Rented	1.6	(1.2, 2.1)	1.5	(1.2, 2.0)	1.3	(1.0, 1.8)	1.3	(1.0, 1.7)+
'Dependent'	1.2	(0.9, 1.7)+	1.0	(0.8, 1.4)+	0.8	(0.6, 1.0)	0.7	(0.6, 0.9)
Supported housing	1.7	(1.2, 2.4)	1.6	(1.2, 2.2)	1.5	(1.0, 2.4)+	1.4	(0.9, 2.2)+
p-value for factor		0.024		0.041		0.059		0.039
Confidante								
Spouse			1.0				1.0	
Other relative			2.0	(1.4, 2.8)			1.7	(1.3, 2.2)
Other			1.7	(1.0, 2.8)			2.2	(1.4, 3.3)
None			3.7	(1.9, 7.5)			3.8	(2.3, 6.6)
p-value for factor				0.006				0.005

.+ Wald p-value >0.05. Shown only for tenure parameters

1. Adjusted for gender, age and tertiles of Jarman and SMR

7 MRC Study – area deprivation and population density

It was hypothesized that there could be an additional impact of area deprivation and population density on quality of life, acting through the communal experience of being in a specific type of area. This would be expected particularly to affect SI and Morale. To see if relative deprivation might be more important than absolute deprivation, I also explored association according to the differences between local measures of deprivation and those of the adjacent areas.

7.1 *Description of measures used and sample composition*

The main measures available were Carstairs score, the population density for the enumeration district (ED) in which the participant lived (persons per square kilometre), and the mean and standard deviation of the Carstairs scores for adjacent EDs. The Carstairs score is an unweighted combination of four standardised variables: percentages of adults unemployed, percentages of residents in households headed by someone of unskilled social class, percentage of households in overcrowded housing, and percentage of households without a car.

Of the total sample of 8734, 8467 (97%) could be assigned an ED. They were spread across 1528 EDs. The median number of people per ED was two, the range being 1-92 with 34% of EDs only having one participant in them. The area measures were divided into quartiles and people categorised accordingly. Continuous measures were not used because we had no prior hypothesis concerning the shape of any association between area characteristics and quality of life. To give an idea of whether the home ED was similar to its surroundings or not, the difference between home Carstairs score and the mean of adjacent ones was calculated. An ED was defined as being similar to its neighbours if the Carstairs score was within an absolute score of +/-1.0 of the mean of scores for adjacent EDs. This was nearly equivalent to being +/- one standard deviation of the difference distribution and it was assumed that those who did not fall into this category were likely to be quite different in deprivation level from their neighbours. The standard deviation of scores of adjacent EDs was also

calculated and quartiles created. The ranges and median values of the quartiles for home score and the difference variable are given below in Table 7.1A and the correlations between the factors in Table 7.1B..

Table 7.1A. Description of categories of the characteristics of the area of residence used in analysis

People eligible for a 75+ year health screening check by their General Practice and not in a nursing home nor too ill to take part

	Home Carstairs score	Population density	Mean Carstairs score of adjacent EDs relative to own
Quartile			
Lowest	-3.03 (-4.60, -2.40)	97 (0, 543)	Similar within +/- 1.00
2nd	-1.90 (-2.40, -1.28)	1602 (544, 2824)	More deprived –5.05, -1.00
3rd	-0.75 (-1.27, 0.12)	3967 (2836, 4974)	Less deprived 1.00, 7.32
Highest	1.42 (0.13, 10.31)	6725 (4979, 230366) [1]	

1. The 99th percentile was 14, 977

Table 7.1B. Correlations between the various summary area-level factors

People eligible for a 75+ year health screening check by their General Practice and not in a nursing home nor too ill to take part

	Carstairs	Population density	Adjacent EDs similar or not
	Correlations between individuals		
Carstairs quartile	1.00		
Population density quartile	0.32	1.00	
Adjacent EDs similar or not	0.35	0.21	1.00
Standard deviation for adjacent EDs	0.36	0.22	0.38

1. Correlations between individuals

People in owner-occupied homes were most likely to be in the least deprived quartile and least likely to be in the most deprived quartile of Carstairs score and least densely-populated areas (Table 7.1.1). Two-fifths of people in a rented home were in the most deprived quartile and one third in the most densely populated quartile. Of the tenure groups, the owner-occupier groups were most likely to have more deprived areas around them and renter groups most likely to have less deprived areas around them. The variability of scores in adjacent EDs was also greater for those in the rented sector than in the owner-occupied sector.

The prevalence of poor quality of life scores by area category is tabulated in Table 7.1.2, but unlike the similar tables in Chapter 6, the p-values are tests for trend. It was not possible to carry out a test for trend that took into account the clustering so that the p-values are probably biased away from 1.0. Tests for departure from trend

were not done for any of the results in this Chapter because there is no correct way of doing so available to me, given the complex design.

There was evidence that prevalence of poor quality of life increased with increasing deprivation level and with increasing heterogeneity of surrounding EDs (Table 7.1.2). The prevalences of poor BCM, SI and Morale were all higher if the home ED was surrounded by less deprived ones. Poor Morale had the clearest inverse relationship with increasing population density but the prevalence of SI was also lowest for those in the least dense quartile of population density.

7.2 *Modelling effect of area factors on quality of life outcomes*

In models that adjusted for age, gender and marital status but included one area factor at a time and ignored personal housing tenure-dependency, quartile of home Carstairs score is significantly positively associated with all five poor quality of life outcomes (Table 7.2.1). Being surrounded by less deprived areas was associated with greater chances of poor quality of life relative to those surrounded by people in similar areas, whereas being surrounded by more deprived areas did not seem to matter. There was a significant trend of increasing chances of poor quality of life with increasing variability of deprivation in adjacent EDs, albeit marginal for MOB. As expected from the previous table, poor Morale showed the clearest inverse trend with population density although there was some sign of a trend for BCM. The p-value for heterogeneity of odds ratios was low with respect to HM and Morale but the pattern was not readily interpretable.

7.2.1 Do area factors have associations with quality of life in addition to housing tenure-dependency?

To see how area and personal factors inter-relate in their effects on quality of life, a series of models was built up (Table 7.2.2). The starting model (Model 1) contained the home ED Carstairs factor but no personal socioeconomic factor. The subsequent models cumulatively added personal housing tenure-dependency (Model 2) population density factor (Model 3), comparison with adjacent EDs (Model 4) and the heterogeneity of adjacent EDs (Model 5). Although correlations between area

factors were substantial, inter-correlations were not too high to preclude including all the factors in one model. Parameters assuming a log-linear trend in outcome are shown as well as those that do not assume any particular pattern of association between area category and poor quality of life.

It is clear that the odds ratios for Carstairs score are all attenuated once personal housing tenure-dependency is added in (Models 1 and 2). The greatest effect is seen for the most deprived home EDs. After adjusting for personal housing tenure-dependency, there are still inverse trend associations for HM, BCM, and SI.

In the models including housing tenure-dependency and all the area factors, the factors that are associated with quality of life in addition to housing tenure-dependency vary according to the quality of life outcome. Most attention is given to the factors showing a clear trend in chances of the outcome with increasing or decreasing values of the area variable. Poor HM and poor BCM are more likely with increasing Carstairs score and there is a suggestion (not formally tested) of a U-shaped relationship with population density quartile. Poor MOB is not strongly associated with any of the measures, once housing tenure is taken into account, although there may be a non-linear relation with variability of surrounding Carstairs scores. Poor SI has an inverse association with both deprivation (weak) and heterogeneity of surrounding EDs. Population density is clearly a much stronger factor than any of the Carstairs factors for the chances of poor Morale.

Table 7.2.3 compares quality of life scores of people in rented accommodation with those in owner occupation. Model 1b, which includes no area factors, is compared with models 2 and 5 containing trend values as defined in Table 7.2.2 (results are very similar if the models that do not assume trends are used). The associations between tenure and quality of life outcomes for 'Independents' are modestly attenuated by adjustment for area factors, BCM and SI showing the largest percentage change in differentials. The odds ratios among 'Dependents' were affected less. The individual's housing tenure is associated with all quality of life outcomes independent of the area characteristics among the 'Independents' and also, among 'Dependents' for SI and Morale (the two outcomes significantly associated with tenure before adjustment).

7.3 *Further exploration of inter-relationships between housing tenure and area factors and between area factors*

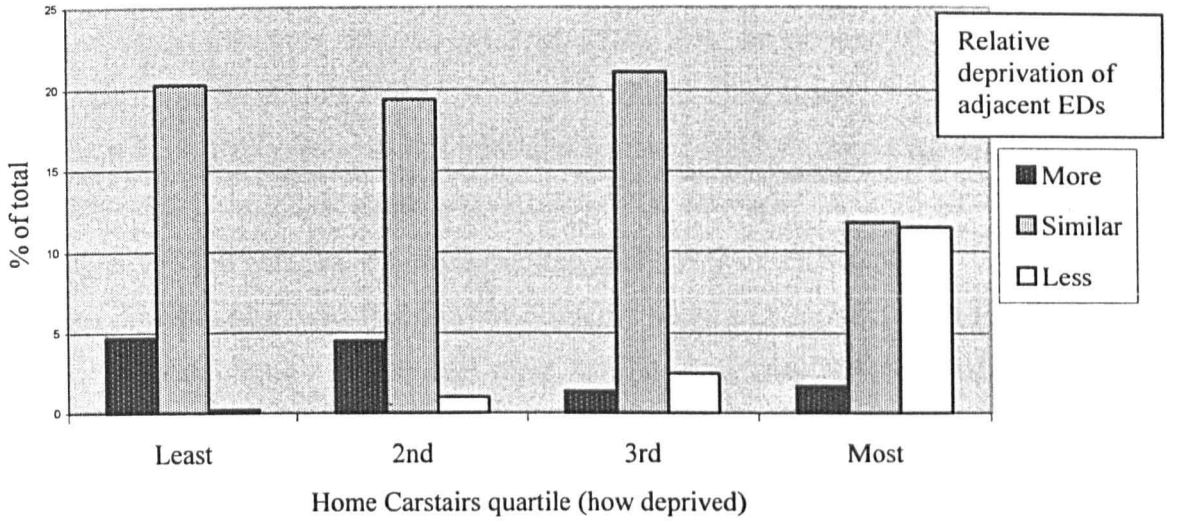
The effect of personal socioeconomic position might vary according to the area lived in. As the emphasis is on the renting/owner-occupation dichotomy, it was decided to exclude people in supported housing before looking at interactions. Models were fitted looking at interactions between a simple owner/renter dichotomy and respectively the two halves of the Carstairs' distribution, of the heterogeneity index, of the population density index and also with the difference indicator. None of them were significant.

Differences between Carstairs scores in ones own ED and in surrounding areas did not appear to be very important in Tables 7.2.2, once home circumstances and own Carstairs score were taken into account. However, the effect of deprivation differentials might depend on the deprivation of one's own area. For example, people who live in very deprived areas might be able to benefit from less deprived surrounding areas ('lifting up'), at least in terms of facilities, but if their area was not very deprived anyway the benefits of being surrounded by better-off areas may be less. Conversely those in non-deprived areas might be pulled down if surrounding areas were deprived. As expected, people in deprived areas were most likely to be surrounded by less deprived ones and vice versa (Figure 7.3.1). Only 20 individuals lived the least deprived quartile yet were worse off than surrounding areas so were excluded from analyses.

There were only statistically significant interactions for HM and Morale and the resulting patterns were not clear cut (not shown) and generally there was no support for either a theory that better-off surrounding areas might help people in deprived areas or its converse.

Figure 7.3.1 Distribution of home Carstairs score and whether the mean score for adjacent EDs is similar or not.

People eligible for a 75+ year health screening check by their General Practice and not in a nursing home nor too ill to take part



7.4 *Combining potential personal and area explanatory factors*

Most of the factors examined in Section 6.5 were brought together with the area factors in one model; physical activity and help received are omitted because of difficulty in interpreting them. The full set of information was available for nearly 5900 people (69% of the whole sample of people with quality of life information). This subgroup has less chance of poor quality of life than the full sample. However, it provides the only indication available of how the types of factors discussed in previous sections cumulatively affect associations observed between housing tenure and poor quality of life.

In Table 7.4.1 the sets of factors are cumulatively added into the models and at each step the odds ratio for a poor outcome is shown comparing people in rented and owner-occupied homes. Unlike the models shown in Chapter 6.5, the Jarman and SMR scores are omitted from most of the models so that the Enumeration District

variables are not confounded with them. There is no standard way of comparing odds ratios across hierarchical models and both the percentage change and absolute change will be considered here. First the 'independent' categories will be considered. Including the health factors reduced the rent/owner differentials by a quarter for three SIP outcomes, by a third for MOB and by 40% for Morale from starting levels of 40-78% excess odds[viii]. Having adjusted for health, additional adjustment for smoking and alcohol consumption further reduced the differentials by roughly a fifth[ix] (0.1 in absolute terms), less for HM. The percentage reductions in differentials in the models in Table 7.4.1 tend to be less than those implied by tables in Section 6.5, probably because differential response rates by adverse health factors and health behaviours made those who provided full information more alike across tenures than the full sample. As expected, the frequency of seeing relatives did not reduce the differentials. Area factors (just Carstairs score and population density) did not affect the odds ratios for Morale, once individual factors had been taken into account (they had the smallest effect on Morale before individual factors were included). They reduced the odds ratios for HM, BCM and SI by the order of 0.1, or approaching a fifth of the initial differential and had a smaller effect on MOB, as expected from the weak associations found in Section 7.2. Except for BCM, the odds ratios among 'Independents' had been reduced to the order of 1.2 and lost statistical significance with a half to two-thirds of the original excess cumulatively accounted for.

For the 'dependent' groups, the odds ratios comparing renters and owner-occupiers are smaller and not statistically significant for the physical SIP outcomes even before any adjustments are made. However, in relative terms, area factors had one of the greater impacts on the tenure differentials for poor HM, and BCM compared with other explanatory factors. The initial tenure odds ratios for SI and Morale among 'Dependents' were high compared with other outcomes and also compared with 'Independents'. The cumulative effect of all four types of intermediate factors reduced the excess odds for Si by over a third but for Morale by only a tenth.

[viii] Estimated as a percentage reduction of excess, e.g. change from 1.65 to 1.48 is a reduction of (1.65-1.48)/(1.65-1.00) = 0.17/0.65 = 26%

[ix] Estimated as a percentage reduction of the original excess before adjustment for health

It is interesting that the intermediate factors had greater relative impact on tenure differentials for Morale among 'Independents' than 'Dependents'. There is no clear explanation for this but tables shown in Chapter 6 indicate that 'Dependents' in owner-occupied homes had less chance of poor Morale than their 'independent' counterparts once health differences etc. are accounted for (among renters 'Dependents' do not seem any worse off) and it may be that there is something about the support given to 'Dependent' people in the owner-occupied homes that gives them an advantage. It is outwith the scope of this thesis to explore this issue further.

7.5 *Summary*

The patterns emerging from analysis by deprivation indicators and population density for people's area of residence are complex. However, the most consistent result is that housing tenure differentials are explained to a lesser extent by the area type than the area type differentials are explained by housing tenure.

Putting all the groups of personal and area factors there remains the clear conclusion that no one set of factors accounts for the differential but that there is a complex interplay between a raft of different ones. The cumulative effect of personal and area factors reduced most of the odds ratios comparing renters and owner-occupiers to 1.2 or less and accounted for a third to a half of the excess odds among 'independent' groups. However, being in rented housing accompanied clear and statistically significant excess risk for BCM among 'Independents' and for SI and Morale among 'Dependents' even after all the adjustments

Key points

- When unadjusted for other socioeconomic factors, high levels of deprivation (quartiles of Carstairs score) were associated with increased risks of poor quality of life. However, much of the excess risk in the most deprived areas was accounted for by personal housing tenure-dependency
- The deprivation levels of adjacent areas relative to ones own appeared to matter little once the circumstances of the home ED was taken into account.
- Poor Morale was less likely in the least densely populated EDs even after adjusting for housing tenure and other area factors.
- Housing tenure differentials were less affected by adjustment for area characteristics than vice versa
- Results did not show any effect modification of area factor on the associations between personal housing tenure and poor quality of life.
- The personal and area factors combined reduced the housing tenure differentials for all outcomes by a third to a half among the 'Independents'
- After adjustment for health, health behaviours, social contact and area statistically significant owner-occupier/renter differentials remained for BCM among 'Independents' and for SI and Morale among 'Dependents'

Study populations for tables in Chapter 7

Table Numbers	Data source	Dates of fieldwork+	Study population
7.1.1, 7.1.2 7.2.1, 7.2.2 7.2.3	MRC Study	1995-9	Men and women aged 75 years and over registered in 23 general practices in Great Britain*. Exclusions: in a nursing home or too ill to take part.. Those whose residence could be linked to an Enumeration District and hence to area categories
7.4.1	MRC Study	1995-9	The subset who had a brief assessment and values for the explanatory variables

Further notes:
+Fieldwork took place during 1995-9, the year depending on which General Practice the person belonged to
*People could be aged 74 years at the time of the quality of life interview provided that they would be aged 75 years when they had an assessment
Most analyses are for men and women combined

Table 7.1.1 Distribution of people by area characteristics within categories of personal housing tenure-dependency.

Area characteristic - quartiles Median value for quartile given in brackets	'Independent'		'Dependent'		Supported housing	p-value[1]
	Owner-occupied	Rented	Owner-occupied	Rented		
Carstairs score for home ED	%	%	%	%	%	
Least deprived (-3.03)	33.3	12.7	33.0	20.1	11.8	
Second quartile (-1.90)	27.8	19.0	23.6	16.1	25.1	
Third quartile (-0.75)	23.3	27.7	25.7	22.9	26.9	
Most deprived (1.42)	15.6	40.6	17.7	41.0	36.2	<0.001
Population density, home ED[2]	%	%	%	%	%	
Least dense (97)	26.7	25.9	30.8	20.9	15.5	
Second quartile (1602)	27.4	19.8	24.1	19.3	23.9	
Third quartile (3967)	24.6	20.4	22.3	24.5	34.8	
Most dense (6725)	21.4	34.0	22.8	35.3	25.8	0.002
Mean Carstairs score for adjacent EDs relative to own score	%	%	%	%	%	
More deprived	14.3	9.6	14.9	9.2	8.6	
Similar	76.1	66.6	73.6	67.9	68.5	
Less deprived	9.6	23.8	11.5	22.9	22.9	<0.001
Standard deviation of Carstairs score for adjacent EDs	%	%	%	%	%	
Least varied (median 0.55)	28.0	20.2	26.6	20.9	19.4	
2nd quartile (median 0.93)	27.7	21.8	25.7	19.3	25.1	
3rd quartile (median 1.22)	23.7	26.8	23.8	24.5	25.4	
Most varied (median 2.01)	20.6	31.2	23.9	35.3	30.1	0.009
N	4395	1724	607	248	1304	

1. Chi-square p-value for heterogeneity, allowing for clustering
2. People per square kilometre

Table7.1.2. Percentages of people in the worst quintiles of quality of life scores, by characteristic of the area

Area characteristic - quartiles Median value for quartile given in brackets	N	HM	MOB	BCM	SI	Morale
Carstairs score for home ED						
Least deprived (-3.03)	2089	15.9	14.1	15.8	16.4	18.6
Second quartile (-1.90)	2057	19.6	15.9	18.0	18.2	19.0
Third quartile (-0.75)	2067	21.9	18.0	21.3	20.6	22.2
Most deprived (1.42)	2065	24.1**	18.7 **	24.5 **	25.6 **	24.3 **
Population density, home ED						
Least dense (97)	2063	19.8	15.9	17.6	16.9	15.6
Second quartile (1602)	2075	22.1	17.6	21.1	21.7	21.8
Third quartile (3967)	2074	18.6	15.6	18.5	19.9	21.8
Most dense (6725)	2066	21.1 ns	17.4 ns	22.4 **	22.2**	24.9 **
Mean Carstairs score for adjacent EDs relative to own score						
More deprived	1019	19.9	18.5	20.1	20.0	20.6
Similar	6001	19.9	15.9	19.1	19.3	20.2
Less deprived	1258	23.0 ns	18.5 ns	23.3 *	24.5 **	25.3 **
Standard deviation of Carstairs score for adjacent EDs						
Least varied (median 0.55)	2046	18.6	16.9	17.6	17.3	17.9
2nd quartile (median 0.93)	2095	19.2	13.9	17.5	17.8	19.6
3rd quartile (median 1.22)	2071	20.1	17.6	20.7	21.5	22.8
Most varied (median 2.01)	2066	23.6 **	18.2 *	23.8 **	24.1 **	23.7 **

**p<0.01 * p<0.05 ns p>=0.05 Refers to p-values for trend ignoring clustering

Table 7.2.1. Odds ratios (95% confidence intervals) for being in the worst quintile of quality of life score by area characteristic.

	HM[1,2] (n=8299)		MOB[1,2] (n=8297)		BCM[1,2] (n=8297)		SI[1,2] (n=8295)		Morale[1,2] (n=8276)	
Carstairs score, home ED										
Least deprived	1.0		1.0		1.0		1.0		1.0	
2nd quartile	1.4	(1.1, 1.7)	1.2	(0.9, 1.5)+	1.2	(1.0, 1.5)+	1.2	(0.9, 1.4)+	1.0	(0.8, 1.3)+
3rd quartile	1.6	(1.4, 1.9)	1.4	(1.1, 1.8)	1.5	(1.2, 2.0)	1.3	(1.1, 1.6)	1.2	(0.9, 1.6)+
Most deprived	1.9	(1.5, 2.5)	1.6	(1.2, 2.0)	1.9	(1.5, 2.5)	1.8	(1.3, 2.6)	1.4	(1.0, 1.9)
Trend value	1.2	(1.1, 1.4)	1.2	(1.1, 1.3)	1.2	(1.1, 1.3)	1.2	(1.1, 1.4)	1.1	(1.0, 1.2)
P-value i) for factor ii) for trend[3]		<0.001, <0.001		0.014, 0.001		<0.001, <0.001		0.009, 0.001		0.014, 0.011
Population density, home ED										
Least dense	1.0		1.0		1.0		1.0		1.0	
2nd quartile	1.1	(0.9, 1.5)+	1.1	(0.8, 1.5)+	1.2	(1.0, 1.6)+	1.4	(1.0, 1.8)	1.5	(1.1, 2.0)
3rd quartile	0.9	(0.7, 1.2)+	1.0	(0.7, 1.4)+	1.1	(0.8, 1.4)+	1.2	(0.9, 1.7)+	1.5	(1.1, 2.0)
Most dense	1.2	(0.9, 1.5)+	1.2	(0.8, 1.6)+	1.4	(1.1, 1.9)	1.4	(1.0, 2.1)+	1.8	(1.3, 2.5)
Trend value	1.0	(0.9, 1.1)+	1.0	(0.9, 1.2)+	1.1	(1.0, 1.2)	1.1	(1.0, 1.2)+	1.2	(1.1, 1.3)
P-value i) for factor ii) for trend[3]		0.010, 0.61		0.39, 0.52		0.036, 0.042		0.18, 0.12		0.027, 0.005
Mean Carstairs score for adjacent EDs relative to own score										
More deprived	1.0	(0.8, 1.3)+	1.2	(1.0, 1.5)+	1.1	(0.9, 1.4)+	1.1	(0.9, 1.3)+	1.0	(0.9, 1.2)+
Similar	1.0		1.0		1.0		1.0		1.0	
Less deprived	1.3	(1.0, 1.6)	1.2	(1.0, 1.6)+	1.3	(1.1, 1.6)	1.4	(1.2, 1.6)	1.3	(1.1, 1.6)
P-value for factor		0.077		0.016		0.004		0.002		0.006
Sd of Carstairs score, adjacent EDs										
Least varied	1.0		1.0		1.0		1.0		1.0	
2nd quartile	1.1	(0.8, 1.3)+	0.8	(0.6, 1.0)+	1.0	(0.8, 1.3)	1.0	(0.8, 1.3)+	1.1	(0.9, 1.4)+
3rd quartile	1.2	(0.9, 1.5)+	1.1	(0.9, 1.4)+	1.3	(1.0, 1.7)	1.3	(1.0, 1.8)	1.4	(1.1, 1.8)
Most varied	1.5	(1.1, 2.0)	1.2	(0.9, 1.5)+	1.6	(1.2, 2.0)	1.6	(1.2, 2.1)	1.4	(1.2, 1.8)
Trend value	1.1	(1.0, 1.3)	1.1	(1.0, 1.2)+	1.2	(1.1, 1.3)	1.2	(1.1, 1.3)	1.1	(1.1, 1.2)
P-value i) for factor ii) for trend[3]		0.15, 0.029		0.10, 0.066		0.004, 0.001		0.028, 0.003		0.026, 0.002

1. Each cell of the table refers to a separate model
2. Adjusted for age, gender and marital status
3. P value for factor tests for heterogeneity of parameters across categories. P value for trend assumes a log-linear trend in odds of outcome by quartile

Table 7.2.2 Odds ratios (95% confidence intervals) for being in the worst quintile of quality of life score comparing categories of area deprivation and population density.
Models mutually adjusted for the factors shown[1]

HM (n=8299)	Model 1a Unadj. housing tenure		Model 2 Adj housing tenure		Model 3 Adj housing tenure		Model 4 Adj housing tenure		Model 5 Adj housing tenure	
Carstairs score, home ED										
Least deprived	1.0		1.0		1.0		1.0		1.0	
2nd quartile	1.4	(1.1, 1.7)	1.3	(1.0, 1.6)	1.2	(1.0, 1.5)	1.2	(1.0, 1.5)+	1.2	(1.0, 1.5)
3rd quartile	1.6	(1.4, 1.9)	1.4	(1.2, 1.6)	1.4	(1.2, 1.6)	1.4	(1.2, 1.7)	1.4	(1.2, 1.6)
Most deprived	1.9	(1.5, 2.5)	1.5	(1.1, 2.0)	1.5	(1.1, 2.1)	1.6	(1.1, 2.3)	1.5	(1.1, 2.1)
Trend value	1.2	(1.1, 1.4)	1.1	(1.0, 1.3)	1.2	(1.1. 1.3)	1.2	(1.1, 1.3)	1.2	(1.1, 1.3)
P-value i) for factor ii) for trend[2]		<0.001, <0.001		0.001, 0.01		0.004, 0.004		0.005, 0.003		0.004, 0.003
Population density, home ED										
Least dense					1.0		1.0		1.0	
2nd quartile					1.1	(0.9, 1.3)+	1.1	(0.9, 1.3)+	1.1	(0.8, 1.3)+
3rd quartile					0.8	(0.6, 1.0)+	0.8	(0.6, 1.0)+	0.8	(0.6, 1.0)
Most dense					0.9	(0.7, 1.3)+	0.9	(0.7, 1.3)+	0.9	(0.7, 1.3)+
Trend value					0.9	(0.8, 1.0)+	0.9	(0.8, 1.0)+	0.9	(0.8, 1.0)+
P-value i) for factor ii) for trend[2]						0.002, 0.25		0.004, 0.26		0.011, 0.22
Mean Carstairs score for adjacent EDs relative to own score										
More deprived							1.1	(0.8, 1.5)+	1.0	(0.7, 1.4)+
Similar							1.0		1.0	
Less deprived							0.9	(0.8, 1.1)+	0.9	(0.7, 1.1)+
P-value for factor								0.55		0.56
Sd of Carstairs score, adjacent EDs										
Least varied									1.0	
2nd quartile									1.0	(0.8, 1.2)+
3rd quartile									1.0	(0.8, 1.3)+
Most varied									1.2	(0.9, 1.7)+
Trend value									1.1	(0.9, 1.2)+
P-value i) for factor ii) for trend[2]										0.69, 0.32

Table 7.2.2, continued

MOB (n=8297)	**Model 1a** Unadj. housing tenure		**Model 2** Adj housing tenure		**Model 3** Adj housing tenure		**Model 4** Adj housing tenure		**Model 5** Adj housing tenure	
Carstairs score, home ED										
Least deprived	1.0		1.0		1.0		1.0		1.0	
2nd quartile	1.2	(0.9, 1.5)+	1.1	(0.9, 1.4)+	1.1	(0.8, 1.4)+	1.1	(0.8, 1.4)+	1.1	(0.9, 1.4)+
3rd quartile	1.4	(1.1, 1.8)	1.3	(1.0, 1.6)+	1.2	(1.0, 1.6)+	1.3	(1.0, 1.7)+	1.3	(1.0, 1.7)
Most deprived	1.6	(1.2, 2.0)	1.2	(1.0, 1.6)+	1.2	(0.9, 1.7)+	1.3	(0.9, 1.9)+	1.3	(0.9, 1.8)+
Trend value	1.2	(1.1, 1.3)	1.1	(1.0, 1.2)+	1.1	(1.0, 1.2)+	1.1	(1.0, 1.2)+	1.1	(1.0, 1.3)+
P-value i) for factor ii) for trend[2]		0.014, 0.001		0.26, 0.071		0.33, 0.086		0.26, 0.093		0.13, 0.093
Population density, home ED										
Least dense					1.0		1.0		1.0	
2nd quartile					1.1	(0.8, 1.5)+	1.0	(0.7, 1.5)+	1.0	(0.8, 1.4)+
3rd quartile					0.9	(0.6, 1.3)+	0.9	(0.6, 1.3)+	0.9	(0.7, 1.2)+
Most dense					1.0	(0.7, 1.5)+	1.0	(0.7, 1.5)+	1.0	(0.7, 1.4)+
Trend value					1.0	(0.9, 1.1)+	1.0	(0.9, 1.1)+	1.0	(0.9, 1.1)+
P-value i) for factor ii) for trend[2]						0.29, 0.76		0.40, 0.70		0.54, 0.72
Mean Carstairs score for adjacent EDs relative to own score										
More deprived							1.3	(1.0, 1.7)	1.3	(1.0, 1.7)
Similar							1.0		1.0	
Less deprived							1.0	(0.8, 1.3)+	1.0	(0.8, 1.3)+
P-value for factor								0.07		0.07
Sd of Carstairs score, adjacent EDs										
Least varied									1.0	
2nd quartile									0.7	(0.6, 0.9)
3rd quartile									0.9	(0.7, 1.2)+
Most varied									0.9	(0.7, 1.2)+
Trend value									1.0	(0.9, 1.1)
P-value i) for factor ii) for trend[2]										0.026, 0.80

Table 7.2.2, continued

BCM (n=8297)	Model 1a Unadj. housing tenure		Model 2 Adj housing tenure		Model 3 Adj housing tenure		Model 4 Adj housing tenure		Model 5 Adj housing tenure	
Carstairs score, home ED										
Least deprived	1.0		1.0		1.0		1.0		1.0	
2nd quartile	1.2	(1.0, 1.5)+	1.1	(0.9, 1.4)+	1.1	(0.9, 1.3)+	1.1	(0.9, 1.3)+	1.1	(0.9, 1.4)+
3rd quartile	1.5	(1.2, 2.0)	1.4	(1.0, 1.7)	1.3	(1.0, 1.7)	1.3	(1.0, 1.7)	1.3	(1.1, 1.6)
Most deprived	1.9	(1.5, 2.5)	1.5	(1.2, 2.0)	1.5	(1.1, 1.9)	1.5	(1.1, 2.1)	1.4	(1.1, 1.8)
Trend value	1.2	(1.1, 1.3)	1.2	(1.1, 1.3)	1.2	(1.0., 1.3)	1.2	(1.1, 1.3)	1.1	(1.0, 1.3)
P-value i) for factor ii) for trend[2]		<0.001, <0.001		0.010, 0.002		0.025, 0.005		0.033, 0.005		0.056, 0.013
Population density, home ED										
Least dense					1.0		1.0		1.0	
2nd quartile					1.2	(1.0, 1.4)+	1.2	(0.9, 1.4)+	1.1	(0.9, 1.3)+
3rd quartile					0.9	(0.7, 1.2)+	0.9	(0.7, 1.2)+	0.9	(0.7, 1.1)+
Most dense					1.1	(0.9, 1.5)+	1.1	(0.9, 1.5)+	1.1	(0.9, 1.5)+
Trend value					1.0	(0.9, 1.1)+	1.0	(0.9, 1.2)+	1.0	(0.9, 1.1)+
P-value i) for factor ii) for trend[2]						0.027, 0.68		0.041, 0.71		0.086, 0.82
Mean Carstairs score for adjacent EDs relative to own score										
More deprived							1.2	(0.9, 1.5)+	1.0	(0.8, 1.4)+
Similar							1.0		1.0	
Less deprived							0.9	(0.8, 1.1)	0.9	(0.8, 1.1)
P-value for factor								0.38		0.58
Sd of Carstairs score, adjacent EDs										
Least varied									1.0	
2nd quartile									0.9	(0.7, 1.1)+
3rd quartile									1.1	(0.8, 1.5)+
Most varied									1.2	(0.9, 1.7)+
Trend value									1.1	(1.0, 1.2)+
P-value i) for factor ii) for trend[2]										0.086, 0.11

Table 7.2.2, continued

SI (n=8295)	Model 1a Unadj. housing tenure		Model 2 Adj housing tenure		Model 3 Adj housing tenure		Model 4 Adj housing tenure		Model 5 Adj housing tenure	
Carstairs score, home ED										
Least deprived	1.0		1.0		1.0		1.0		1.0	
2nd quartile	1.2	(0.9, 1.4)+	1.1	(0.9, 1.3)+	1.1	(0.9, 1.3)+	1.1	(0.9, 1.3)+	1.1	(0.9, 1.3)+
3rd quartile	1.3	(1.1, 1.6)	1.2	(1.0, 1.5)+	1.2	(0.9, 1.5)+	1.2	(1.0, 1.5)+	1.2	(0.9, 1.4)+
Most deprived	1.8	(1.3, 2.6)	1.5	(1.2, 2.1)	1.5	(1.1, 2.0)	1.5	(1.0, 2.2)+	1.4	(1.0, 1.9)+
Trend value	1.2	(1.1, 1.4)	1.2	(1.0, 1.3)	1.1	(1.0, 1.3)	1.1	(1.0, 1.3)	1.1	(1.0, 1.2)+
P-value i) for factor ii) for trend[2]		0.009, 0.001		0.070, 0.008		0.15, 0.017		0.22, 0.030		0.33, 0.066
Population density, home ED										
Least dense					1.0		1.0		1.0	
2nd quartile					1.3	(1.0, 1.7)	1.3	(1.0, 1.6)+	1.2	(1.0, 1.5)+
3rd quartile					1.1	(0.8, 1.5)+	1.1	(0.8, 1.4)+	1.1	(0.8, 1.4)+
Most dense					1.2	(0.8, 1.7)+	1.2	(0.8, 1.7)+	1.1	(0.8, 1.7)+
Trend value					1.0	(0.9, 1.2)+	1.0	(0.9, 1.2)+	1.0	(0.9, 1.2)+
P-value i) for factor ii) for trend[2]						0.16, 0.60		0.17, 0.64		0.25, 0.72
Mean Carstairs score for adjacent EDs relative to own score										
More deprived							1.1	(0.9, 1.4)+	1.0	(0.8, 1.2)+
Similar							1.0		1.0	
Less deprived							1.0	(0.8, 1.2)+	1.0	(0.8, 1.2)+
P-value for factor								0.71		0.87
Sd of Carstairs score, adjacent EDs										
Least varied									1.0	
2nd quartile									1.0	(0.8, 1.2)+
3rd quartile									1.2	(0.9, 1.5)+
Most varied									1.2	(0.9, 1.6)+
Trend value									1.1	(1.0, 1.2)
P-value i) for factor ii) for trend[2]										0.19, 0.049

Table 7.2.2, continued

Morale (n=8276)	**Model 1a** Unadj. housing tenure		**Model 2** Adj housing tenure		**Model 3** Adj housing tenure		**Model 4** Adj housing tenure		**Model 5** Adj housing tenure	
Carstairs score, home ED										
Least deprived	1.0		1.0		1.0		1.0		1.0	
2nd quartile	1.0	(0.8, 1.3)+	0.9	(0.7, 1.2)+	0.9	(0.8, 1.2)+	0.9	(0.8, 1.2)+	0.9	(0.8, 1.2)+
3rd quartile	1.2	(0.9, 1.6)+	1.1	(0.8, 1.5)+	1.1	(0.8, 1.4)+	1.1	(0.8, 1.4)+	1.0	(0.8, 1.3)+
Most deprived	1.4	(1.0, 1.9)	1.2	(0.8, 1.6)+	1.0	(0.7, 1.4)+	1.0	(0.7, 1.4)+	0.9	(0.6, 1.4)+
Trend value	1.1	(1.0, 1.2)	1.1	(1.0, 1.2)+	1.0	(0.9, 1.1) +	1.0	(0.9, 1.1)+	1.0	(0.9, 1.1)+
P-value i) for factor ii) for trend[2]		0.014, 0.011		0.12, 0.17		0.65, 0.71		0.65, 0.84		0.75, 0.80
Population density, home ED										
Least dense					1.0		1.0		1.0	
2nd quartile					1.5	(1.1, 1.9)	1.4	(1.1, 1.9)	1.4	(1.0, 1.8)
3rd quartile					1.4	(1.0, 2.0)	1.4	(1.0, 2.0)	1.4	(1.0, 1.9)
Most dense					1.7	(1.1, 2.4)	1.6	(1.1, 2.4)	1.6	(1.1, 2.3)
Trend value					1.2	(1.0, 1.3)	1.2	(1.0, 1.3)	1.1	(1.0, 1.3)
P-value i) for factor ii) for trend[2]						0.035, 0.032		0.045, 0.033		0.060, 0.034
Mean Carstairs score for adjacent EDs relative to own score										
More deprived							1.1	(0.9, 1.2)+	1.0	(0.8, 1.2)+
Similar							1.0		1.0	
Less deprived							1.1	(0.9, 1.3)+	1.1	(0.9, 1.3)+
P-value for factor								0.39		0.69
Sd of Carstairs score, adjacent EDs										
Least varied									1.0	
2nd quartile									1.0	(0.8, 1.2)+
3rd quartile									1.2	(0.9, 1.5)+
Most varied									1.2	(0.9, 1.6)+
Trend value									1.1	(1.0, 1.2)+
P-value i) for factor ii) for trend[2]										0.46, 0.088

+ Wald p-value >0.05

1. Adjusted for gender, age and marital status
2. P-value for trend ignores clustering within practice

Table 7.2.3. Odds ratios for being in the worst quintile of quality of life score comparing rented with owner-occupied accommodation before and after adjusting for area factors

Outcome and subgroup	Model 1b[1]		Model 2[1,2]		Model 5[1,2]	
'Independents'						
HM	1.79	(1.4, 2.2)	1.62	(1.3, 2.0)	1.63	(1.3, 2.0)
MOB	1.60	(1.2, 2.1)	1.51	(1.2, 2.0)	1.53	(1.2, 2.0)
BCM	1.74	(1.4, 2.1)	1.56	(1.3, 1.9)	1.56	(1.3, 1.9)
SI	1.70	(1.4, 2.1)	1.54	(1.3, 1.8)	1.53	(1.3, 1.8)
Morale	1.53	(1.3, 1.8)	1.46	(1.2, 1.8)	1.45	(1.2, 1.8)
'Dependents'						
HM	1.25	(0.8, 1.9)+	1.16	(0.8, 1.7)+	1.16	(0.8, 1.7)+
MOB	1.41	(1.0, 2.1)+	1.36	(0.9, 2.0)+	1.37	(0.9, 2.0)+
BCM	1.16	(0.8, 1.7)+	1.07	(0.7, 1.5)+	1.07	(0.7, 1.6)+
SI	1.73	(1.2, 2.5)	1.61	(1.1, 2.4)	1.60	(1.1, 2.4)
Morale	1.63	(1.1, 2.4)	1.58	(1.1, 2.3)	1.57	(1.1, 2.3)

1. Adjusted for gender, age and marital status
2. Model 2 and Model 5 are as in Table 7.2.2; adjusted for trend values for Carstairs and population density

Table 7.4.1 Odds ratios (95% confidence intervals) for being in the worst quintiles of quality of life score comparing rented with owner-occupied accommodation – effect of successively adding in potential intermediate factors then area factors

	HM[1] (n=5876)		MOB[1] (n=5875)		BCM[1] (n=5875)		SI[1] (n=5874)		Morale[1] (n=5873)	
'Independents'										
Basic model	1.65	(1.3, 2.1)	1.53	(1.1, 2.1)	1.78	(1.5, 2.2)	1.50	(1.2, 1.9)	1.40	(1.1, 1.7)
Add health problems	1.48	(1.1, 1.9)	1.35	(1.0, 1.9)+	1.58	(1.3, 2.0)	1.37	(1.1, 1.7)	1.24	(1.0, 1.5)
Add lifestyle[2]	1.37	(1.0, 1.8)	1.23	(0.9, 1.7)+	1.45	(1.2, 1.8)	1.27	(1.0, 1.6)	1.16	(0.9, 1.4)+
Add social contact[3]	1.35	(1.0, 1.8)	1.23	(0.9, 1.7)+	1.44	(1.2, 1.8)	1.27	(1.0, 1.6)	1.19	(1.0, 1.5)+
Add area factors[4]	1.22	(1.0, 1.6)+	1.16	(0.8, 1.6)+	1.31	(1.1, 1.6)	1.16	(1.0, 1.4)+	1.19	(1.0, 1.5)+
'Dependents'										
Basic model	1.26	(0.8, 1.9)+	1.26	(0.8, 1.9)+	1.44	(0.9, 2.3)+	2.07	(1.4, 3.1)	2.01	(1.2, 3.4)
Add health problems	1.23	(0.8, 1.9)+	1.18	(0.8, 1.8)+	1.40	(0.8, 2.3)+	2.04	(1.4, 3.1)	2.06	(1.2, 3.5)
Add lifestyle[2]	1.18	(0.7, 1.9)+	1.10	(0.7, 1.7)+	1.38	(0.8, 2.3)+	1.92	(1.3, 2.9)	1.99	(1.2, 3.4)
Add social contact[3]	1.16	(0.7, 1.9)+	1.07	(0.7, 1.7)+	1.35	(0.8, 2.3)+	1.86	(1.2, 2.8)	1.90	(1.1, 3.3)
Add area factors[4]	1.05	(0.6, 1.7)+	1.02	(0.6, 1.6)+	1.24	(0.7, 2.1)+	1.66	(1.1, 2.6)	1.90	(1.1, 3.3)

* Wald test $p>0.05$

1. Adjusted for gender, age,marital status,
2. Lifestyle including smoking and alcohol consumption but excluding perception of physical activity
3. Frequency of external contact
4. Quartile of home Carstairs score + quartile of population density

8 MRC Study – do both socioeconomic position in mid-life and in old age matter

8.1 *Description of socioeconomic measures; objectives of analysis*

Hitherto, the analyses have used one measure of socio-economic status current in late life. Distributions of people by each of four socioeconomic indicators are given in Table 8.1.1, including the distributions of social class using both own and husband's classification for women. The latter classification is used in further analyses because in the generation covered by the study many women had only worked for a small part of their adult life and their husband's occupation was assumed to be the more dominant influence on their lifestyle. The social class distribution was weighted towards the top end with over a third of men in Social Class I/II and a further third in Social Class IIIM.

In this chapter the rented housing sector is subdivided into social-sector housing and 'other' because they are different in their nature. At the time of the study social-sector housing was that provided by local authorities or housing associations for people with restricted incomes or special needs. Local authority housing is under the direct ownership of local government councils whereas housing associations are non-profit businesses with volunteer Boards of Management. Standards can fluctuate over time (for example Parker Morris space standards for local councils existed for nearly 20 years until these lapsed in 1981) and according to what the local authorities can afford.[86] In the current quality of life study, housing associations were identifiable for people's housing in old age but not for housing tenure in middle age (but they were probably a minor part of such housing). The 'other' rented sector is a heterogeneous group of people renting from commercial landlords, living in property owned by family, and living in tied cottages or rent-free. Privately rented housing is less well controlled and the standards can be appalling. Single older people living in the private rented sector experience the poorest housing conditions. [18] I pay less attention to this group than to the social-sector housing category both because of its small size (so giving little power to study it well) and its heterogeneous composition.

It is separated out to show more clearly the picture for social-sector housing. This was not done in Chapters 6 and 7 because priority was given there to including both 'independents; and 'Dependents' and having the power to look at multiple intermediate factors.

Fifty-eight percent of participants had been in owner-occupation for most of their adult life, 25% in local authority accommodation and only 16% in other housing tenures. Three-quarters had at some time owned a car but women aged 80 years and over were least likely to have done so (67%) (Table 8.1.1).

The main questions this chapter seeks to answer are:

1. Whether housing tenure in old age matters for quality of life in addition to housing tenure in mid life even if the person is still independent
2. Whether having changed from owner-occupation to social-sector housing is associated with worse quality of life than having stayed in owner-occupation
3. Whether having changed from social-sector housing to owner-occupation is associated with better quality of life than having stayed in social-sector housing
4. If either (2) or (3) is true, whether the improvement or deterioration brings chances of poor quality of life to the same level as those who were always in the destination housing tenure.
5. Whether moving into a situation of dependency (as defined by living with others or moving to supported accommodation) has a similar effect regardless of the source housing tenure

8.2 *Are socioeconomic indicators cumulative in their effects on quality of life*

Figure 8.2.1 shows that housing tenure experience varied with social class, local authority renting being more common among manual classes. Figure 8.2.2 shows that people in lower social classes and, within social class, people in local authority homes were least likely to have ever had a car.

Figure 8.2.1. Distribution of all participants in the MRC Study quality of life sample by combined social class and housing tenure for most of adult life

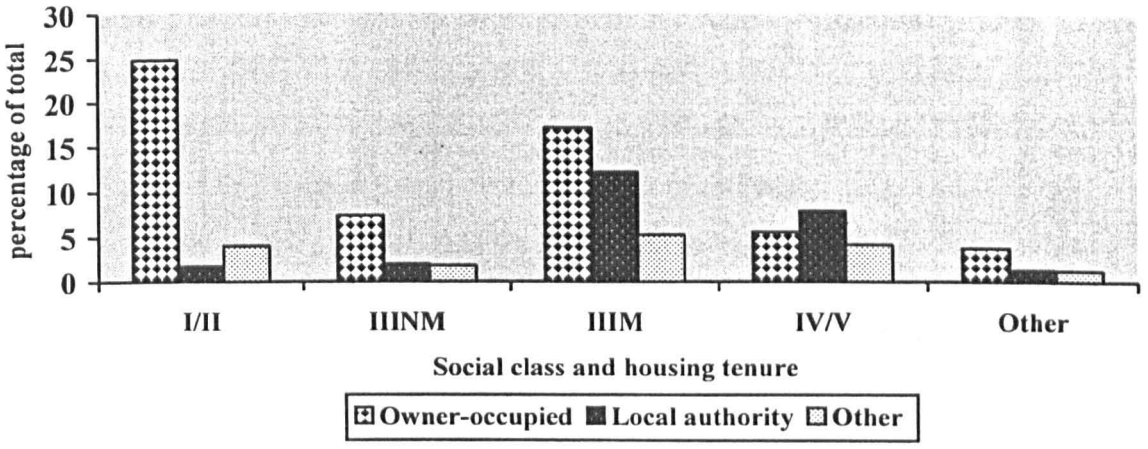
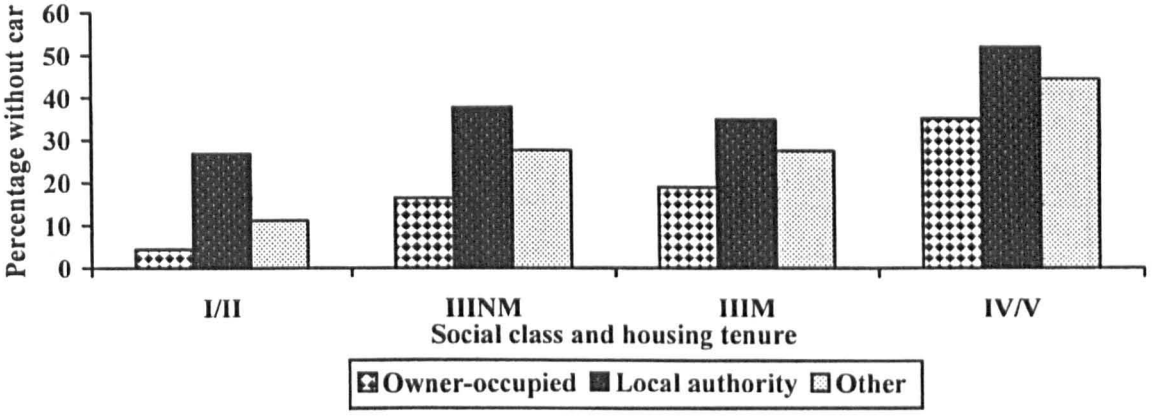


Figure 8.2.2. Percentage of social class and housing tenure sub-groups who had never been in a household with a car



The 'other' housing group cuts across the hierarchies implied by social class and car ownership. There were similar numbers in this tenure in Social Class I/II as in Social Class IV/V and percentages of the 'other' tenure group lacking a car were intermediate between those in the two other housing tenure categories.

People who were in class IIIM or IV/V were more likely to have poor quality of life than those in classes I/II (Table 8.2.1 Model 1a). The odds ratios were 1.6 to 2.0 for the various dimensions. For every outcome, there was an independent effect whereby people who had been in local authority accommodation most of their lives had

increased risk of poor outcomes, even after adjusting for social class (Model 2). However, the third historic factor, ever-ownership of a car did not add to these two socioeconomic measures (possibly a slight benefit for social interaction) (Model 3). Comparing models 1a and 1b with model 4, it is apparent that both circumstances in mid-life and in old age are independently associated with health-related quality of life in old age but that there are also correlations between social class and housing-tenure dependency in old age such that the estimated effect of each is reduced when allowance is made for the other.

8.3 *Change in housing tenure and quality of life*

The numbers in 'dependency' categories were too small to analyse change in tenure among those who became 'Dependent' in old age. Thus the categorisation given in Table 8.3A was adopted with most emphasis being given to the cells marked by a double cross:

Table 8.3A Categorisation for change in housing tenure

Tenure in old age	Tenure most of adult life		
	Owner-occupied	Local authority housing	'Other'
'Independent'			
Owner-occupier	XX	XX	X
Social sector	XX	XX	X
'Other'	X	X	X
'Dependent'	X	X	X
Supported housing	X	X	X

8.3.1 Prevalence of change in tenure combinations

Table 8.3.1 shows that over 40% of the sample reported living in owner-occupation at both periods of their lives and were 'Independent' at the time quality of life was measured. The next largest group, but only a quarter the size, comprised those who were in social-sector housing at both times and remained 'independent'. Larger numbers of the 'Independent' group had moved into owner-occupation than out (nearly 9% of the whole sample compared with 3%).

Of those who were in owner-occupation in mid-life, 10% were in a 'dependent' category and 11% in supported housing at the time quality of life was measured. The equivalent percentages for people who were in local authority housing in mid-life were 11% and 23%.

Of the four categories marked with a double cross in Table 8.3A, the ones who had moved from local authority to 'Independent' owner-occupied homes had the lowest median age, were most likely to be male, and, for women, still to be married. People who had moved in the opposite direction had higher median age and were most likely to be widowed and to be female. More detail is given in Appendix Table 8.3.A1. None of these groups were as predominantly female and widowed or divorced as the ones in 'dependent' situations, although only 'dependent' women who had moved from owner-occupation were clearly much older.

8.4 *Joint effects of housing tenure during mid-life and late-life on quality of life*

Table 8.4.1 shows the odds ratios for poor outcomes by combinations of housing tenure for most of a person's adult life and their housing tenure-dependency at the time of the quality of life interview. The reference group was in owner-occupation at both periods and 'independent' in late life[x]. Some patterns emerge:

- For each housing tenure experienced during middle age, 'Independent' people living in social-sector housing in old age were generally more likely to have any of the outcomes than those living in owner-occupation at that time (reading down columns). MOB and BCM were least consistent in demonstrating this.
- People who were in local authority housing in mid-life tended to have greater odds of poor quality of life than those in owner-occupation in mid-life, regardless of housing tenure-dependency in old age (reading across rows).

[x] The odds ratios were estimated from models with separate parameters for each combination (however, the interactions between main and current housing tenure were only statistically significant for BCM, for which the odds of poor score were higher among the 'Independents' who changed from or to owner-occupation than one would expect from a non-interactive model).

These patterns show a more consistently negative outlook for people in social-sector housing than in other housing.

Table 8.4.2 shows more clearly the effect of transitions to and from owner-occupation among those who had not yet become 'dependent' by the time of the quality of life interview. The top segment addresses the question whether people who move 'up' are better off than those who stay in the mid-life tenure and those who move 'down' are worse off. The point estimates for people who moved 'down' from owner-occupation to social-sector housing were consistent with increased risk of poor quality of life and this was statistically significant for three of the dimensions (confidence intervals were wide). Those who moved 'up' from social-sector housing to 'Independent' owner-occupation had significantly reduced odds of poor HM and SI scores compared with those who stayed and none of the estimated odds ratios were greater than 1.0. Those who moved to 'other' tenure from owner-occupation showed increased chances of poor outcomes that were not statistically significant and reverse moves showed some signs of reduced chances of poor quality of life but again not statistically significant.

The lower segment of Table 8.4.2 addresses the question of whether the chances of poor outcomes after changing housing tenure reach the same level as people who had already been in that tenure group in mid-life. It appears that people who moved 'down' from owner-occupation to social-sector housing were not quite as likely to have poor quality of life in the three physical SIP dimensions as those already in social-sector housing. On the face of it, their chances of poor SI and Morale were no better than those of people already in social-sector housing but the wide confidence intervals leave some room for doubt. On the other hand, moving upwards from local authority housing to owner-occupation clearly does not reduce the odds of any physical SIP outcome or morale to the level of those who had previously been in owner-occupation.

Finally, in Table 8.4.3 the odds ratios for poor physical SIP scores are higher for those who moved from owner-occupation to dependent living or supported housing than they are for their counterparts who moved from social-sector housing to these situations. In other words, the transition from owner-occupation to dependency

accompanies a greater increase in chances of poor physical quality of life than the one from local authority renting.

8.4.1 Whether health differences explain different chances of poor outcomes among those who did or did not change housing tenure

In this analysis the same set of health variables are used as in Chapter 6.5.2. The models refer to the subset who did the brief assessment. In this subset the odds ratios for poor outcomes before adjustment for health variables vary from those in the fuller sample but not in any clear systematic way. However the confidence intervals are wide so that the analysis can only lead to tentative conclusions. Generally the odds ratios are closer to 1.0 after adjustment for health variables (Table 8.4.4). The group who remained in owner-occupation were not only younger and more predominantly male than many other groups but in better health and this partly explained their advantage in quality of life. Among the 'independent' groups in old age, this health disadvantage was most noticeable for physical SIP (via attenuation of odds ratios) for people who had remained in social-sector housing and those who had moved from social-sector housing to owner-occupation.

8.5 *Social class in middle age and housing tenure in old age*

The main interest in this section is to see whether people in non-manual classes who did not own their homes in old age, even though 'independent', were more likely to have poor quality of life than those who did. Conversely, to assess whether people in manual classes who did buy their homes were less likely to have poor quality of life than those who did not.

The largest group, accounting for one in five people, was those who were socioeconomically the most advantaged, i.e. in social class I/II and in owner-occupation and non-dependent in old age (Table 8.5.1). The next largest group, about two-thirds the size of the largest group, were people in manual class III and then in owner-occupation in old age. Otherwise no one group comprised more than 7% of the total.

There was an inverse association between social class and percentage in owner-occupation but even in class IV/V 30% were owner-occupiers. Percentages in dependent living circumstances, varying from 8% to 13%, did not follow a strict inverse association with social class. Percentages in supported housing did follow a strict inverse association, increasing from 8% of those in social class I/II to 23% of those in social class IV/V.

The largest and most privileged socioeconomic group was also more predominantly male (48% compared with 42% of all non-dependent). People who belonged to a non-manual group but were in social-sector housing in old age were more likely to be women and more likely to be widowed than those who were in owner-occupation (not shown). However, this group was small. People who were in manual groups were of similar gender composition whether in owner-occupation or social-sector housing at the time of the quality of life interview. Both men and women in manual groups were more likely to be widowed or divorced if in social-sector housing than in owner-occupation in old age. For people in social class IIIM median ages were similar in the two housing tenure subgroups; in social class IV/V people in social-sector housing were a little older than their counterparts in owner-occupation.

8.5.1 Joint effects of social class and of housing tenure-dependency in old age on quality of life

Table 8.5.2 is designed to show how chances of poor outcomes vary according to whether people's social class and housing tenure in old age are both privileged, both less privileged or a mixture. People in social class I/II and in 'independent' owner-occupation in old age comprised the reference group. The odds ratios are adjusted for gender, age and marital status. Generally there were significant interactions between social class and housing tenure-dependency in old age, i.e. the effect of being in a particular tenure-dependency group in old age depended on social class. The patterns of odds ratios for poor quality of life are complex and few general points can be made.

- People in class IIINM and owner-occupation had similar chances of poor quality of life to their counterparts in class I/II (except for morale); for the

SIP outcomes these chances was lower than those experienced by other groups (reading across the top row).

- Within the owner-occupation categories poor quality of life is more likely among manual than non-manual classes but this is not so consistently true within the social-sector housing categories (comparing along the top two rows)
- Within social classes I-IIIM, chances of poor quality of life appear greater among those in social-sector housing than among those in owner-occupation but not within social class IV/V (comparing down columns)

8.6 *Index of cumulative socioeconomic position*

Following the example of Davey-Smith et al[75] who cumulated the number of occasions on which someone was assigned to a manual social class through their life-course, I wanted to track through to see whether the odds for poor quality of life increased the more indicators of disadvantaged socioeconomic position someone had. I assigned one point if someone was in social class IV/V in mid-life, or in social-sector housing in mid-life, or in 'Independent' social-sector housing in late life (making a maximum of three points). I assigned half a point if someone was in social class IIIM in mid-life. The analyses were confined to the particular sub-group who were in 'Independent' housing in late life and did not report being in 'other' rented accommodation either in mid-life or late-life. This accounted for 71% of the younger men (aged under 80 years), just over 60% of older men and younger women, and 45% of older women. One in five of the sub-population had a score of 2-3 (Table 8.6.1). As there were demographic variations across scores (Appendix Table 8.6.A1) the odds ratios for poor quality of life were modeled adjusting for age, gender, marital status as well as Jarman and SMR, as in previous sections. The odds ratios in Table 8.6.2 suggest that the odds of poor quality of life generally increased, the more socio-economic disadvantages people had, but peaked at a score of 2.5. A model assuming a quadratic relation of the log(odds ratio) with increasing score fitted better than a linear model and the parameters are shown in the second part of Table 8.6.2. People who were in a non-manual social class and in owner-occupation at both times had a very clear advantage over anyone who had at least one disadvantage in this sub-population, despite there already having been some

selection of people with poor quality of life out of the sub-population into the 'dependent' or 'supported' groups. Example age-standardised predictions were estimated from these models for married men and widowed or divorced women (as the largest groups). According to these estimates, about 20% of those with an index score of 2 could expect to have poor HM among both married men and formerly-married women (gender differences disappeared when the index was used) compared to 16% for an index of 1 and 9% for an zero score. For morale the equivalent figures were 17%, 14%, and 9% for married men and 35%, 31%, and 21% for formerly married women. This shows wide variation even though it is confined to those still 'independent' at the time quality of life was measured.

8.7 *Summary*

Socioeconomic circumstances in mid-life and late-life are independently associated with quality of life in old age, despite the largest group of people being in privileged position at both times. In this sample of people, social class and housing tenure in mid-life were associated with quality of life but experience of having a car in the household was not – perhaps by this age where absence of a car is more normal, any status effects on Morale or SI had worn off.

A downward transition from owner-occupation to social-sector housing was clearly accompanied by greater odds of poor BCM, SI, and Morale and odds ratios were consistent with deterioration for all. The evidence was inconclusive as to whether they became as likely to have poor quality of life as those who had been in local authority housing in middle age as well but they were more likely to state that any restrictions on their functioning were due to their health than those who had not changed (analyses not shown). People who moved up from local authority housing to owner-occupation and remained non-dependent were at a clear advantage over those who had not changed up for SI. They were more likely to see friends and family from outside the household frequently (analyses not shown). Otherwise the evidence of benefits of upward moves was weak.

An unanticipated finding was that the differentials in chances of poor physical quality of life between 'Dependents' and 'Independents' were less among those

whose mid-life tenure was social-sector housing than among those whose mid-life tenure was owner-occupation (for home management odds ratio of around 2 if from social-sector housing and 31/2 if from owner-occupation). These contrasts could arise if going into dependency is more of a last resort for those who start in owner-occupation.

Adding in health variables attenuates the odds ratios for all groups whose mid-life tenure was social-sector housing more than it does for groups whose mid-life tenure was owner-occupation. Thus having been in social-sector housing in mid life seems to carry with it a disadvantage in health symptoms in late life that in turn carries a disadvantage in physical functioning.

Cautious inferences from analyses of social class and later housing tenure combinations are that the non-manual classes are more likely to have poor quality of life if they are in social-sector housing than if they are in owner-occupation. Conversely, there are some signs that being in owner-occupation is better for quality of life among the skilled manual groups. However, housing tenure in old age makes no difference among the unskilled and semi-skilled groups. Analyses of transitions were confined to men and women who were classified as 'independent' in old age.

An index of socioeconomic position was created, ranging in value from 0-3; this excluded people in 'other' rented accommodation at any time, or in 'Dependent' or supported housing in old age. Having one socioeconomic disadvantage (being in social-sector housing either in mid-life or late-life but not both or being in social class IV/V) is associated with considerably higher prevalence of poor quality of life than having none in this sub-population; having a second disadvantage increases the prevalence of poor quality of life by a smaller amount but the third disadvantage has marginal additional impact.

Key Points

- Both socioeconomic position in mid-life (housing tenure and social class) and in old age (housing tenure) are independently associated with health-related quality of life in old age
- Among 'Independents' results were consistent with worse quality of life for those who had moved 'down' from owner-occupation to rented homes
- 'Independents' who changed to owner-occupation had reduced prospects of poor SI so that they were no worse than people already in owner-occupation
- Among 'Independents' being in social-sector housing both in mid-life and in old age carried roughly double the chance of all dimensions of poor quality of life compared to those in owner-occupation at both time.
- Being in social-sector housing in old age appears to be worse for quality of life for non-manual classes than being in owner-occupation. Being in owner-occupation may be better for quality of life among skilled manual groups but makes no difference among the unskilled and semi-skilled groups.
- Chances of poor quality of life are substantially increased with one socioeconomic disadvantage and increased further with a second but a third disadvantage does not greatly exacerbate the risks.

Study populations for tables in Chapter 8

Table Numbers	Data source	Dates of fieldwork+	Study population
8.1.1, 8.2.1, 8.3.1, 8.4.1, 8.4.2, 8.4.3	MRC Study	1995-9	Men and women aged 75 years and over* registered in 23 general practices in Great Britain..Exclusions: in a nursing home or too ill to take part.
8.4.4	MRC Study	1995-9	The subset who had a brief assessment.
8.5.1, 8.5.2	MRC Study	1995-9	All who had quality of life interviews – as 8.1.1
8.6.1, 8.6.2	MRC Study	1995-9	People in owner occupation or social housing in mid-life and late life and assigned a social class

Further notes:
+Fieldwork took place during 1995-9, the year depending on which General Practice the person belonged to
*People could be aged 74 years at the time of the quality of life interview provided that they would be aged 75 years when they had an assessment
Most analyses are for men and women combined

Table 8.1.1 Distributions of participants by measures of socioeconomic status applicable during most of adult life and during old age.
Number (percentage of gender and age group)

	Men		Women (husband's social class)		Women's own social class	
	Aged <80 years	Aged 80+ years	Aged <80 years	Aged 80+ years	Aged <80 years	Aged 80+ years
Social class						
I/II	616 (36.2)	515 (34.1)	686 (28.9)	804 (26.8)	432 (18.2)	527 (17.7)
III NM	151 (8.9)	155 (10.3)	290 (12.2)	352 (11.8)	632 (26.7)	606 (20.4)
III M	605 (35.6)	515 (34.1)	833 (35.0)	1013 (33.8)	331 (14.0)	512 (17.2)
IV/V	252 (14.8)	279 (18.5)	395 (16.6)	573 (19.1)	600 (23.3)	808 (27.2)
AF, UN, UC[1]	39 (2.3)	30 (2.0)	84 (3.5)	142 (4.7)	341 (14.4)	462 (15.5)
Not known	37 (2.2)	17 (1.1)	89 (3.7)	111 (3.7)	31 (1.3)	61 (2.0)
Housing tenure most of adult life	1012 (60.0)	906 (60.2)	1381 (58.3)	1693 (56.9)		
Owner-occupied	454 (26.9)	329 (21.9)	672 (28.4)	696 (23.4)		
Local authority	220 (13.1)	270 (17.9)	314 (13.3)	314 (13.3)		
Other						
Ever in household with a car						
Yes	1447 (85.8)	1206 (80.1)	1904 (80.4)	2003 (67.3)		
No	239 (14.2)	299 (19.9)	463 (19.6)	973 (32.7)		
Housing tenure-dependency						
'Independent'						
Owner-occupied	1097 (65.1)	854 (56.7)	1328 (56.1)	1232 (41.4)		
Rented	348 (20.6)	321 (21.3)	510 (21.6)	597 (20.1)		
'Dependent'						
Owner-occupied	64 (3.8)	91 (6.0)	163 (6.9)	310 (10.4)		
Rented	39 (2.3)	34 (2.3)	72 (3.0)	110 (3.7)		
Supported housing	138 (8.2)	205 (13.6)	294 (12.4)	727 (24.4)		

1. Armed forces, no job, not classifiable. For women the predominant group was "no job", for men it was armed forces.

Table 8.2.1 Odds ratios (95% confidence intervals) for being in the worst quintile of quality of life score by socioeconomic position in mid-life and in old age.

Models 1a (social class) 1b (housing tenure-dependency) not adjusted for other socioeconomic measures

Models 2-4 adjusted for the other socioeconomic measures shown in that column

	HM[1] (n=8278) Model 1a, Model 1b		Model 2		Model 3		Model 4	
Historic measures[2]								
Social class								
I/II	1.0		1.0		1.0		1.0	
IIINM	1.1	(0.9, 1.4)+	1.0	(0.8, 1.3)+	1.0	(0.8, 1.3)+	1.0	(0.8, 1.3)+
IIIM	1.6	(1.3, 2.0)	1.5	(1.2, 1.8)	1.5	(1.2, 1.8)	1.3	(1.1, 1.6)
IV/V	1.7	(1.4, 2.1)	1.5	(1.2, 1.8)	1.5	(1.2, 1.9)	1.3	(1.1, 1.6)
AF, UC, UN[3]	1.9	(1.3, 2.8)	1.8	(1.2, 2.7)	1.8	(1.2, 2.7)	1.6	(1.1, 2.4)
P-value for factor		<0.001		0.010		0.012		0.070
Housing tenure most of adult life								
Owner-occupied			1.0		1.0		1.0	
Local authority			1.5	(1.3, 1.6)	1.5	(1.3, 1.7)	1.2	(1.1, 1.3)
Other			1.3	(1.0, 1.6)	1.3	(1.0, 1.6)	1.1	(0.8, 1.3)+
P-value for factor				<0.001		<0.001		0.016
Car ownership								
Never vs Ever					0.9	(0.8, 1.1)+	1.0	(0.8, 1.1)+
P-value for factor						0.47		0.72
Current measures								
Housing tenure-dependency								
'Independent'								
Owner-occupied	1.0						1.0	
Rented	1.7	(1.4, 2.1)					1.5	(1.2, 1.8)
'Dependent'								
Owner-occupied	3.7	(3.0, 4.5)					3.5	(2.9, 4.2)
Rented	4.6	(3.2, 6.8)					3.9	(2.7, 5.6)
Supported housing	3.4	(2.7, 4.4)					3.1	(2.4, 3.9)
Rented vs owned								
'Independents'	1.7	(1.4, 2.1)					1.5	(1.2, 1.8)
'Dependents'	1.3	(0.8, 1.9)+					1.1	(0.7, 1.7)+
P-value for factor		<0.001						<0.001

Table 8.2.1 continued

	MOB[1] (n=8277)							
	Model 1a, Model 1b		Model 2		Model 3		Model 4	
Historic measures[2]								
Social class								
I/II	1.0		1.0		1.0		1.0	
IIINM	1.1	(0.9, 1.4)+	1.1	(0.9, 1.3)+	1.1	(0.9, 1.3)+	1.0	(0.8, 1.3)
IIIM	1.6	(1.3, 1.9)	1.4	(1.1, 1.7)	1.4	(1.1, 1.7)	1.3	(1.0, 1.6)
IV/V	1.9	(1.5, 2.4)	1.6	(1.2, 2.0)	1.6	(1.2, 2.0)	1.4	(1.1, 1.8)
AF, UC, UN[3]	1.9	(1.2, 2.9)	1.7	(1.1, 2.7)	1.7	(1.1, 2.7)	1.6	(1.0, 2.5)+
P-value for factor		<0.001		0.003		0.004		0.027
Housing tenure most of adult life								
Owner-occupied			1.0		1.0		1.0	
Local authority			1.6	(1.3, 2.0)	1.6	(1.3, 2.0)	1.3	(1.1, 1.7)
Other			1.2	(1.0, 1.5)	1.2	(1.0, 1.5)	1.1	(0.9, 1.3)+
P-value for factor				0.001		0.001		0.033
Car ownership								
Never vs Ever					1.0	(0.8, 1.2)+	1.0	(0.8, 1.2)+
P-value for factor						0.85		0.82
Current measures								
Housing tenure-dependency								
'Independent'								
Owner-occupied	1.0						1.0	
Rented	1.6	(1.3, 2.1)					1.3	(1.0, 1.7)+
'Dependent'								
Owner-occupied	2.1	(1.6, 2.8)					2.0	(1.5, 2.7)
Rented	2.9	(2.0, 4.2)					2.2	(1.6, 3.2)
Supported housing	2.5	(2.0, 3.1)					2.1	(1.7, 2.6)
Rented vs owned								
'Independents'	1.6	(1.3, 2.1)					1.3	(1.0, 1.7)+
'Dependents'	1.4	(1.0, 1.9)+					1.1	(0.8, 1.6)+
P-value for factor		<0.001						<0.001

Table 8.2.1 continued

	BCM[1] (n=8279)							
	Model 1a Model 1b		Model 2		Model 3		Model 4	
Historic measures[2]								
Social class								
I/II	1.0		1.0		1.0		1.0	
IIINM	1.2	(1.0, 1.5)+	1.1	(0.9, 1.4)+	1.1	(0.9, 1.4)+	1.1	(0.9, 1.3)
IIIM	1.6	(1.4, 1.8)	1.3	(1.2, 1.6)	1.4	(1.2, 1.6)	1.3	(1.1, 1.5)
IV/V	1.7	(1.4, 2.1)	1.4	(1.1, 1.7)	1.4	(1.1, 1.8)	1.3	(1.0, 1.6)
AF, UC, UN[3]	1.6	(1.1, 2.3)	1.4	(1.0, 2.0)	1.4	(1.0, 2.1)+	1.3	(0.9, 1.9)+
P-value for factor		<0.001		0.011		0.010		0.050
Housing tenure most of adult life								
Owner-occupied			1.0		1.0		1.0	
Local authority			1.7	(1.5, 2.0)	1.7	(1.5, 2.0)	1.5	(1.2, 1.8)
Other			1.3	(1.1, 1.6)	1.3	(1.1, 1.6)	1.1	(0.9, 1.4)+
P-value for factor				<0.001		<0.001		0.001
Car ownership								
Never vs Ever					0.9	(0.8, 1.1)+	0.9	(0.8, 1.1)+
P-value for factor						0.32		0.28
Current measures								
Housing tenure-dependency								
'Independent'								
Owner-occupied	1.0						1.0	
Rented	1.7	(1.4, 2.1)					1.3	(1.1, 1.7)
'Dependent'								
Owner-occupied	2.2	(1.7, 2.8)					2.0	(1.6, 2.6)
Rented	2.6	(1.9, 3.6)					2.0	(1.4, 2.8)
Supported housing	2.7	(2.2, 3.3)					2.2	(1.8, 2.8)
Rented vs owned								
'Independents'	1.7	(1.4, 2.1)					1.3	(1.1, 1.7)
'Dependents'	1.2	(0.8, 1.7)+					1.0	(0.6, 1.5)+
P-value for factor		<0.001						<0.001

Table 8.2.1 continued

	SI[1] (n=8275)							
	Model 1a Model 1b		Model 2		Model 3		Model 4	
Historic measures[2]								
Social class								
I/II	1.0		1.0		1.0		1.0	
IIINM	1.2	(0.9, 1.6)	1.1	(0.9, 1.5)+	1.1	(0.9, 1.5)+	1.1	(0.8, 1.4)+
IIIM	1.7	(1.4, 2.0)	1.5	(1.2, 1.8)	1.4	(1.2, 1.8)	1.4	(1.2, 1.7)
IV/V	2.0	(1.6, 2.4)	1.7	(1.4, 2.1)	1.6	(1.3, 2.0)	1.5	(1.2, 1.9)
AF, UC, UN[3]	1.8	(1.4, 2.3)	1.7	(1.3, 2.1)	1.7	(1.3, 2.1)	1.6	(1.3, 2.0)
P-value for factor		<0.001		<0.001		<0.001		<0.001
Housing tenure most of adult life								
Owner-occupied			1.0		1.0		1.0	
Local authority			1.4	(1.2, 1.7)	1.4	(1.2, 1.6)	1.2	(1.1, 1.4)
Other			1.2	(1.0, 1.5)+	1.2	(1.0, 1.5)	1.1	(0.9, 1.3)+
P-value for factor				0.001		0.001		0.007
Car ownership								
Never vs Ever					1.2	(1.0, 1.4)	1.1	(0.9, 1.4)
P-value for factor						0.072		0.14
Current measures								
Housing tenure-dependency								
'Independent'								
Owner-occupied	1.0						1.0	
Rented	1.7	(1.4, 2.0)					1.3	(1.1, 1.6)
'Dependent'								
Owner-occupied	1.1	(0.9, 1.5)+					1.1	(0.8, 1.4)+
Rented	1.8	(1.3, 2.4)					1.4	(1.0, 1.9)
Supported housing	1.7	(1.4, 2.1)					1.4	(1.2, 1.7)
Rented vs owned								
'Independents'	1.7	(1.4, 2.0)					1.3	(1.1, 1.6)
'Dependents'	1.6	(1.1, 2.3)					1.3	(0.9, 1.9)+
P-value for factor		<0.001						0.010

Table 8.2.1 continued

	Morale[1] (n=8262)							
	Model 1a Model 1b		Model 2		Model 3		Model 4	
Historic measures[2]								
Social class								
I/II	1.0		1.0		1.0		1.0	
IIINM	1.5	(1.2, 1.8)	1.4	(1.1, 1.7)	1.4	(1.1, 1.7)	1.4	(1.1, 1.7)
IIIM	1.7	(1.4, 2.0)	1.5	(1.2, 1.8)	1.5	(1.2, 1.8)	1.4	(1.2, 1.8)
IV/V	1.6	(1.4, 1.9)	1.4	(1.1, 1.6)	1.4	(1.1, 1.7)	1.3	(1.1, 1.6)
AF, UC, UN[3]	1.0	(0.8, 1.4)+	1.0	(0.7, 1.3)+	1.0	(0.7, 1.3)+	0.9	(0.7, 1.3)+
P-value for factor		<0.001		0.005		0.007		0.012
Housing tenure most of adult life								
Owner-occupied			1.0		1.0		1.0	
Local authority			1.5	(1.4, 1.7)	1.5	(1.3, 1.7)	1.3	(1.1, 1.5)
Other			1.2	(1.0, 1.4)+	1.2	(1.0, 1.4)+	1.0	(0.8, 1.3)+
P-value for factor				<0.001		<0.001		0.002
Car ownership								
Never vs Ever					1.0	(0.9, 1.2)+	1.0	(0.8, 1.1)
P-value for factor						0.93		0.46
Current measures								
Housing tenure-dependency								
'Independent'								
Owner-occupied	1.0						1.0	
Rented	1.6	(1.3, 1.9)					1.3	(1.0, 1.6)
'Dependent'								
Owner-occupied	0.8	(0.6, 1.0)+					0.8	(0.6, 1.0)
Rented	1.3	(1.0, 1.7)					1.1	(0.8, 1.4)+
Supported housing	1.6	(1.4, 1.9)					1.4	(1.2, 1.7)
Rented vs owned								
'Independents'	1.6	(1.3, 1.9)					1.3	(1.0, 1.6)
'Dependents'	1.6	(1.1, 2.3)					1.4	(1.0, 2.0)+
P-value for factor		<0.001						0.004

+ Wald p-value for category >0.05

1. All models adjusted for gender, age, marital status, tertiles of jarman and smr
2. Socioeconomic position in mid-life was asked retrospectively
3. Armed forces, no job, not classifiable. For women the predominant group was "no job", for men it was armed forces.

Table 8.3.1 Joint distribution of people by housing tenure most of adult life and current housing tenure-dependency.

Number (percent of total sample)

Housing tenure at time of quality of life interview	Housing tenure most of adult life		
	Owner-occupied	Local authority	Other
'Independent'			
Owner-occupied	3704 (43.4)	429 (5.0)	376 (4.4)
Social-sector[1]	134 (1.6)	938 (11.0)	182 (2.1)
Other [2]	115 (1.4)	57 (0.7)	350 (4.1)
'Dependent'	495 (5.8)	237 (2.8)	147 (1.7)
Supported housing	541 (6.3)	487 (5.7)	335 (3.9)
N[3]	4989 (58.5)	2147 (25.2)	1390 (16.3)

1. Local authority and housing association
2. Other = private renting, rent-free, family housing
3. Base = people with all the socioeconomic status classifications

Table 8.4.1 Odds ratios (95% confidence interval) for being in the worst quintile of quality of life score by combinations of housing tenure at two stages of life

Housing tenure in late life	Housing tenure for most of adult life[1,2]					
HM (n=8528)	**Owner-occupied**		**Local authority**		**Other**	
'Independent'						
Owner-occupied	**1.0**		1.5	(1.1, 2.1)	1.2	(0.9, 1.6)+
Social sector	1.5	(1.0, 2.4)+	**2.0**	(1.7, 2.5)	1.3	(0.8, 2.0)+
Other	1.6	(1.0, 2.6)+	2.0	(1.0, 4.0)+	**1.8**	(1.3, 2.3)
'Dependent'	3.9	(3.1, 4.9)	4.3	(3.1, 5.8)	5.2	(3.6, 7.5)
Supported housing	3.6	(2.9, 4.4)	4.1	(3.3, 5.2)	3.1	(2.4, 4.1)
MOB (n=8526)						
'Independent'						
Owner-occupied	**1.0**		1.9	(1.4, 2.5)	1.1	(0.8, 1.6)+
Social sector	1.3	(0.8, 2.1)+	**2.0**	(1.4, 3.0)	1.4	(0.9, 2.1)+
Other	1.4	(0.8, 2.3)+	1.2	(0.5, 2.9)+	**1.6**	(1.2, 2.1)
'Dependent'	2.2	(1.7, 2.8)	2.9	(2.1, 4.0)	3.2	(2.2, 4.7)
Supported housing	2.4	(1.9, 3.1)	3.4	(2.7, 4.3)	2.2	(1.7, 2.9)
BCM (n=8527)						
'Independent'						
Owner-occupied	**1.0**		2.2	(1.7, 2.9)	1.5	(1.1, 2.0)
Social sector	2.0	(1.3, 3.1)	**2.2**	(1.8, 2.7)	1.5	(1.0, 2.3)
Other	1.4	(0.9, 2.3)+	2.1	(1.1, 4.2)	**1.5**	(1.1, 2.0)
'Dependent'	2.6	(2.1, 3.3)	3.0	(2.2, 4.2)	2.3	(1.5, 3.4)
Supported housing	2.7	(2.2, 3.4)	3.4	(2.7, 4.3)	2.9	(2.3, 3.8)
SI (n=8524)						
'Independent'						
Owner-occupied	**1.0**		1.2	(0.9, 1.6)+	1.3	(1.0, 1.8)
Social sector	1.6	(1.1, 2.4)	**2.0**	(1.7, 2.4)	1.7	(1.2, 2.5)
Other	1.3	(0.8, 2.1)+	2.3	(1.3, 4.3)	**1.0**	(0.8, 1.4)+
'Dependent'	1.3	(1.0, 1.6)	1.6	(1.2, 2.2)	1.4	(0.9, 2.1)+
Supported housing	1.4	(1.1, 1.8)	2.2	(1.8, 2.8)	1.9	(1.5, 2.5)
Morale (n=8509)						
'Independent'						
Owner-occupied	**1.0**		1.5	(1.1, 1.9)	1.0	(0.7, 1.3)+
Social sector	1.5	(1.0, 2.3)	**1.8**	(1.5, 2.1)	1.7	(1.2, 2.4)
Other	1.4	(0.9, 2.2)+	1.9	(1.0, 3.4)	**1.2**	(0.9, 1.6)+
'Dependent'	0.9	(0.7, 1.1)+	1.3	(0.9, 1.8)+	0.9	(0.6, 1.4)+
Supported housing	1.3	(1.1, 1.6)	2.1	(1.7, 2.6)	1.6	(1.2, 2.1)

+ Wald p-value >0.05 for the category

1. Adjusted for gender, age, marital status, tertiles of Jarman score and tertiles of SMR
2. The reference group is people in owner-occupied accommodation for most of their adult life and, at the time of the quality of life interview, in owner-occupation and "independent".

Table 8.4.2. Odds ratios (95% confidence interval) for being in the worst quintile of quality of life score: comparing groups of 'Independents' who changed housing tenure with those who did not

Odds ratio[1,2] comparing 'Independents' for:	HM (n=8528)		MOB (n=8526)		BCM (n=8526)		SI (n=8524)		Morale (n=8509)	
Comparison with source tenure										
Move to social sector vs stay in owner-occupied[3]	1.5	(1.0, 2.4)+	1.3	(0.8, 2.1)+	2.0	(1.3, 3.1)	1.6	(1.1, 2.4)	1.5	(1.0, 2.3)
Move to 'other' tenure vs stay in owner-occupied[4]	1.6	(1.0, 2.6)+	1.4	(0.8, 2.3)+	1.4	(0.9, 2.3)+	1.3	(0.8, 2.1)+	1.4	(0.9, 2.2)+
Move to owner-occupied vs stay in social sector	0.8	(0.6, 1.0)	0.9	(0.6, 1.4)+	1.0	(0.8, 1.3)+	0.6	(0.4, 0.9)	0.8	(0.6, 1.2)+
Move to owner-occupied vs stay in 'other' tenure	0.7	(0.4, 1.1)+	0.7	(0.5, 1.0)+	1.0	(0.7, 1.5)+	1.3	(0.9, 1.9)+	0.8	(0.5, 1.3)+
Comparison with destination tenure										
Move to social sector from owner-occupied vs stay in social sector	0.6	(0.4, 0.9)	0.7	(0.5, 1.0)+	0.7	(0.5, 1.0)	0.9	(0.5, 1.4)+	1.0	(0.7, 1.4)+
Move to owner-occupied from social sector vs stay in owner-occupation	1.5	(1.1, 2.1)	1.9	(1.4, 2.5)	2.2	(1.8, 2.8)	1.2	(0.7, 1.4)+	1.5	(1.1, 2.0)

+ Wald p-value >0.05 for category

1. Adjusted for gender, age, marital status, tertiles of Jarman score and tertiles of SMR
2. All 15 tenure categories were in one model but odds ratios have been reworked to show variation within category of housing tenure for most of life
3. Move into either local authority or housing association housing
4. Move into privately rented housing or rent-free (including changes of ownership to ownership by relatives)

Table 8.4.3. Odds ratios (95% confidence interval) for being in the worst quintile of quality of life score: comparing groups who moved to dependency according to their source housing tenure

Odds ratio[1,2] comparing movers to status shown with those who stayed in source tenure and remained "non-dependent	HM		MOB		BCM		SI		Morale	
Movers to "dependent" status[3]										
From owner occupied for most of adult life	3.9	(3.1, 4.9)	2.2	(1.7, 2.8)	2.6	(2.1, 330)	1.3	(1.0, 1.6)	0.9	(0.7, 1.1)+
From local authority housing for most of adult life	2.1	(1.5, 2.9)	1.4	(1.0, 2.0)+	1.4	(1.1, 1.8)	0.8	(0.6, 1.1)+	0.7	(0.5, 1.0)+
Movers to supported housing[4]										
From owner occupied for most of adult life	3.6	(2.9, 4.4)	2.4	(1.9, 3.1)	2.7	(2.2, 3.4)	1.4	(1.1, 1.8)	1.3	(1.1, 1.6)
From local authority housing for most of adult life	2.0	(1.3, 3.1)	1.7	(1.3, 2.3)	1.5	(1.1, 2.1)	1.1	(0.8, 1.5)+	1.2	(0.9, 1.6)+

+ Wald p-value >0.05 for category

1. Adjusted for gender, age, marital status, tertiles of Jarman score and tertiles of SMR
2. All 15 tenure categories were in one model but odds ratios have been reworked to show variation within category of housing tenure for most of life
3. Living with someone other than spouse at the time of the quality of life interview but not in sheltered housing or a residential home
4. Living in sheltered housing (whether alone or with spouse or with others) or in a residential home

Table 8.4.4. Odds ratios (95% confidence interval) for being in the worst quintile of quality of life score by combinations of housing tenure at two stages of life, before and after adding in health variables

Housing tenure among 'Independents' at time of quality of life interview	Housing tenure for most of adult life											
	Owner-occupied[1,2]				Local authority[1,2]				Other[1,2]			
HM (n=5550)	Before adjustment		After adjustment[3]		Before adjustment		After adjustment[3]		Before adjustment		After adjustment[3]	
Owner-occupied	**1.0**		**1.0**		1.8	(1.2, 2.5)	1.3	(0.9, 2.0)+	1.1	(0.6, 1.8)+	1.1	(0.7, 1.8)+
Social sector	1.2	(0.6, 2.6)+	0.9	(0.4, 2.1)+	**1.8**	(1.3, 2.5)	**1.5**	(1.1, 2.1)	1.4	(0.8, 2.6)+	1.2	(0.6, 2.2)+
Other	2.0	(1.2, 3.5)	1.9	(1.1, 3.4)	1.6	(0.6, 4.0)+	1.4	(0.6, 3.3)+	**1.4**	(0.9, 2.4)+	**1.4**	(0.8, 2.5)+
MOB (n=5551)	Before adjustment		After adjustment		Before adjustment		After adjustment		Before adjustment		After adjustment	
Owner-occupied	**1.0**		**1.0**		2.0	(1.1, 3.6)	1.5	(0.8, 2.8)+	0.8	(0.5, 1.4)+	0.9	(0.6, 1.3)+
Social sector	1.1	(0.4, 3.0)+	0.8	(0.3, 2.6)+	**2.0**	(1.2, 3.3)	**1.6**	(1.0, 2.6)	1.2	(0.6, 2.2)+	1.0	(0.6, 1.7)+
Other	1.5	(0.9, 2.5)+	1.4	(0.8, 2.3)+	0.6	(0.1, 3.6)+	0.6	(0.1, 3.5)+	**1.6**	(1.1, 2.2)	**1.5**	(1.0, 2.1)
BCM (n=5548)	Before adjustment		After adjustment		Before adjustment		After adjustment		Before adjustment		After adjustment	
Owner-occupied	1.0		1.0		2.0	(1.5, 2.7)	1.5	(1.1, 2.1)	1.4	(0.8, 2.3)+	1.4	(0.9, 2.3)+
Social sector	2.1	(1.1, 4.0)	1.7	(0.9, 3.3)+	**2.4**	(1.7, 3.3)	2.0	(1.4, 2.9)	1.6	(1.0, 2.6)+	1.4	(0.8, 2.3)+
Other	1.2	(0.6, 2.4)+	1.0	(0.5, 2.0)+	1.5	(0.5, 4.3)+	1.2	(0.4, 3.9)+	**1.2**	(0.7, 2.0)+	1.1	(0.6, 1.9)+
SI (n=5548)	Before adjustment		After adjustment		Before adjustment		After adjustment		Before adjustment		After adjustment	
Owner-occupied	1.0		1.0		1.2	(0.8, 1.8)+	1.0	(0.7, 1.6)+	1.1	(0.8, 1.6)+	1.1	(0.8, 1.6)+
Social sector	1.5	(0.9, 2.6)+	1.3	(0.7, 2.3)+	**1.7**	(1.3, 2.2)	**1.5**	(1.1, 2.0)	1.8	(1.0, 3.2)+	1.5	(0.8, 2.1)+
Other	1.4	(0.8, 2.3)+	1.3	(0.8, 2.1)+	1.6	(0.6, 3.8)	1.4	(0.6, 3.7)+	**0.7**	(0.4, 1.3)+	**0.7**	(0.4, 1.2)+
Morale (n=5546)	Before adjustment		After adjustment		Before adjustment		After adjustment		Before adjustment		After adjustment	
Owner-occupied	1.0		1.0		1.5	(1.0, 2.3)	1.2	(0.8, 1.9)+	0.7	(0.5, 1.1)+	0.7	(0.5, 1.1)+
Social sector	1.5	(0.9, 2.6)+	1.3	(0.7, 2.1)+	**1.6**	(1.2, 2.0)	1.4	(1.1, 1.7)	1.4	(0.9, 2.0)+	1.2	(0.8, 1.8)+
Other	1.1	(0.6, 2.2)+	1.0	(0.5, 2.0)+	1.9	(1.0, 3.4)	1.7	(0.8, 3.3)+	1.0	(0.7, 1.5)+	0.9	(0.6, 1.5)+

1. Adjusted for gender, age, tertiles of Jarman score and tertiles of SMR
2. Base = those with brief questionnaire as well as quality of life information
3. Self-reported health problems as reported in Table 6.5.4

Table 8.5.1 Distribution of combined current housing tenure-dependency and social class.

Number (percent of total sample)

Housing tenure-dependency	Social class (for women = husband's class if ever married)[1] I/II	IIINM	IIIM	IV/V	AF, UC, UN
'Independent'					
Owner-occupied	1911 (22.4)	568 (6.7)	1311 (15.4)	446 (5.2)	
Social sector	97 (1.1)	109 (1.3)	595 (7.0)	395 (4.6)	
Other	145 (1.7)	54 (0.6)	183 (2.2)	112 (1.3)	
'Dependent'	236 (2.8)	72 (0.8)	315 (3.7)	188 (2.2)	
Supported housing	214 (2.5)	141 (1.6)	550 (6.5)	348 (4.1)	
N	2603 (30.5)	944 (11.1)	2954 (34.6)	1489 (17.5)	537 (6.3)

1. Base = those with housing tenure on both occasions, social class, car, marital status and eligible

Table 8.5.2 Odds ratios (95% confidence interval) for being in the worst quintile of quality of life score by combinations of social class and current housing tenure-dependency

[1,2]	Social class (for women = husband's class if ever married)									
HM (n=8577)	I/II		IIINM		IIIM		IV/V		Other (all)[3]	
'Independent'										
Owner-occupied	1.0		1.0	(0.7, 1.3)+	1.6	(1.2, 2.1)	1.9	(1.4, 2.7)	2.9	(2.1, 4.1)
Social sector	2.1	(1.2, 3.7)	1.5	(0.8, 2.8)+	2.8	(1.9, 4.0)	1.8	(1.3, 2.6)		
Other	1.7	(1.1, 2.8)	3.3	(1.5, 7.3)	2.3	(1.4, 3.7)	1.4	(0.7, 2.8)+		
'Dependent'	4.0	(3.0, 5.2)	3.9	(2.3, 6.6)	5.6	(3.9, 8.1)	5.3	(3.6, 8.0)		
Supported housing	4.2	(2.9, 6.1)	4.3	(2.6, 7.3)	3.7	(2.6, 5.1)	5.1	(3.6, 7.8)		
MOB (n=8575)	I/II		IIINM		IIIM		IV/V		Other (all)	
'Independent'										
Owner-occupied	1.0		0.9	(0.6, 1.4)+	1.7	(1.3, 2.3)	2.0	(1.4, 2.8)	2.7	(1.9, 3.7)
Social sector	2.0	(0.9, 4.1)+	1.7	(0.8, 3.4)+	2.3	(1.5, 3.6)	2.2	(1.4, 3.4)		
Other	1.7	(1.0, 2.9)	1.6	(0.7, 3.7)+	2.3	(1.6, 3.5)	1.5	(0.8, 2.8)+		
'Dependent'	2.7	(1.8, 4.1)	2.8	(1.6, 5.0)	2.6	(1.6, 4.4)	4.4	(2.7, 7.0)		
Supported housing	2.6	(1.7, 3.9)	3.9	(2.1, 7.0)	2.8	(2.0, 3.9)	4.0	(1.9, 3.7)		
BCM (n=8576)	I/II		IIINM		IIIM		IV/V		Other (all)	
'Independent'										
Owner-occupied	1.0		1.1	(0.8, 1.4)+	1.5	(1.2, 1.8)	1.9	(1.4, 2.6)	2.5	(1.8, 3.4)
Social sector	2.4	(1.6, 3.8)	2.1	(1.2, 3.7)	2.7	(2.0, 3.6)	1.8	(1.3, 2.6)		
Other	1.4	(0.8, 2.4)+	1.5	(0.9, 2.5)+	2.3	(1.4, 3.8)	1.3	(0.7, 2.5)+		
'Dependent'	2.3	(1.6, 3.3)	2.5	(1.4, 4.2)	2.8	(2.0, 3.8)	3.6	(2.4, 5.2)		
Supported housing	2.8	(1.9, 4.2)	3.5	(2.6, 4.8)	2.9	(2.1, 3.9)	3.6	(2.7, 5.0)		

Table 8.5.2 continued

SI (n=8573)	I/II		IIINM		IIIM		IV/V		Other (all)	
'Independent'										
Owner-occupied	1.0		1.2	(0.8, 1.7)+	1.6	(1.3, 2.1)	2.1	(1.6, 2.6)	2.1	(1.8, 4.0)
Social sector	2.5	(1.8, 3.4)	2.5	(1.5, 4.0)	2.7	(2.0, 3.7)	2.2	(1.6, 3.1)		
Other	0.8	(0.5, 1.4)+	1.4	(0.5, 4.4)+	2.0	(1.3, 3.0)	1.6	(0.9, 3.0)+		
'Dependent'	1.6	(1.1, 2.2)	1.2	(0.6, 2.4)+	1.4	(1.0, 2.2)+	2.7	(1.8, 4.0)		
Supported housing	1.7	(1.1, 2.6)	1.7	(1.1, 2.7)	2.3	(1.8, 3.0)	2.8	(1.8, 4.1)		

Morale (n=8556)	I/II		IIINM		IIIM		IV/V		Other (all)	
'Independent'										
Owner-occupied	1.0		1.4	(1.1, 1.8)	1.6	(1.2, 2.1)	1.8	(1.5, 2.2)	1.4	(1.2, 1.8)
Social sector	2.1	(1.3, 3.4)	2.6	(1.7, 3.9)	2.6	(2.1, 3.1)	1.8	(1.3, 2.5)		
Other	1.4	(0.9, 2.1)+	2.0	(0.8, 5.1)+	2.0	(1.3, 3.1)	1.5	(0.9, 2.3)+		
'Dependent'	1.1	(0.7, 1.5)+	1.2	(0.8, 1.8)+	1.3	(0.9, 1.8)+	1.7	(1.1, 2.5)		
Supported housing	1.8	(1.4, 2.3)	2.4	(1.5, 3.8)	2.5	(1.9, 3.2)	2.2	(1.6, 3.2)		

1. Adjusted for gender, age, marital status, tertiles of Jarman score and tertiles of SMR
2. The reference group is people in social class I/II who were in owner-occupied accommodation at the time of the quality of life interview and either living alone or with spouse
3. The odds ratio for other refers to all who had not been classified to a social class compared with those in social class I/II and in 'Independent' owner-occupation in old age

Table 8.6.1 Distribution of people by cumulative socioeconomic index.

People who were in owner-occupation or social housing in mid-life and late life and were assigned a social class

Index	Socioeconomic position (social class, mid-life tenure, late life tenure	Number (%) of those with score
0	Non-manual, owner-occupier, owner-occupier 'independent'	2209 (44.7)
0.5	Class IIIM, owner-occupier, owner-occupier 'independent'	1011 (20.5)
1	Class IV/V OR local authority OR social sector 'independent'	409 (8.3)
1.5	Class IIIM AND (local authority, OR social sector 'independent')	278 (5.6)
2	Two out of Class IV/V, local authority, social sector 'independent'	261 (5.3)
2.5	Class IIIM AND local authority AND social sector 'independent'	469 (9.5)
3	Class IV/V AND local authority AND social sector 'independent'	301 (6.1)
		4938

Table 8.6.2 Odds ratios (95% confidence intervals) in worst quintile of quality of life score by an index of socioeconomic position

Ses index [1]	HM[2] (n=4932)	MOB[2] (n=4931)	BCM[2] (n=4932)	SI[2] (n=4928)	Morale[2] (n=4927)
0 [3]	1.00	1.00	1.00	1.00	1.00
0.5[4]	1.58 (1.12, 2.23)	1.69 (1.23, 2.32)	1.31 (1.01, 1.69)	1.65 (1.32, 2.06)	1.49 (1.10, 2.01)
1.0	1.55 (1.10, 2.19)	1.61 (1.08, 2.39)	1.85 (1.47, 2.31)	1.74 (1.35, 2.24)	1.47 (1.11, 1.95)
1.5	1.99 (1.47, 2.68)	2.42 (1.51, 3.87)	2.89 (1.99, 4.19)	1.72 (1.14, 2.58)	1.89 (1.23, 2.89)
2.0	2.02 (1.29, 3.17)	2.25 (1.35, 3.76)	2.18 (1.31, 3.64)	2.35 (1.72, 3.21)	2.13 (1.57, 2.87)
2.5	2.99 (2.22, 4.01)	2.71 (1.74, 4,22)	2.85 (2.12, 3.84)	2.80 (2.02, 3.87)	2.42 (2.02, 2.91)
3.0	2.02 (1.44, 2.85)	2.46 (1.58, 3.82)	2.26 (1.61, 3.19)	2.55 (1.83, 3.56)	1.83 (1.31, 2.54)
Quadratic model					
Linear term	2.05 (1.48, 2.83)	2.17 (1.50, 3.14)	2.36 (1.69, 3.30)	1.96 (1.38, 2.79)	1.96 (1.44, 2.67)
Quadratic term	0.86 (0.77, 0.96)	0.85 (0.77, 0.94)	0.83 (0.74, 0.93)	0.88 (0.78, 1.00)	0.86 (1.04, 1.13)

1. Score one point for being in social class IV/V or in social housing in midlife or in social housing and 'Independent' in late life: excludes people in a "Dependent" or supported housing category and people who had been in 'other' rented accommodation in mid life or late life
2. Adjusted for age, gender, marital status, jarman score and smr
3. Those with score 0 were in a non-manual social class, in owner-occupation in mid life and in 'Independent' owner occupation in late life
4. Score 0.5 if in Social Class IIIM, 1 if in Social Class IV/V or in social housing

9 Discussion

This chapter first discusses methodological issues that could affect interpretation. It then draws out the insights from the three studies used for this thesis in the light of the literature on health inequalities cited in Chapter 2. Exact comparisons with other studies of quantitative estimates of effect are not possible because of differences in statistical techniques, the indicators of socioeconomic position, or the health outcome. However, at a broader level it is possible to draw some parallels with other research. Finally, recommendations are summarised.

9.1 *Methodological issues*

9.1.1 Longitudinal and cross-sectional design

The LS and Whitehall studies were longitudinal with long follow-up periods so that we can be confident that socioeconomic position preceded health outcome. As the MRC Study analyses use cross-sectional data with some retrospective data the interpretation has to be more cautious, given the possibility of negative health selection that can distort differentials.

The longitudinal studies are themselves limited because of long time lapses between measures. For the Longitudinal Study the date of death was known but not the specific trajectories of moving into an institution or of gaining a limiting long-term illness. Similarly, dates of onset of health problems were not known in the Whitehall Study. Analysing prevalence among survivors at one time point is not the same as analysing incidence over a certain period. For example, the average length of stay in a home is two to three years[244] so many more of the original 1971 cohort will have lived in an institution at some time before 1991 than lived in one at the end of that period. Moreover the socioeconomic differentials in incidence were probably greater than those measured for prevalence, assuming that the more disadvantaged socioeconomic groups were over-represented among the hidden group of those who entered institutions and died before 1991. Another disadvantage is that changes in explanatory variables over time were not measured and cumulative years of exposure

not known. Using a one-off measurement to adjust for confounders could leave residual confounding.[245]

9.1.2 Representativeness and implications for generalisability of the results

Most of the socioeconomic comparisons exclude people who were in long-term care at the time of exposure measurement. The Whitehall Study theoretically included people who were in institutions at the time of resurvey but in practice the very small percentage (around 1%) suggests that they were under-represented. It is likely that the socio-economic differences of people in the community are less than in the total population assuming that it is largely people with higher income or wealth who can stay at home to a more advanced stage of dependency.

The Whitehall study was further restricted to men in a specific form of employment. The respondents at resurvey had better self-perceived health than reported in other studies. The mean scores for the mental health and physical performance scales were 82.1% and 77.3% respectively, compared with 79.7% and 64.4% found in population studies in three local districts in Britain[246] and mean scores ranging from 68%-73% and 54%-72% in six localities in outer London.[247] While this limits the generalisability of the results, the presence of health inequalities in this group is important in highlighting that it is not just an issue for the people who are defined as socially excluded.

The MRC Study sample was not a random sample of the age group (general practices taking part had all volunteered firstly to belong to the General Practice Research Framework and then to take part in the study). There may be a resulting bias but the direction is not obvious. Practices with very large or very small numbers of patients aged 75 years and over were to be excluded by design. The selection from the pool of volunteer practices was partially controlled to include a mix of areas with high, medium, and low mortality rates and with high, medium and low Jarman scores.

Table 9.1.A. Comparison of demographic composition of respondents analysed for the thesis and other national data

	Census 1971 England and Wales Community sample		Longitudinal Study 1971. All including people in institutions	
	55-64 yrs	65-74 yrs	55-64 yrs	65-74 yrs
Married[1]				
Men	87	80	87	81
Women	71	47	70	48
	Census 1991/GHS 1998		Whitehall Study resurvey participants 1997/8	
Men				
Marital Status[2,3]				
Married	68		78	
Widowed	23		14	
Single	7		5	
Divorced/separated	2		2	
% Living alone				
Under 75 yrs	19		19	
75 yrs and over	29		33	
	Age 75 y and over. Census 1991/GHS 1998. Community		MRC Study quality of life participants, excluding in institutions	
	Men	Women	Men	Women
Age 85 years and over[4]	14	21	16	23
Marital Status[3]				
Married	65	28	67	27
Widowed	30	60	27	64
Other	5	12	6	10
% Living alone	29	59	28	61

1. Derived from Census 1971 Great Britain. Non-private households. Table 6 England and Wales. London. HMSO 1974[248]
2. Derived from 1991 Census Great Britain. Persons aged 60 and over. Table 1 Great Britain. London HMSO 1993.[15] Census figures use legal status, hence separated included with married. Figures refer to people aged 70 years and over as 95% of respondents to the Whitehall main questionnaire were in this age range
3. Office for National Statistics. 2000. Living in Britain: results from the General Household Survey 1998. London. The Stationery Office.[249] Table 5.2(b) for marital status. Table 3.14 for living alone. The GHS figure for under 75 years refers to the age range 65-74 years.
4. Derived from Census 1991. Great Britain. Persons aged 60 and over. Table 3 Great Britain. London HMSO 1993[15]

Table 9.1.B. Socioeconomic characteristics of respondents analysed for the thesis and other national data

	Census 1991 . Age 65 y and over [1]		Whitehall at resurvey	
Owner-occupier	64		94	
Local authority	29		3	
Other renting	7		2	
	Survey of English Housing 1999/2000		**MRC Study quality of life participants [3]**	
	Men	**Women**	**Men**	**Women**
Owner-occupier [2]	69	60	68	61
Local authority/housing association	26	34	22	27
Other rent	5	6	10	12

1. Derived from 1991 Census. Great Britain. Sex, age and marital status. Table 17 Great Britain.[15]
2. DETR. English Housing 1999/2000 Table A1.30.[250]
3. Excludes those in residential homes or nursing homes. Includes people in sheltered accommodation. The "other rent" may include some housing association for the MRC Study

Very little directly comparable information on sample composition could be found (Table 9.1.1 and 9.1.2). Not surprisingly the LS sample is very close to the national Census samples in percentages married and also in the ratio of numbers in the older and younger age groups (latter not shown). The percentage of those aged 75-84 who were alone in 1971 (23%) is close to that of the General Household Sample in 1973 (26%).[251] Percentages with limiting long-term illness also were within two percentage points of Census figures for the age groups (not shown).[21] The MRC Study is also similar to national samples in percentage aged 85 and over, distribution by marital status, and in percentages in owner-occupation and who live alone. The subdivision of renters into social housing and other differs but this may be because the 'other' category in the MRC Study classification in this table included some people in housing association property. The Whitehall cohort, however, was clearly different from the general population. Although the age ranges are not strictly comparable, it is still clear that the Whitehall men were more likely to be married and in owner occupation. Although the figures for living alone did not look much different this probably disguises a relatively high percentage living with spouse and low percentage living with someone other than spouse.

9.1.3 Response rates

The LS relies on the Census and routine information so that there are few drop-outs as noted in Chapter 3.1. In the Whitehall Study the differential response by employment grade at baseline and at follow-up was discussed in Chapter 5 where it was concluded that non-response bias could be leading to an under-estimation of health inequalities. In the MRC Study the response rate to the quality of life component was over 90% but there was only information from the brief assessment for 70% of these. Although people with a brief assessment were less likely to have poor quality of life than the total sample, a comparison of odds ratios comparing renters with non-renters suggested that this was not substantially distorting health inequalities. Also, the median and interquartile ranges of Carstairs score and population density were very similar for quality of life participants with and without a brief assessment. Only 3% of those with quality of life information lacked Carstairs and population density information so within this quality of life group substantive bias in the area results was unlikely. By design there were detailed assessments in only 12 of the 23 practices plus there were drop-outs between the brief and detailed assessments. The difference between non-dependent owners and renters in percentage with a detailed assessment was small (48% and 52%) and this subsample appears to be similar to the full sample in socioeconomic differentials. The main limitation in using the data from the detailed assessment was considerably reduced power to study differentials.

9.1.4 Recall and observer bias

Observer bias was unlikely since the collection of data was done in ignorance of the analyses performed. Items requiring recall (housing tenure in midlife for Whitehall housing tenure and social class in mid-life in the MRC Study, cardiovascular events in Whitehall, smoking history in the MRC Study) either played a minor part in analysis or – as in tenure- were unlikely to change often, making recollection easier. However, in the MRC Study social class for widowed women who had to remember their late husband's jobs could be in error but should be correct at the broad level of manual and non-manual where most of the distinctions are found in this analysis. Also where a proxy interview was given social class would tend to be omitted.

9.1.5 Misclassification of outcome or exposure and missing values

Social class may be misclassified in the LS because it was retrospective information that could be provided by someone other than the subject or the subject's husband. Also, if widowed or single women had not been employed they were put into an unclassified category that was probably heterogeneous (nearly half of older women were in this category). This could be one reason for the weak associations found between social class and the LS outcomes.

Dependence may be misclassified in the MRC Study. For example, those who were living with friends or siblings rather than sons or daughters may have been independent – they accounted for 36% of 'Dependent' owners compared with 28% of 'Dependent' renters. On the assumption that the genuinely dependent people tended to have worse quality of life on the SIP dimensions, this would exaggerate quality of life differentials by tenure among dependent people. Conversely those living with spouse may also have lived with others in a dependent situation. As a higher proportion of the owner group were married, this would underestimate differentials by tenure in the non-dependent group. The situation is more complex for Morale where the 'Dependent' group in owner-occupation had lower chances of poor Morale than 'Independent' ones – this itself may be partly the result of misclassification.

Employment grade on the Whitehall study should be accurate as the fieldworkers had access to the employer records. There is no reason to think that misclassification of income was either major or differential between employment grades, despite sensitivity of the subject. The lowest category was purposively set very low at less than £100 a week so avoidance of this category still enabled designation of a low income group. Incomes at the higher end of the scale were not finely classified and so may have avoided sensitivities about very high incomes. Only 4% of those who answered the full questionnaire did not answer the income question (6% of clerical and manual staff or of those with poor performance score).

Misclassification of outcome could arise from the treatment of missing values for component items of the instruments used on the Whitehall and MRC Studies. In the Whitehall study it was assumed that the answers given for the physical performance and mental health scores reflected the overall scale (provided fewer than half were missing) whereas for the disability item and all the MRC Study quality of life scores it was assumed that a missing answer denoted lack of a problem. As scores had to be adjusted for a higher percentage of the lower grades than higher ones in the Whitehall study (for example, 10% of lower grades compared to 3-4% of other grades for physical performance) there may be under-estimation for disability, a small exaggeration of socioeconomic differentials for poor physical performance (but this would still be substantial) and for poor mental health. In the MRC Study the percentages of missing items were small. For example, missing values led to imputations being made for 3% of those who had tenure information with respect to MOB and 5% with respect to Morale. The differences in percentages with imputed values between owners and renters within either the 'Dependent' or 'Independent' group were very small.

Proxies were allowed on the quality of life interviews and could affect the PGMS (Morale) scoring in particular. About 4% of those with Morale scores and in the owner-occupier or rented groups were proxy interviews. Not surprisingly, their exclusion would affect the results for the 'Dependents' more than the 'Independents'; exclusion reduced the tenure odds ratio among 'Dependents' for poor Morale from 2.00 to 1.95 so did not have a substantial effect.

9.1.6 Criticisms of the selected outcomes

9.1.6.1 Moving into an institution

The provision of supported care is changing continually with shifts to more privately-run organisations and continuing attempts to keep people in the community. The Longitudinal Study results may in some senses be out-of-date, therefore. However, institutional care will always be appropriate for some people and, as it an expensive form of service to provide,[252] it is vulnerable to discrimination on the basis of ability to pay. The Sutherland Commission's report was based on the premise that any state support at home or in institutions should be

fair and equitable and that the cost be shared between state and individual such that it is affordable to both;[4] a corollary of this is to monitor socioeconomic variations in the forms of care people receive and the affordability of services. At the very least, the LS findings remind us that policies concerning long-term care should be taking into account socioeconomic factors.

9.1.6.2 Self-reported general health

Although self-rated health correlates with number of illnesses, disabilities, use of medicines,[253] and use of health,[254] it should also be seen as a valuable outcome in its own right because it focuses on the person's own perceptions. It captures a health dimension otherwise hidden from clinical assessment; this is clear from mortality studies in which self-rated health continues to predict mortality after adjustment for objective clinical indicators[255] and people who appeared illness-free but 'under-estimated' their health had higher mortality rates than those who did not, while people who 'over-estimated' their health had lower rates.[256]

9.1.6.3 Limiting long-standing illness

The question on limiting long-standing illness used in the analyses of the Longitudinal Study has been criticised as not predicting health service use as well as other measures[257] and also of under-estimating health problems.[258] It is the only morbidity indicator available for people aged 75 years and over in a national longitudinal framework and can therefore give the first indications of the persistence of socioeconomic influence on morbidity from middle age to old age and of the subsequent health of people who have changed socioeconomic status.

9.1.6.4 Functional disability

Both here and elsewhere measures of functioning are considered to be reflecting important aspects of quality of life. Functional disability predicts health, mortality, [259] or institutionalisation[113] and underpins independent living[27] and participation in family and community living.[260] Berkman and Gurland[136] linked it to a wide range of aspects of people's lives: depression, self-rated health, life satisfaction, service use, locus of control, and social activity. Functioning is distinct from self-rated health – particularly at older ages when health appraisal seems to depend on psychological outlook.[261]

Experience in the Whitehall Study did not bear out concerns that people aged 75 years and over would find the SF36 too difficult to complete. Hayes et al [262] had already found that older people felt that the questions were relevant to them except questions on work or other regular activities (not used in the Whitehall study) and on vigorous activity. Out of those who filled in the full questionnaire on the Whitehall resurvey 3% could not be coded on the mental health scale and physical performance scale. Some implausible combinations of answers ruled out a further 1% for the physical performance scale. In the Whitehall study there was a particularly high association between answers to the physical performance questions given at 20 month intervals; the general health and mental health questions were more divergent between time period but the time lapse was long enough for genuine change to have occurred. Other studies have concluded that it can be used by older people.[263;264]

The idea of the "impact" in the Sickness Impact Profile is that self-perceived signs and symptoms, perhaps modified by professional definition of disease, can result in dysfunction in the sense of impaired or ineffective role performance and deviations from previous behaviour.[265] This is entirely appropriate in concept for the age group covered by the MRC Study since, even though many remain functioning well, changes of some degree are common. The instrument has been criticised for its ceiling effect[266] and it is noted in Chapter 6 that substantial minorities had the best score (in this analysis coded as zero). However, for the purposes of identifying a group with worse health-related quality of life than most, the ceiling effect is not a problem.

The SIP scoring system has been criticised for insufficiently reflecting severity of dysfunction.[267] A respondent with a severe condition can score as being less limited than a respondent with a mild condition. People are only assigned a score for items marked "yes" but, for example, five of the 23 items on the BCM scales would not apply to someone who cannot stand so would not be answered "yes". An alternative scoring was suggested that relies on the item checked with the maximum weight. The score would be 100 x (maximum weight for items checked ÷ max weight for any item in scale). This was considered for the current thesis but rejected because people clustered into a relatively small number of discrete scores and it was less

successful at identifying a quintile whose quality of life was so clearly worse than the remainder. In this sample, the particular problem cited by the critics was uncommon. The exact number of people whose standard score would underestimate their severity relative to others has not been estimated but they are likely to be people who stay in one room (1.2%), stay in bed most of the time (0.7 %), stay lying down most of the time (0.6 %), or only stand with someone's help (2.7%), and these people were all rated as having poor outcomes by the system adopted.

9.1.6.5 Morale

The Philadelphia Geriatric Morale Scale[218] was designed specifically for older people, and its score correlates well with other measures of satisfaction and morale.[268] Although three sub-factors can be identified in the scale (agitation, dissatisfaction and attitudes towards own aging), there is a higher order factor of global satisfaction which accounts for most of the variation in the first-order factors[269] hence it was considered appropriate to consider the total score as one measure. Morale is subjective and the perception of an outsider may differ from that of the subject. An advantage of the PGMS is that it was designed for people in care and to prevent respondent confusion or fatigue.[270]

9.1.7 Health selection

The health selection issue of most concern in old age is the possibility that ill health may lead to change in socioeconomic position thereby giving a misleading picture of socioeconomic effects. In Section 4.2 three forms of selection were identified: positive, negative, and survival. Selection occurring at later ages differs from that at younger ages in that ill health can select people into superficially 'better' socioeconomic position.

In the Longitudinal Study there was no information about health in 1971, but it is unlikely that negative health selection into rented homes or being without a car would account for 21-year mortality differentials or differences in chances of being in an institution or having a limiting long-term illness 20 years later. On the assumption that risk ratios would change over time where health selection was involved, the mortality risks were modelled for the first 4.5 years and the remaining

years. Examples of all three kinds of health selection were found. However, importantly, the differentials by housing tenure and car availability mostly persisted through both periods, weakening the possibility that health selection accounted for the 20-year mortality differences. For negative health selection to apply to the other two outcomes, the diseases causing the socioeconomic change would have to be long-term chronic and non-fatal ones. It would be surprising for debilitating conditions to be sufficiently common in late middle age as to account for the differentials in old age.

The socioeconomic changes during the ten-year period 1971-1981 were more likely to be health related. Mortality risks were analysed separately for the early (three) years and later ones. Higher odds ratios applied in the earlier years than later years in four situations that could result from ill-health causing a change in socioeconomic position, as described in Chapter 4. In two of these the distortion would increase the observed socioeconomic differential and in two of them decrease it. It was anticipated that change of address might be an indicator of negative health selection but it was unrelated to mortality (it was not included for other outcomes). On reflection, this result was not so surprising as during the 10 year period over a third of all the subjects had moved (in each of the four gender-age groups) so 'normal' moves could have swamped the ones arising from health selection.

Adjusting the socioeconomic measures for marital status and whether lived alone should also have controlled for negative health selection into a supposedly favourable socioeconomic position by accounting for non-married people living with carers. The models of changes between 1971 and 1981 also took into account changes in living status that might have been health-related. Indeed, for people who moved into owner-occupation or gained availability of a car, the risk ratios for being in an institution were much lower after adjusting for the socio-demographic factors than before (except for the small group of older men moving into owner-occupation). On the other hand the odds ratios for LLTI were barely changed by adjustments but LLTI was so common that in most cases its severity was probably insufficient to lead to a change in living arrangements.

Most socioeconomic factors in the Whitehall analyses were measured at baseline. Even if there had been some health selection into lower grades before the first screening, the baseline health indicators did not explain later differentials. Low income at the time of the resurvey was associated with poorer functioning, especially for the professional and executive grades. Staff in middle grades in mid-life then on low income in retirement were slightly more likely to have left the civil service for medical reasons (7% versus 4%) or for redundancy (17% versus 15%), but these differences are not sufficient to account for a twofold increase in risk. Rising a grade category appeared to ameliorate the risk of poor mental health. While being mentally fit might have increased the chances of rising a grade, it is also plausible that the greater job control in a higher grade might also have improved mental health.

In the MRC Study it is unlikely that restricted mobility or self care was sufficiently common at an early age for negative health selection to be a major factor in the differentials with respect to socioeconomic position in mid-life. The main analyses referred to associations between concurrent measures of housing tenure in old age and quality of life. Although the sequence of events is unknown, the so-called 'Independent' groups were separated out to try and identify a group who were unlikely to have changed tenure because of their health. Previous studies have shown that deteriorating health may prompt moves in with relatives to look after the older person and generational differences mean that the relatives are more likely to be in owner-occupation.[230] In this thesis those labelled 'Dependent' were indeed more likely to have poor physical functioning than those labelled 'Independent'. Tenure differentials on the three physical SIP measures were not statistically significant among the dependent group – perhaps partly because some of the 'dependents' in owner-occupied homes had acquired their dependency when previously in rented homes. In the MRC Study, 30% of older people living in owner-occupied homes with sons or daughters had previously been in rented homes compared with 18% of the 'Independents' in owner-occupation. Differences between 'Dependent' groups might also be small because more of those in rented accommodation had taken a further step to dependency and were living in sheltered houses or residential homes. It is therefore all the more surprising that differentials for SI and Morale were substantial (chances of poor Morale being particularly low among 'Dependent' people in owner-occupied homes).

As reported in the Literature Review, Chapter 2, health selection is an issue of which researchers are aware but few specifically evaluate. The choice of education as the measure of socioeconomic position is often justified on the grounds of being established prior to the development of health problems.

In conclusion, there is some evidence of both negative and positive health selection in the LS but not so clearly in the Whitehall Study. In the MRC Study I tried to identify a group who were least likely to be in their socioeconomic position for health reasons. Having taken steps to account for it where possible, there remain clear socioeconomic differentials in both the longitudinal and cross-sectional studies of long-term impact and contemporary socioeconomic disadvantage. The study of effects of transitions in socioeconomic position is particularly difficult in the presence of health selection and ideally the reasons for those transitions would be documented in future studies. As several of the examples of negative health selection involved supposed 'gains' in socioeconomic position, this warns us that the pure effect of socioeconomic position may be greater than observed. In the meanwhile, the three studies were able to provide some evidence, particularly of downward transitions adversely affecting health, that do not appear to be the consequence of negative health selection.

9.2 *Findings: does socioeconomic position in middle age affect people's health status in old age*

Both the Longitudinal Study and the Whitehall Study demonstrate long-lasting effects of socioeconomic position in mid-life on a variety of health outcomes in old age. This applied to mortality and being in an institution as well as to quality of life measures such as self-rated health and daily functioning. In each case, the chances of poor outcomes were worse if a person had two or more disadvantages rather than one (lack of car and being in a rented home or lower employment grade and being in a rented home). This is of particular concern because the poor health outcomes in the Whitehall Study identified minority groups (roughly 10% of the sample) who performed considerably worse on the indicators than the rest of the cohort. Using a

cumulative socioeconomic index on the Whitehall Study (see Section 5.5) it was clear that prevalences of poor outcomes varying widely. For example, for physical performance, the predicted prevalence ranges from 9% with no socioeconomic disadvantage to 35% with two disadvantages for the oldest age group (age 80 years or over at resurvey). The Whitehall data cover a restricted population of males in secure employment with a good pension scheme and yet they too demonstrate substantial variability in health status in old age according to socioeconomic status. The LS population was larger, more heterogeneous and representative – fairly crude socioeconomic classifications were used and more refined measures may have revealed a greater degree of inequality. The strength of the findings is surprising in the context of selective survival. In the LS only one third of the younger cohort of men and half of younger women (aged 55-64 years at baseline) had survived 20 years in the community by which time limiting long-standing illness was common yet differentials were pronounced. The selectiveness is illustrated by the Whitehall study. Not only was survival generally worse in lower grades (18% of the original cohort participating in the resurvey compared with over 40% of others) but within the grades it was the healthier who survived (for example, 26% of the full cohort of clerical and manual staff had evidence of heart disease at baseline but only 14% of survivors).

This evidence of the continued influence on morbidity of socioeconomic position from mid-life into old age in Britain is new and suggests that action to counter socioeconomic disadvantage in middle age might continue to show benefits well into old age. Hitherto there had only been one analysis looked at health differentials persisting 20 or more years – that of mortality of the Whitehall cohort.[178] LS analyses of mortality by age at death over shorter follow-up periods had led to the conclusion that household socioeconomic measures were stronger discriminators than individual ones (own social class) and this was clear also in our long-term results, although social class may have been poorly classified, as discussed in Section 9.1.5. In study of American men, the longest-held occupation influenced mortality over a follow-up period stretching up to 17 years or so after the subjects reached the age of 55 years.[106] Olausson[114] in Sweden did not find a clear-cut trend in mortality by social class in middle age but exclusion of the unemployed probably reduced the differentials.

Evidence of long-term effects on functioning comes from the USA and Sweden. High income people in the Alameda cohort were more likely to be in the top quintile of functioning at age 65-89 years,[183] while at the top end of this age range the less educated people had lower functioning.[160] People with high occupations had greater chances of remaining healthy and unimpaired over a 25 year period in Honolulu.[168] Keil et al[182] found that education was still predicting disability after 25 years only for white women not white men with no obvious reason for this gender difference. Ten-year follow-ups from late middle age also showed that people with lower education and/or income were more likely to acquire problems in activities of daily living or mobility,[104;105] although not always as strong in both genders.[134] In Sweden, the less educated were more likely, and white collar workers less likely, to have ADL and mobility limitations 20 years after baseline[117;121;164] although there was not a difference by occupational class for self-rated health and results were weaker for women. While these results from other countries reinforce the general message about persistence of effects from socioeconomic position in middle age, their choice of different exposure measures also raises the question of what aspects of socioeconomic position matter most – studies have not yet systematically compared the more material influences of income, housing tenure with the prestige of social class (also income) or coping resources that could arise from education.

Contrary to findings on the LS, socioeconomic factors were not predictors of moving into an institution in the US in a 20-year follow-up[109] or a shorter follow-up[111] and income only associated with longer term stays in a 10-year follow-up.[110] However, family factors such as marital status or living alone were strong, as they were in the LS study. The three US studies may yield contrasting results to the LS because of the way the Medicaid system works to pay for non-institutional care, or because the results only looked at people who had died (so under-representing those who were of higher socioeconomic position and not in institutions). One study adjusted for willingness to enter the institution that might in turn have been influenced by education.

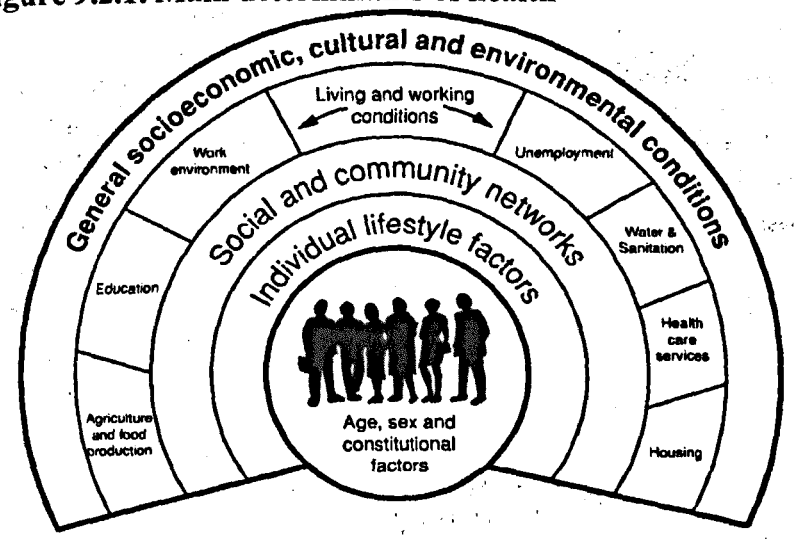
As well as longitudinal studies, cross-sectional studies can give some backing to continuing relevance of socioeconomic position in middle age for health status in old

age, if they use socioeconomic measures that were determined by middle age. In the MRC Study it was clear that those who had been in local authority accommodation most of their adult lives or in the manual occupational classes were at greater risk of poor quality of life. Other cross-sectional studies in Britain found associations between social class and limiting long-term illness, self-rated health, psychosocial wellbeing, and disability.[43;98;171;172;174] Serious illness or poor self-rated health or disability was also more common among manual workers in other European countries.[74;113;118] In contrast, in the Health and Lifestyle study differences in functioning by social class were small among people aged 70 years and over.[43] Several North American and European studies found that less educated people had greater prevalence of disability in old age[28;101;104;136] or of poor mobility[127] or poor self-rated health,[101;102;137;185] for some SF quality of life dimensions,[120] greater chance of unhappiness,[123] and lower prevalence of good self-rated health.[100] One Dutch study only found weak influence of education on quality of life,[124] while two studies found that education was associated with function or quality of life only among women. [123;125] The balance of evidence is in favour of continued adverse influence of socioeconomic disadvantage in middle age on mortality and day-to-day functioning and perceived health in old age.

9.2.1 Explanatory factors for influence of socioeconomic position in middle age on health status in old age

There are various levels of possible intermediate factors ranging from those that act at a personal level such as behaviour to the macro-level factors such as the general economic situation, and government policies on housing, education, health services etc. The framework put forward by Dahlgren and Whitehead some years ago provides a neat illustration of these layers (Figure 9.2.1).[271] Most of the data available in the studies used in this thesis concern proximate individual factors such as smoking and co-morbidity, although in the MRC Study I was also able to look at some characteristics of the area in which people live. For the Whitehall analyses I concentrated on circumstances at baseline.

Figure 9.2.1. Main determinants of health



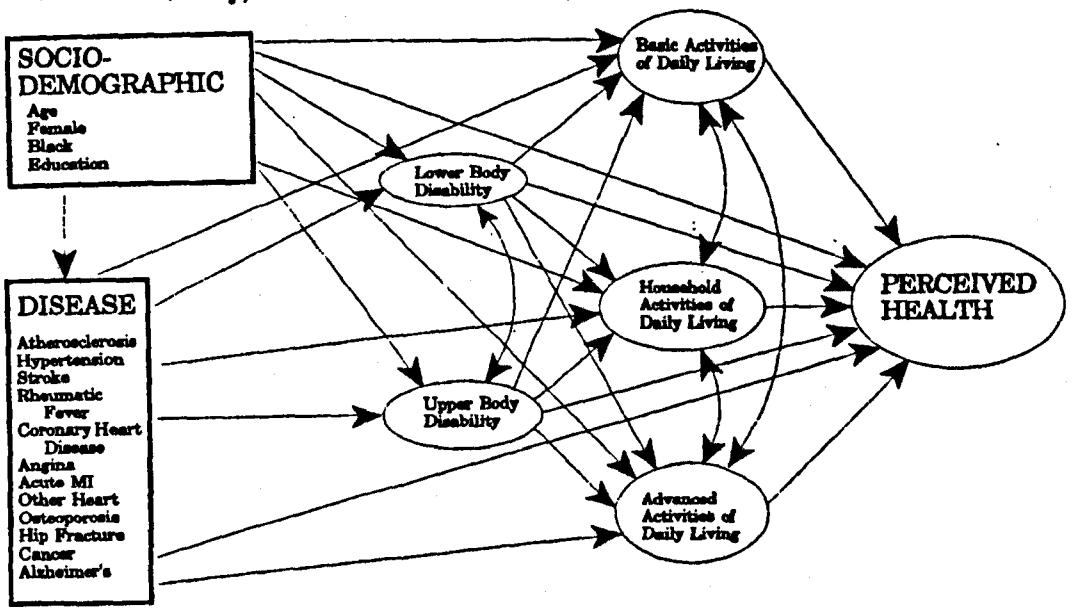
Source: Dahlgren and Whitehead – reproduced in Goldblatt and Whitehead 2000[271]

In the 1960s when the Whitehall cohort was first screened, smoking was common among men but clerical and manual grades were more likely to smoke than higher grades (46% and 32% of survivors respectively), and their smokers averaged a higher consumption level. Although these percentages had diminished dramatically by the resurvey, taking into account the earlier smoking experience reduced the odds ratios for lower grades compared to higher ones from 4.1 to 3.7 for physical performance (14% of the excess) and from 2.8 to 2.5 for poor health (20% of the excess), after taking account of health factors in mid-life. It also reduced the smaller excess differentials for poor mental health and disability by about 15%. Impact of past physical activity as measured by Whitehall was not important in explaining grade differentials in self-reported morbidity but there were weaknesses in the data (see Section 5.3.3).

Poor self-rated health or functional limitations can be the end product of a long chain that includes various illnesses and diseases(Figure 9.2.2)[272] - thus I took into account some biological risk factors for cardiovascular disease, some information on diagnosed illnesses and some symptoms. In the Whitehall Study only three of the eight baseline indicators examined (high systolic blood pressure, high total cholesterol, and obesity) were more prevalent among the clerical/manual grades than among other grades. These differences accounted for a about 12% of the grade differentials for poor general health and a very minor part of the differential for poor

physical performance. Limited evidence also suggested that experience of heart attack, angina, or stroke did not account for increased prevalences of poor health and functioning in old age for clerical and manual grades.

Figure 9.2.2. Conceptual model for composite scales and latent variables of disease, disability, functional limitation, and perceived health.



Source: Johnson and Wolinsky 1993[272]

Other studies have also found persistent socioeconomic effects net of health behaviour and chronic disease. In the Charleston Study the significance of education for women's disability 25 years later remained after adjustment for cardiovascular risk factors and smoking.[182] In the Alameda study, persistent chronic conditions did not reduce the strength of association between education and functional status.[160] In Sweden, the less educated had double the risk of three poor outcomes even after taking into account smoking, prior mobility and circulation problems. In contrast in Honolulu education no longer predicted healthy ageing when occupation, biological risk factors and smoking were taken into account[168] (it is not shown which of these was responsible for attenuation of the education parameter). However, excluding those with illness at baseline probably made the group more socioeconomically homogeneous and the common bond of being Japanese migrants might have offset some of the usual socioeconomic influences.

In the cross-sectional studies in the literature, the time sequence of events is lacking and in most cases the strength of association between social class or education and outcome are not compared with and without adjustment for health behaviour. However, the pathway is unlikely to be simply through smoking or chronic diseases or other ill health if significant associations are still apparent after adjusting for such factors, as reported for self-rated health,[100;118] mobility,[127] disability[119] or quality of life,[124] even if only for women only.[125]

Although the picture varies to some extent across the literature, the balance of evidence suggests that health behaviour and health at earlier stages in the life-cycle are contributors to health inequalities later in life and hence that improvements earlier in the life course would also have benefits for health inequalities in old age. Health factors in mid-life may have contributed only a small amount to socioeconomic differentials among survivors to old age but probably because they had taken their toll through mortality.

9.3 *Findings: Socioeconomic position in old age- does it still have an influence?*

There are three ways of assessing this. First, use longitudinal studies of *change* in outcome during old age relative to socioeconomic position held at the beginning of the period. Second, it is sometimes possible to surmise a causal sequence from cross-sectional studies describing how health status varies with current socioeconomic position. Third, and most powerfully, the health impact of changes in socioeconomic position later in life can be studied.

9.3.1 Longitudinal studies within old age

The older cohort of the Longitudinal Study was aged 65-74 years in 1971 and the fact that mortality over the following 20 years was higher for people in rented accommodation and without a car, shows that selective survival had not yet removed all socioeconomic differences for those who had attained this age. This cohort was aged 86-94 in 1991 and still demonstrated socioeconomic health inequalities in institutional residence. Limiting long-term illness did not vary so much by

socioeconomic position for the very old cohort although there was a small excess risk for women in rented housing without a car.

Other analyses of the Longitudinal Study reinforced our findings that owner-occupiers and/or people with a car had a lower rate of transition to institutions [175] and of mortality [38;131;179;180] even after age 65. In particular, Goldblatt noted that the household measures performed better than social class as predictors of mortality; these could also be seen as measures of current material circumstances. In addition, two of the studies analysed mortality occurring after a time lag during which effects of health selection should have worn off. Salas,[132] on the other hand, judged that socioeconomic position appeared to worsen general health but not to the extent of increasing mortality over a four year period after adjusting for several intermediate variables and baseline health.

Several longitudinal studies following up people within old age, have results consistent with various measures of socioeconomic position having some impact on mortality within old age.[107;115;116;184 119;122;128;140;141;187;188]In some of these cases multiple measures contributed independently[107;140;188] whereas in others they did not.[141] Additional evidence that the impact happened *after* baseline came from The Longitudinal Study of Aging in which there was little change in the odds ratios for disability by education or poverty after adjusting for whether disabled at baseline .[28]

Education was less consistently associated with mortality across subgroups in a Spanish study[186] but socioeconomic factors only lacked predictive value for mortality during follow-up within old age in two studies. In the first, the only model presented is already adjusted for several factors that might be on the pathway (e.g. physical activity, health status)[148] but there was no explanation for the Australian result.[147]

There is evidence that people with lower socioeconomic position in old age have worse prospects for subsequent self-rated health, mobility or disability. This applies to self-rated health in Britain,[96;132] retention of physical ability or successful ageing in the USA,[163;165] decline in mobility or functioning in the USA[27;28;104;134;167] and Spain.[126] The analysis of people from NHANES and NHEFS in the USA, like the

one in this thesis of the LS, could not take into account baseline functioning, but lower socioeconomic people had worse disability ten years after first studied.[105] The evidence for health inequalities was not universal, however. The null result among Melton Mowbray residents for effects of social class both for a four-category classification of health state and for mortality [97;169] was to be expected given the population's homogeneity. Socioeconomic position was not related to successful ageing in a Canadian study (no obvious explanation),[108] nor to decline in ADL functioning[103] nor to onset of self-care problems.[27] Two of these studies had fairly small sample size – for example in one the point estimate of effect was nearly 2 but not statistically significant.

9.3.2 Cross-sectional studies of socioeconomic position and health status

This section focuses on studies that use socioeconomic measures indicative of current material position. The MRC Study has shown that people in rented accommodation had 60-70% increased odds of poor physical functioning (three dimensions from the Sickness Impact Profile) compared to owner-occupiers if they were 'Independent'. Renters were markedly worse off than owner-occupiers with respect to poor SI and poor Morale for both 'Independent' and 'Dependent' groups. In the Whitehall Study, men on low incomes had greater chances of poor outcomes than others in the same grade (except for poor general health) and those with additional income boosting their pensions by more than 20% had lower chances of poor outcomes (except for poor mental health). Moreover in both these studies these current circumstances were associated with the outcomes in addition to measures based on past circumstances such as occupation. Both these studies add to the evidence for the existence of differences. In particular no other study in Britain has used comprehensive health-related quality of life instruments on those aged 75 years and over in a population where there is sufficient socioeconomic heterogeneity to look closely at health inequalities.

Arber and Ginn[98] showed that renting a home and lacking a car accompanied greater chances of less than good self-rated health; tenure was also associated with disability for women and car availability for men (echoing the LS findings in Chapter 4 where

car availability or loss thereof was more consistently a factor and sometimes stronger for men than for women). This gender differential for car availability may diminish with successive generations, as women become car users as much as men. Even when a detailed questionnaire about functioning was used to define disability, owner-occupiers came out with the least risk.[170] Material measures (income for men and car availability for women) rather than education remained statistically significant in a detailed model of self-rated health adjusted for other measures of socioeconomic position and baseline health.[132]

In the USA, income was stronger than education in its association with life satisfaction[139] and less income meant greater functional limitation even when education was taken into account.[136] In Canada income has been a strong factor for mobility impairment (with housing tenure not as consistently associated)[133] and for self rated health (with education)[100;102;137]. Robert and House[89] compared a combination of education and income with a combination of liquid assets and housing tenure and found that liquid assets and housing tenure were better predictors of functional health in the age range 65-84 years (older than that the numbers were small and differentials not found) while it was income that had a strong link with self-rated health. Smith and Kington [135] hypothesised that good health not only results from the income to purchase relevant goods and services but that good health facilitates earning and deteriorating health may trigger resort to government benefits. Their cross-sectional data is consistent with this but cannot prove it. However, even if income affects health and this in turn affects income the idea of intervention on income to reduce inequalities is still valid.

In other countries income was used less often but also appears as a strong factor for serious illness, poor mental health[74] and the only one of three socioeconomic measures to be associated with both self-rated health and functional status in Japan.[122] ADL difficulties were also more common among those with perceived poor financial situation.[125] Against this and suggesting dominance of pre-determined position rather than current material circumstances, education rather than income remained significant for mobility in Finland[127] and for a multinomial outcome ranging from death to full independence in Spain.[126]

At present much information on affects of socioeconomic position within old age still has to be gleaned from studies that do not specifically set out to answer this question. However, there is a substantial body of evidence accumulating over high-income countries that is consistent with a continuing impact. As yet there is little direct information from Britain and the MRC Study has added greatly to this. There is now a need to test it more formally with longitudinal studies

9.3.3 Transitions in socioeconomic status in late middle age or early old age and subsequent mortality and quality of life

If a change in socioeconomic position is followed by a change in quality of life and functioning, this is one of the clearest indications that the influence of socioeconomic factors continues to accumulate into old age. Changes in socioeconomic position were not common in the general population. Over a ten year period about 1 in 9 people changed housing tenure (other than going to an institution) in the Longitudinal Study, more becoming part of an owner-occupier household than ceasing to be one. It was more common for car availability to change, with over 10% ceasing to have access in this period (16% of women aged 55-64 years at the start of the period), and five or six per cent gaining household access to a car. The resurvey of Civil Servants took place 29 years after screening; between the first screening and leaving the Civil Service, two-fifths of the professional/executive staff and over half the clerical/manual staff had risen a category (for some this would have involved more than one promotion). In the MRC Study the transitions analysed were changes from being in local authority accommodation during "most of my adult life" to being in owner-occupation and 'Independent' in old age and vice versa. These transitions excluded people who moved to sheltered housing and people in 'other' rental situations and may explain why the percentages were smaller than those reported for the Longitudinal Study, being 5% of the whole sample making the former transition and under 2% the latter.

From the Longitudinal Study, we find that changing from an owner-occupying to a renting household carried increased risks of mortality, being in an institution, and having a limiting long-term illness for women aged 55-74 years who made the change during the following ten years, the only exception being that younger women

did not have a statistically significant increase in risk of a limiting long-term illness. Among men who changed to rented accommodation the observed risks of these outcomes were generally not statistically significantly raised, but this was partly because of small numbers – the point estimates were as large as those for women in some cases. Losing access to a car was associated more generally with worsened risk of the LS outcomes among the younger generation and also of mortality among older men. In each case the risk or odds ratio for this transition group compared to people retaining the socioeconomic advantage, where statistically significant, was of similar magnitude to, or greater than, the equivalent ratio for people who were in the disadvantaged position both in 1971 and in 1981.

In the MRC Study, the change from owner-occupation to social housing (including housing associations) among 'Independents' was also associated with greater chance of poor quality of life for this group, though not significant for MOB. Furthermore, the odds of poor SI or Morale for those who made the change were similar to those of people who had been in social-sector housing in both mid-life and old age. However, the confidence intervals were wide. In the Whitehall Study, the professional/executive staff who had a low income after retirement had higher prevalence of poor health outcomes than those who did not – although it is not known when their income became low, it is quite likely that they had suffered a drop in their socioeconomic position.

There were mixed results for the health status of people who had improved their socioeconomic position. For the most part, the risks of LS outcomes among people who had changed from renting to owner-occupation were no worse than among people who had been in owner-occupation at both time points. The exceptions could be explained by health selection. Direct comparisons between those who moved 'upwards' and those who stayed in rented housing were not made. A more specific change from local authority housing to owner-occupation among the 'independent' group was considered in the MRC Study. In contrast to the LS, the 'upward' transition appeared to bring no advantage or disadvantage for three of the quality of life dimensions (MOB, BCM, and Morale) over those who had been in social-sector housing both in mid-life and in old age. The risk of poor HM was reduced for the upward movers but not to the level of people who had been in owner-occupation all

the time. SI was the only measure for which the chances of poor outcome among the upward transition group were similar to that for people in owner occupation at both periods. In the Whitehall study, a promotion from the lowest category to a higher one reduced the odds of poor mental health, poor physical performance and disability by 30% or more for people compared with men who stayed in the lowest category.

These analyses of transitions provide a new perspective on socioeconomic factors in old age – only one study found in the literature concentrated on transitions and just had one outcome.[29] Unfortunately, the evidence from the three projects analysed in this thesis is more consistent in suggesting negative effects of a deterioration in socioeconomic position than positive effects from an improvement. Further research is needed to understand pathways more fully and to see how socioeconomic transitions arise and which ones are most common.

9.3.4 Explanations of socioeconomic factors having an effect in late life

In the MRC Study, the number who changed tenure or had other indications that socioeconomic circumstances changed were too small to look at explanatory factors. In the following account it is assumed that if significant socioeconomic differentials remain after adjustment for potential mediating factors such as smoking or chronic conditions, then those factors at best partially account for any differences one would observe without adjusting for them. For the cross-sectional differentials, co-existing health problems contributed to greater prevalence of poor quality of life among people in rented than owner-occupied homes – the odds ratios for renting with respect to quality of life (including Morale) were reduced by about 0.2 from a starting point of 1.4 to 1.7 (depending on the outcome) when symptoms and physical problems were added into the models. This was about a third of the excess odds, and more than this for MOB and Morale. Although the quality of life and other health problems were measured within a few weeks of each other, the health problems were of a kind that conceptually are more likely to precede than to follow functioning limitations. Some key symptoms that might be amenable to relief, such as pain, were not covered in the study and might have contributed to the explanation. One point of

intervention to reduce health inequalities in quality of life could therefore be treatment of chronic conditions.

As health problems did not differ much between the tenure groups among the 'Dependent' groups tenure differentials in quality of life were unchanged by adjustment for the other health problems.

Adjusting for both smoking and alcohol consumption reduced the odds ratios for renters among 'non-dependents' by approximately 0.1 from a starting point of 1.3-1.5 and similarly for SI and Morale among 'dependents'. This is a reduction of about a fifth in the excess odds although modest in absolute terms. Fortunately, the percentages still smoking at the time of quality of life interviews were small (7% of people in owner-occupation and 12% of those in rented homes), otherwise the differentials would probably have been greater. The absolute reduction was similar whether or not the models had already been adjusted for health problems. Perceived inactivity was clearly more common among renters, associated with worse quality of life, and accounted for some of the differential. This has to be interpreted with caution since the measure may have reflected a negative affect rather than objective activity and lack of a good measure of physical activity prevented a proper assessment of its impact. Nutrition is a major health behaviour omitted from these studies – its role needs to be studied further.

The third layer of Dahlgren and Whitehead's diagram covers social and community networks. Social support could only be looked at in a limited way in the MRC Study. Frequency of contact with the combined groups of relatives, friends and neighbours living outside the household did not vary greatly by housing tenure and so did not explain tenure differentials in SI or other quality of life measures. In the detailed assessment (available for a much reduced sub-sample) there was also information about availability of a confidante – it was rare not to have one and although lacking one was associated with increased chances of poor SI or Morale, there were insufficient differences between tenure groups for this to be a substantial explanatory factor in this sample. To understand the scope for reducing differentials better, a breakdown of types of support is needed[273] and, similarly, disability and wellbeing are affected by some types of social interaction and support and not others[274;275] and

it may also be necessary to take more detailed account of the stressors experienced by people.[276]

The fourth layer includes health care services. The availability of services was unknown but there were crude measures of use of services in the quality of life questionnaires. Neither receipt of informal nor of formal care noticeably reduced the tenure differentials with respect to Morale. In some ways it is encouraging that receipt of help did not differ enormously by tenure but it is also discouraging that those receiving formal help were more likely to have low Morale than those who did not. The chronological sequence of events needs to be studied before a firm conclusion can be reached as to whether the nature or timing of care was contributing to socioeconomic differentials in Morale.

The studies cited in the Literature Review that show estimated socioeconomic effects before and after adjusting for intermediate factors yield mixed results. The broad conclusion is that groups of proximate risk factors are not accounting for socioeconomic differentials in morbidity but there is scope for them to have a role. In two papers[100;118] the hypothesis that lifestyle factors mediate between income adequacy and the health outcomes is not well supported. Although not shown explicitly, smoking seemed to have an association with disability only among women in Italy, where smoking was more common among the more educated so was unlikely to exacerbate health inequalities.[119] In another study Cairney[137] attributed about one third of the relationship between socioeconomic position and poor self-rated health to a combination of lifestyle, financial stress, mastery and self-esteem.

With respect to health conditions, Camacho et al[160] found that the difference in functional status score between higher and lower education groups changed a little after adjusting for persistence of a number of chronic conditions. Adjustment for chronic conditions only led to one out of four parameters becoming insignificant for ADL outcomes among women in a Finnish study.[125] On the other hand, Smith and Kington [135] show much reduced parameters for education and income after adjusting for a range of health conditions (e.g. stroke, lung disease and pain) and education became insignificant for functional status once chronic conditions at baseline entered into the model.[126] Newacheck [161] concluded that poor people had more restricted

activity days and more bed disability days because they had more chronic sickness and that these had greater impact on their lives, a somewhat stronger conclusion than the MRC Study results but this may be because chronic sickness was defined as one which limited them in daily activities so there could be some circularity in the argument. Four papers raise the possibility that chronic illness or general health condition might be a (partial) mediator between socioeconomic status and mortality [119;122;128;162]

Some observations can be made from the literature in which there is no explicit consideration of mediating factors. In longitudinal models clear socioeconomic differentials remain for life satisfaction after adjustment for self-rated health and social contact,[122] for mobility after adjustment of social isolation, smoking, overweight and depression,[27] and after taking into account both lifestyle and biological risk factors.[105;134] Income and education also appeared to operate in old age to maintain people with physical ability[165] or general functioning[163]. On the other hand, it is possible that the wide range of health and housing conditions and health behaviours in Salas' model[132] had explained why income was only marginally significant for men with respect to self-rated health in relation to socioeconomic position four years earlier.

In cross-sectional studies using current measures of socioeconomic position, clear differentials remain for life satisfaction after adjustment for self-rated health and social contact.[139] The differentials for education remain for mobility after adjustment of chronic diseases and health status in a Finnish study;[127] there is no explanation why this did not apply to current income but the study was done before Finland's recession in the 1990s and income generally was equitable with good pensions.[277]

There is enough evidence here to warrant careful monitoring of socioeconomic differentials in health in old age in the light of policies that affect the health and welfare of older people. In particular, the new information from this thesis about implications of changes in socio-economic circumstances for health in Britain are worrying. The numbers that changed status in these studies may be relatively small but there are three messages arising from the results on transitions. First, services that cater for older people should be alert to those whose socioeconomic position is

deteriorating. Second, people who are living with others may appear to be in a good socioeconomic position but still have some disadvantages from their previous socioeconomic position. Third, there is the wider message that socioeconomic position still exerts influence in old age. Even if people attained their current socioeconomic situation partly through earlier experience of health or sickness, that position can in turn have implications for future health.

9.3.5 Socioeconomic influences differing by gender or age

Many studies undertake separate analyses for men and women in case socioeconomic influences vary by gender. As gender and age differentials were not the focus of this thesis, firm conclusions will not be drawn but some observations can be made. Separate analyses by gender were done for the LS study but not for the MRC Study. However, some checks were made on the simpler models in the MRC Study (before adjusting for health etc) and these suggested that the tenure differentials did not differ significantly by gender. In both the Whitehall and MRC Studies, I judged that there was insufficient power to undertake detailed modelling of different age groups – and there was no obvious cut-off at which one might expect influences to weaken. In the Whitehall study there were no age interactions when tested in models unadjusted for intermediate factors. In the MRC study, there were indications that tenure had a weaker effect for two quality of life dimensions but the absolute differences in prevalences between tenures were the same at younger and older ages. Robert and House[89] found that at ages 85 years and over, associations between education and either functional ability or self-rated health disappeared but Ross and Wu[101] finding that they strengthened for functioning. The number of people at the upper age range was small in both studies. In the LS the socioeconomic variation for long-standing illness for those aged 85-94 years in 1991 was much weaker than for those ten years younger. Also, for older men, but not for older women, the differentials in mortality were lower in the period 1976-92 than during the first five years of follow-up. On the other hand the socioeconomic differentials were fairly similar for the two age groups when the whole follow-up period for mortality was used and for institutionalisation. Now that the population aged 85 years and over is of substantial size, further work needs to be done on whether health

inequalities weaken at very advanced years and to what extent any reduction in differentials in the community arises because the most vulnerable are in institutions.

9.3.6 Area influences

As Bartley et al have stated, individuals live in neighbourhoods and act within the local social structure.[278] Carstairs' score was developed in Scotland and showed that standardised mortality rates were positively correlated with deprivation score even among people aged 65 years and over.[220] However this did not tell us whether the correlation was wholly due to the composition of those areas (more people who were personally deprived or otherwise at risk) or also due to the context, e.g. some common hazard such as pollutants or an environment of mistrust or a culture in the way people react to health issues. In this thesis, the analysis of quality of life by Carstairs deprivation score and population density showed that individual socioeconomic position was a more robust predictor of poor outcomes than these particular area characteristics, but there were more signs of a residual area effect than Sloggett and Joshi[279] found for mortality of younger adults. Greater deprivation was associated with greater prevalence of poor HM, self-care and SI and higher population densities carried greater chance of worse morale. Relative deprivation (compared to adjacent Eds) did not appear to make a difference to quality of life once the deprivation in one's own ED was taken into account.

This is an under-researched issue for older people. Berkman and Gurland [136] included a Poor Residential Environment Scale in their study of New York residents. Although this directly assesses the condition of the building occupied and the person's own furnishings, it gives some indication of whether the person is in a run-down area or not. People in worse areas had worse functioning and addition of this factor to the prediction model did not affect the parameters for income and education (similar to the MRC Study where parameters for tenure hardly altered once adjusted for deprivation and population density). Among men and women aged 65 years and over the crude mortality rates were very similar in a poverty and non-poverty area of California although for all adults combined there were significant differences even after adjustment for personal socioeconomic factors.[280] A study of adults aged 25

years and over in the USA used a similar approach to the one adopted in this thesis.[281] This found small additional community-level effects on self-rated health and number of chronic conditions but not on functional limitations, after adjusting for education and income of individuals. Robert makes the point, also valid for the MRC Study, that community effects did not take duration of residence in the area into account – longer duration may strengthen the effect – and also the area information was derived from the 1991 Census and the areas may have changed by the time the quality of life data was collected between 1994 and 2000. The studies that take into account both individual and area factors suggest that there is some contextual factor working although we do not have the information to say what this is. Although there are some theoretical models specifically about residential environment and older people[282] there is still much work to be done in this area. This will involve a mixture of qualitative techniques to discover processes[283] and of more advanced statistical techniques such as multi-level modelling [284] together with improved measures of relevant area factors.[285]

9.4 *Need for better socioeconomic measures*

Although socioeconomic differences have been found, it is clear that more refined measures are needed. The choice of socioeconomic position was limited in these studies. Housing tenure has been a useful addition to social class in the UK. It is rarely used elsewhere and may have different connotations in different cultures but will probably continue to have a place here. In the light of both changing housing organisation and the specific situations of older people, the tenure classification needs to be refined, possibly by the addition of other information that allows a better measure of material resources (e.g. the value of a property or the rental paid or some measure of comfort – central heating may no longer discriminate enough). Two or three categories are not enough for a fine discrimination and even the small private-renting category is itself heterogeneous in terms of the housing conditions, income and other resources enjoyed by people in the sector. Its inclusion with local authority housing will have diluted socioeconomic comparisons in the LS and MRC Study analyses. As local authorities cease to own property and Registered Social Landlords take their place in catering for those with restricted incomes, both housing quality and status may change. Owner-occupation is not universally a marker of greater

income or even wealth and certainly not of better physical living conditions (see Chapter 1.1) and in the coming generations of older people it will be more heterogeneous However, it carries some status and pride with it[92] and the type of home may not only be a marker of status and material resources but have direct impact on health via exposures to, for example, cold, damp, insecure surroundings. In older age groups the presence of sheltered housing and residential homes also complicates tenure-based classifications in not having a clear socioeconomic status.

Income was not available except for a simple measure on the Whitehall study. Even using a broad-brush indicator of net income identified a group of people with low income and worse self-reported health. To understand this better we would need to know more about the extent to which income was itself affected by health, and how individuals used their income – for example, were basic necessities (rent, food, warmth) absorbing their income and limiting capacity for care of health. Also, as Smith and Kington[135] argued, different forms of income are more or less likely to be the outcome of past health.

Car availability is a measure of material resources and concerns a resource that has direct application for health insofar as it can be used to visit health facilities, go to the shops with the best value food, to visit people etc. However its usefulness in old age is considerably reduced by health selection. Possession of various items considered important to well-being in old age (e.g. a warm winter coat, items considered essential for social exchange, having a holiday) might be an appropriate measure, especially if it was known whether lack of one of these was due to inability to afford it rather than having no wish for it. Townsend used this approach in his survey of poverty in the 1970s[204] and it was also used in the Retirement and Retirement Plans Survey and its follow up.[286;287]

North American studies have already found that education is a factor in several health outcomes. In future generations of people aged 75 years and over, it may come to be a more powerful discriminator because the variation in educational achievement will be greater. Also, job opportunities and hence income and other life chances may be more contingent on educational achievement than it was for those born in the early 1900s. In a study of people aged approximately 60-74 years old in

1994 people with no academic or trade qualifications were more likely to report fair or not good health than those with school qualifications.[287]

For occupation-based classifications a crude manual/non-manual distinction is inadequate as shown by the Whitehall study where employment grade was a sub-classification of non-manual workers - 'lower' grades who had much worse health were mainly clerical staff. The 2001 Government classification has more theoretical grounding than the old RG classification and could be combined with a poverty indicator. Some methodological work showed that a household material deprivation index predicted various health measures in adults better than either the old Registrar General's social class (RGSC) or the new official socio-economic classification (SEC) but that combining the material deprivation index with the SEC was better.[288] More work also needs to be done on how various measures of socioeconomic position are linked to knowledge of, and preparedness to take up, ways of managing health. We should not expect to find one measure of socioeconomic position that captures all the socioeconomic variation partly because multiple measures can refine the discrimination but also because some measures will be more appropriate than others, depending on the theory being tested.

9.5 *Policy implications*

9.5.1 Monitoring health inequalities

A major aspect of any policy must be to monitor the inequalities among older people, as is already done with mortality rates by social class for people of working age. This monitoring was seen as crucial by Acheson's Committee.[34] However, in so doing, we need to remember that reporting of self-rated health and of functioning may be affected by cultural expectations and values as well as by objective illnesses, impairment and individual personality. This could influence apparent trends. Two theories suggest that observed differences are in some way under- or over-estimating the scope for improvement among the disadvantaged. First, people in advantaged situations may be more likely to rate themselves in poor health because they have higher ideals, have greater affinity with the medical profession, and expect treatment.[289;290] If this is true, interventions to encourage health promotion among the disadvantaged groups could initially widen the observed gap as they learn to state

their health problems more fully. On the other hand, disadvantaged people may be more reliant on physical functioning to get by in daily life and so have greater motivation to report difficulties.[289] If this is true then even for if there is a major improvement in the functioning of the more disadvantaged people, there will remain a measured difference in self-reported quality of life or self-rated health. The evidence for these theories is mixed. Two studies of adults (not older people) have supported the former view.[289;291] On the other hand, Blaxter's results suggested the opposite .[43] Adjusting for negative or positive affect could provide some idea of differences in the way socioeconomic groups rate themselves. I did not have direct measures of this but in the Whitehall Study, excluding those who said they were nervous most of the time or happy little of the time did not substantially alter the results (not shown).

9.5.2 Interventions

Macintyre et al[292] noted that people were willing to recommend policies to reduce health inequalities in their submissions to the Acheson Committee on the basis of little or no evidence of their effectiveness. The observational data used in this thesis does not show how health inequalities can be reduced among older people but it does give support for taking a long-term view of health inequalities. If socioeconomic position in mid-life persists in influencing health status in old age then intervention in mid-life should have the double advantage of gains then and later. Retrospective estimation of hazard exposure shows that people in lower social classes in early old age had cumulated a much higher total score of adverse exposures in the home, the neighbourhood and the workplace than those in higher social classes. There were smaller differences in cumulated hazards by housing tenure.[293]

There are several stages of the progress of health inequalities at which intervention can be targeted. Link and Phelan[294] argue that historically the diseases and risk factors that dominate health inequalities have changed but each time people with monetary and educational resources are the first to reduce their risk factor profile. Therefore, it would be more effective in the long run to reduce differences in income and education than to focus on proximal risk factors. On the other hand comparisons between the UK and both Sweden and Finland show that having a good welfare

system or employment support and redistributive income policies do not suffice to remove differences in health between groups who are disadvantaged in other respects (occupation or being a lone mother).[295;296] Material resources alone are unlikely to suffice without adequate coping mechanisms including the will to continue, and belief in self-efficacy.[297]

Meanwhile it would be neglectful of the current older generations not to try to reduce inequalities for them. Part of this should be encouragement of healthier lifestyles. We have to move beyond the experiments of limited duration that have shown that increasing physical activity can bring clear physical and psychological benefits to older people[298] to more permanent changes. Unfortunately, this is not straightforward. For example, participation rates in trials of exercise tend to be low[298] and Ebrahim and Davey Smith[299] pointed out that interventions aimed at improving individual risk profiles for cardiovascular disease have been limited in effect and costly. Graham showed that poor single mothers smoked because for them it provided immediate benefits in allowing them to take time out for themselves[300]. Apparently 'unhealthy' behaviour may be justifiable for some older people (e.g. cannot afford health food or find it difficult to eat) and health education does not necessarily change this. There have to be broader changes that make the behaviour appropriate for them. Another policy goal should be to improve health and social services that can bring major benefits to those already experiencing some impairment or disability.[298]

There is much we do not yet know about effectiveness of, and potential impact of, interventions, particularly community interventions – for example few studies have looked into health impact of housing interventions for people of any age[301] or dietary interventions for the elderly.[302] There is a need for developing better methodology to build up the evidence base for public health medicine[303] while not becoming so cautious that only a randomised controlled trial will suffice. Several major health advances would have been missed with the latter approach.[304] Work done by the Campbell Collaboration might be relevant (http://www.campbellcollaboration.org).

9.5.2.1 Acknowledging barriers to change, and finding ways forward

Older people's own views should be taken into account in developing policies and provision of services; their unwillingness to adopt the professional's suggestions may be for good reason. Policies need to be sensitive to threats to self-esteem and feelings of self-reliance that older people can feel when offered support.[305] Older people's groups might benefit from greater advocacy and sharing of ideas with disability-rights groups.[306]

The Government has taken steps to reduce income and resource differences among older people (via policies on pensions, fuel-poverty and transport charges). It has also set goals to reduce health inequalities and it has set up mechanisms for focussing on the most vulnerable people (those described as socially excluded), although, as noted earlier, this ignores health inequalities that exist in the wider population. It probably needs sustained effort to make a lasting impact on differentials. Translation into local implementation suffers from the tension between the long-term nature of these policies and the short-term targets on other issues that drive the way local systems operate.[307] Thus, in general, there has to be a long-term view that is not over-influenced by the exigencies of short-term political agendas.

9.6 *Recommendations*

9.6.1 Research:

1. Research to develop alternative socioeconomic indicators appropriate to older people, e.g. enhancing the tenure measure and a version of the Townsend index relating to inability to afford various goods and services
2. Longitudinal studies tracking changes in socioeconomic position and in self-rated health or functioning in Britain
3. More detailed work on the ways in which social support might be a target for intervention to reduce socioeconomic differentials. More detailed work on socioeconomic factors influencing entry to institutions – using data sources that include information on cognitive status and dysfunctioning.
4. Qualitative and quantitative work to understand better the barriers and drivers to adopting healthier lifestyles or seeking treatment and aids for disabling conditions and how these vary by socioeconomic group.

5. Qualitative and quantitative work to understand better the coping mechanisms used by people and how these might be influenced by interventions
6. Developments such as the Campbell collaboration should be considered for their applicability to assessing interventions to reduce health inequalities among older people

9.6.2 Policy

1. Include socioeconomic break-down in national statistics about the health of older people
2. Pursue Acheson's recommendation that "all policies likely to have an impact on health should be evaluated in terms of their impact on health inequalities" [34]for older people as well as younger
3. Amend the National Service Framework for older people to include specific commitment to take into account differential impact on certain socioeconomic groups that could widen health inequalities (e.g in use of new technology or patient self management or in placement in intermediate care)
4. Use the networks and techniques developed by the Social Exclusion Unit to develop policy recommendations that impinge on older people. For example the current SEU initiative on transport could have a section specifically focussing on older people.
5. Support research listed in Section 9.6.1
6. Continue to seek ways of improving uptake of benefits and reducing inequalities in income among older people
7. Continue to seek ways of reducing crime and fear of crime and to make street environments conducive to people to take exercise, socialise and to play an active part in the community
8. Schemes to facilitate access by disadvantaged socioeconomic groups to chiropody, general practice, ophthalmic and audiology services, so that remediable health problems are dealt with

Tables appendix

Notes for Tables 2.3.A1-2.3.A3,
Columns

1. Reference
2. Source of data
3. Age range covered
4. Whether institutional population included (Y/N)
5. Whether cross-sectional or longitudinal (C/L)
6. Whether outcome self-reported or clinical (S/Cl)
7. Whether socioeconomic position the primary focus of the paper or not (F-focus/O-other)
8. Measure of outcome. Number of categories used in analysis in brackets
9. Socioeconomic variable. Number of categories used in analysis in brackets
10. Potential explanatory factors taken into account.
11. Selected results; main findings

Abbreviations:
ADL – activities of daily living
hhd – household
MMSE – Mini-mental State Examination (cognitive ability)
ns – not stated
M – male F – female
s.e.p. – socioeconomic position
y –years

Table 2.3.A1 Health inequalities among older people in the UK. Part A. Morbidity

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 5 6 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Brown et al 1957[308]	11 GPs, Birmingham 1956 N=1062	Male 60-69	N C A F	Coronary artery disease (CAD)	Social class (3)	Smoking, physical and mental workload	Positive association social class and myocardial infarction. Negative association social class and other CAD. Protective effect of heavy physical work
Taylor & Ford 1983[166]	Aberdeen Styles of Ageing Study 1980 N=619	Both 60+	N C S F	No. chronic conditions (5) No. acute symptoms (5) No. difficulties, functioning (4) Overall rating health (4) Morale (3) Self-esteem (3)	Social class (2)	Gender and age stratified.	Working class had more chronic conditions, more acute symptoms, but similar distributions of number of difficulties in functioning. More likely to say that health poor or fair. Distributions of self-esteem and morale not very different. When stratified by gender and age, class differences were small.
Victor 1989[171]	GHS 1980 N=4039	Both 65+	N C S F	Limiting long-term illness (2) (LLTI) Good self-rated health (versus fairly good + not good) (2) --- Acute illness (2) Sight difficulty (2) Hearing difficulty (2)	Social class (4) (last occupation; husband's)	None	Negative association between social class and LLTI 37% Class I/II; 47% Class IV/V Positive association between social class and good health 49% Class I/II vs 31% Class IV/V --- No significant association between social class and any of acute illness, self-reported sight, and hearing difficulty

Table 2.3.A1 Part A continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 5 6 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Evandrou & Victor 1989[173]	GHS 1980 N=3965	Both 65+	N C S F	Disability (4) Ability to do 6 ADL Self-rated health (3) Acute illness (2)- restricted in activity over previous 2 weeks	Housing tenure(6)	None	Local authority tenants always higher prevalence of all outcomes than owner-occupier Privately rented sector – varied results depending on whether rented from relatives, or rented commercially furnished or unfurnished
Blaxter 1990[43]	Health and Lifestyle Survey N= 10000 60+ N=997M, 1352F	Both 18+	N C S O	Disability (2) Fitness (2) Psychosocial wellbeing (2) Illness symptoms (2)	Social class (last job (ns) (4) (husband's if married)	Gender-stratified. Age	Over age 60, and especially over 70y, substantial class differences in subjective dimensions (illness and psychosocial health). Class differences for fitness and disability negligible for the oldest group – small but noticeable for age 60-69y and disability
Grundy 1992[130]	LS 1971, 1981 N=8497 M, 17080 F	Both 65+	N L A O	Being in an institution in 1981	Social class in 1971 (males) (5) Housing tenure in 1971(3).	Gender stratified. Age, home amenities (1971) marital status (1981)	Compared to owner-occupiers local authority female tenants and private renters of both genders were at increased risk of moving into an institution.
Arber & Ginn 1993[98]	GHS 1985-7 N= 1424 M, 2082F	Both 65+	N C S F	Disability (2) (see Evandrou & Victor) Less than good self-rated health (2) (see Evandrou & Victor)	Own socioeconomic group (s.e.g.) (6) Housing tenure(2) Car in hhd (2) Hhd income (4)	Gender-stratified. Age, other s.e.p.	All four measures of s.e.p. associated at bivariate level. Adjusted for other s.e.p., s.e.g. associated with disability. In addition car availability significant for men and housing tenure for women. All four measures associated with self-reported health even after adjustment for other measures

Table 2.3.A1 Part A continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 5 6 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Jagger et al 1993[97]	Melton Mowbray Study – one general practice. N=1203	Both 75+ in 1980	N L A S O	At follow-up either dead or in institution or dependent in the community or independent in the community. Follow-ups 1985 and 1987	Social class (3) (last job; husband's if married) Difficulty in managing (2)	Age, marital status, self-rated health,	No significant association found between either social class or difficulty in managing on income and the outcomes five or seven years later.
Swain 1993[96]	Health and Lifestyle Survey 7 years on. N=4346 Age 60+ N=495M, 664F	Both 18+ in 1984/5	N L S O	Self-rated health	Socioeconomic group of head of household (2)	Stratified by gender then by self-rated health at baseline	Among those aged 60+y in 1984/5, the percentages reporting fair/poor health seven years later were higher in the manual classes than in non-manual, regardless of baseline health. The most substantial differences between classes for men was in the % saying their health was better and for women in the % saying their health was worse, both to the disadvantage of the manual class.
Grundy & Glaser 1997[175]	LS 1971, 1981 & 1991 N ns	Both 65+	N L A O	Being in an institution in 1981 relative to 1971 Being in an institution in 1991 relative to 1981	Housing tenure 10 years previously (3)	Age, marital status	Owner-occupiers had lowest rates of transition and tenants in privately rented homes the highest.
Grundy et al 1999[170]	1996/7 Disability Survey*. 60/65-74y 607M 851F 75+y 963M 1479F	Both 16+	N C A O	Disability in at least one of 13 domains, determined from detailed questioning (2) *Follow-up to Family Resources Survey	Housing tenure (3)	Gender and age stratified	Variation by housing tenure depended on age group and gender. For age groups 60+ y, the prevalence was lowest among owner-occupiers except for women aged 80+ y for whom it was lowest amongst private renters

Table 2.3.A1 Part A continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 5 6 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Salas 2002[132]	British Household Panel Study 1991 and 1995 N=641 M 894 F	Both 60+ in 1991	N L S F	Self-rated health in 1995 (4)	Housing tenure(2) Car availability(2) Education (3) Annual hhd income (continuous) Above/below average income	Gender stratified Age, marital status, smoking, house conditions, baseline health factors (self-rated, symptoms, limiting illness or disability) GP/hospital visit	Adjusted for other factors except other s.e.p more income or education associated with better health. Once all the s.e.p. measures included in the model, only income remained marginally significant for men and car availability strongly significant for women.
Falaschetti et al 2002[172] Hirani and Malbut 2002[174]	Health Survey for England 2000 N = 735 M, 860 F in community	Both 65+	Y C S O	Self-rated health Disability (3)	Own social class (2)	Gender stratified	Results for those not in care homes. Higher percentages of men and women in manual classes reported bad or very bad health than those in non-manual classes. Also applied to severe disability (e.g. very poor sight, cannot do personal care function without help)

Table 2.3.A1 Health inequalities among older people in the UK. Part B. Mortality

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Fox & Goldblatt 1982[179] E&W	Longitudinal Study 1971 No. deaths 65-74y – 4566M 3156F 75+y - 5070M 7687F	Both 15+	N F	All-cause mortality 1971-5 (Standardised mortality ratio SMR)	Housing tenure and car access combined (3x3)	Gender and age stratified	For men both factors significant for deaths at age 65-74 years but at older ages only car ownership. For women only tenure a factor for both age groups.
Jagger & Clarke[169] 1988	Melton Mowbray Study N=1124	Both 75+	Y O	5-year all-cause mortality 1981-5	Social class (ns)	Gender and age	Social class not a significant factor
Goldblatt 1990[131] E&W	Longitudinal Study 1971 N ns	Both 15+	Y F	All-cause mortality 1976-81 Mortality from malignant neoplasms, circulatory diseases, respiratory diseases, accidents and violence.	Social class – men only (2) Housing tenure(2) Car access (2)	Age stratified. Other s.e.p	In bivariate analyses, men in manual classes, rented homes or without car had higher SMR. When combined, household indicators were more powerful discriminators. Unlike younger men, tenure had a stronger association than car availability. For women variation in SMRs by housing tenure and car ownership diminished by age but persisted as significant. Mortality differentials narrowed with age for each major group of causes, becoming negligible for cerebrovascular disease for women 75+y but remained substantial for respiratory disease.

Table 2.3.A1 Part B continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Shahtah-masebi 1992[157] Wales	Rural north Wales 1979 N=534	Both 65+	N O	All-cause mortality 1979-87 All cause mortality 1983-1987 if aged 79+y in 1983 (N=108)	Social class (3) Housing tenure (3) Income (3)	Age, gender, marital status, hhd members, social network, quality of life, self-assessed health, service use	In full sample renters had higher rates than owner-occupiers but lower rates than "other" (incl living with relatives other than spouse). Income not significant and social class only in the second analysis (assumed interaction between age and socioeconomic position)
Filakti & Fox 1995[180] E&W	Longitudinal Study 1971, 1981 N approx 250000 of each gender	Both All ages	N F	All-cause mortality 1971-81 All-cause mortality 1981-89 (SMR)	Housing tenure (3) Car availability (2)	Gender-stratified. Age	Local authority tenants had the highest mortality rates in both decades. Greater differentials by car for men than for women. Despite falling death rates, the differentials increased noticeably over time for women with respect to housing tenure and for men with respect to car availability.
Harding 1995[176] E&W	Longitudinal Study 1971 N=26230 aged 65+	Men 15+	? F	Mortality 1976-89 Mortality from lung cancer, ischaemic heart disease, cerebrovascular disease, respiratory diseases, injuries and poisonings.	Own social class (6) (last main job)	Age stratified	Social class differentials still apparent at age 75+y for lunch cancer and respiratory disease; At ages 65-74y also apparent for cerebrovascular disease.

Table 2.3.A1 Part B continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Marmot & Shipley 1996[178]	Whitehall cohort 1967-70 N=18001 N deaths 1450 at age 65-69y and 4685 at age 70-89y	Men 40-69 at base-line	N F	All-cause mortality – end January 1995	Employment grade (3) Car ownership (2)	Stratified by age at death. Age, length of follow-up. Other s.e.p.	The employment grade differential reduced with age but, once adjusted for employment grade, the car differential did not. For both, the differentials were still substantial for those dying at ages 70-89. The relative index of inequality in the oldest age group for both was 1.8 before adjustment for the other measure and 1.5 afterwards. Although the relative index reduced with age, the absolute mortality differences increased.
Hattersley 1997[177] E&W	Longitudinal Study 1971 N ?	Both All ages	? F	Life expectancy at age 65	Social class (4)	Gender, period and age stratified. Age	Positive association between social class and life expectancy and over ten years the manual classes fell further behind in life expectancy.
Smith & Harding 1997[38] E&W	Longitudinal Study 1971 N aged 65+ 26246 M 57367 F	Both 35+	N F	All-cause mortality 1971-81, 1981-91 (SMR)	Social class , housing tenure and car availability combined (2x3x2)	Gender and age stratified. Age	Analyses for age 65+. Even within categories of the other factors those in manual social class, or in local authority housing or without access to a car tended have highest SMR. However, women in privately rented accommodation did not always fare better than local authority.

Table 2.3.A1 Part B continued

1 **Reference**	2 **Source Number in analysis**	3 **Gender Age (years)**	4 7	8 **Outcome**	9 **Socio-economic variable (s.e.p.)**	10 **Factors taken into account**	11 **Main Finding**
Neale et al. 2001[181]	MRC CFAS Cognitive Function and Ageing Study 1991-4 N= 5047M, 7505 F	Both 64+	YO	All-cause mortality to mid 1997	Education (4)	Gender and age stratified. Age, MMSE, history of chronic disease, self-rated health, residence, smoking	Education was not a significant factor for survival in full models for either gender or for any of three age groups (65-74, 75-84, 85+). Education was not an effect modifier for association between MMSE and mortality. Social class was measured but did not have any additional effect.
Salas 2002[132]	British Household Panel Study 1991 and 1995 N=641 M 894 W	Both 60+ in 1991	NLSF	Mortality by 1991	Housing tenure(2) Car availability(2) Education (3) Annual hhd income (continuous) Above/below average income	Gender stratified Age, marital status, smoking, house conditions, baseline health factors (self-rated, symptoms, limiting illness or disability) GP/hospital visit	Unlike self-rated health, income not significant. Housing tenure and car availability associated for men in models with one s.e.p. measure but only tenure when all included. Marginal association with tenure for women in full model.

Table 2.3.A2 Health inequalities among older people in the North America. Part A. Morbidity

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 5 6 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Palmore 1976[109] USA	Duke First Longitudinal Study of Aging Decedents N=207	Both 60+ in 1955	N L A O	Being in an institution at any time before death (persons dead by 1976)	Education (2) Whether can make ends meet	Gender, race, living arrangement	At a bivariate level, less likely to be in an institution if less than 7 y education; no association with self-perceived finances (once adjusted for other factors only marital status and race significant).
Vicente et al 1979[110] USA	Alameda Study decedents N=521	Both 55+ in 1965	N L A O	Being in an institution with medical care at any time before death (persons dead by 1975)	Education (3) Family income adequacy (4)	Gender, race, age in 1965, marital status, household size, year of death, baseline health status	At a bivariate level only income negatively associated with time spent in institutional nursing care (any stay or stay of 6 months or loner). After adjustment for other factors, having inadequate income remained significant for longer stays only.
Newa-check 1980[161]. USA	1977 Health Interview Survey. N= 40000 all ages	Both All ages	N C S F	Restricted activity days (days decreases normal activities) Bed disability days (all or most of day in bed because of illness or injury)	Family income – poor or not poor	Age No. chronic illnesses	Poor people more likely to have restricted activity days and bed disability days even at age 65 years and over. The greater percentage of the poor with chronic conditions and greater impact of this for them accounted for income differentials – little differential among those free of conditions
Branch & Jette 1982[111] USA	Masse-chusetts Health Care Panel Study N=1625	Both 65+	N L A O	In community in 1975 and in institution in 1981	Education (ns) Medicaid eligible (i.e. low income)	Age, gender, marital status, alone, social support, vision & hearing, mobility, ADL needs, health care, morale, if willing to enter	Education and Medicaid use not associated with outcome in models adjusted for the major factors

Table 2.3.A2 Part A continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 5 6 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Palmore et al 1985[103] USA	1972 OARS survey N=248 2nd Duke Longitudinal Study N=49	Both M 72+ F 75+ 1980-3	N L S O	At follow up 1980-3: Social, economic, mental, physical scales of OARS instrument, including ADLs (each 6) Organic mental health (4), functional mental health (4)	Education (2) Income of respondent and spouse (ns)	Age, gender, race, marital status, employment, baseline rating on scales.	Education and income positively correlated with all functioning scales at follow-up in bivariate analysis. Income negatively correlated with decline in mental and economic functioning after adjustment for other factors, not with decline in ADLs. Baseline ratings dominated most models.
Usui et al 1985[139] USA	Jefferson County, Kentucky 1980 N=704	Both 60+	N C S F	Life satisfaction (Neugarten Index)	Education (continuous years) Family gross Income (12) If closest friend/ neighbour/relative better off(5)	Gender, age, marital status, household size, self-reported health, social contact	Income positively associated with life satisfaction after adjustment for all but comparison with close neighbour etc. Education not significantly associated even before adjustment for income. The better off a respondent felt relative to a close relative the higher life satisfaction but did not affect income parameter.
Brock 1985[112] USA	Community & institution samples. Houston USA N=47+40	Both Mean age 75	Y C A O	Recently admitted to, or awaiting admission to, a nursing home	Education (2)	Gender	In this small sample no statistically significant difference between the two samples in percentages with college education.
Keil et al 1989[182] USA	Charleston Heart Study 1960 N=247 M 376 F white	Both 59+ in 1994/5	? L S O	At least one disability 25 years after baseline (has difficulty with one or more physical tasks or needs help on one or more of 4 mobility tasks or 6 self-care tasks)	Education (2)	Gender and race stratified; blood pressure cholesterol, BMI, smoking. NOT baseline functioning	Among those free of cardiovascular disease at baseline, and adjusted for age only, white women with more than high school education significantly more likely to have disability than those without. Not significant for white men. Remained significant for women after adjustment for other factors.

Table 2.3.A2 Part A continued

1 **Reference**	2 **Source Number in analysis**	3 **Gender Age (years)**	4 5 6 7	8 **Outcome**	9 **Socio-economic variable (s.e.p.)**	10 **Factors taken into account**	11 **Main Finding**
Guralnik & Kaplan 1989[183] USA	Alameda County Study 1965-84. N=496	Both 65-89 in 1984	N L S O	High physical functioning (2) (top quintile of scale combined from 17 basic function items and 6 exercise items)	Family income (adequate or not)	Age, gender, race, baseline functioning	Among survivors, those with adequate incomes had three times the odds of high functioning as those with marginal or inadequate incomes.
Harris et al 1989[165] USA	Supplement on Aging to NHIS. 1984 N=513	Both 80+ 1984	N L S O	Continued physical ability at follow up (2) (no difficulty in walking 1/4 mile, stooping, lifting, walking without resting)	Education (4)	Age, gender, time of follow-up	Among those who were physically able at baseline, those with education of 7 or more years had twice the odds of continued physical ability at follow-up as those with little education.
House et al 1990[158] USA	American Changing Lives Survey 1986 N=3617 all ages	Both 25+	N C S F	No. chronic conditions (11) Functional status (4) (1= confined to bed/chair, 4= can do heavy work around house) Limitation of daily activities due to health (5)	Socioeconomic status combined education and income (4)	Age, gender, race, marital status	Interactions between age and socioeconomic status. At age 75+y associations not generally significant; at age 65-74y and middle age trends whereby lowest socioeconomic status has worst outcome (tests for trend not done). Similar but weaker results from National Health Interview Survey.
Forbes et al 1991[133] Canada	Health Activity Limitation Survey 1986 (HALS)	Both Age 55+	N C S F	Mobility impairment (difficulties walking, carrying, standing, steps) Mental impairment (problems learning, memory problems, limiting emotional problems)	Below vs above poverty line Housing tenure(2)	Age and gender stratified. Marital status, whether alone	Low income strongest and most consistent association with mobility outcome compared to other factors. Tenure had additional impact in most groups As for mobility impairment. Income odds ratios lower than for mobility but some tenure odds ratios higher.

Table 2.3.A2 Part A continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 5 6 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Kaplan 1992[27] USA	Alameda County Study N=ns	Both Age 50-89 1965	N L S O	By 1974; incident self-care problems (2) incident mobility problem (2)	Inadequate income or not	Gender, age Social isolation, Smoking, overweight, depression	Inadequate income carried statistically excess risk of mobility problems but not of self-care problems in multivariate analysis. Among those with incident disease during the follow up period, income was also a predictor.
Roos & Havens[108] 1991 Canada	Manitoba Longitudinal Study on Aging. 1971 1983/4 N=3573	Both Age 65-84 in 1971	N L S O	At reinterview 1983/4: Successful ageing (2) (not in institution, not dependent in ADL, mobile, rated health excellent to fair and good mental test result)	Education (ns) Income (ns) Occupation (ns)	Age, gender, marital status, race, selected events baseline physical & mental function,	Socioeconomic factors not significant in multivariate model, either singly or in combination (bivariate associations not given). Self-rated health at baseline a strong risk factor.
Maddox & Clark 1992[104] USA	Longitudinal Retirement History Study 1969. 5 follow-ups to 1979 N=6270	Both 58-63 in 1969	? L S	Functional Impairment scale 0-3 (covers physical mobility, self-care, subjective wellbeing)	Education (4) Family income (poor/non-poor)	Gender stratified. All had been in employment in 1969 and only non-married women included.	Impairment prevalence started and remained highest for those with less than 12 years education and lowest for those with more than 16 years. Trajectories of deterioration roughly parallel. Among those with stable relative income over the period. (N=2728), poor had consistently higher prevalence of impairment regardless of educational level; however variation by education considerably reduced once stratify for income level
Rogers et al 1992[28] USA	Longitudinal Study of Aging 1986 N=707	Both 70+ in 1984	N L S F	Transitions between disability and ability 1984-6 (disability = difficulty with 1+ of 7 ADL)	Education (continuous years) Poverty index (2)	Gender, race, age, marital status, other s.e.p. Disability in 1984	Education negatively correlated with prevalence of disability in 1986, and with transition to disability but only marginally positively correlated with transition from disability. Poverty not significantly associated in multivariate models.

Table 2.3.A2 Part A continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 5 6 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Camacho et al 1993[160] USA	Alameda County Study 1965 and four follow-ups N = 91	Both 80+ in 1984	N L S O	Functional status (scale 0-72 based on 18 activities)	Education (2)	Age, gender, persistence of chronic conditions.NOT baseline functioning	Those with less than 12 years education had substantially lower functioning score than those with more education and this difference was not reduced by adjusting for persistent chronic conditions
Hubert et al 19933[105] USA	NHANES 1971-5 NHEFS 1982-4 N= 1884M, 2544 F	Both 50-77	N L S O	Disability at NHEFS 10 years later (0-3) (derived from 26 ADL)	Education (continuous years) Family Income (6)	Age, gender, race, marital status, alcohol, physical activity, BMI, blood pressure, medical history, blood & urine tests, nutrient intake. NOT baseline disability	Negative bivariate correlations between education or income and disability score. In multivariate analysis, education had stronger association than income. Several variables indicating history of diseases retained plus obesity. Slightly different patterns for men and women, income only being important for men.
Guralnik et al 1993[134] USA	EPESE. 3 areas N=3046M, 3935F	Both 65+	N L S O	Onset of mobility problems during 4 years (2) (ability to climb stairs and walk a half mile)	Income (3) Education (3)	Stratified by gender and location Age, other s.e.p, baseline chronic conditions	Negative bivariate trends. In multivariate models, income negatively associated with onset of problems in 5 out of 6 strata. 12 years or less of education associated with greater risk of onset for men and marginal for women (but not in all area subgroups)
Maddox et al 1994[29] USA	Longitudinal Retirement History Study 1969. 5 follow-ups to 1979 N=6270	Both 58-63 in 1969	? L S F	Transitions on Functional Impairment scale(0-3) (covers physical mobility, self-care, subjective wellbeing)	Poor/non-poor one year prior to measurement Education (4)	Gender, age	Negative association between education and onset of impairment even after adjusting for other factors. Also predicted by being poor at baseline Poverty did not consistently predict onset of impairment during subsequent two years but impairment consistently predicted onset of poverty over time.

Table 2.3.A2 Part A continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 5 6 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Cairney & Arnold 1996[100] Canada	General Social Survey (GSS), Canada 1991 N=820M 1123F	Both 66-99	N C S F	Good self-rated health (2) High blood pressure (2) Heart disease (2) Sleeping problem (2) Respiratory problem (2) Arthritis (2)	Education (3) Household income adequacy (5) Social class (6)	Age, gender, church attendance, sedentary, smoking, drinking, weight	Adequate income, more education and non-manual jobs more likely to have good self-rated health – even after adjustment for behaviour and weight. Income adequacy only associated with heart disease, sleeping problem and respiratory problem; no s.e.p..associated with high blood pressure or arthritis.
Robert & House 1996[89] USA	American Changing Lives Survey (ACL)1986 N=1913M, 1704F	Both 25+	N C S F	Self-rated health Functional health (scale 0-4) No. chronic conditions (up to 10)	Education (3) Income of self and spouse (3) Liquid assets (3 incl missing) Housing tenure(2) Liquid assets and housing tenure seen as alternative s.e.p. measures to the traditional ones of education and income.	Age stratified. Gender, race, other s.e.p	Interactions found between socioeconomic variables and age in associations with outcomes. In bivariate analysis liquid assets were negatively associated with all three outcomes up to age group 75-84 y but not among the oldest. Housing tenure was not associated with number of chronic conditions in old age, with self-rated health if aged 75+y, or with functional status if aged 85+y. Education only strong for age 65-74y self-rated health and functional health, income only for age 65-74y and self-rated health. Assets and tenure were better predictors for functional health in age groups 65-84 and liquid assets was the only socioeconomic predictor of no. chronic diseases at age 75-84. They were not better indicators for self-rated health.

Table 2.3.A2 Part A continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 5 6 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Ross & Wu 1996[101] USA	Work, family and well-being survey 1990 60+y 160M,303F	Both 18+	N C S F	Self-rated health (scale 0-5) Physical functioning (scale 0-2) Physical well-being (scale 0-7) (absence of symptoms)	Education (8 – treated as continuous)	Age, gender, race, household income	Absolute difference in physical functioning scale and physical wellbeing, but not self-rated health, increased with age. Differentials tended to increase because less of an age gradient in deterioration among more educated than less educated. Income an additional factor
Strawbridge et al 1996[163] USA	Alameda County Study1984 N=356	Both 65-95 in 1984	Y L S O	Successful ageing in 1990 (2) (ability to do 15 phsycial activities with no difficulty)	Family income (2) Education (2)	Gender, age, baseline successful ageing	Both income above lowest quintile and having more than 12 years education had increased chance of outcome, but statistical significance marginal.
Smith & Kington 1997[135] USA	Asset & Health Dynamics among the oldest old (AHEAD) 1994 N=7114	Both 70+	N C S F	Functional status (11 activities, score range 0-33 converted to % scale 0-100)	Household income (amount) Household wealth (amount) Education (3) – higher levels)	Gender, race, marital status, spouse's education, health conditions, no. children, survival of parents, siblings & children	Lesser functional limitation with increases in income and wealth; strongest association at lower income/wealth levels. Income components matter, e.g. worse functioning if recipient of welfare, better if recipient of earnings or of pension. Some reverse causation from income to health. Contemporary income does not reveal how cumulative life experience affects health. Higher education fewer functional limitations (no added advantage beyond high school for women)

Table 2.3.A2 Part A continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 5 6 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Berkman & Gurland 1998[136] USA	Growing Older in New York City Study 1990 N=586M, 984F	Both 65+	P C S F	Functional limitation (5) – derived from 27 items	Education (4 ? also continuous years) Hhd income (11) Occupation prestige rating (9)-own, longest job	Gender, age, ethnicity, marital status, live alone, local environment, other s.e.p	In regression models, income negatively associated with functioning in a bivariate model; reduced by half but still significant in full model Education and poor local environment additionally significant but occupation not in presence of other s.e.p. Confined to those on Medicare lists
Reed et al 1998[168] USA	Honolulu Heart Program. 1965-8 N=3263	Men 45-68 at base-line	P I S A C	Successful ageing in 1991-3 (4) -survival free of major life-threatening illness + maintain ability to function physically and mentally Categories of Not ill and not impaired Ill and not impaired Impaired and not ill Ill and impaired	Education (ns) Occupation (2) (high/low)	Age, marital status, biological measures, smoking, years in Japan,	Among survivors high occupation nearly 1 1/2 times as likely as those of low occupation to remain healthy and unimpaired rather than impaired and not ill (but not significant contrast between remaining healthy and being ill and either impaired or not). Education associated with outcomes in models adjusted for age but not in full models. Population: Japanese origin free of clinical illness.
Liao et al 1999[99] USA	NHIS 1986-90. Decedents by end 1991 N=5847 M 5085F	Both 50+	P I S A F	Long-term limitation of major activity(4) No. chronic conditions (0-6) No. bed days in past year No.days in hospital in past year	Education (3)	Sratified by no.years to death. Age, age^2, gender, race	All indicators showed trend worse morbidity with less education (except hospital days for those who survived more than 2 years). Associations continued to final years of life and not significantly different if near death or not.

Table 2.3.A2 Part A continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 5 6 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Veenstra 2000[102] Canada	Hhd sample Saskat-chewan, 66+y N=534 N=118	Both 18+	N C S F	Self-rated health (4)	Household income (3) Education (3)	Other s.e.p.? (not clear)	Prevalence of fair/poor self reported health associated with income but lowest percentage in middle-income group for those aged 66+ y. Negative trend with increasing education. Only in this age group that both s.e.p. associated with outcome
Cairney 2000[137] Canada	National Population Health Survey 1994 55+ y N=5093	Both 12+	N C S F	Self-rated health (5 or 2)	Education (3) Household income adjusted for size (3)	Gender, age, marital status, region, other s.e.p, lifestyle, financial stress, psycho-social resources	Results for aged 55+ years: Both education and income negatively associated with poor health; estimates reduced in size when adjusted for the other s.e.p and further when adjusted for the other factors. About a third of the relationship explained by the mediating effect of the other factors
Melzer 2001[167] USA	EPESE 1981-3 N=8871	Both 65-84 at base	N L S F	Incidence of mobility disability (2) (walking, stairs) Recovery from disability (2)	Education (3)	Age & gender stratified	For women all age-groups had higher incidence of disability if few education years; for men this applied to all but those aged 80-84 yrs at baseline. Rates of recovery did not differ by education nor did death rates within the disabled group. Estimated excess number of years with disability if lower education

Table 2.3.A2 Health inequalities among older people in the North America. Part B Mortality

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Branch & Jette 1984[148] USA	Masse-chusetts 1976 Health Care Panel Study N=467M,768F	Both 66+ in 1976	N L A O	Dead by late 1980 (five years)	Family income (ns)	Gender stratified. Age, health status, physical activity, sleep smoking, alcohol, meals	Income only related to mortality rates for women in adjusted models (bivariate not given)
Moore & Hayward 1990[106] USA	National Longitudinal Survey of Mature Men N=3080	M 55	? F	All-cause mortality from date reached 55 years to 1983	Education (years) (continuous) Family income (continuous) Longest and latest occupations (10)	Race, marital status, period, labour force status at age 55, poor health limiting work	Longest occupation influenced mortality (also more complex lower mortality) whereas latest occupations with greater physical demands associated with lower death rates (attributed to health selection out of such jobs or early death) Education effects accounted for by longest occupation and income but latter two significant
Rogot et al 1992[107] USA	National Longitudinal Mortality Study 1979-85	Both	N F	Life expectancy at age 65 years	Education (8) Family income (7)	Gender-stratified. Age	Analysis confined to white persons. Negative association with years of education. Also negative association with income for men but at best weakly for women.
Rogers 1995[162] USA	NHIS Supplement on Aging 1984 N=16148	Both 55+	N O	Life expectancy at age 55	Education (4)	Gender, age. Baseline health status, disability, chronic disease	Education of marginal significance.
Backlund et al 1996[184] USA	National Longitudinal Mortality Study 1979-85 65+y N= 40808 M, 57386F	Both 25+	N F	All-cause mortality to end 1987	Family income (7)	Gender and age stratified. Marital status, race, household size, education, employment status	Flattening relationship between income and mortality at high levels but for age 65+ y still existed. The flattening was seen both before and after adjustment for education, marital status. The income gradient was less for older people than for middle-aged people

Table 2.3.A3 Health inequalities in high income countries other than Britain and North America – Part A Morbidity

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 5 6 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Parker et al 1994[164] Sweden	Level of Living Survey 1968 N=210M 327F	76+ in 1991	Y L S F	Limited in ADL (2) (at least one out of five) Limited in mobility (2) (at least one out of four aspects)	Social class (4) (highest of both spouses – main occupation)	Age, gender	People from unskilled worker households more likely to have ADL and mobility limitation than white-collar households; skilled worker class also more likely to have mobility limitation. Unskilled worker households not consistently the most likely to have poor outcomes. Stronger class differences among men than among women
Parker et al 1994[164] Sweden	Level of living survey N=177M 256 F	76+ in 1991	Y L A F	Performance tests (2) (problem with at least one of nine)	Social class (4) (highest of both spouses)	Age, gender	Both skilled and unskilled workers had nearly double the odds of problems with performance tests as white-collar workers
Thorslund & Lundberg 1994[117] Sweden	Level of living survey 1968 N=210M 327F	76+ in 1991	Y L S F	Self-rated health (2) (bad or in between vs good) Index of aches and pains (2) Index of circulatory problems (2)	Social class (4) (highest of both spouses)	Age, gender	Having not-good health not associated significantly with social class but the other measures were. While non-manual class had the lowest odds, not a consistent hierarchy between unskilled and skilled class
Thorslund & Lundberg 1994[117] Sweden	Level of living survey 1968 N=172 M 239F	76+ in 1991	Y L A F	Lung function (2)	Social class (4) (highest of both spouses)	Age, gender	Unskilled worker class more than three times the odds of low peak flow compared to non-manual. Unskilled respondents less likely to take the test so differences probably underestimated.

Table 2.3.A3. Part A. continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 5 6 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Sakari-Rantala et al 1995[127] Finland	Evergreen project Jyväskylä 1988 N= 419 M, 805 F	Both 65-74	N C S O	Mobility (2) (getting about outdoors)	Education (2 categories) Personal net income (ns)	Gender, age, marital status, living alone, home facilities, no. chronic diseases, health status	Those with less than 6 years education had 1.6 the odds of difficulties getting about outdoors than those with less education in the model adjusted for age, defects in dwelling and number chronic disease. Income was not significant.
Reijneveld & Gunning-Schepers 1995[185] Nether-lands	Health Interview Survey, Amsterdam 1992-3 N 65+ 701M 1098F	Both 16+	N C S F	Self-rated health not good (2)	Education (4)	Gender and age stratified.	At all ages, prevalence of poor health was negatively associated with education. Interactions found between age and educational level: the odds ratios for people aged 65 years and over were closer to 1.0 than those for younger people but having more than primary school education was still associated with lower odds of reporting not good health.
Parker et al 1996[121] Sweden	Level of Living survey 1968 N=198 M, 310F	76+ in 1991	Y L S O	In 1992: Limited in ADL (2) (at least one out of five) Limited in mobility (2) (at least one out of four aspects)	Education (2)	Gender stratified. Age, mobility, smoking & circulatory problems	Higher percentages of less educated had limitations and remained significant in multivariate models for the full sample. In subgroup analysis by gender (small numbers) education became insignificant except for performance for men.
Parker et al 1996[121] Sweden	See above N=167M, 250 F	76+ in 1991	Y L A O	Performance tests in 1992 (2)(problem with at least one of nine)	Education (2)	See above	Men with up to grade school education had nearly three times the odds of performance limitation. The odds ratio for women was not statistically significant

Table 2.3.A3. Part A. continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 5 6 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Dahl & Birkelund 1997[74] Norway	Community survey in Norway N=410M 527F	Both 65+	N C S	Serious illness (2) (affects everyday life) Poor mental health (2) (feeling nervous, anxious, or depressed)	Own social class (5) (main job) Disposable hhd income (cont.) Economic difficulties (2) Housing tenure(2)	Age, marital status, other current s.e.p. Father's class and some child-hood factors	Income significant for both men and women and both outcomes. Only male manual workers at greater risk of outcomes and excess risk for serious illness disappeared on adjustment for other current s.e.p. Only female renters at greater risk and only for mental health.
Rakhonen & Takala 1998[113] Finland	Finnish Survey on Living Conditions 1994 N=563M 885F	Both 65+	N C S F	Self-rated health (2) poor Functional disability (2) (3-6 difficulties vs 0-2) Limiting long-standing illness (2)	Own social class (4) (last job)	Gender stratified. Age, marital status, urban/rural	Workers of both genders had increased odds of all three outcomes than white-collar. The association with functional disability was particularly strong for men but was statistically marginal for women. For women the strongest association was found with poor health.
Amaducci et al 1998[119] Italy	Italian Longitudinal Study on Aging 1992 N=1817M 1643F	Both 65-84 in 1992	Y C S F	Disability (2) (5 ADL)	Education (4) Own social class (4) (longest held job)	Gender, smoking, alcohol, clinical diagnosis of cardiovascular & other disease	Negative association in multivariate model between education and disability. Farmers most likely to have disability but white-collar and blue-collar workers seemed to be similar.
Damian et al 1999[118] Spain	Sample of Madrid residents 1994-5 N= 323M, 449F	Both 65+	N C S O	Self-rated health poor (2)	Own social class (2)	Gender, age, live alone, no. chronic conditions, functional status	Substantial odds ratio for poor self-perceived health for manual workers compared to non- manual, after adjustment. The strength of association was lower for older people but similar by gender. Additional analyses showed that lifestyle did not explain the differentials.

Table 2.3.A3 Part A continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 5 6 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Kempen et al 1999[124] Nether-lands	Groningen Longitudinal Aging Study (GLAS) 1993 N= 2312 M, 2967 F	Both 57+	N C S F	SF-20 (0-100 for each dimension): Physical function, role function, social function, health perceptions, bodily pain, mental health.	Education (4)	Gender, age, chronic medical comorbidity (4 groups of diagnosed diseases)	Significant but weak additive effects of education for all but role function and bodily pain. A weak interaction between education and medical comorbidity for mental health such that comorbidity had greater effect if low education level.
Regidor et al 1999[120] Spain	National Survey on Drug Use 1996 N 65+ 827M 1023 F	Both 15+	N C S F	SF-36:(0-100 for each dimension) Physical functioning, role function, bodily pain, general health, vitality, social functioning, emotional role, mental health	Education (4)	Gender and age stratified. Marital status, occupational status	Results for age 65 years and older: Men with the lowest education levels had worse scores than those with the highest level for all dimensions; this applied to 4 dimensions for women. Absolute differences by education increased with age for most dimensions
Beland & Zunzun-egui 1999[126] Spain	Ageing in Leganés 1993 N=615M, 621F	Both 65+	N L S O	Multinomial outcome in 1995 (5): complete function, functional limitations only (difficulty doing certain movements); IADL disability, ADL disability; deceased or in institution; not followed up.	Education (4) – Primary = highest Income (5) Occupation (6) (longest job – spouse if married woman)	Gender, age, functional status in 1993, chronic conditions, cognitive deficit, depressive symptoms	Functional decline was more prevalent among the less educated, manual workers and those on low income. However, occupation and income ceased to be significant in the presence of other factors. Education was associated with functional status when socio-demographic variables were considered but not once health status at baseline entered into the model.

Table 2.3.A3 Part A continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 5 6 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Rautio et al 2001[125] Finland	Evergreen project, Jynälskä 1989/90 75y N= 119M, 236F 80y N=74M, 188F	Both 75 or 80	? C S F	Physical activities of daily living (0-36) (PADL- 9 activities) Instrumental activities of daily living (0-28) (IADL- 7 activities)	Education (3) Perceived financial situation (3)	Gender stratified. Age, marital status, other s.e.p, chronic diseases	Education not statistically significant for men but negatively associated with functioning for women. Perception of poor financial situation associated with greater difficulty or need for help; chronic diseases accounted for the association among women with respect to IADL.
Rautio et al 2001[125] Finland	Evergreen project, Jynälskä 1989/1990 75y. N= 104M, 191F 80y N= 60M, 145F	Both 75 or 80	? C A F	Performance on: Lung vital capacity Maximal physical capacity Maximal muscle strength Maximal walking speed Cognitive capacity (all continuous measures)	Education (3) Perceived financial situation (3)	Gender stratified. Age, marital status, other s.e.p, chronic diseases	Education only positively associated with vital and cognitive capacity for men but with all aspects for women (and not confounded by chronic diseases). Poor perceived financial situation associated with worse capacity on the three maximal capacity measures for men and with cognitive and physical capacity for women but latter was accounted for by chronic disease.
Lasheras et al 2001[123] Spain	Residents of Oviedo. Year ns N= 130M, 218F	Both 65-95	Y C S F	Quality of life (2 each dimension): unhappy, poor social relations, poor self-assessment of health, poor self-rated vision or hearing or chewing ability	Education (2)	Gender stratified. Age and whether alone/family/ institution	Strong differentials for men and women by education. Association particularly strong for men with respect to feeling unhappy and for women with respect to poor general health or vision.

Table 2.3.A3 Part A continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 5 6 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Liang et al 2002[122] Japan	National sample survey linked to official records N=2200 1987 & 3-yearly to 1999	Both 60+	N L S F	Index of functional status scale Z-scores (4 physical abilities and 5ADL) Self-rated health (0-15?) (3 measures used)	Education (4) Household income (5) Home ownership(2)	Gender, age, marital status, other sep, work status, household size, emotional support, instrumental support. NOT prior measure of health	Analysed by 3-year episodes with time-varying covariate. Education negatively associated with poor functional status but not with self-rated health. High income group had lowest prevalence of poor functional status and self-rated health in successive episodes. Owners less likely to have self-rated ill health.

Table 2.3.A3 Health inequalities in high income countries other than Britain and North America – Part B Mortality

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Olausson 1991[125] Sweden	Linkage 1960 Census and National Cause of Death Registry	Both 45-64 in 1960	? F	All-cause mortality 1961-79	Own social class (4) (excluded if not in employment in 1960)	Gender and age stratified. Age, marital status, urbanization	Adjusting only for age, class I/II had the lowest mortality rates for males but Class IIIN no lower than for manual groups. Tendency for class differences to be greater in more urban areas. Class differences increased with age among women; class IV/V clearly the worst for women.
Martelin 1994[115] Finland	Linkage 1980 Census to death registration No. deaths: 1918 M 1706 F	Both 60+ at death	Y F	All cause mortality 1981-5	Educational (3) Own occupation (7, incl none) Hhd income (5 incl not known) Housing tenure (3 incl not known) Housing conditions (5 incl not known)	Gender and age stratified. Age	Lower mortality among those with secondary or higher level of education compared to those with basic education; also lowest among upper white – collar workers or with highest income or with highest housing standard. Occupational differences larger among men than women up to age 85 and tend to diminish with age. Among non-farmers, the four indicators confound each other but are all significant except possibly for women's occupation (Tenure and housing conditions apply to non-institutionalised population only)
Sundquist & Johansson 1997[128] Sweden	Level of Living Survey 1979-85 N=39156	Both 25-74	Y F	All-cause mortality to end 1993	Education (3) Housing tenure (2) (rented flat/other)	Gender and age stratified. Age, marital status, live alone, self-reported health status, other s.e.p	For those aged 60-74 at baseline: Both in crude and fully adjusted models education level was negatively associated with mortality (but for women middle level not significantly different from higher level). Also people in rented flats had higher mortality than others.

Table 2.3.A3 Part B continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Amaducci et al 1998[119] Italy	Italian Longitudinal Study on Aging 1992 No deaths = 426	Both 65-84 in 1992	Y F	All cause mortality 2 years	Education (4)	Gender, age, disability status	Education was negatively associated with mortality in unadjusted models but this disappeared when further adjusted for disability, age, and gender
Martelin 1998[116] Finland	Linkage Census data (1970, 1975, 1980, 1985) to death registers No deaths: 163998 M 81807 F	Both 80+ at death	? F	All-cause mortality for five-year period following Census.	Education (3) Occupational class in 1970/75 (6) (spouse if not working)	Gender stratified. Age, period, marital status, region of residence, language group.	Adjusted for age and period, excess mortality rate for men and women with basic education compared with those with higher education. Similarly for former manual workers compared with upper non-manual workers. Also high death rate among female farmers. Life expectancy after age 80 1 year less for the high-rate groups. Education and occupation confound each other but each contributes to the mortality rate - other factors did not further attenuate the rate ratios.
Borrell et al 1999[186] Spain	1991 Municipal Census linked to death register. No. deaths: 48474 Madrid 32280 Barcelona	Both 25+	Y F	All-cause mortality 1993-4	Education (3)	Gender and age stratified	A mixed picture for men and women aged 65+y and weaker associations than at younger ages. Generally some sign that having no education associated with increased mortality (not significant in all groups). Primary education only a clear disadvantage for men in Madrid. The causes contributing most to the excess were respiratory diseases in men and cardiovascular diseases among women.

Table 2.3.A3 Part B continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Manor et al 1999[140] Israel	Israel Longitudinal Mortality Study 1983 Census	Both 45-89	N O	All-cause mortality to end 1992	Education (3) Possession of car (2) Employment status (2)	Age stratified. Age, marital status, origin, no, rooms in home, household amenities other s.e.p	Result for age 70-89 y. Having 9+y of education yielded lower mortality rate than fewer years; also reduced rate if employed or in possession of a car in age-adjusted models. In the full model education ceased to be significant but car ownership and employment remained so. Absolute and relative differentials smaller for age 70-89 y than for age group 45-69 y.
Van Rossum et al 2000[141] Nether-lands	Rotterdam study – residents of Ommoord district 1989-93 N=7983	Both 55+	Y F	All-cause mortality to mid 1996	Education (4) Occupational class (5) (own last job) Equivalent hhd income (5)	Gender stratified. Age, other s.e.p.	Adjusted for age only, all three indicators showed differentials between extreme groups for men and education and income did for women. In the full model, the separate s.e.p parameters were attenuated and only income statistically significant for men while none of the factors were for women. No statistically significant interactions between age and s.e.p.
Regidor et al 2001[187] Spain	1996 Madrid Municipal Census linked to deaths N = 27,761 deaths	Both 25+	Y F	All-cause mortality 1996-7	Education (5)	Gender and age stratified Age, marital status, household size	Results for age 65 +y. Trends of increasing mortality rates with less education. Relative rates adjusted for marital status and household size were only slightly less than those adjusted only for age.

Table 2.3.A3 Part B continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Marti-kainen et al 2001[188] Finland	1990 Census and tax information linked to death registration N 261000 death	Both 30+	Y F	All-cause and cause-specific mortality 1991-6	Hhd disposable income per consumption unit (10)	Gender and age stratified. Age, family, social class, education, economic activity of self and spouse.	Results for age 65+y. Negative association between income deciles and all-cause mortality that was only slightly attenuated after adjusting for social class, education and economic activity. The relative rates for income diminished in old age, peaking at around age 55-59y for income
Korten et al 1999[147] Australia	Community survey Canberra & Queanbeyan 1990/1 link to death registers N=897	Both 70+	N O	All-cause mortality -1994	Education (ns) Occupational class (5)	Gender, age, Many factors measured, including behaviour, prior health and functioning	Socioeconomic status was not associated even at the bivariate level.

Table 2.3.A3 Part B continued

1 Reference	2 Source Number in analysis	3 Gender Age (years)	4 7	8 Outcome	9 Socio-economic variable (s.e.p.)	10 Factors taken into account	11 Main Finding
Liang et al 2002[122] Japan	National sample survey linked to official records N=2200	Both 60+	N F	Mortality 1987-1999	Education (4) Household income (5) Home ownership (2)	Gender,age, marital status, other sep, work status, household size, emotional support, instrumental support. Various health measures Period	At a bivariate level, less education and lower income associated with higher mortality (not uniform trend) but tenure not. Education appeared to influence mortality partly through baseline health conditions. Educational and income effect attenuated by gender, age and social support, and ceased to be significant when baseline health status and period added. Interactions between gender and education and age and education: benefit of higher education persists over time with women; with longer follow up less education becomes an advantage; for deaths at age 80+ less education an advantage

Study populations for Appendix tables

Table Numbers	Data source	Dates	Study population
4.3.A1	Longitudinal Study	1971	Men and women aged 55-74 years in 1971 and in the community in both 1971 and 1981
4.6.A1, 4.7.A1	Longitudinal Study	1971	Men and women aged 55-74 in 1971 who were in the community in 1971, 1981 and 1991
5.3.A1, 5.3.A2, 5.3.A3,	Whitehall Resurvey	1997-8	Survivors of a cohort of men in London-based Civil Service Departments and aged 40-69 years in 1967-70 (aged 65-97 years at Resurvey I 1997-8)
5.7.A1	Whitehall Resurvey	1997-8	Specified at the head of each column
6.1.A1, 6.1.A2, 6.2.A1, 6.3.A1,	MRC Study	1995-9+	Men and women aged 75 years and over* registered in 23 general practices in Great Britain.. Eligible for health screening check for those aged 75 years and over. Exclusions: in a nursing home or too ill to take part.
6.5.A1	MRC Study	1995-9	As above but comparisons of subsets with and without a brief assessment
6.5.A2, 6.5.A3, 6.5.A4, 6.5.A5, 6.5A6	MRC Study	1995-9	The subset who had a brief assessment. In each case those with missing values on the key variables are excluded
6.6.A1	MRC Study	1995-9	Top half: all with quality of life data. Lower half: subset with brief assessment
6.6.A2, 6.6.A3, 6.6.A4, 6.6.A5, 6.6.A6, 6.6.A7	MRC Study	1995-9	The subset who had a detailed assessment.
8.3.A1	MRC Study	1995-9	Men and women aged 75 years and over* registered in 23 general practices in Great Britain.. Eligible for health screening check for those aged 75 years and over. Exclusions: in a nursing home or too ill to take part.
8.6.A1	MRC Study	1995-9	People in owner occupation or social housing in mid-life and late life and assigned a social class

Further notes:
+Fieldwork took place during 1995-9, the year depending on which General Practice the person belonged to
*People could be aged 74 years at the time of the quality of life interview provided that they would be aged 75 years when they had an assessment

Table 4.3.A1 Odds ratios (OR), 95% confidence intervals (CI) and p values for mortality 1981, 1992 by inter-census changes in demographic and socioeconomic circumstances and whether changed address –Longitudinal Study

Transition factor 1971-1981	Age 55-64 years in 1971				Age 65-74 years in 1971			
MEN	OR[1]	Adj OR[2]	95% CI	P	OR[1]	Adj OR[2]	95% CI	P
Housing tenure								
Owner-occupation in 1971 and1981	1.00	1.00			1.00	1.00		
Moved into owner-occupation	1.07	1.09	(0.99, 1.20)	*0.06*	1.03	1.03	(0.86, 1.23)	*0.72*
Moved out of owner-occupation	1.21	1.22	(1.07, 1.39)	*0.00*	1.05	1.06	(0.89, 1.27)	*0.48*
In rented accommodation	1.22	1.22	(1.16, 1.29)	*0.00*	1.04	1.05	(0.97, 1.13)	*0.26*
Car availability								
Available in 1971 and 1981	1.00	1.00			1.00	1.00		
Gained availability	1.22	1.21	(1.09, 1.35)	*0.00*	1.34	1.34	(1.13, 1.60)	*0.00*
Lost availability	1.48	1.48	(1.37, 1.59)	*0.00*	1.48	1.48	(1.32, 1.66)	*0.00*
No car in either year	1.36	1.36	(1.28, 1.43)	*0.00*	1.36	1.36	(1.25, 1.47)	*0.00*
Marital status								
Married in 1971 and 1981	1.00	1.00			1.00	1.00		
Formed relationship	0.92	0.92	(0.76, 1.10)	*0.37*	0.90	0.90	(0.69, 1.19)	*0.47*
Marriage ended after 1971	1.14	1.14	(1.00, 1.30)	*0.05*	1.17	1.17	(0.96, 1.45)	*0.12*
Single throughout	1.31	1.31	(1.18, 1.45)	*0.00*	1.28	1.28	(1.12, 1.47)	*0.00*
Marriage ended before 1971	1.31	1.31	(1.15, 1.50)	*0.00*	1.31	1.32	(1.12, 1.56)	*0.00*
Living arrangements								
Not alone in 1971and 1981	1.00	1.00			1.00	1.00		
Ceased to be alone	1.08	1.08	(0.87, 1.37)	*0.49*	1.13	1.14	(0.83, 1.55)	*0.43*
Became alone	0.88	0.88	(0.78, 0.98)	*0.02*	0.89	0.89	(0.77, 1.03)	*0.12*
Alone in 1971 and 1981	0.87	0.87	(0.75, 1.01)	*0.08*	0.80	0.80	(0.66, 0.97)	*0.02*
Moved:								
Not in 1971, 81		1.00				1.00		
In year before census		0.98	(0.93, 1.03)	*0.36*		0.97	(0.90, 1.33)	*0.48*
In first 9 years of period		0.99	(0.88, 1.12)	*0.90*		1.08	(0.88, 1.33)	*0.47*

Table 4.3.A1 continued

Transition factor 1971-1981 WOMEN	Age 55-64 years in 1971 OR[1]	Adj OR[2]	95% CI	P	Age 65-74 years in 1971 OR[1]	Adj OR[2]	95% CI	P
Housing tenure								
Owner-occupation in 1971 and1981	1.00	1.00			1.00	1.00		
Moved into owner-occupation	1.07	1.06	(0.96, 1.18)	*0.24*	1.00	0.99	(0.87, 1.12)	*0.84*
Moved out of owner-occupation	1.18	1.18	(1.04, 1.33)	*0.01*	1.30	1.24	(1.10, 1.41)	*0.00*
In rented accommodation	1.23	1.23	(1.17, 1.30)	*0.00*	1.15	1.14	(1.08, 1.21)	*0.00*
Car availability								
Available in 1971 and 1981	1.00	1.00			1.00	1.00		
Gained availability	1.08	1.08	(0.97, 1.20)	*0.18*	1.05	1.04	(0.92, 1.19)	*0.53*
Lost availability	1.13	1.13	(1.05, 1.22)	*0.00*	1.01	1.01	(0.91, 1.11)	*0.90*
No car in either year	1.22	1.22	(1.15, 1.29)	*0.00*	1.14	1.15	(1.06, 1.24)	*0.00*
Marital status								
Married in 1971 and 1981	1.00	1.00			1.00	1.00		
Formed relationship	1.03	1.03	(0.86, 1.23)	*0.77*	0.87	0.87	(0.66, 1.15)	*0.32*
Marriage ended after 1971	1.14	1.14	(1.03, 1.26)	*0.01*	1.17	1.17	(1.05, 1.30)	*0.00*
Single throughout	1.24	1.24	(1.14, 1.34)	*0.00*	1.14	1.13	(1.03, 1.25)	*0.01*
Marriage ended before 1971	1.23	1.23	(1.14, 1.34)	*0.00*	1.30	1.30	(1.19, 1.41)	*0.00*
Living arrangements								
Not alone in 1971and 1981	1.00	1.00			1.00	1.00		
Ceased to be alone	0.96	0.96	(0.81, 1.14)	*0.62*	1.00	1.00	(0.84, 1.17)	*0.90*
Became alone	0.82	0.82	(0.75, 0.89)	*0.00*	0.88	0.88	(0.80, 0.96)	*0.01*
Alone in 1971 and 1981	0.89	0.89	(0.81, 0.97)	*0.01*	0.78	0.78	(0.71, 0.85)	*0.00*
Moved:								
Not in 1971, 81		1.00				1.00		
In year before census		1.02	(0.97, 1.08)	*0.35*		1.05	(0.99, 1.11)	*0.11*
In first 9 years of period		0.94	(0.83, 1.06)	*0.30*		1.18	(1.02, 1.36)	*0.03*

1. Adjusted for 5, year age and time bands and other factors
2. Also adjusted for having changed address in 1980/81 or 1971/80

Table 4.6.A1 Odds ratios (OR), 95% confidence intervals (CI) and p values of having a long-standing illness at the 1991 Census by socioeconomic and demographic circumstances in 1971- Longitudinal Study

People in the community in 1971, 1981 and 1991 .

Characteristic in 1971 MEN	Age 55-64 years in 1971				Age 65-74 years in 1971			
	OR[1]	Adj OR[2]	95% CI	*P*	OR[1]	Adj OR[2]	95% CI	*P*
Housing tenure and car availability								
In owner-occupation, car	1.00	1.00			1.00	1.00		
In owner-occupation, no car	1.39	1.36	(1.19, 1.56)	0.00	1.13	1.09	(0.80, 1.47)	0.59
In rented accommodation, car	1.18	1.17	(1.04, 1.31)	0.01	0.97	0.91	(0.63, 1.32)	0.62
In rented accommodation, no car	1.49	1.41	(1.25, 1.60)	0.00	1.27	1.24	(0.91, 1.70)	0.17
Social Class[3]								
I/II	1.00	1.00			1.00	1.00		
IIIN	1.12	1.06	(0.91, 1.23)	0.46	0.89	0.86	(0.60, 1.25)	0.43
IIIM	1.13	1.03	(0.92, 1.15)	0.66	1.19	1.13	(0.82, 1.57)	0.46
IV/V	1.31	1.14	(1.00, 1.30)	0.04	1.23	1.15	(0.82, 1.62)	0.41
Unclassified[4]	2.63	2.31	(1.69, 3.15)	0.00	1.05	0.97	(0.57, 1.63)	0.90
Marital status/whether alone								
Married/cohabiting	1.00	1.00			1.00	1.00		
Single, alone	0.95	0.81	(0.59, 1.11)	0.19	{0.40	{0.38	(0.20, 0.71)	0.00
not alone	0.82	0.75	(0.57, 0.99)	0.04	{.....	{.....		
Widowed, alone	1.00	0.92	(0.66, 1.29)	0.63	{1.03	{1.00	(0.67, 1.48)	0.99
not alone	0.96	0.94	(0.66, 1.34)	0.73	{.....	{.....		
Divorced/separated, alone	1.15	1.06	(0.73, 1.55)	0.76	{.....	{.....		
not alone	1.03	1.00	(0.73, 1.37)	0.98	{.....	{.....		

Table 4.6.A1 continued

Characteristic in 1971 WOMEN	Age 55-64 years in 1971				Age 65-74 years in 1971			
	RR[1]	Adj RR[2]	95% CI	*P*	RR[1]	Adj RR[2]	95% CI	*P*
Housing tenure and car availability								
In owner-occupation, car	1.00	1.00			1.00	1.00		
In owner-occupation, no car	1.19	1.19	(1.08, 1.31)	0.00	1.04	1.03	(0.96, 1.10)	0.33
In rented accommodation, car	1.31	1.32	(1.20, 1.46)	0.00	1.05	1.02	(0.92, 1.12)	0.67
In rented accommodation, no car	1.48	1.47	(1.35, 1.60)	0.00	1.21	1.09	(1.03, 1.15)	0.01
Social Class[3]								
I/II	1.00	1.00			1.00	1.00		
IIIN	0.99	0.94	(0.82, 1.09)	0.42	0.79	0.89	(0.75, 1.03)	0.13
IIIM	1.15	1.04	(0.87, 1.26)	0.65	0.62	0.79	(0.61, 0.95)	0.02
IV/V	1.24	1.09	(0.95, 1.25)	0.24	0.88	0.91	(0.77, 1.04)	0.20
Unclassified[4]	1.32	1.28	(1.13, 1.46)	0.00	0.94	0.95	(0.84, 1.06)	0.43
Marital status/whether alone								
Married/cohabiting	1.00	1.00			1.00	1.00		
Single, alone	1.02	1.10	(0.92, 1.31)	0.30	{0.95	{0.95	(0.74, 1.22)	0.69
not alone	0.87	0.94	(0.80, 1.11)	0.48	{.....	{.....		
Widowed, alone	1.08	1.05	(0.92, 1.19)	0.49	1.00	0.94	(0.78, 1.14)	0.53
not alone	1.14	1.14	(1.00, 1.30)	0.04	1.23	1.24	(0.97, 1.61)	0.08
Divorced/separated, alone	1.36	1.34	(1.03, 1.75)	0.03	{0.99	{0.96	(0.66, 1.42)	0.86
not alone	0.91	0.91	(0.74, 1.11)	0.33	{.....	{.....		

1. Adjusted for age
2. Adjusted for age and other factors listed
3. Social class derived from occupation at the census or most recent occupation.
4. Those not assigned a class either because of inadequate information or because they did not have an occupation.

Table 4.7.A1 Odds ratios (OR), 95% confidence intervals (CI) and p values for having longstanding illness at the 1991 census by inter-census changes in socioeconomic factors: Longitudinal Study

People in the community in 1971, 1981 and 1991

Transition factor 1971, 1981 MEN	Age 55-64 years in 1971				Age 65-74 years in 1971			
	OR[1]	Adj OR[2]	95%CI	*P*	OR[1]	Adj OR[2]	95%CI	*p*
Housing tenure								
Owner-occupation in 1971 and1981	1.00	1.00			1.00	1.00		
Moved into owner-occupation	0.96	0.97	(0.81, 1.16)	0.71	0.87	0.89	(0.50, 1.58)	0.68
Moved out of owner-occupation	1.33	1.21	(0.93, 1.57)	0.16	1.64	1.61	(0.88, 2.94)	0.12
In rented accommodation	1.31	1.15	(1.04, 1.26)	0.01	1.18	1.09	(0.84, 1.42)	0.52
Car availability								
Available in 1971 and 1981	1.00	1.00			1.00	1.00		
Gained availability	1.16	1.15	(0.94, 1.39)	0.17	1.17	1.12	(0.63, 2.00)	0.70
Lost availability	1.55	1.49	(1.28, 1.74)	0.00	1.28	1.21	(0.81, 1.80)	0.35
No car in either year	1.53	1.45	(1.31, 1.61)	0.00	1.28	1.21	(0.93, 1.58)	0.16
Marital status								
Married in 1971 and 1981	1.00	1.00			1.00	1.00		
Formed relationship	0.81	0.76	(0.58, 0.99)	0.05	0.69	0.97	(0.40, 2.32)	0.94
Marriage ended after 1971	0.93	0.96	(0.76, 1.20)	0.70	{0.87	{0.72	(0.40, 1.30)	0.16
Single throughout	1.08	0.86	(0.63, 1.18)	0.35	{1.09	{1.41	(0.87, 2.29)	0.28
Marriage ended before 1971	1.15	0.95	(0.71, 1.27)	0.73	{.....	{.....		
Living arrangements								
Not alone in 1971and 1981	1.00	1.00			1.00	1.00		
Ceased to be alone	0.77	0.88	(0.56, 1.40)	0.59	0.45	0.50	(0.17, 1.50)	0.22
Became alone	1.12	1.07	(0.84, 1.37)	0.57	0.89	0.64	(0.37, 1.11)	0.11
Alone in 1971 and 1981	1.17	1.18	(0.85, 1.63)	0.32	1.15	1.48	(0.70, 3.13)	0.31

Table 4.7.A1 continued

Transition factor 1971, 1981 WOMEN	Age 55-64 years in 1971 OR[1]	Adj OR[2]	95%CI	*P*	Age 65-74 years in 1971 OR[1]	Adj OR[2]	95%CI	*p*
Housing tenure								
Owner-occupation in 1971 and1981	1.00	1.00			1.00	1.00		
Moved into owner-occupation	1.30	1.28	(1.11, 1.48)	0.00	0.79	0.78	(0.56, 1.08)	0.13
Moved out of owner-occupation	1.23	1.19	(0.99, 1.42)	0.06	1.66	1.66	(1.12, 2.47)	0.01
In rented accommodation	1.36	1.27	(1.18, 1.36)	0.00	1.26	1.22	(1.05, 1.43)	0.01
Car availability								
Available in 1971 and 1981	1.00	1.00			1.00	1.00		
Gained availability	1.07	0.97	(0.83, 1.14)	0.75	0.96	0.88	(0.63, 1.23)	0.46
Lost availability	1.19	1.21	(1.08, 1.34)	0.00	1.16	1.16	(0.90, 1.49)	0.26
No car in either year	1.35	1.28	(1.17, 1.39)	0.00	1.21	1.15	(0.94, 1.40)	0.18
Marital status								
Married in 1971 and 1981	1.00	1.00			1.00	1.00		
Formed relationship	1.02	0.98	(0.77, 1.26)	0.89	0.66	0.67	(0.36, 1.23)	0.19
Marriage ended after 1971	1.01	1.07	(0.94, 1.21)	0.31	1.14	1.41	(1.08, 1.84)	0.01
Single throughout	0.94	0.92	(0.79, 1.06)	0.24	0.99	1.08	(0.82, 1.43)	0.59
Marriage ended before 1971	1.11	1.06	(0.94, 1.21)	0.35	1.15	1.24	(0.97, 1.59)	0.08
Living arrangements								
Not alone in 1971and 1981	1.00	1.00			1.00	1.00		
Ceased to be alone	1.10	1.08	(0.83, 1.41)	0.56	0.92	1.08	(0.67, 1.75)	0.74
Became alone	0.98	0.84	(0.74, 0.95)	0.01	1.00	0.71	(0.55, 0.93)	0.01
Alone in 1971 and 1981	1.09	0.95	(0.82, 1.10)	0.47	1.06	0.85	(0.67, 1.09)	0.21

1 Adjusted for 5 year age bands

2 Adjusted for 5 year age bands and other factors shown.

Table 5.3.A1 Odds ratios (95% confidence intervals) for components of self-reported poor health outcomes by baseline employment grade, adjusted for age at re-survey – Whitehall Resurvey

		Employment Grade				
Morbidity measure	Prevalence (%)	Administrative	Professional/ executive	Clerical/ manual	p-val	n
Mental health						
Nervous most/all of the time	1.4	1.00	1.06 (0.4-2.7)	2.26 (0.8-6.2)	0.045	5899
Down in dumps most/all of the time	0.7	1.00	1.57 (0.4-6.6)	1.72 (0.3-8.9)	0.78	5902
Calm none/little of the time	7.1	1.00	1.02 (0.7-1.5)	1.52 (1.0-2.4)	0.027	5958
Down-hearted most/all of the time	1.5	1.00	3.10 (0.8-12.7)	5.82(1.3-25.4)	0.011	5929
Happy none/little of the time	5.3	1.00	1.41 (0.8-2.4)	2.16 (1.2-3.9)	0.010	6022
Physical performance						
Limited a lot by health in:						
vigorous activities	31.2	1.00	1.11 (0.9, 1.4)	1.49 (1.1, 2.0)	0.002	6005
moderate activities	8.4	1.00	1.31 (0.9, 2.0)	2.54 (1.6, 4.0)	<0.001	6031
lifting or carrying groceries	5.9	1.00	2.53 (1.3, 5.2)	6.17 (3.1,12.5)	<0.001	6019
climbing several flights of stairs	16.9	1.00	2.11 (1.5, 3.0)	3.63 (2.5, 5.3)	<0.001	6027
climbing 1 flight of stairs	4.8	1.00	3.19 (1.4, 7.2)	8.16 (3.5,19.0)	<0.001	6003
bending, kneeling, stooping	10.9	1.00	2.05 (1.3, 3.2)	3.94 (2.5, 6.3)	<0.001	6039
walking more than half a mile	14.8	1.00	1.64 (1.2, 2.3)	2.86 (2.0, 4.2)	<0.001	6029
walking half a mile	10.0	1.00	1.92 (1.2, 3.0)	3.63 (2.2, 5.9)	<0.001	5954
walking one hundred yards	4.1	1.00	4.23 (1.6, 11.5)	9.05 (3.2,25.2)	<0.001	5960
bathing and dressing oneself	3.4	1.00	3.22 (1.2, 8.8)	9.00 (3.2,25.1)	<0.001	6052
Activities of daily living						
Unable to do:						
cutting toe nails	8.6	1.00	1.60 (1.0, 2.5)	3.21 (2.0, 5.2)	<0.001	6111
cooking a hot meal	4.6	1.00	1.15 (0.7, 1.9)	1.86 (1.0, 3.3)	0.015	6078
light housework, simple repairs	3.5	1.00	1.50 (0.8, 3.0)	3.17 (1.5, 6.6)	<0.001	6098
Unable to do, or difficulty with, [1]:						
dressing self	6.3	1.00	1.69 (1.0, 2.8)	2.64 (1.5, 4.6)	0.001	6106
going up and down stairs/steps	17.4	1.00	1.81 (1.3, 2.5)	3.08 (2.2, 4.4)	<0.001	6104

1 As few were unable to do the task those who had difficulty were included for the purposes of this table only

Table 5.3.A2 Baseline predictors (other than employment grade) of self-reported poor health outcomes – Whitehall Resurvey: odds ratios (OR) (95% confidence intervals) and p-values

Baseline characteristic	General health [1] (n=6939) OR (95% CI)	p-value	Mental health [1] (n=5921) OR (95% CI)	p-value	Physical performance [1] (n=5968) OR (95% CI)	p-value	Disability [1] (n=6079) OR (95% CI)	p-value
Not married	-		1.54 (1.16, 2.04)	0.003	-		-	
Had signs of heart disease [2]	1.42 (1.09, 1.85)	0.010	-		-		-	
In top quintile [3] of:								
total cholesterol	-		-		-		1.24 (1.01, 1.53)	0.056
systolic blood pressure	-		-		-		-	
diastolic blood pressure	1.38 (1.05, 1.82)	0.022	-		-		1.31 (1.04, 1.65)	0.020
Had body mass index >=30[4]	1.74 (1.06, 2.84)	0.029	1.58 (0.97, 2.55)	0.065	2.26 (1.48, 3.45)	<0.001	1.76 (1.16, 2.66)	0.008
Blood sugar level >96mg/dl	-		-		-		1.84 (1.30, 2.62)	0.001
No respiratory symptom	1.00		-		1.00		1.00	
Persistent phlegm/cough	1.23 (0.90, 1.69)		-		1.31 (1.01, 1.70)		1.60 (1.27, 2.01)	
Increasing phlegm/cough	3.89 (2.81, 5.38)		-		2.64 (1.88, 3.71)		1.65 (1.16, 2.37)	
Hospitalised for respiratory	1.78 (1.26, 2.50)	<0.001	-		1.41 (1.02,1.95)	<0.001	1.23 (0.90, 1.67)	<0.001
Hospitalised for non-cardio-respiratory disease (4 or more times)	1.67 (1.24, 2.24)	0.001	-		1.91 (1.48, 2.46)	<0.001	-	

1. Factors were retained in the model if they affected the estimates of grade effect or if they had a significant association with the outcome in the presence of the other factors. Models adjusted for age, for employment grade, and for other factors listed.
2. Coded yes if had angina according to the Rose Angina questionnaire, answered adversely a question on chest pain suggesting a possible myocardial infarction, had intermittent claudication, had an adverse ECG reading, or had been in hospital for a cardiovascular complaint. Reference group = those who were coded no.
3. Reference groups = those not in the top quintile
4. Reference group those with BMI < 30

Table 5.3.A3 Odds ratios (OR) (95% confidence intervals) for poor health outcomes by respiratory symptoms, before and after adjustment for cigarette smoking (both adjusted for age, employment grade and for other significant baseline health factors in the model) Whitehall Resurvey

Baseline characteristic	General health (n=6939) OR (95% CI)	Physical performance (n=5968) OR (95% CI)	Disability (n=6079) OR (95% CI)
Before adjustment for smoking			
No respiratory symptom	1.00	1.00	1.00
Persistent phlegm/cough	1.23 (0.90, 1.69)	1.31 (1.01, 1.70)	1.60 (1.27, 2.01)
Increasing phlegm/cough	3.89 (2.81, 5.38)	2.64 (1.88, 3.71)	1.65 (1.16, 2.37)
Hospitalised for respiratory	1.78 (1.26, 2.50)	1.41 (1.02,1.95)	1.23 (0.90, 1.67)
p-value[1]	<0.001	<0.001	<0.001
After adjustment for smoking			
No respiratory symptom	1.00	1.00	1.00
Persistent phlegm/cough	1.01 (0.73, 1.39)	1.12 (0.85, 1.46)	1.43 (1.13, 1.81)
Increasing phlegm/cough	3.22 (2.30, 4.49)	2.23 (1.58, 3.16)	1.46 (1.01, 2.10)
Hospitalised for respiratory	1.77 (1.25, 2.50)	1.38 (1.00,1.91)	1.23 (0.91, 1.68)
p-value[1]	<0.001	<0.001	0.008

1. Maximum likelihood log-likelihood ratio test for whole factor

Table 5.7.A1 Estimated prevalence of self-reported poor health outcomes at resurvey by employment grade at baseline, with and without assumptions about outcomes among those for whom the information is missing – Whitehall resurvey

1	2	3	4	5
Baseline grade	**Main questionnaire; outcome known**	**Main and short questionnaire; outcome known**	**Assuming outcome among respondents with incomplete information**	**Assuming outcome also among non-respondents who were alive at resurvey**
General health[1]				
Administrative		14/459 (3.1%)	14/466 (3.0%)	42/555 (7.6%)
Professional/Executive		296/5652 (5.2%)	218/5709 (5.6%)	739/6743 (11.0%)
Clerical/Manual		79/853 (9.3%)	84/866 (9.7%)	288/1239 (23.2%)
Mental health[2]				
Administrative	30/437 (6.9%)		35/466 (7.5%)	56/555 (10.1%)
Professional/Executive	367/4879 (7.5%)		661/5709 (11.6%)	1056/6743 (15.7%)
Clerical/Manual	87/610 (14.3%)		217/866 (25.1%)	421/1239 (34.0%)
Physical performance[3]				
Administrative	19/430 (4.4%)		45/466 (9.7%)	109/555 (19.6%)
Professional/Executive	426/4923 (8.7%)		1072/5709 (18.8%)	1916/6743 (28.4%)
Clerical/Manual	117/625 (18.7%)		317/866 (36.6%)	647/1239 (52.2%)
Disability[4]				
Administrative	37/440 (8.4%)		43/466 (9.2%)	63/555 (11.4%)
Professional/Executive	518/5030 (10.3%)		758/5709 (13.3%)	1125/6743 (16.7%)
Clerical/Manual	138/666 (20.7%)		228/866 (26.3%)	408/1239 (32.9%)

1. Columns 4 and 5 assume that has poor general health in non-respondent to general health but at baseline had high bmi or increasing phlegm or had been hospitalised 4 or more times for diseases other than cardio-respiratory or smoked 10 or more cigarettes a day.
2. Columns 4 and 5 assume that has poor mental health if mental health score unavailable but if at baseline was not married or had high bmi or smoked 10 or more cigarettes a day.
3. Columns 4 and 5 assume that has poor physical performance if physical performance score not available but if at baseline had high bmi or increasing phlegm or had been hospitalised 4 or more times for diseases other than cardio-respiratory or was other than a never-smoker
4. Columns 4 and 5 assume that has disability if activities of daily living unavailable but if at baseline was diabetic or had high bmi or smoked 10 or more cigarettes a day.

Table 6.1.A1 Composition of the Quality of Life sample by housing tenure and by who lived with. MRC Trial of the Assessment and Management of Older People in the Community 1995-9

Number (percentage of column).

	Owner-occupied	Rented	Residential home	Not known	Total
Not sheltered	**5164 (98.0)**	**2048 (67.5)**	**273 (100.0)**	**0**	**7485**
Live alone	2129 (40.4)	1086 (35.8)	0		3215
Live with partner	2384 (45.2)	700 (23.1)	1		3085
Live with son/daughter	433 (8.2)	183 (6.0)	0		616
Live with other	192 (3.6)	72 (2.4)	237		501
Not known	26 (0.5)	7 (0.2)	35		68
Sheltered	**106 (2.0)**	**987 (32.5)**	**0**	**26 (100.0)**	**1119**
Live alone	67 (1.3)	727 (24.0)		18	812
Live with partner	32 (0.6)	215 (7.1)		3	250
Live with son/daughter	1 (0.0)	8 (0.2)		0	9
Live with other	4 (0.1)	27 (0.9)		5	36
Not known	2 (0.0)	10 (0.3)		0	12
N (% of total) [1]	5270 (61.3)	3035 (35.3)	273 (3.2)	26 (0.3)	8604

1. Based on those who could be assigned to the housing-tenure dependency, gender and marital status. A further 121 could not be assigned housing tenure-dependency of whom 101 had known tenure only, 13 known living arrangements only, and 7 missing information on both. Marital status was unknown for nine.

Table 6.1.A2 Gender, age and marital status composition of housing tenure-dependency groups. MRC Study

	Non-dependent [1]		Dependent [2]		Supported housing [3,4]	Not known	All
	Owner-occupied	Rented	Owner-occupied	Rented			
Number (%)	4533 (51.9)	1792 (20.5)	632 (7.2)	257 (2.9)	1392 (15.9)	128 (1.5)	8734 (100)
Men (%)	43.2	37.8	24.5	28.4	25.0	44.5	37.5
Age (years)	%	%	%	%	%	%	%
74-79	56.3	52.1	41.3	53.4	40.2	64.9	53.1
80-84	28.2	31.9	34.2	20.6	34.8	29.8	29.8
85-89	12.9	14.3	20.0	24.6	16.9	5.3	14.1
90 or over	2.6	1.8	4.5	1.4	5.3	-	3.0
median age	79.1	79.8	81.1	79.4	81.4		79.6
Marital status	%	%	%	%	%	%	%
Married/cohabiting	76.8	64.5	11.0	9.6	43.1	91.2	66.3
Widowed	19.9	27.4	67.1	74.0	44.0	5.3	27.2
Separated/divorced	1.0	3.4	6.4	11.0	3.4	-	2.2
Single	2.3	4.7	15.5	5.5	9.5	-	4.2
Not known	-	-	-	-	-	0.0	0.0
Women (%)	56.8	62.2	75.5	71.6	74.9	55.5	62.5
Age (years)	%	%	%	%	%	%	%
74-79	51.9	46.0	34.2	39.1	28.5	56.3	44.3
80-84	29.8	33.7	30.2	28.8	33.9	28.2	31.4
85-89	14.4	15.0	22.4	23.9	23.4	11.3	17.2
90 or over	3.9	5.3	13.2	8.2	14.2	4.2	7.1
median age	79.8	80.5	82.5	81.5	81.4		80.9
Marital status	%	%	%	%	%	%	%
Married/cohabiting	36.2	26.1	2.3	1.6	12.0	52.1	25.6
Widowed	55.7	65.0	82.6	82.1	76.3	36.6	64.5
Separated/divorced	1.7	2.3	2.7	4.9	2.6	2.8	2.2
Single	6.4	6.6	12.2	10.9	9.1	1.4	7.5
Not known	-	-	0.2	0.5	-	7.0	1.3

1. Those living alone or with spouse
2. Those living with someone other than spouse but not in supported accommodation
3. Those living in sheltered accommodation or residential homes
4. Gender of one person in a residential home was not known

Table 6.2.A1 Answers to component items of quality of life scales by whether in top (worst) quintile score of that scale. MRC Study

Percentages indicating that the condition applies to them (for Morale, percentage whose response carried negative connotation). Ordered by frequency of problem among the majority.

Item	Top quintile	Remainder
HM		
Do not do heavy work around the house	99	53
Housework for short periods/rest often	80	50
Less of daily household chores than used to	87	50
Do not do any of maintenance/repair work that used to	96	45
Difficulty using hands	51	15
Do not do any of shopping that used to	82	10
Do not do any of clothes washing that used to	79	12
Given up taking care of personal or household business affairs	57	8
Do no do any of cleaning that used to	80	6
Do not do any household chores that used to	51	1
MOB		
Do not get about in dark or unlit places unless someone to help	93	54
Stay at home most of the time	99	52
Only stay away from home for short periods	83	42
Do not use public transport now	89	34
Only go out if there is a lavatory nearby	53	11
Do not go into town	70	11
Stay in bed more	44	9
Only get about in one building	51	1
Stay in one room	7	0
Stay in bed most of the time	4	0
BCM		
Kneel, stoop, bend down only by holding on to something	90	42
Only stand for short periods of time	93	31
Do not keep balance	79	19
Make difficult movements with help, e.g. getting in/out bath/car	86	16
Change position frequently	42	16
Dress self but very slowly	69	13
Move hands/fingers with some difficulty/limitation	52	12
Get in/out of bed/chairs by grasping something for support	78	10
Have trouble putting on shoes/socks/stockings	66	10
Very clumsy	36	7
Do not bath self completely, e.g. need help	63	5
Do not have control of bladder	27	3
Do not bath self at all, am bathed by someone else	42	1
Do not fasten clothing; e.g. require help with buttons/zips/laces	31	1
Hold onto something to move self around in bed	26	1
Do not have control of bowels	7	1
Cannot get in and out of beds/chairs unaided	28	0
Only get dressed with someone's help	22	0
In a restricted position all the time	16	0
Only stand with someone's help	13	0
Use a bedpan with help	4	0
Spend most of time partly dressed or in nightclothes	4	0
Stay lying down most of the time	3	0

Table 6.2.A1 continued

Item	Top quintile	Remainder
SI		
Take part in fewer social activities than used to	90	58
Go out to visit people less often	83	54
Stay alone much of the time	67	34
Cutting down length of visits with friends	71	25
Do not look after my children or family as well as used to	57	18
Often express concern over what might be happening to health	49	17
Talk less with other people	56	12
Often irritable with those around me	32	8
Do not go out to visit people at all	53	7
Show less interest in other people's problems	37	6
Do not joke with members of family as much as used to	25	2
Pay less attention to the children	19	2
Avoid having visitors	13	2
Show less affection	21	1
Disagreeable with family	10	1
Make many demands on other people	8	0
Have frequent outbursts of anger at my family	4	0
Isolate myself as much as can from the rest of the family	5	0
Refuse contact with my family	2	0
Morale		
Take things to heart (% yes)	90	51
Have as much energy as did last year (% no)	88	51
As get older feel less useful (% yes)	88	43
Things keep getting worse as grow older (% yes)	91	38
As get older things better than expected (% no)	75	32
As happy now as when were younger (% no)	81	29
Get upset easily (% yes)	80	27
See enough of friends and relatives (% no)	55	19
Little things bother more this year (% yes)	73	17
Sometimes worry so much that cannot sleep (% yes)	63	17
Feel lonely much (% yes)	63	15
Have a lot to be sad about (% yes)	57	12
Get more angry than used to (% yes)	39	12
Life hard most of the time (% yes)	54	8
Satisfied with life today (% no)	44	7
Sometimes feel that life is not worth living (% yes)	51	6
Afraid of a lot of things (% yes)	33	4

Table 6.3.A1 Medians and inter-quartile ranges for quality of life scores by gender and i) age ii) marital status. MRC Study

	Number[1]	HM[2]	MOB[2]	BCM[2]	SI[2]	Morale
Age (years)						
Men						
<77.5	1089	14.0 (0.0, 31.3)	13.5 (6.3, 25.1)	3.3 (0.0, 9.6)	7.4 (2.0, 14.6)	3 (1, 6)
77.5, <80.0	647	18.2 (5.4, 34.9)	17.2 (7.2, 26.9)	3.6 (0.0, 12.9)	7.9 (2.5, 15.6)	3 (2, 6)
80.0, <82.5	546	21.3 (8.6, 43.1)	17.2 (7.9, 32.0)	3.7 (0.0, 15.0)	10.0 (4.6, 18.3)	4 (2, 7)
82.5, <85.0	426	24.2 (8.6, 43.5)	21.4 (10.9, 32.3)	6.2 (0.0, 15.2)	11.9 (5.4, 20.0)	4 (2, 7)
85.0, <87.5	304	30.3 (10.9, 54.4)	24.4 (10.9, 37.2)	8.6 (2.4, 21.9)	12.6 (7.4, 19.8)	4 (2, 7)
87.5, or greater	253	43.4 (21.3, 75.3)	32.3 (18.1, 45.0)	13.8 (3.6, 30.9)	14.4 (8.1, 23.9)	5 (3, 7)
Women						
<77.5	1451	21.3 (8.6, 34.4)	16.6 (7.9, 26.1)	6.1 (0.0, 15.1)	8.9 (3.7, 15.9)	5 (2, 8)
77.5, <80.0	964	24.9 (11.4, 42.9)	18.8 (7.9, 32.3)	7.8 (2.6, 17.3)	10.7 (4.6, 17;4)	5 (2.5, 8.5)
80.0, <82.5	934	32.2 (15.9, 43.7)	24.7 (10.9, 33.8)	10.0 (3.3, 21.1)	11.9 (7.0, 19.6)	5 (3, 8)
82.5, <85.0	771	33.5 (21.3, 55.0)	26.1 (15.1, 38.9)	14.7 (3.7, 28.6)	14.4 (8.1, 21.3)	6 (3, 9)
85.0, <87.5	575	42.2 (23.6, 65.4)	32.3 (18.8, 43.1)	16.4 (7.0, 31.2)	15.9 (10.0, 22.7)	6 (3, 9)
87.5, or greater	736	54.6 (34.2, 76.7)	38.9 (26.1, 49.4)	22.1 (10.6, 37.2)	18.3 (12.2, 25.3)	6 (3, 9)
Marital Status						
Men						
Married	2162	18.2 (7.3, 36.8)	17.2 (7.2, 29.6)	3.7 (0.0, 13.8)	7.4 (2.5, 14.9)	3 (2, 6)
Widowed/divorced/separated	963	24.9 (8.6, 48.8)	18.8 (7.9, 32,3)	5.8 (0.0, 16.3)	13.5 (7.4, 21.6)	5 (2, 8)
Single	138	26.6 (8.6, 53.5)	23.3 (10.9, 32.3)	3.3 (0.0, 17.5)	14.4 (7.4, 23.2)	4 (2, 7)
Women						
Married	1394	24.0 (10.9, 42.9)	18.8 (7.9, 32.3)	7.3 (0.0, 18.7)	8.1 (3.7, 16.1)	5 (2, 8)
Widowed/divorced/separated	3623	32.2 (16.3, 54.4)	25.1 (13.5, 38.9)	12.1 (3.3, 25.8)	14.4 (7.4, 21.6)	6 (3, 9)
Single	409	32.2 (12.7, 53.4)	25.1 (10.9, 37.5)	10.7 (3.3, 23.4)	12.6 (7.4, 19.8)	4 (2, 7)

1. Base number = those with a Morale score. The numbers with scores on SIP dimensions tended to be a little higher
2. SIP scored – problem due to health or not

Table 6.5.A1 Comparison of age and housing tenure-dependency distributions for those with and without a brief assessment. MRC Study

	Men		Women	
	No brief assessment	Brief assessment	No brief assessment	Brief assessment
Age at quality of life survey (years)	%	%	%	%
Under 77,5	30.9	34.1	22.3	28.4
77.5, under 80	18.9	20.1	16.0	18.3
80, under 82.5	15.5	17.1	16.2	17.6
82.5, under 85	13.4	12.9	13.6	14.4
85, under 87.5	10.6	8.9	12.0	10.0
87.5 and over	10.6	6.9	19.9	11.2
n	753	2519	1576	3886
Housing tenure-dependency	%	%	%	%
'Independent'				
Owner-occupied	54.7	62.8	42.9	49.7
Rented	24.3	20.1	21.2	20.5
'Dependent'				
Owner-occupied	4.7	4.9	9.5	8.6
Rented	3.0	2.1	4.4	3.0
Supported housing	13.4	10.1	22.0	18.3
n	741	2514	1560	3871

Table 6.5.A2 Distributions of health problems (%) by housing tenure-dependency . MRC Study

Health problem[1]	'Independent'		'Dependent'		Supported housing	All	p-value[2]
	Owner-occupied (n=3367)	Rented (n=1251)	Owner-occupied (n=437)	Rented (n=162)	(n=914)	(n=6131)	
A lot of difficulty hearing	5.0	8.7	8.2	11.7	10.3	7.0	<0.001
A lot of difficulty seeing	6.1	8.5	10.5	5.6	17.1	8.5	<0.001
Urinary incontinence	4.1	6.2	7.6	7.4	10.9	5.9	<0.001
Lower legs swollen in morning	6.0	9.4	8.7	11.1	12.8	8.0	<0.001
Severe shortness of breath when sitting/talking	9.0	12.7	13.0	13.0	17.3	11.4	0.001
Number of prescribed medicines							
None	21.4	18.6	19.0	17.3	13.3	19.3	
One/two	38.4	37.6	36.8	32.7	30.0	36.9	
Three or more	37.0	40.1	41.2	44.4	49.8	40.1	<0.001
Not known	3.2	3.7	3.0	5.6	6.9	3.7	
Has problems with everyday memory							
Often/always	6.8	8.7	12.1	11.1	11.8	8.5	<0.001

1. Missing values have been omitted from these tables but are included in the modeling where there were more than 100 overall (incontinence, respiratory disease, swollen legs, number of medicines). Base numbers vary between health problems – the numbers given are those for which there is a value of morale and the health factor
2. Chi-square p-value for heterogeneity allowing for clustering

Table 6.5.A3. Percentages in the worst quintile of quality of life score by health category. MRC Study

Health category	Number in category	HM	MOB	BCM	SI	Morale
Difficulty hearing						
None/little	5704	15.8	12.9	15.7	16.4	17.9
A lot	427	34.0 ***	32.4 ***	36.1 ***	33.9 ***	35.8 ***
Difficulty seeing						
None/little	5609	14.9	12.3	15.2	16.2	17.6
A lot	522	40.7 ***	35.4 ***	38.1 ***	33.0 ***	35.8 ***
Urinary incontinence						
Absent	5690	15.3	12.7	14.9	16.4	18.1
Present	360	42.1	36.0	49.0	34.6	35.8
Not known	81	31.2 ***	29.6 ***	32.1 ***	27.2 ***	29.6 ***
Lower legs swollen						
Not in the morning	5439	15.1	12.2	14.7	15.8	17.5
Yes in the morning	492	38.1	34.8	40.1	31.8	32.9
Not known	200	21.5 ***	20.0 ***	27.0***	30.6 ***	31.0 ***
Severe shortness of breath when sitting/ talking						
Absent	5196	14.3	11.9	14.1	15.3	15.9
Present	697	37.8	32.2	39.3	32.9	40.3
Not known	238	17.2 ***	14.7 ***	19.8 ***	22.7 ***	27.7 ***
No. prescribed medicines						
None	1186	6.7	6.0	5.5	11.2	9.1
One/two	2263	12.3	9.2	12.3	14.5	15.3
Three or more	2456	25.5	22.0	26.0	22.7	27.1
Not known	226	29.2 ***	24.9 ***	31.6 ***	27.0 ***	24.8 ***
Everyday memory problems						
Never/Occasionally	5612	15.2	13.1	15.2	16.2	17.9
Often/Always	519	37.3***	27.2***	38.1***	32.0***	33.0***

*** $p<0.001$ on chi-square adjusted for clustering by practice

Table 6.5.A4. Distributions (%) of health behaviours by housing tenure–dependency. MRC Study

	'Independent'[1] Owner-occupied (n=3405)	Rented (n=1256)	'Dependent'[1] Owner-occupied (n=443)	Rented (n=162)	Supported housing[1] (n=919)	All[1] (n=6185)	p-value[2]
Current cigarette consumption	%	%	%	%	%	%	
None	92.9	88.0	91.9	85.8	89.8	91.2	
1-9 a day	3.4	5.9	4.5	2.5	3.9	4.1	
10 or more a day	3.7	6.1	3.6	11.7	6.3	4.8	<0.001
Alcohol consumed in last week	%	%	%	%	%	%	
Non-drinker	24.7	38.3	34.3	45.1	36.7	30.5	
Occasional drinker	16.9	18.2	17.4	14.8	20.4	17.6	
1-7 drinks	38.8	31.8	35.4	29.0	33.6	36.1	
8-14 drinks	10.7	6.7	8.6	5.6	4.0	8.6	
15 or more	6.4	2.7	3.3	3.7	2.1	4.7	
Not known	2.5	2.4	1.2	1.8	3.3	2.5	<0.001
Self-reported physical activity	%	%	%	%	%	%	
Very active	33.7	26.8	30.5	17.3	16.9	29.1	
Fairly active	49.3	49.9	42.2	50.0	48.3	48.8	
Not very active	13.8	17.9	21.0	25.9	27.0	17.5	
Not at all active	3.2	5.4	6.3	6.8	7.8	4.6	<0.001

1. Base numbers are those with values for the lifestyle variables reported and a value for morale
2. Chi-square test for heterogeneity, taking clustering into account

Table 6.5.A5. Distributions (%) of frequency of external contact by housing tenure–dependency. MRC Study

	'Independent'		'Dependent'		Supported housing	All	p-value[1]
	Owner-occupied (n=3416)	Rented (n=1268)	Owner-occupied (n=442)	Rented (n=162)	(n=919)	(n-6206)	
Sees people outside the household	%	%	%	%	%	%	
Daily	43.3	47.3	42.1	39.5	54.8	45.6	
Two-four times a week	40.2	35.5	33.9	30.9	28.5	36.8	
Less than twice a week	12.5	12.9	17.4	17.3	12.3	13.0	
Rarely	4.0	4.3	6.6	12.3	4.4	4.5	<0.001

1. Chi-square test for heterogeneity, taking clustering into account

Table 6.5.A6. Percentages receiving specified help by housing tenure–dependency . MRC Study

	'Independent'[1,2]		'Dependent'[1,2]		Supported housing[1,2]	All[1,2]	p-value[3]
	Owner-occupied (n=4524)	Rented (n=1791)	Owner-occupied (n=628)	Rented (n=254)	(n=1375)	(n=8572)	
Regular help received from:	%	%	%	%	%	%	
No-one	68.6	62.4	41.4	35.8	59.0	62.8	
Spouse	12.1	11.2	1.4	0.8	6.1	9.8	
Child in same house[4]	0.2	0.3	41.6	41.3	0.2	4.5	
Child not in same house[4]	10.1	17.0	3.0	6.3	20.2	12.5	
Other person in house[5]	-	-	8.3	9.1	1.1	1.1	
Other person not in house[5]	5.7	7.0	1.8	3.5	7.3	5.8	
Not known	3.3	2.2	2.5	3.2	6.1	3.5	<0.001
Service use	%	%	%	%	%	%	
Did not use any services	32.3	33.2	31.1	35.4	18.6	30.3	
Used:							
selected treatment services only	31.2	33.8	33.9	34.2	29.5	31.8	
selected personal care services only	6.7	5.0	3.8	2.4	6.7	6.0	
both treatment and personal care, not other social services or club & treatment or personal care	11.2	8.8	9.2	5.9	17.3	11.4	
social services or club, not treatment or personal care	4.5	6.6	5.4	6.7	11.9	6.3	
Not known	1.4	1.6	1.6	3.2	1.2	1.5	
	12.7	10.9	15.0	12.2	14.8	12.8	<0.001

1. Based on those with information for the variables shown and a value for morale
2. Table limited to those who had information on use of formal services
3. Chi-square pvalue for heterogeneity allowing for clustering
4. Child includes son- or daughter- in-law
5. Other person include sibling, other relative, friend, neighbour

Table 6.6.A1. Percentages with detailed assessment by characteristics used in previous analyses. MRC Study

Characteristic	%	Characteristic	%
Men aged under 80 years	39.2	**Housing tenure-dependency**	
Men aged 80 years and over	36.9	'Independent'	
Women aged under 80 years	36.5	Owner-occupied	37.2
Women aged 80 years and over	33.7	Rented	37.6
All	36.1	'Dependent'	
		Owner-occupied	32.8
Married	39.1	Rented	24.1
Widowed/separated/divorced	33.9	Supported housing	32.8
Single	35.3		
Regular help received from:		**Service use**	
No-one	40.0	Did not use any services	31.3
Spouse	32.1	Used:	
Child in same house	24.0	selected treatment services only	31.7
Child not in same house	29.5	selected personal care services only	37.2
Other person in house	28.9	both treatment & personal care, not other	32.9
Other person not in house	35.4	social services or club & treatment or personal	
Not known	21.4	care	36.5
		social services or club, not treatment/ personal care	
		Not known	29.1
			61.4
Characteristic from brief assessment:			
All	48.3		
Difficulty hearing		**No. prescribed medicines**	
None/little	48.1	None	47.9
A lot	50.2	One/two	49.3
Difficulty seeing		Three or more	47.7
None/little	48.6	Not known	46.2
A lot	45.2		
Urinary incontinence		**Current cigarette consumption**	
Absent	48.1	None	48.7
Present	50.8	1-9 a day	41.6
Not known	50.4	10 or more a day	44.2
Lower legs swollen		**Alcohol consumed in last week**	
Not in the morning	48.2	Non-drinker	45.1
Yes in the morning	49.0	Occasional drinker	51.2
Not known	48.2	1-7 drinks	48.5
		8-14 drinks	50.5
		15 or more	60.3
		Not known	35.5
Severe shortness of breath		**Self-reported physical activity**	
Absent when sitting/ talking	48.5	Very active	50.9
Present	44.7	Fairly active	48.2
Not known	52.8	Not very /not at all active	45.1
Everyday memory problems		**Sees people outside the household**	
Never/Occasionally	48.3	Daily	52.8
Often/Always	48.4	Two-four times a week	45.4
		Less than twice a week	43.3
		Rarely	40.4

Table 6.6.A2. Distributions (%) of health problems reported in the detailed assessment by housing tenure-dependency. MRC Study

	'Independent' Owner-occupied (n= 1533)[1]	Rented (n= 615)[1]	'Dependent' (n= 232)[1]	Supported housing (n=385)[1]	All (n=2765)[1]	p-value[2]
Hearing Failed whispered voice test	21.8	31.4	27.2	29.6	25.5	0.010
Vision < 6/12 binocular vision	13.7	20.5	20.3	26.8	17.6	0.003
Ever told has cancer (excl skin)	8.0	5.2	8.6	6.5	7.2	0.31
Cardiovascular problems/ diabetes						
Possible angina	8.4	10.6	8.2	9.6	9.0	0.58
Ever told has (had):						
Diabetes	5.2	8.1	7.3	7.5	6.4	0.11
Heart attack	10.0	10.4	9.9	15.1	10.8	0.043
Stroke	6.4	7.6	8.2	12.0	7.6	0.024
Symptoms:						
Urinary incontinence- severe	4.1	5.2	6.0	8.4	5.1	
Not known	8.0	7.0	6.9	7.8	7.6	0.19
Phlegm: Not have or < 3 months in year	80.6	75.0	78.0	77.9	78.8	
On most days 3 months of year	14.5	16.3	14.7	16.9	15.2	
Not known	4.9	8.8	7.3	5.2	6.0	0.10
Shortness or breath : None	79.6	70.6	71.5	61.8	74.5	
Walking only	13.6	18.9	20.3	24.2	16.8	
Talking	3.9	5.8	5.6	7.8	5.0	
Not known	2.9	4.7	2.6	6.2	3.7	<0.001
Ever told has: Emphysema	2.9	2.0	1.7	1.3	2.4	0.13
Pneumonia	15.8	13.2	18.5	13.0	15.0	0.20
Asthma	8.9	11.5	11.6	13.8	10.4	0.045
Number of medications : None or one	30.9	24.4	30.2	15.1	27.2	
Two or three	32.7	34.3	28.4	28.0	32.0	
Four –six	21.5	23.4	25.4	35.1	24;2	
Seven or more	6.9	10.2	7.3	12.5	8.5	
Not known	8.0	7.6	8.6	9.3	8.1	<0.001

1. Based on those with values for all the health variables shown and for morale
2. Chi-square p-value for heterogeneity allowing for clustering

Table 6.6.A3. Percentages in the worst quintile of quality of life score by health category from the detailed assessment. MRC Study

	Number in category	HM	MOB	BCM	SI	Morale
Hearing						
Passed test	2060	13.7	10.4	12.8	13.5	15.0
Failed	705	17.3*	17.4**	17.7*	22.7***	18.7*
Vision						
At least 6/12 binocular	2279	12.1	9.4	11.7	14.1	14.7
Less than 6/12 binocular	486	26.5***	25.2***	24.9***	23.9**	21.6*
Never told has cancer (excl skin)	2565	145	11.7	14.1	15.9	15.8
Ever told	200	15.5 ns	18.5 ns	13.5 ns	15.5 ns	17.0 ns
Cardiovascular/diabetes						
Not angina	2516	14.2	11.8	13.5	15.1	14.9
Possible angina	249	18.9 ns	16.5 ns	19.3 **	22.9 *	26.5 ***
Never told has diabetes	2589	14.3	11.7	13.7	15.8	15.8
Ever told	176	18.8 ns	19.9 **	18.8 ns	17.0 ns	18.2 ns
Never told had heart attack	2467	14.0	11.8	13.2	14.9	15.3
Ever told	298	19.1 *	15.8 **	20.8 **	23.5 **	21.1 *
Never told had stroke	2555	12.8	11.2	12.2	14.8	15.7
Ever told	210	36.7 ***	24.3 ***	35.7 ***	28.6 ***	19.0 ns
Symptoms						
Severe incontinence						
Absent	2412	13.4	11.0	11.8	15.1	14.9
Present	142	29.6	26.1	37.3	23.2	22.5
Not certain	211	18.4***	16.0 ***	23.2***	19.0*	23.2*
No phlegm	2178	13.6	11.2	13.3	14.4	14.6
Phlegm for 3+ months/year	421	20.7	17.1	18.3	22.3	22.1
Not known	166	12.0 *	13.2 *	12.6 *	18.6 **	18.1 *
Shortness of breath						
None	2059	9.4	7.7	8.4	11.3	12.8
Walking only	464	26.4	22.2	27.1	27.7	23.5
Talking	139	31.6	24.5	30.9	33.1	33.1
Not known	103	41.8 ***	39.8 ***	45.6 ***	29.1 ***	21.4 ***
Never told has emphysema	2700	14.4	12.0	14.0	15.6	15.7
Ever told	65	21.5 *	18.5 *	16.9 ns	26.2 *	23.1 *
Never told had pneumonia	2349	14.3	11.7	13.5	15.2	15.2
Ever told	416	16.7 ns	14.7 ns	16.8 ns	19.7 ns	19.7 **
Never told has asthma	2477	13.8	12.2	13.4	15.2	15.5
Ever told	288	21.2 **	12.8 ns	19.1 *	21.2 ns	19.1 ns
Number of medications						
None or one	752	8.6	6.8	6.9	11.7	9.8
Two or three	886	13.1	10.6	12.6	15.4	16.1
Four-six	668	21.8	19.0	22.1	20.5	22.5
Seven or more	234	22.6	18.0	24.8	22.2	21.8
Not known	225	10.7***	10.2 ***	8.0 ***	11.1 **	9.8**

*** p<0.001 ** <0.01 * <0.05 ns p>0.05 on chi-square adjusted for clustering by practice

Table 6.6.A4. Distributions (%) of health behaviours from detailed questionnaire by housing tenure–dependency. MRC Study

	'Independent'		'Dependent'	Supported housing	All	p-value[1]
	Owner-occupied (n=1587)	Rented (n= 633)	(n= 257)	(n=420)		
Number of pack-years of cigarettes[2]	%	%	%	%	%	
Less than 2	46.5	41.2	54.9	51.7	46.8	
2, less than 10	12.2	11.4	10.5	13.3	12.1	
10, less than 25	17.0	15.3	8.2	14.8	15.5	
25, less than 40	9.4	11.8	9.3	9.3	9.9	
40 or more	14.9	20.2	17.1	10.9	15.7	0.020

1. Chi-square test for heterogeneity, taking clustering into account
2. One pack year equivalent to 20 cigarettes a day or 2/3 oz tobacco for hand rolled cigarettes for a year

Table 6.6.A5. Percentages in the worst quintile of quality of life score by health behaviour from the detailed assessment. MRC Study

	Number in category	HM	MOB	BCM	SI	Morale
Number of pack-years of cigarettes[2]						
Less than 2	1386	15.8	13.9	15.2	15.7	16.5
2, less than 10	356	15.7	15.4	15.2	15.4	6.3
10, less than 25	463	14.5	11.0	14.0	14.7	15.1
25, less than 40	298	16.1	9.1	14.8	16.1	19.5
40 or more	458	17.5 ns	14.6 ns	15.3 ns	22.0 *	18.1 ns

*** p<0.001 on chi-square adjusted for clustering by practice ** P< 0.01 ns p>0.05

Table 6.6.A6. Distributions (%) of social situation from the detailed assessment by housing tenure–dependency. MRC Study

	'Independent'		'Dependent'	Supported housing	All	p-value[1]
	Owner-occupied (n=1615)	Rented (n= 640)	(n= 258)	(n=435)	(n=2948)	
Confidante	%	%	%	%	%	
Spouse	45.9	35.5	4.6	20.0	36.2	
Other relative	39.8	45.3	81.4	57.0	47.1	
Other	9.6	11.7	9.7	11.4	11.4	
None	4.7	7.5	4.3	5.3	5.3	<0.001
In last year a loved one:	%	%	%	%	%	
Neither ill nor separated	74.1	77.2	74.0	76.5	75.1	
Ill	9.1	5.6	6.2	6.0	7.6	
Separated or both[2]	16.8	17.2	19.8	17.5	17.3	0.17

1. Chi-square test for heterogeneity, taking clustering into account
2. Includes those who experienced separation only (whether through death or other means) and those who experienced both illness of, and separation from, a loved one

Table 6.6.A7. Percentages in the worst quintile of quality of life score by social situation. MRC Study

	No. in category	HM	MOB	BCM	SI	Morale
Confidante						
Spouse	1068	12.2	8.6	10.7	9.6	9.4
Other relative	1390	18.3	16.6	17.5	20.1	19.2
Other	335	18.5	13.7	20.0	18.2	23.9
None	155	17.4 *	14.8 ***	14.2 **	30.3 ***	29.7 ***
In last year a loved one:						
Neither ill nor separated	2214	16.0	13.8	15.2	16.9	16.4
Ill	225	10.7	9.3	11.6	12.9	16.4
Separated or both[2]	509	18.4 ns	12.9 ns	16.5 ns	17.1 ns	18.3 ns

*** p<0.001 ** p<0.01 * p<0.05 on chi-square adjusted for clustering by practice

1. Includes those who experienced separation only (whether through death or other means) and those who experienced both illness of, and separation from, a loved one

Table 8.3.A1 Demographic characteristics by combined housing tenure in middle age and in old age –selected categories . MRC Study

Housing tenure for most of adult life	'Independent'			Local authority			All
Housing tenure in old age	Owner-occupied	Social sector	Other	Owner-occupied	Social sector	Other	
	(n=3757)	(n=135)	(n=116)	(n=450)	(n=958)	(n= 57)	(n=8652)
% male	42.9	36.6	31.9	46.9	39.7	45.6	37.5
Median age (quartiles)							
Men	79.3 (76.7, 83.2)	81.4 (78.8, 85.8)	80.3 (78.3, 83.0)	77.7 (76.2, 80.8)	79.3 (76.8, 82.7)	78.0 (75.9, 82.2)	79.6 (76.8, 83.5)
Women	79.9 (77.0, 83.7)	80.3 (76.6, 84.9)	81.5 (78.1, 84.4)	78.1 (76.3, 81.2)	78.0 (76.9, 83.5)	78.1 (77.0, 80.7)	80.8 (77.3, 84.9)
Marital status							
Men							
Married	77.8	52.5	73.0	73.9	68.2	84.6	66.2
Widowed	19.3	37.5	27.0	23.2	24.2	15.4	27.3
Divorced/separated	0.9	7.5	0	1.0	3.4	0	2.2
Single	2.0	2.5	0	1.9	4.2	0	4.2
Women							
Married	36.3	15.8	24.0	42.7	27.8	29.0	25.7
Widowed	55.7	76.8	67.1	53.6	65.2	71.0	64.6
Divorced/separated	1.7	1.0	5.1	1.7	2.1	0	2.2
Single	6.2	6.3	3.8	2.1	4.8	0	7.5

Table 8.6.A1 Demographic characteristics by socioeconomic index: people who were in owner-occupation or the social sector in mid-life and old age and were assigned a social class. MRC Study

	Index							
	0	0.5	1	1.5	2	2.5	3	All in analysis
% male	45.3	43.1	39.6	43.9	39.1	40.1	40.2	43.2
Median age (quartiles)								
Men	79.4 (76.9, 83.3)	79.3 (76.6, 83.2)	78.9 (76.4, 81.9)	78.9 (76.1, 82.0)	79.2 (76.9, 82.2)	78.5 (76.7, 82.3)	79.9 (76.8, 83.1)	79.2 (76.7, 82.9)
Women	79.9 (77.0, 83.5)	79.7 (77.0, 83.9)	80.0 (76.9, 83.8)	78.1 (76.4, 81.9)	79.0 (76.5, 83.4)	79.0 (76.6, 82.7)	80.4 (77.0, 84.9)	79.7 (76.9, 83.5)
Marital status								
Men								
Married	78.0	77.8	72.2	68.0	73.5	71.8	57.8	75.0
Widowed	19.3	19.5	20.4	28.7	23.5	23.4	28.9	21.1
Divorced/separated	1.2	0.7	1.8	1.6	2.9	2.7	3.3	1.5
Single	1.5	2.1	5.6	1.6	-	2.1	9.9	2.4
Women								
Married	37.2	36.2	29.2	39.1	26.4	31.0	22.2	34.2
Widowed	52.8	60.2	64.4	57.7	64.2	65.1	65.1	58.5
Divorced/separated	1.6	5.2	1.2	1.3	1.3	2.8	1.1	1.4
Single	8.4	3.1	5.3	1.9	1.9	1.1	8.3	6.0

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