UNIVERSITY OF SOUTHAMPTON

FACULTY OF SOCIAL AND HUMAN SCIENCES

CENTRE FOR RESEARCH ON AGEING

HEALTH INEQUALITIES AMONGST OLDER PEOPLE FROM ETHNIC MINORITY GROUPS IN BRITAIN: 'SENSITIVITY' OF DIFFERENT SES MEASURES

By

Sharon M. Holder

Supervisors: Professor Maria Evandrou
Dr. Athina Vlachantoni

Thesis for the degree of Doctor of Philosophy

August 2011

UNIVERSITY OF SOUTHAMPTON

ABSTRACT

FACULTY OF SOCIAL AND HUMAN SCIENCES
Doctor of Philosophy

HEALTH INEQUALITIES AMONGST OLDER PEOPLE FROM ETHNIC MINORITY GROUPS IN BRITAIN: 'SENSITIVITY' OF DIFFERENT SES MEASURES

By Sharon M. Holder

The United Kingdom (UK) ethnic population is ageing. However, there has been a dearth of research focussing on the ethnic diversity of the older population and the implications for health and health care needs. In fact 'ageing' and 'ethnicity' are rarely integrated within health research. According to the United Kingdom (UK) 2001 Census, there are over 4.6 million individuals belonging to minority ethnic groups, with a quarter million aged 50 years or over. The ageing of these communities over the next two decades places greater emphasis on the importance of empirical evidence on their health status and the policy implications for health and health care needs.

This thesis contributes to our understanding of health, socio-economic status (SES), ethnicity and ageing. The research explores the 'sensitivity' of different measures and their appropriateness and validity in assessing health inequalities amongst ethnic minority groups in order to better understand health inequalities in later life. This is a critical issue with widespread policy implications. Using cross-sectional data from Health Survey for England (HSE), with a sample size of 5,086 men and women 50 years and older, different logistic regression models are run for the outcome variables general health and limiting long-standing illness in order to ascertain the 'sensitivity' of SES of the different measures of health amongst the different ethnic minority groups.

The results suggest that older people from ethnic minority groups are more likely to report bad/very bad' health compared with the White population. For example, amongst Black Africans the odds of reporting 'bad/very bad' health are 1.45 times the odds amongst Whites, amongst Pakistanis the equivalent odds are 1.69 times the odds amongst Whites, amongst Bangladeshi the odds are 2.34 times the odds of Whites, and amongst Chinese people the odds are 2.53 times the odds of Whites. There are distinct patterns in reporting 'bad/very bad' health and a LLSI amongst and between ethnic minority men and women aged 50 and over based on SES measures employed in the study. Additionally, behavioural risk factors, that is, smoking and alcohol consumption were significant predictors of reporting 'bad/very bad' health and LLSI. Health inequalities have important implications for policy, particularly for health and health care. The research findings would be useful in informing national policies (e.g. health promotion campaigns, housing, occupationally based services, culturally competent health care services) and locally based interventions (e.g. health campaigns for older men and women; health education) would be better targeted at ethnic minority groups of older men and women.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

DECLARATION OF AUTHORSHIP

I, **SHARON MARIE HOLDER**

declare that the thesis entitled

HEALTH INEQUALITIES AMONGST OLDER PEOPLE FROM ETHNIC MINORITY GROUPS IN BRITAIN: 'SENSITIVITY' OF DIFFERENT SES MEASURES

and the work presented in the thesis are both my own, and have been generated by me as a result of my own original research. I hereby confirm that:

- this work was done wholly or mainly while in candidature for a research degree at this university;
- where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
- where I have consulted the published work of others, this is always clearly attributed;
- when I have quoted the published work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
- I have acknowledged all main sources of help;
- none of this work has been published before submission,

Signed:……..

Date……

ACKNOWLEDGEMENTS

I am truly grateful to all the people who made it possible for me to pursue my PhD and who have been tremendously supportive throughout the course of this thesis. There are numerous people who should be mentioned individually, although I know saying thanks is by no means comparable to the support they provided me with. Thus, I will begin by thanking all those whose names do not appear below but share a special place in my heart and I will be forever grateful to each of you for helping me accomplish what seemed unimaginable.

I am indebted to my supervisors, Professor Marie Evandrou and Dr. Athina Vlachantoni. This thesis would not have been possible without your invaluable guidance, constructive comments and suggestions during these last three years. Your enormous support and encouragements are deeply appreciated and this thesis, as well as my overall PhD experience, would not have been the same without your expert advice and encouragement.

I owe special gratitude to the SIR RICHARD STAPLEY EDUCATIONAL TRUST and GLAXOSMITHKLINE PLC for providing me with a very generous financial support in order for me to live independently while pursuing my PhD. I am grateful for the support of colleagues, friends, and family. Thus, my wholehearted appreciation goes to Dr(s). Fifi Amoako Johnson, Lisa Danquah, Claire Bailey, Dayang Affizzah Awang Marikan, Valerie Lipman, Michelle Heward, Ms. Serena Pattaro, Lauren Ndupuechi, Sima Vyas, Hildah Essendi, Omar De La Riva, and Nico Owusu for your friendship and intellectual support. Special thanks to my dear friend Dr. Gloria Chepngeno Langat and to Kay Channon for your valuable editorial comments. My sincere gratitude to the Lambeth family, specially my adopted sister, Dr. Ufoo-Vicky Lambeth for your love, encouragement and emotional support.

To my oldest and dearest friend, Pauline Taylor, thank you for your continuous support, love encouragement and most of all for believing in me – I share this thesis with you. To Dr(s) Klas Hedenstierina, Gunnel Sandeġard, Sharon Ostwald, Titus Howell, Brad Mattinson and Mary Trumble you are always in my heart. To my brothers, nephews and nieces specially Michelle Kelly and Sasha Holder, thanks for all your undying support and for believing in me. To my sisters, Delrose and Melrose, thanks for always being on the other end of the telephone, for the laughter and for helping me to stay in good sprits each and every day.

DEDICATION

To three extraordinary women - my mothers, mentors and teachers who were superb examples of how to age well.

Mrs. Gritley Kelly (1926–1997)
Mrs. Louise Holder (1924 –2009)
Mrs. Edna Pratt (1907–2010)

ABBREVIATIONS

AHEAD	Asset and Health Dynamics Among the Oldest Old
AI	Absolute Income
ACL	American Changing Lives
ADL	Activities of Daily Living
BHPS	British Household Panel Survey
BMEG	Black and Minority Ethnic Groups
CVD	Cardiovascular Disease
CHD	Coronary Heart Disease
DoH	Department of Health
ECHP	European Community Household Panel
FNS	Fourth National Study of Ethnic Minorities
GLAS	Groningen Longitudinal Ageing Study
GH	General Health
GHS	General Household Survey
GHQ	General Health Questionnaire
GLOBE	Gezondheid en Lavens Omstandigheden Bevolking Eindhoven (i.e. Health and Living Conditions of the Population in Eindhoven)
HALS	Health and Lifestyles Survey
HIS	Health Interview Survey
HRS	Health Retirement Survey
HSE	Health Survey for England
HTN	Hypertension
IIH	Income Inequality Hypothesis
LIS	Luxemburg Income Study
LS	Longitudinal Study
LSI	Long-standing Illness
LLSI	Limiting-longstanding Illness

LLTI	Limited Long-Term Illness
MRFIT	Multiple Risk Factor Intervention Trial
NatCen	National Centre for Social Research
NHANES	National Health and Nutrition Examination Survey
NHIS	National Health Interview Survey
NHS	National Health Services
NLMS	National Longitudinal Mortality Study
NS-SEC	National Statistics Socio-economic Classification
NSF	National Service Framework
OECD	Organisation for Economic Cooperation and Development
ONS	Office for National Statistics
QoL	Quality of Life
RGSC	Register General Social Class
SEG	Socio-economic Group
SES	Socio-economic Status
SHS	Scottish Health Survey
UCL	University College London
US	United States
UK	United Kingdom
WHO	World Health Organization

Chapter 1

"A society for all ages is one that does not caricature older persons as patients and pensioners. Instead, it sees them as both agents and beneficiaries of development. It honours traditional elders in their leadership and consultative roles in communities throughout the world". __ Kofi Annan, Secretary General of the UN, 1998.

1.1 Introduction and rationale

Ethnic minority groups aged 50 and over are an important part of British society and they have contributed considerably to the growth and development of the society. However, there are a number of factors (e.g. education, occupation, income) that are markers of health inequalities among this sub-population of British society. Socio-economic status (SES) is often implicated as a contributor to health inequalities observed amongst ethnic minority groups (Census, 2001; Cooper et al., 2000; Curtis and Lawson, 2000; Evandrou, 2000a; Nazroo and Williams, 2005; Platt, 2007a). Thus, the purpose of this study is to investigate the 'sensitivity' of different measures of SES for understanding health inequalities amongst different ethnic groups in later life. This is a critical issue with widespread policy implications. The 2001 Census indicates that 27% of people aged 50-64 report a limiting long-term illness such as diabetes, hypertension and stroke. This proportion rises to 54% amongst people of Bangladeshi origin, 49% amongst those of Pakistani origin, and 36% amongst Black Caribbeans. Interestingly, only 20% of Chinese individuals of the same age report such ill health conditions (Census, 2001; Evandrou, 2005; Nazroo and Williams, 2005).

Differences in health across ethnic groups in Britain is an established area of study, however there has been less of a focus on ethnic inequalities in health at older ages compared with inequalities amongst younger age groups of the population (Cooper et al., 2000; Evandrou, 2000; Ginn and Arber, 2000; Grundy and Holt, 2001; Nazroo, 2003). Data limitations have had a significant impact on investigations of ethnic inequalities in health (Davey Smith, 2000; Nazroo, 2003). Some commentators argue that the number of older people from minority ethnic groups is currently small and that migrants tend to return to their homeland in old age (Cooper et al., 2000; Curtis and Lawson, 2000). As a result, the research on the association between poor health and socio-economic status (SES) at older ages amongst minority groups remains rather fragmented. SES is referred to as an aggregate concept that can be determined by a broad range of indicators such as occupation, income and education (Davey Smith 2000, Grundy and Holt, 2001; Huisman et al., 2003) and individual status in the social hierarchy that is related to both childhood and adult SES (Graham, 2002; Krieger, 2001; Lynch and Kaplan, 2000).

The ageing of the UK population is well documented, and a better understanding of ethnic minority health is essential given the growing numbers of ethnic minorities in the UK and their anticipated age profile (2001 Census; Davey Smith et al., 2000; Evandrou, 2000; Nazroo 2003). However, the ageing of ethnic minority groups and the implications for health and health care needs have received far less attention. In fact, 'ageing' and 'ethnicity' are hardly ever integrated within the health research literature (Cooper et al., 2000). There are over 4.6 million individuals belonging to minority ethnic groups in the UK, with a quarter of a million aged 50 years or older (2001 Census).

The ageing of these communities over the next two decades places greater emphasis on the importance of empirical evidence on their health status and the need for providing older ethnic elders with appropriate health care. Thus, the topic of measurement of health inequalities amongst ethnic minorities using SES indicators was selected for the study because it remains to some extent under-researched. Several studies (Cooper et al., 2005; Davey Smith et al., 2000; Evandrou, 2000; Nazroo et al., 2003) have identified SES and health as complex and multi-faceted. However, the ill-health of ethnic minorities becomes more marked with increasing age (Bajekal, et al., 2004; Nazroo et al., 2003; Nazroo and Williams, 2005). The research on the health of ethnic minorities which exists suggests that people who are poorer and who have a socio-economic disadvantage are more likely to report disease and high levels of morbidity (Knesebeck, et al., 2007; Read and Gorman, 2006; Nazroo et al., 2002).

1.2 Background of the study

The issue of health inequalities is not new in British academic and policy research. The Black Report, a major landmark in UK health research, widened the debate on the causes of health inequalities (Townsend and Davidson, 1982). It helped to shift the focus on the influence of SES in showing how people that are more socio-economically disadvantaged experience marked health inequalities compared with their socio-economically advantaged counterparts. Since the Black Report there has been extensive development in the measurement of SES and health inequalities (Bowling, 2004; Ebrahim et al., 2004, Evandrou, 2000; Graham, 2005; Grundy and Holt, 2001; Macintyre, et al., 1997; 2001; Vagero and Illsley, 1995). Health inequalities are often defined by health differentials using a broad range of socio-economic indicators, such as education, occupation and income (Bowling, 2004; Ebrahim et al., 2004, Evandrou, 2000; Galobardes, et al., 2006; Grundy and Holt, 2001; Macintyre, et al., 1997; Nazroo, 2003; Vagero and Illsley, 1995). However, the salience of these indicators for measuring health may vary for different ethnic groups and appear less sensitive to their socio-economic circumstances (Graham, 2005; Lynch and Kaplan, 2000; Nazroo, 2003). For example, according to the diminishing returns hypothesis, even when ethnic minorities are in the same socio-economic classifications based on their educational levels and/or occupational status, such groups

are less likely to get the same rewards for the same and/or higher levels of SES achievement (Farmer and Ferraro, 2005; Nazroo, 2003). Instead, minorities experience lower returns on the resources that they procure, such as educational attainment, in terms of income compared with their White counterparts (Davey Smith et al., 2000; Powers, 2005).

1.3 Research aim

The focus of this thesis is to investigate the impact of different socio-economic status on health amongst older people from ethnic minority groups in Britain. The main aim is to ascertain the 'sensitivity' of the different measures of health to SES amongst the different ethnic minority groups. Different logistic regression models using the traditional SES measures (education, occupation and income) and alternative SES measures (housing tenure and car availability) will be run for each outcome variable in order to ascertain the 'sensitivity' of the different measures of health to SES amongst the different ethnic minority groups.

Throughout the thesis, 'older people' are defined as individuals aged 50 years and over. It has been noted that the older population is growing twice as fast as the general population on a whole. Clearly, this definition includes a wide range of experiences, however it is useful to examine how similar and/or varied experiences of different age groups are associated with morbidity. The literature, for example on socio-economic inequalities in health, referred to people aged 50 years as being in mid-life, and this is a critical stage of the life-course when the relationship between different factors, such as SES and health, is strong (Cooper et al, 2000; Crimmins et al., 2010; Lynch & Kaplan, 2000, Naess et al, 2004; ONS, 2010). Additionally, one of the first studies on ethnic minorities in Britain, 'The Fourth National Survey (FNS) of Ethnic Minorities' shows that the ages of migrant and non-migrant ethnic minority groups in Britain are very different. For example, the mean age of Caribbean people born in Britain is 26 years and of Caribbean born elsewhere is 50 years (Nazroo, 2001). Therefore, the age group of those who are 50 years and older is important for this study as a transition from mid-life to older age.

Studies on ethnic minority groups tend to compare ethnic elders with the White population, often ignoring intra-group heterogeneity (Cooper et al., 2005; Davey Smith et al., 2003; Nazroo and Williams 2006; Platt, 2007). For example, in previous studies using the FNS, Pakistani and Bangladeshi groups were usually combined into one group, due to small sample size. In so doing, studies overlook the dimensions of culture which distinguish the various ethnic groups that comprise the ethnic elder population. This approach ignores the positive experience of participating in ethnic minority groups in which shared cultural values facilitate individual adjustment to ageing (Nazroo, 2006). Thus, by recognising the importance of research on different ethnic minority groups in an

ageing society, this research attempts to answer the central research question: '*How can SES be used to measure health inequalities in later life?*' The question can be understood in terms of SES as a methodological measurement tool and the 'sensitivity' of each SES measure for studying health inequalities amongst ethnic elders. However, prior to examining the central research question on SES measurement, Research Questions 1 and 2 will be the introduction of the study.

1.4 Research questions

The thesis explores the complexity of SES measures amongst ethnic minority groups aged 50 and over and the factors associated with poor health in later life. Having an understanding of the choice of SES measures and how they relate to ethnic elders' health can have a significant positive effect on the quality of life of ethnic minority groups as they age by adding to the evidence base in this field. The study investigates the following research questions:

> **RQ 1.** *What is the association between health and ethnicity in later life?*
>
> **RQ 2.** *How can SES (e.g. education, occupation and income) be measured in later life*?
>
> **RQ 3.** T*o what extent do differentials in demographic characteristics, health risk behaviours and SES explain the relationship between health and ethnicity in later life?*
>
> **RQ 4.** *Does the relationship between ethnicity and health change when alternative measures of SES (e.g. housing tenure and car availability) are used?*

These questions are addressed using a broad range of SES indicators which are discussed in detail in Chapter 2 of the literature review and Chapter 3 on the methodology. SES is also said to increase morbidity and mortality and appears to be consistent throughout the literature (Davey Smith 2000, Galobardes et al., 2006; Grundy and Holt, 2001; Huisman et al., 2003). The evidence will be explored and the operational definitions in the literature will be examined and integrated into the study. This will help guide the analysis of this thesis in framing the analytical strategy of the HSE data which is proposed in Chapter 3. In addition, the examined literature will help in answering these research questions and the policy relevance to this thesis will be highlighted (see also Chapter 8).

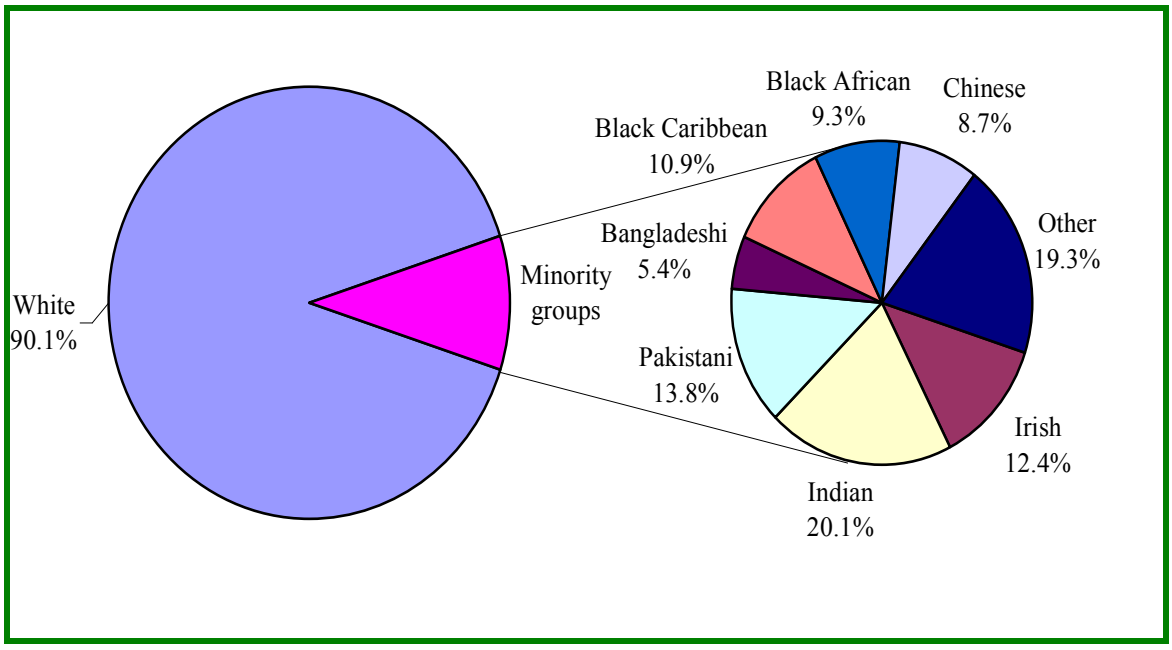
In this introductory chapter, themes which are central to the thesis will be developed. First, the areas of a historical perspective of migration, the demographic profile of older people, the ageing structure of the UK population and older people from ethnic minority groups that have implications for the health and health care needs of such groups will be discussed. Second, concerns of health inequalities, ethnicity, ageing and the different SES measures will be examined. Finally, the chapter discusses the issues relating to SES measures of health inequalities and how they relate to ethnic minority health in later life.

1.5 Historical background

1.5.1 Ethnicity and early immigrants to the UK

Ethnic migration into the UK has been a continuous process throughout the last 100 years. Prior to the 19th century, migrants to UK did not constitute significant ethnic minority groups with different histories and composition, or language, religion and way of life (Haug, Compton and Courbage, 2002). The 20th century, particularly after World War ll, brought with it a large influx of migrants from Britain's former colonies and other developing countries, and as a result, the largest (non-White) minority groups in 2001 (Figure 1.1) and in descending population size order are currently from India, Pakistan, Caribbean, Africa, Bangladesh and China. These groups varied in the timing of their arrival in Britain. Due to a booming economy, chronic labour shortages and no immigration restrictions for colonial citizens between 1955 and 1964, thousands of migrants, mainly from the West Indies and the Indian subcontinent, were encouraged to seek a more prosperous life and in turn help to fill the gap in the UK workforce (Harding, 2004; Nazroo and Williams, 2005; Warnes et al., 2004).

Figure 1.1: Composition of the UK population



Source: Author's analysis, 2001 Census

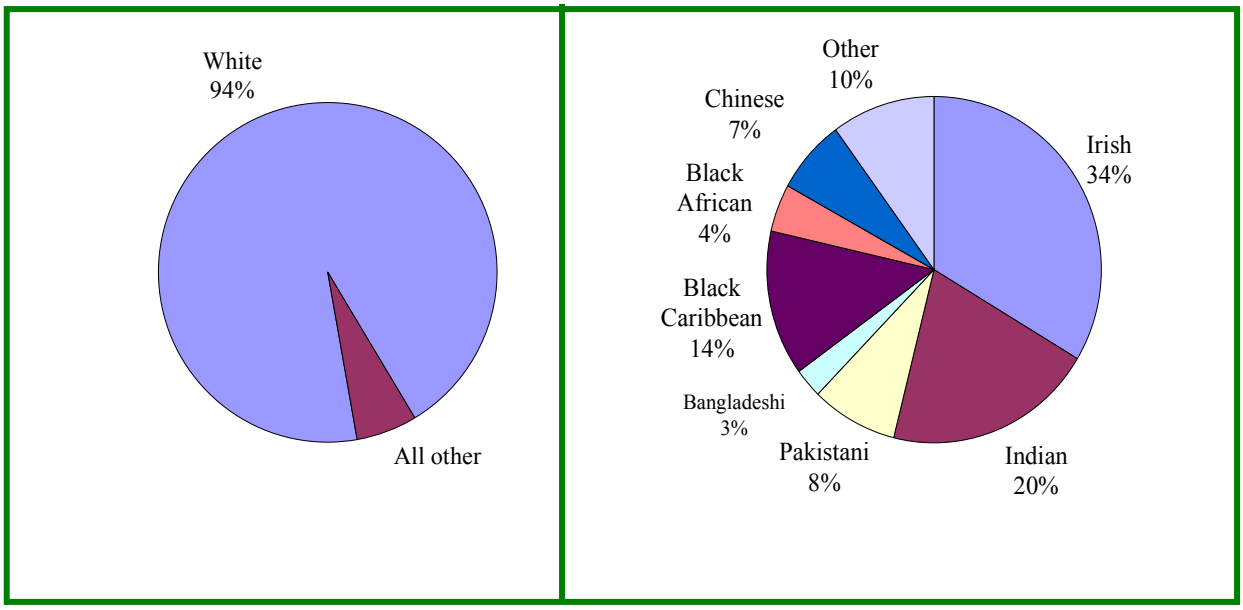
The majority of these migrants were ethnically and culturally distinct from the UK's White population. For example, in the early 1950s large numbers of immigrants arrived from the Caribbean (i.e. 550,000) to the UK due to the increasing demand for labourers to fill government sponsored jobs, such as the National Health Service (NHS) and the Department of Transportation (Dustmann and Theodoropoulos, 2006; Harding, 2004; Nazroo and Williams, 2005). However, migration waves from British former colonies were not equally spread over time. Migration from the Caribbean continued throughout the 1950s, peaking in the 1960s, and today the Black Caribbean people

represent 1% of the total UK population and 10.9% of the ethnic minority population. Similarly, in the 2001 Census, Black Africans made up 9.3% of the ethnic minority population. Migrants from India, Pakistan and Bangladesh arrived in the UK in the early 1970s and 1980s. According to the 2001 Census (Figure 1.1), Indians are the largest ethnic minority group, making up 20.1% of the minority ethnic population or 1.8 % of the total UK population.

The growth of a second generation Pakistani population has been rapid. According to the 2001 Census Pakistanis constituted over 1.4% of the total UK population and 13.8% of the UK ethnic minority population. The Bangladeshi community is the youngest but the fastest growing of all the ethnic groups. In the 1991 Census, 0.5% of people identified themselves as Bangladeshi; however, in the 2001 Census Bangladeshi represented 5.4% of the UK ethnic minority population. Similarly, in the 1990's the Chinese formed the smallest ethnic minority groups 0.4% of the UK population but in the 2001 Census Chinese represent 8.7 % of the ethnic minority population. However, as indicated in Figure 1.1, of the White groups, the Irish constituted over 1.2% of the UK population and 12.4% of the ethnic minority groups.

While many of these migrants intended their stay to be temporary and to eventually return to their countries of origin, the majority of them settled permanently in the UK (Warnes et al., 2004; Harding, 2004). A consequence is an increasing number of older ethnic migrants now entering retirement age (see Figure 1.2). However, Britain is still a predominantly White society, with 94% of its population from the White majority (Figure 1.2). The demography composition of ethnic elders is changing with an increasing diversity amongst ethnic groups as illustrated in Figure 1.2. For example, of the non-White groups aged 50 and over, the largest proportions are the Indians (29.4%) followed by Black Caribbeans (14%) and Pakistani (13.2%). Of the ethnic groups, the Chinese (7%) and Black African (4%) groups are relatively small. In addition, the 'Other' group (10%) makes up the reminder of the minority ethnic total (2001 Census).

Figure 1.2: Composition of total and minority ethnic older people (50+), Britain



Source: Author's analysis, 2001 Census

Older migrants are defined as post-war migrants (i.e.1950s and 60s) to Britain who are now entering retirement age (Grewal, et al., 2004). Thus, some commentators argue that immigration and population ageing, have a major impact on society (Blakemore, 1999; Warnes et al., 2004). Population ageing is the outcome of sustained decline in fertility rates, decline in mortality and a rise in life expectancy (Kinsella and Suzman, 1992). This shift is creating a new demography, that is, a demography of low fertility and long lives.

The UK's changing life-courses, which reflect changes in the demographic profile, lifestyle and retirement patterns, are subject of much debate because these factors can help alter the composition and demand for resources (i.e. access to goods and services), and as a result have an impact on national and local policies towards older people (Warnes et al., 2004). For example, an awareness of the ageing population has encouraged the UK government to turn its attention to the health and social care needs of older people and to identify the addressing of poor health as a priority of the government (Ayis, Gooberman-Hill and Ebrahim, 2003; Department of Health (DoH), 2003; Evandrou, 2003). The 2001 National Service Framework (NSF) for Older People was the first government document that initiated and implemented standards of care for older people, warranting fair, high quality and integrated health and social care services. One of the aims of the NSF for Older People is to ensure that older people are not discriminated against but have equal access to NHS and/or social care services (DoH, 2003) (see also Chapter 8).

Prior to the NSF for Older People, it was noted that older people were more likely to be subjected to poor health care based on their age and ethnic background. Cooper et al. (2000) referred to this as the 'double jeopardy' effect. They argued that the health of older ethnic minorities is jeopardised

because of old age and being a member of an ethnic group and that such persons are at a double disadvantage, particularly with regard to economic and health status. Older minorities are discriminated against by virtue of being members of a minority group (Ebrahim, 1999 and Nazroo, 2003). This in turn can influence health through several potential factors, for example, poorer education and lower income can place constraints on lifestyle choices, access to material and social resources, which can in turn affect health via behavioural, lifestyle and social trajectories.

The following sections will discuss the demographic and socio-economic status of older people and older ethnic minorities in the UK and show their heterogeneity.

1.6 Demographic and socio-economic factors

1.6.1 Older people and ethnic minorities

The ageing of the UK population is well-documented (Breeze, et al., 1999; Curtis et al., 2000). Older people, particularly ethnic minorities were considered to be a small part of the UK population and the need to tell them apart as a separate age group was not noticeable. In 1950, just over one in ten people in the population was 65 years or older. In the 2001 Census the number of older people had more than tripled to 19.6 million, comprising 33.3% of the UK population (ONS, 2004 and Tomassini, 2005). It has been projected that by 2031, 36% of the population will be 50 and over as the baby boom generations of those born in the 1950s to late 1960s reach older ages (ONS, 2004; Tomassini, 2005).

It has been noted that gender differentials are most marked amongst the older population. For example, life expectancy at birth has increased significantly over the last century, but in 1901 life expectancy at birth was 45 years for men and 48.8 for women. However, by 1951 this had increased to 65.7 and 70.7 years, respectively. The Office for National Statistics (2008) has indicated that life expectancy at birth continued to improve steadily. For example, a baby boy could expect to live to 77.2 years and a baby girl 81.5 years. Life expectancy at age 65 has also improved for men and women. A man aged 65 could expect to live 17.2 years longer, and a woman aged 65 another 19.9 years (ONS, 2008). Among those aged 65 years and over, the majority, that is 58%, are women and 60 % of this age group are between 65 – 74 years, with just over 30% being between 75 – 84 years. Those aged 85 years and older represent 8% of the ageing population, and are becoming one of the fastest growing age groups. There are more widowed women compared with their male counterparts. Most of the men, 71%, are married compared to about 40% of women, such that there were 27% more married men and married women who are 65 years and older (ONS, 2001).

Ethnic minorities, on the other hand, represent the fastest growing segment of the older population and are generally younger than the White majority, reflecting past immigration patterns. According to the figures from the Office for National Statistics (ONS), just over one in ten amongst Asian and Black elders are aged 50 and over. However, black Caribbeans have the oldest age structure, with one in four being aged 50 or older, reflecting the ageing of the first large-scale migrants to the UK during the 1950s. Within certain ethnic minority groups, men out number women, and the reverse is the case within the Asian groups (e.g. Indian, Pakistani and Bangladeshi) because the majority of migrants from South Asia tended to be male, with female family members joining them later (Evandrou, 2000a). Immigration patterns contribute to such differentials between men and women amongst the different ethnic groups.

Even though the White population of the UK will continue to represent the majority of older people, older ethnic minorities will become a larger component of the ageing population in the future. For example, while older ethnic minorities may only represent a small proportion (4% of all older people in the UK), it is projected that by 2030 ethnic minorities will account for more than 30% of older people (ONS, 2001). Consequently, the growing numbers and percentages of older ethnic minorities' means that other socio-economic factors and policies geared toward older people from ethnic minority groups are no longer a minor concern for UK policy makers.

1.6.2 Housing

The demographic structures and cultural traditions of ethnic groups in the UK differ in household size and composition (Evandrou, 2000a). In 2005, 67% of people aged 65 years and over were in owner-occupied dwellings without a mortgage and 14% in local authority or housing association compared with 70% and 23% of people of all ages respectively (ONS, 2001; Age Concern, 2007). The percentage of women living in owner-occupied housing is smaller than for men (29% versus 34%). It has also been noted that people from ethnic minority groups, especially older Asians, live in larger households. South Asians are more likely to live in large households. For example, it has been noted that on average 74% of Bangladeshis, 66% of Pakistanis and 50% of Indian households contain two or more generations of adults with at least one dependent child. This is twice the size of the Black Caribbean and the White households (ONS, 2001; Raleigh and Polato, 2005). Thus, amongst older people who lived alone, 32% were British Whites, followed by Black Caribbeans who comprised 30% and Indians who comprised 9% of this group (Census, 2001; Evandrou, 2000a).

In addition, older people are more likely to live in poor housing conditions, but this is even more acute for older ethnic minorities (National Council on Ageing, 2005). For example, the lack of central

heating and overcrowding[2] are commonly used indicators of the quality of housing in which people live (Evandrou, 2000a). Only 28% of Pakistanis and Bangladeshis and 24% of Black Caribbeans have central heating in their households compared with other groups. Over a third of Bangladeshis live in overcrowded accommodation compared with only 2% of the White population (Evandrou, 2000a). Other studies also echoed that the quality of poor housing and inadequate economic resources contributed to the poor health of ethnic minorities (2001 Census; Evandrou, 2003; Haug, Compton and Courbage, 2002; Kenway, and Palmer, 2007).

1.6.3 Individual and household income

A large body of research has demonstrated that people from ethnic minority groups experience a significant degree of economic disadvantage (Evandrou, 2000a; Nazroo et al., 2004), and people from ethnic minority groups are less likely to have private pension arrangements in old age (Ginn and Arber 2000). In the analysis of the 1999 HSE, Nazroo et al. (2004) showed that in terms of household income, more than 90% of Bangladeshis aged 50 or older and over three-quarters of Pakistani households were in the lowest income tertile compared with just over a third of their White counterparts in the same age group. It has also been noted that people from ethnic minority groups are more disadvantaged than Whites with regard to the level of individual income they receive at older ages ONS (2002).

Several factors contribute to economic inequalities among ethnic minorities. For example, the first generation migrants from older ethnic minority groups tend to have insufficient National Insurance contributions to qualify for full state pensions and tend to be employed in lower paid and insecure jobs (Evandrou, 2000a). Moreover, prevailing cultural norms regarding women's employment and their periods of unemployment, make women generally less likely to have contributed to a private pension (Ginn and Arber, 2000; Grewal, 2004). This will in fact affect women's ability to make personal contributions to their pension plans making it less likely for them to reap the rewards in old age.

1.6.4 Morbidity

There is considerable evidence linking morbidity to SES (Cooper et al., 2000; Cooper, 2002; Davey Smith et al., 2000; Evandrou, 2000a; Farmer and Ferraro, 2005; Huisman et al. 2003; Mackenbach and Kunst, 1997; Zimmer et al., 2003). Although it is evident that socio-economic variations in health outcomes have been widely documented for most health conditions in the developed world (Davey Smith et al., 2000; Farmer and Ferraro, 2005; Lynch et al., 1997; Marmot et al., 1997; Smith and

[2] A household is classified as overcrowded if the number of rooms occupied is less than the number of room 'required' by members of the household, based on their ages and relationship (Evandrou, 2000a).

Kingston, 2004), less research is available on such variations amongst older ethnic minorities (Cooper et al., 2000; Ginn and Arber, 2000; Nazroo, 2003). People who are poorer and who have fewer socio-economic advantages are more likely to report diseases and to experience high levels morbidity and mortality (Laio et al., 1999; Read and Gorman, 2006; Salas, 2002; Salway et al., 2007; Nazroo et al., 2002). The 2001 Census, for example, indicated that 27% of all people from ethnic minority groups aged 50-64 years reported a limited long-term illness (LLTI), and other studies indicated that Pakistanis, Bangladeshis and Black Caribbeans are more likely to report a poor health status compared with their White counterparts (2001 Census, ONS, 2001; Salway et al., 2007). In general, ethnic differences in health vary between men and women (2001 Census). For example, amongst ethnic elders, 53% of women reported a LLTI compared with 49% of men, with the greatest differences amongst older Indians and Pakistanis (2001 Census). However, amongst older Bangladeshis a higher proportion of men reported a LLTI (65%) compared with women (59%). Section 1.7 discusses how ethnicity, ageing and health inequalities in general are relevant to health, SES and ethnic elders in order to get an overview for the research.

1.7 Ethnicity, ageing and health inequalities

People from ethnic minority groups who are now older have experienced an unparalleled history associated with immigration patterns, socio-economic disadvantages, high morbidity and mortality (Warnes and Williams, 2006; Warnes et al., 2004). Furthermore, this group faced multiple problems such as access to pensions, income benefits, health and personal care that may impact on their SES (Warnes et al., 2004). The anticipated growth of the older ethnic minority population over the next decade indicates the need for accurate information regarding their health in order to ensure that the needs of ethnic minorities are appropriately understood and met. It was not until recently that there was research exploring the diversity of older people, with less of a focus on ethnic minorities. For example, the earliest national cohort study was of people born in 1937 from the Boyd Orr Cohort. This study is now one of the major sources of information on the life-course (Berney et al., 2000), and for the last ten years, the Whitehall cohorts (Ferrie et al., 2003; Kuper and Marmot, 2003; Singh-Manoux et al., 2004) and the British Regional Heart Study (Ebrahim et al., 2004; Lawlor et al., 2005) are often cited in studies of retirement ages. This data is frequently referred to in studies of the association between poor health and SES. Thus, due to the lack of such data on ethnic minorities, ethnic elders are underrepresented in such studies regardless of their migration history and their increasing proportion in the UK population.

Several references have been made to other groups which may face a disadvantage in terms of their health status in the UK. For example, in the 1840s, Chadwick raised concerns about the sanitary conditions of the labouring population in Britain and its contribution to poor health. In his report, Chadwick not only described the inadequate living conditions of the working poor but also included

data on morbidity and mortality. In the same time period, Engels (1845) also published, *The Condition of the Working Class in England* in which he described the difficult conditions in which the working class lived. Over one hundred years ago the association between poor health and socio-economic disadvantage was very apparent to these researchers. However, the complexity of the different interrelationships has not been recognised in most of the research done in this century in relation to ethnicity, ageing and health inequalities. 'Health inequalities' refers to differences in the number of occurrences or incidence of health outcomes amongst population groups (Graham, 2000), and health is shaped by many different factors such as lifestyles, educational attainment, occupation, housing conditions and material wealth (Bowling, 2004; Evandrou, 2000; Galobardes, et al., 2006; Grundy and Holt, 2001; Nazroo, 2003). Existing evidence suggests that there is some support for the theories of multiple disadvantages amongst older ethnic minorities, however this may not be consistent across ethnic groups and in the latter part of their life-course. For example, Nazroo (2001) indicated that ethnic inequalities in health increase markedly with age, disappearing in late childhood and early adulthood. Thus, health inequalities in later life represent the cumulative effect of these factors over the life-course and can be passed from one generation to the next through socio-economic influences.

In addition, the study of health inequalities among older people from ethnic minority groups needs to be contextualised in evidence of the epidemiological transition, which reflects the gradual shift from high to low mortality and fertility rates. In terms of morbidity patterns, such transition is characterised by non-communicable diseases such as cardiovascular diseases (CVD), obesity, diabetes and other diseases associated with lifestyle including diet, smoking and alcohol consumption (Omran, 2005). Therefore, this research aims at including key indicators of risk behaviour in the analysis, such as smoking and alcohol consumption (see also Chapter 3).

Section 1.8 provides further detail about the structure and contents of the thesis, with a brief discussion of each chapter.

1.8 The structure of the thesis

The central concern of this thesis is the 'sensitivity' of different measures of SES for understanding health inequality amongst different ethnic groups in later life. Chapter 1 introduces the focus of the thesis and the rationale for investigating the relationship between health, ethnicity, and the 'sensitivity' of different SES measures at older ages.

Chapter 2 is the literature review on the epistemological and empirical evidence from studies on SES and health inequalities among older age groups, and on older ethnic minorities' health status in

Britain and other developed countries. It seeks to examine and highlight the evidence on the relationship between ethnicity and ageing, examining the use of different SES measures for studying the circumstances of ethnic minorities in later life. Although some literature on other countries has been utilised because of the dearth of evidence on older ethnic minorities, the emphasis in this thesis is mainly on the evidence from Great Britain, especially pertaining to morbidity, SES of ethnic minorities and older ages. However, keeping in mind the research questions, it was necessary to use the empirical evidence as a guide to explore the facts and data of previous studies in health, ageing and ethnicity and build upon them. In doing so, attempts were made to avoid duplication and relate the evidence to the empirical framework referred to in the thesis. The chapter concludes with the research gaps in the literature.

Chapter 3 discusses the source of the data, the methods of data analysis used and the reasons for which they are adopted. The analysis uses data from the 2004 HSE Ethnic Boost Sample. The first half of the chapter describes the study design, the data, data quality and the study population. Definitions of key terminologies and concepts are presented, focusing on the outcome and explanatory variables. The next part of the chapter details the data analysis strategy, including the bivariate and multivariate analysis, the model formation process for logistic regression models and a brief discussion on weighting.

Chapters 4, 5 and 6 present the results of the thesis. In order to better understand the demographic make up of ethnic elders in the UK, Chapter 4 presents the findings from the bivariate analysis identifying the demographic make-up (e.g. age, sex, marital status and ethnicity) of ethnic elders in Britain by exploring the 1991 and 2001 Census and the 2004 HSE in assisting to address the research questions set out in this thesis.

Chapter 5 presents the findings on the association between health and ethnicity among ethnic minority groups aged 50 and over by examining how SES can be measured in later life. The demographic (age, sex, marital status and ethnicity), socio-economic status (education, social class, household income, housing tenure and car availability) and the behavioural risk factors (smoking status and alcohol consumption) are examined, with particular emphasis on the health (e.g. general health and the report of a LLSI) outcome variables. This chapter is aimed at exploring the ways in which the research methodology fits the overall theoretical framework in answering the research questions starting with questions:

RQ 1. *What is the association between health and ethnicity in later life?*

RQ 2. *How can SES (e.g. education, occupation and income) be measured in later life*?

RQ 3. T*o what extent do differentials in demographic characteristics, health risk behaviours and SES explain the relationship between health and ethnicity in later life?*

Chapter 6 explores the relationship between SES and ethnic inequalities in health, and details the findings of the logistic regression modelling in answering all the research questions (see Section 1.4). Particular focus was given to the 'sensitivity' of the SES measures and their appropriateness and validity in assessing health inequalities amongst ethnic elders. This Chapter presents models indicating the relative influence of the explanatory variables on health status, and distinguishing between models for men and women in order to reflect the gender differences in this area.

Chapter 7 integrates the results from Chapters 4, 5, and 6 and discusses their implications. It is argued that SES is multi-faceted and that some SES measures should be examined in relation to different social circumstances. The 'sensitivity' of different SES measures was examined in relation to ethnic elders in Britain. The implications for these findings for ethnicity and health in the context of policy implications at local and national levels are then considered.

Finally, Chapter 8 concludes this thesis by summarising the main findings in relation to the research questions posed in Section 1.4. This Chapter discusses the limitations of the study the policy implications of the findings, and directions which could be recommended for future research in the area of health inequalities among ethnic elders.

The following Chapter examines the empirical evidence on health inequalities and SES measures among older age groups and the health status of ethnic elders in Britain.

Chapter 2:

2 Literature review

2.1 Introduction and structure of review

This literature review provides an overview of the evidence on the association between SES and health. Its main focus is therefore to gather existing evidence to see whether or not the impact of SES changes with age among ethnic minority groups and to explore the different measures of SES and health. Although the main emphasis of the literature is on SES and the health status of the younger population, the focus of this thesis is on people 50 years of age and older. Health fluctuates over the life-course (Smith and Kingston, 2004) and poor health can occur early in life. Increasing evidence demonstrates that the effects of childhood circumstances impact upon health in later life (Davey Smith, et al., 2000; Hayward et al., 2000; Kuh et al., 2003). Hence, national and international studies will be examined in order to get a broad perspective to better understand the relationships between SES and health and older people from ethnic minority groups in the UK.

A variety of databases were searched for terms on health inequalities, SES, ethnicity, mortality and morbidity which include Medline, PubMed, AgeLine, AgeInfo, Science Direct, ESTOR and EMBASE, which hold details of a wide variety of journals. In addition, the Gerontological, Medical and Social Science Journals (1990-2011), American Journal of Public Health, JAMA, Social Science and Medicine were also utilised. References on the social determinants of health (mortality and socio-economic status) were retrieved via the Web of Knowledge (ISI) and were limited to 1990-2011. It was felt necessary to explore all notable databases because of the paucity of literature on studies of ethnicity and older ages. The review was restricted to journal articles, including self-reported outcomes, however, references to chapters from books, governmental and electronic databases will also be made throughout the thesis.

The literature review is broken down into two parts and focuses on selected reviews from the literature in Parts I and II, addressing aspects of the association of SES and health relevant to this thesis, for example the 'sensitivity' of different measures of SES and their appropriateness and validity in assessing health inequalities amongst different ethnic groups in later life. Part 1 includes Sections 2.2 to 2.7 focusing on the use of different SES measures to explore health among ethnic elders. It has been noted that research should be grounded in theory (Grundy and Holt, 2001). However, in health inequalities and SES research a number of theoretical models have been proposed and the different theoretical models will also be examined in this section of the literature review. Thus, Part ll of the literature review is on theoretical underpinning and the following sections

are included: Section 2.8 examines the different theoretical frameworks, such as the impact of poverty and deprivation on health, and the empirical evidence that point to the salience of health inequalities, particularly in the context of ethnic elders and their SES. Section 2.9 addresses the empirical underpinning of the different theories, while Section 2.10 concludes with a summary of the methodological issues and gaps cited in the literature.

The discussion in Section 2.2 will begin with the historical and theoretical origin of SES measures in Britain and identifies the main limitations of the current measurement approaches in the determinants of health inequalities amongst different groups

2.2 Socio-economic status (SES) as a measurement tool: Health, ethnicity and ageing

2.2.1 Introduction

Understanding the measurement of SES in health inequalities research has increased both in the UK (Breeze et al., 2004; Ebrahim et al., 2004; Grundy e al., 2001; Manor et al., 1997) and elsewhere (Lantz et al., 2001; Singh-Manoux, et al., 2002; Knesebeck et al., 2003). Kunst and Mackenbach (1997) refer to socio-economic inequalities in health as 'differences in the occurrence of health problems between individuals of higher and lower SES' (p. 758). It has been argued that SES, represented through a number of measures, is a major factor of health inequalities (Kunst and Mackenbach 1997; Oakes and Rossi, 2003). Thus, during the last 50 years health inequalities and SES have been measured using indicators of education, occupation and income (Achenson, 1998; Huisman et al., 2003; Macintyre, 1997; Townsend, et al., 1988). Nonetheless, the measurement of such indicators (e.g. social class and education) is not clear-cut, and due caution should be taken with the application for suitable classifications of such measures (Kunst and Mackenbach (1997). SES measurements need to be sensitive if they are to be used as a measurement tool for understanding ethnicity and health in later life. Thus, in this section the focus will be on different indicators of SES. However, prior to reviewing the evidence on SES measurements the discussion will begin with a brief discussing of the historical, conceptual and disciplinary origin of the different SES measures.

2.2.2 Historical, theoretical and disciplinary origin of SES measures

Many of the concepts underlying the use and measurement of SES have their origin in the work of two 19th century social theorists, Marx and Weber (Ebrahim et al., 2004; Galobardes et al., 2007; Lynch and Kaplan, 2000). Marx theorised that SES was entirely determined by 'social class', whereby an individual is defined by their relationship to the means of production which inevitably brought (dis)advantages and conflict between the owners of the means of production and the workers, thus determining the workers' subsequent status in society (Galobardes et al., 2007; 2006; Lynch and Kaplan, 2000). Conversely, Weber suggested that society develops and maintains systems that are hierarchically stratified along several dimensions and such systems created groups, some of which are made up of working classes. Often the working classes are at a competitive disadvantage in the market place depending on their knowledge, skills and abilities (Galobardes et al., 2007; Lynch and Kaplan, 2000). Weber referred to these sets of skills as 'life chances' and Marx and Weber's theoretical notions have guided researchers to use indicators, such as education, occupation and income as measures of the different dimensions of social stratification and for measuring inequalities

amongst different groups in society (Galobardes et al., 2007; Lynch and Kaplan, 2000). Or, as Galobardes and colleagues have most succinctly expressed it:

> Weber places more emphasis on human agency in activity creating life chances, whereas Marx has a more structural approach that highlights the imposition of life chances on those who find themselves accidentally by birth or other exigencies in different social classes (2007: 24).

There is an extensive history in Britain of measuring differences in health inequalities based on socio-economic classifications (SECs) (Acheson, 1998; Benzeval et al., 1995; Rose and O'Reily, 1998; Townsend et al., 1988). However, the gap between SES measurement and SES and health inequalities is relatively large (Grundy and Holt, 2001; Lynch and Kaplan, 2000; Macintyre, 1997; Oakes and Rossi, 2003; Townsend et al., 1988). One of the first SES measures in Britain was based on the theoretical strand of Weber, occupational social class (Benzeval et al., 1995; Ebrahim et al., 2004). Occupational social class was introduced in 1913 by Stevenson, a British Census worker, who relied upon the knowledge of the class structure to develop the first Register General's Social Class (RGSC) (Benzeval et al., 1995; Oakes and Rossi, 2003; Rose and Pevalin, 2001). The RGSC was intended to reflect relative wealth, knowledge and/or skill required, as well as stratification associated with each class, that is, Weber's dimension of class and status (Ebrahim et al., 2004; Benzeval et al., 1995; Lynch and Kaplan, 2000). However, alongside the RGSC, in 1951, a second socio-economic classification was introduced, the Socio-economic Group (SEG) classifications (Rose and O'Reily, 1997). The SEG was made up of seventeen occupational groups and the aim was to bring together people with jobs of similar social and economic status (Rose et al., 2005). However, occupational social class has remained the main SES indicator in British studies on health inequalities, in part, because it has been regarded as a more effective measure compared with other SES measures such as education (Ebrahim et al., 2004).

Whilst the RGSC has been widely used in research studies in Britain, it has been subject to much criticism (Benzeval et al., 1995; Chandola, 2001; Chandola and Jenkinson, 2000; Drever et al., 2004; Manor et al., 1997; Nazroo, 2001). Some critics argued that the social class classification of occupations has not been really clear about what it is measuring, particularly in relation to certain groups, such as women, ethnic groups and the self-employed, and thus, said to be lacking explanatory power and theoretical coherence (Benzeval et al., 1995; Chandola, 2001; Drever et al., 2004; Manor et al., 1997). However, even though the SEG was less criticised, it shares the same basic problem as the RGSC, that is, the ambiguity of precisely what it is measuring and how it is applied to different groups (Benzeval et al., 1995; Chandola, 2001; Williams et al., 1998). In response to such criticisms and in order to complement the two systems (RGSC and SEG), and prior to the 2001 Census, the Office for National Statistics (ONS) commissioned the Economic and Social Research Council (ESRC) to undertake the review of the government's social class classifications (Rose and

Pevalin, 2000). Consequently, the National Statistics Socio-economic classification (NS-SEC) replaced the RGSC (Chandola, 2001; Rose and O'Reily, 1997; Rose et al., 2005). The NS-SEC categories are designed with a distinct theoretical basis, and according to its authors, the new NS-SEC classified people's occupations explicitly based on their employment relations in the labour market and production units (Rose et al., 2005). Hence, the NS-SEC distinguished between employers, employees and the unemployed (Please see Table A.1 for the description of the NS-SEC occupational class). Thus, individuals can be classified by their own, current or past occupation, by the occupation of their spouse, or the highest occupation of the head of the household and their spouse (Rose and Pevalin, 2002).

The new NS-SEC categories, however, have not escaped criticism. This method too has been noted to lack the explanatory power for detailed analysis in some of its categories. For example, it has been argued that the NS-SEC might not be gender neutral, because more men than women are referred to as the 'Household Reference Status Persons' (e.g. head of household or highest occupation) and thus men are still characterised as head of household (Blackburn, 1998; Macintyre et al., 2003; Prandy, 1998). Also, because there are different versions of NS-SEC, and depending on the version that is employed in studies, the NS-SEC does not provide a means for comprehensive analysis for nuanced categories of people outside the labour market, such as women doing unpaid care work, the unemployed or the retired persons, for whom the long-term impact of unemployment in terms of life chances may be lower (Prandy, 1998). Others also argued that very little attention has been given to the measurement of SES in general (Galobardes et al., 2007; Kaplan and Lynch 2000; Oakes and Rossi, 2003; Shavers, 2007; Nazroo, 2006). For example, SES measures need to capture more of the 'social context' instead of the 'indexes' of such measures as education, occupation and income (Oakes and Rossi, (2003). It is desirable to consider the different approaches to measuring SES. Although well implemented, they may be inadequate measures of social and economic forces that affect ethnic elders' health.

The next section identifies and discusses the different SES measures and the debates on health inequalities, including the measurement of SES for understanding health, particularly amongst different groups in society.

2.2.3 SES measurement: Debates and determinants of health inequalities

Although numerous studies show that low SES influences health, the empirical evidence on the different SES measures predicting health inequalities amongst older people and ethnic minorities is scarce (Davey Smith 2000, Grundy and Holt, 2001; Huisman et al., 2003; Lynch and Kaplan, 2000; Nazroo, 2001; Nazroo and Williams, 2005). Many of these studies are fraught with problems (Davey

Smith, 2000; Grundy and Holt, 2001; Lynch and Kaplan, 2000; Oakes and Rossi, 2003; Nazroo, 2001). For instance, SES measures are understood to provide information about an individual's access to social and economic resources and as such, such measures are indicators for social relationships and directives over resources and skills that vary throughout one's life (Lynch and Kaplan, 2000). However, in addition to occupational social class, there has been much discussion about what SES (e.g. education and income) actually measures (Acheson, 1998; Lynch and Kaplan, 2000; Karlsen and Nazroo, 2002a; Oakes and Rossi, 2003), and how the choice of an indicator can influence the pattern of inequalities amongst different groups in society (Grundy and Holt, 2001; Nazroo, 2003; Nazroo and Williams, 2005). There have also been discussions questioning as to whether the indicator should be single or combined (Bowling, 2004; Davey Smith, 2000; Grundy and Holt, 2001; Lynch and Kaplan, 2000). As highlighted in Section 2.2.1, measures of education, occupation and income are related to life chances (Galobardes et al., 2007). For example, higher levels of education by and large are predictive of better jobs, and higher incomes are indicators of better choices of lifestyle behaviours (Lynch and Kaplan, 2000).

Thus, education is frequently used as an important marker of SES because it is thought to capture knowledge-related assets of an individual that help to contribute to their SES through occupation and income (Davey Smith et al., 1998; Galobardes et al., 2007; Lynch & Kaplan, 2000; Knesebeck et al., 2006). Consequently, because education is acquired early in life, it may be less likely to be the result of poor health (Grundy and Holt, 2001; Huisman et al., 2005; Smith and Kingston, 2004). Additionally, in contrast to occupation, education allows for the classification of individuals who do not work, such as older people, and it is generally identified as an individual measure of SES because it is often available to both sexes and excludes few members of the population. Also, people with higher educational levels have a sense of personal control and they are more likely to have better knowledge and understanding of lifestyle choices that could subsequently increase their health risk and compromise their health status (Bowling, 2004; Grundy and Holt, 2001; Huisman et al., 2005). The possible implications of this are poorer health outcomes. Educational attainment also has different social implications and consequences for different groups because it often fails to stratify people, in particular, women and minorities who often receive low economic returns for the same investment than their White male counterparts (Ginn and Arber, 2000; Davey Smith et al., 1996; Smith and Kingston, 2004). Also, as a disadvantage, education includes a varying distribution of education levels amongst age cohorts introducing measurement ambiguity (Lynch and Kaplan, 2000). For example, years of education or the achieved level of education falls short of revealing what is significant about education in terms of its relationship with health. Lynch and Kaplan, (2000) noted:

> Exposure to formal education involves gathering facts, learning concepts, and finding out how to access information. It may provide a set of cognitive resources that have broad potential to influence health (p. 22).

Huisman et al., (2005) found that education was strongly associated with cardiovascular disease (CVD) amongst older men and women in Western Europe. In a cross-national comparison study of eight Western European populations, Huisman and colleagues noted that many older men and women in European countries who are retired make up a large proportion of the population. Hence, using data from mortality registries linked with population Census data from Finland, Norway, England and Wales, Belgium, Switzerland, Austria, Italy and Spain, they examine the contribution of cause-specific mortality between groups of older men and women with different levels of education. Huisman and colleagues (2005) found that the differences in mortality by educational level amongst men and women persisted into old age. Amongst men, CVD explained 39% of the difference between low and high educational groups in total mortality, while cancer explained 24% and other diseases explained 32% of such difference. Among women, the equivalent contributions were 60%, 11%, and 30% respectively.

It would appear that education as a single SES measure was a useful indicator for this cross-national comparison study because the findings are suggestive of the actual circumstance of educational achievement in the older population in Europe. Only a few older people received an education beyond secondary level and therefore health inequalities based on education vary among countries (Huisman et al (2005). Accordingly, it is evident that educational inequalities in mortality are ever-present throughout Western Europe. However, it has been noted that education is a commonly used SES indicator not only in Europe but also in the United States of America (USA) and elsewhere, however it is often coupled with other measures of SES (Davey Smith 2000, Grundy and Holt, 2001; Huisman et al., 2005; Lynch and Kaplan, 2000; Nazroo and Williams, 2005).

Grundy and Holt (2001), for example, suggested coupling the level of an individual's education with a measure related to deprivation, such as housing tenure, in order to use in the studies of health amongst older people. Analysing data from the Retirement and Retirement Plans Surveys (1988/1989) and by employing seven indicators of SES (i.e. occupational social class, education, income, housing tenure, household resources, Townsend Deprivation and car), they examined which SES measure, single or combined, was most valuable in the studies of health inequalities amongst older people. Their findings indicated that it is best to combine one or more SES measures. They argued that SES measures need to be adequately sensitive to allow for differentiation amongst different groups of people, such as older people and ethnic minorities (Grundy and Holt, 2001).

In contrast to the Grundy and Holt (2001) study, it has been noted that income is the best SES measure of health amongst older people in Germany because it relates directly to the material

circumstances that may influence health (Knesebeck, et al., 2003). In a comparative study of the US and Germany, Knesebeck et al., (2003) examined SES and health amongst older people in each country. Using data from two national telephone surveys conducted in Germany (n = 682) and the US (n = 608) of people 60 years and older, Knesebeck and colleagues concluded that there is a higher percentage of SES differences in health amongst older people in Germany compared with their counterparts in the US based on three indicators of health (i.e. self-rated health, depression and functional limitations). In addition to the most commonly used SES measures of education, income and occupational status, two alternative measures of assets and home ownership were used. Their findings indicated that income was the best SES predictor of health amongst older Germans whilst the other SES measures (i.e. education, occupational prestige, home ownership and assets) were not consistently related to health.

Hence, there are two opposing alternative explanations in regard to the relationship between income and health, one showing a linear relationship and the other one showing a non-linear relationship (Lynch and Kaplan, 2000; Shavers, 2007). The former relationship represents better health status amongst those with a higher income regardless of the level of income (e.g. high income versus low income), as illustrated by Knesebeck and colleagues study. Whereas, if income has a linear relationship with health, even if better health status is related with higher income, small differences in income are associated with greater differences in health amongst those in the lower income groups compared with the higher income groups (Lynch and Kaplan, 2000; Shavers, 2007).

Thus, the evidence on the measurement of SES is mixed, and there are arguments for the use of single or multiple measures of SES. Whilst there is some overlapping between different SES measures, for example between education and income, and health inequalities amongst older people, it is evident that there are independent contributions from each SES measure in most of the studies. Others argue that since income is so strongly linked with employment as a measure of SES, it has similar problems as occupation, including those of reverse causation, for example exploring whether poor health results in lower income instead of lower income causing poor health (Bowling, 2004, Lynch and Kaplan, 2000). In addition, due to the number of sensitive questions about different sources of income such as benefits or pensions, the data collection process can become very complex, which in turn may lower response rates. It has also been argued that certain older people's income may be a less reliable measure of their SES because income typically follows a curvilinear trajectory with age (Galobardes et al., 2007).

As noted previously, occupational social class explained several characteristics relating to education, that is, access to life chances based on cultural factors such as lifestyle choices and material

influences (Benzeval et al., 1995; Ebrahim et al., 2004; Lynch and Kaplan, 2000). However, in the case of 'occupation' it has been noted that older people, especially those over age 65 are retired and for many, poor health in later life may be the result of early retirement or downward social mobility (Bowling, 2004; Ebrahim et al., 2004; Graham, 2005). Hence, one study using multiple SES measures (occupational social class, car availability, and home ownership) found such measures to be strong predictors of disability in later life independent of a number of lifestyle factors and presence of diagnosed diseases (Ebrahim et al 2004).

Ebrahim et al (2004) found that the likelihood of reporting poor health amongst and within social class groups was influenced by material wealth, for example car or housing, after combining multiple measures of SES. Using data from a prospective study of a cohort of 5,773 men aged 52–73 years in Britain, occupational social class was used to explore the association of SES with self-reported disability. Socio-economic status measured as both occupational class and ownership of home and car showed a graded relationship with the likelihood of reporting disability. Men with a lower SES were more likely to have poor health outcomes, and even though similar patterns were observed for car and home ownership, the difference in health, as reflected in reported disability, was smaller. The relationship between SES and disability severity did not appear to be independent of life-style risk factors such as smoking, alcohol intake and physical inactivity (Ebrahim et al., 2004). Ebrahim and colleagues argued that SES measures, such as car and home ownership, did not diminish some of the increased risk of disability observed among occupational social classes. However, material wealth is a major factor in influencing differences in health amongst different social classes.

It has been noted that men and women in Britain have different employment histories and as the social class classifications were originally based on the 'pecking order' of men's occupation, these are less sensitive measures of differences in women's SES (Arber, 1997; Benzeval et al., 1995; Bowling, 2004; Galobardes et al., 2007; Graham, 2005). For example, studies using measures of occupational social class indicated that a high proportion of women could not be stratified by their own SES (Arber, 1997; Benzeval et al., 1995). Thus, it has been noted that even though single women were assigned to a class category based on their current occupation, they were disproportionately assigned to the lower social class categories (non-manual and manual), while married women were assigned to their husband's occupational class (Arber, 1997). Benzeval and colleagues argued that because of the stratification of the social class categories between men and women, it is difficult to make meaningful comparisons of women in different marital status based on their own SES. As a consequence of such deficiencies, the outcome on women's health owing to their social circumstances in relation to SES measures is given less attention when health inequalities are discussed (Benzeval, et al., 1995).

Similar to the groups discussed so far, the measurement of SES for example through occupational social class, has become an important issue among researchers' studying ethnic minorities health (Bowling, 2004; Chandola, 2001; Chandola and Jenkinson, 2000; Davey Smith et al., 2003; Harding and Maxwell, 1997; Kelaher, et al., 2008; Nazroo, 1998, 2001). Using a single SES measure of the RGSC, Harding and Maxwell (1997) found that social mobility amongst South Asians, especially among Bangladeshi and Pakistani men, has significantly contributed to the increase of a class gradient in mortality. Analysing 1991 Census data, they examined social class differences in mortality amongst migrants born in the Caribbean, East, West and South Africa, Indian subcontinent, Scotland and Ireland. Their findings indicated that higher proportions of men from the Caribbean and Ireland were in a manual class. However, East, West/South Africans and Scottish men were more likely to be in non-manual classes. These authors emphasised that even after adjusting for social class, South Asian men (e.g. Bangladeshi) have significantly higher mortality rates compared with those born in India and their White counterparts. However, as indicated in other studies, the authors acknowledged that social class is not an adequate explanation for the observed differences in mortality (Harding and Maxwell, 1997).

A part of the debate surrounding health inequalities in Britain is due to the lack of explanatory value of the RGSC (Chandola, 2001; Chandola and Jenkinson, 2000). Hence, it would appear that occupational social class is a challenging issue because even though there have been substantial changes in British occupational class structure over the last 50 years, the differences in life expectancy among social classes found in previous studies persist (Benzeval et al., 1995; Davey Smith et al., 1998; Huisman et al., 2003; Marmot et al., 1991; ONS, 2007). For example, people in Social Class I have the longest life expectancy, followed by people in managerial and technical occupations (Social Class II). People in unskilled manual occupations (Social Class V) have the shortest life expectancy, particularly unskilled men and women. For instance, a man aged 65 years can expect to live slightly more than a professional man in 1972-76 (14.1 compared to 14 years), and an unskilled woman aged 65 had a life expectancy of 17.7 years compared to a professional woman who had an expectancy of 19.1 years (ONS, 2007). Thus, the debate about occupational social class as a sensitive measure continues, and as indicated by several studies, social class is less sensitive to ethnic minority health status and is far from being a homogenous measure of SES (Chandola, 2001; Harding and Maxwell, 1997; Nazroo, 2001; Kelaher, et al., 2008). Chandola (2001), for example, presented findings from cross sectional data from the Fourth National Survey (FNS) of Ethnic Minorities (1993-1994) using indicators of the NS-SEC combined with other SES measures, such as area level deprivation and deprivation indices, in explaining differences in health between British South Asians and the majority White population. Working class men and women have twice the odds of reporting fair to very poor health compared to higher professionals. Pakistanis and Bangladeshis were more likely to have poor health, followed by Indians (see also Chapter 4). However, after adjusting for a

combination of SES measures, such as social class, local area deprivation and standard of living, measures there was no significant difference in health amongst ethnic minority groups. This is an example of further evidence for the significance of material factors of SES in explaining health inequalities.

Chandola (2001) argued that the NS-SEC is useful for explaining ethnic differences in health, as well as differences in terms of social class. For example, working-class Indian men and women have a 1.2 times higher odds of reporting poor health compared with the White population. Such results have triggered the need for the use of multiple SES indicators when examining inequalities in health according to different SES circumstances. As reiterated by Chandola, it is important to keep in mind that the poor health of ethnic minorities may be largely understood in terms of multiple SES factors, such as occupational social class, material resources and area deprivation (Chandola, 2001).

Nazroo (2001) concluded that occupational social class is a crude SES measure of ethnic minorities, particularly for older people and those from Asian backgrounds. Nazroo indicated that using a single measure of SES, such as social class, is of little use when controlling for the impact of SES within class groups. For example, an analysis of data from the Fourth National Survey for Ethnic Minorities, shows that in the overall poorest groups, that is Pakistani and Bangladeshi people, the people in the highest social class had an average income which was equivalent to that of their White counterparts in the lowest social class. Thus, such an indicator as a measure of SES showed that even when ethnic minorities are in the same socio-economic class as their White counterparts, they are less likely to reap the rewards for higher levels of SES achievement, which is referred to as the diminishing return hypothesis (Nazroo, 2001; Shavers, 2007). Similar evidence from the US found that investigating SES on the basis of income minimised the extent of ethnic differences in economic resources, because there are large ethnic variations in wealth at every income level (Nazroo, 2003; Smith and Kingston, 2004) (see also Chapter 4).

Most of the studies encapsulated the inherent problems of SES measurement, that is, each SES measure is context dependent (Chandola, 2001; Grundy and Holt, 2001; Huisman et al., 2005; Knesebeck, et al., 2003; Nazroo, 2001). It is also evident that not all SES measures are applicable to all ethnic minority groups (Benzeval, et al., 1995; Chandola, 2001; Kelaher et al., 2008; Nazroo, 2003). Conversely, a single measure may underestimate the true differences in health amongst different groups in the population (Grundy and Holt, 2001; Kelaher et al., 2008; Nazroo, 2001). The remainder of this section will therefore discuss the use of two asset-based measures, housing tenure and car availability, which are often used in studying health inequalities in Britain.

Many of the studies reviewed in this section employed housing tenure or car availability as an alternative measure of SES, coupled with one of the more traditional SES measures such as education, occupation or income, because it has been noted that such indicators are more refined measures of material wellbeing than social class or income alone (Chandola, 2001; Ebrahim et al., 2004; Grundy and Holt, 2001; Lynch and Kaplan, 2000; Macintyre et al., 1998; Nazroo, 2001). Housing tenure and car availability are taken to be measures of material wellbeing and are shown to be strong predicators of morbidity (Chandola, 2001; Ebrahim et al., 2004; Ellaway and Macintyre, 1998; Grundy and Holt, 20001; Macintyre et al., 1998). As a result, such measures are indicators of wealth and can apply to almost anyone living outside an institution (Bowling, 2004; Grundy and Holt, 1991). These measures are influenced by a range of factors, for example housing tenure is often associated with the type of neighbourhood and housing quality of the house one lives in.

Grundy and Holt (2001) noted that a number of older people lived in poor housing even though they were owner-occupiers or privately renting. Nonetheless, the absence of certain amenities, such as central heating, running water or a good bathroom facility, may be related to specific mechanisms of disease. For example, the lack of running water or a bathroom facility may increase the risk of infections and poor health, whilst central heating may decrease the threat of exposure to dampness and cold (Galobardes et al., 2006; Grundy and Holt, 2001). As such, people who owned their own home with essential amenities and have car or van access are more likely to have better health. In contrast, people who lived in rented properties, particularly owned by a local housing authority, in over-crowded rooms with no central heating and do not have car availability have poorer health (Ebrahim et al., 2004; Grundy and Holt, 2001; Huisman et al., 2005; Lynch and Kaplan, 2000; Macintyre et al., 1998).

Analysing data from the West of Scotland Twenty-07 study, Macintyre and colleagues (1998) used a range of SES measures, including housing tenure and car availability, to examine whether the relationship between assets-based measures and health was significant. At the bivariate level, all the health measures such as the report of a long-standing illness, or an issue with respiratory function, were significantly associated with housing tenure. When individual income and self-esteem were included in their regression models, the relationship of housing tenure and car availability with health was not significant. However, Macintyre and colleagues argued that housing tenure and car availability are more than proxies for income and self-esteem because they may directly promote health or enhance damaging effects. Hence, the observed relationship of housing tenure and car availability with health may contribute to our understanding of income and self-esteem (Macintyre et al., 1998).

In another study, Kelaher et al. (2008) carried out analysis of survey data amongst different minority groups (aged 18 to 59 years) living in Leeds to examine the relationship between ethnicity, health

and SES. They found that the differences in living conditions, household assets and debts amongst ethnic minority groups (Indians, Pakistanis and Black Caribbeans) were dependent on differences in education. However, differences in home and car availability and the group members perceived ability to receive £10,000 remained after controlling for education. The inclusion of the asset-based SES measures, such as car availability and the ability to obtain £10,000, were more likely to increase ethnic differences in health. However, the more traditional measures, for example education level coupled with home ownership, have little effect on reducing ethnic differences in health (Kelaher et al., 2008). It appears that the car availability of a car coupled with other SES measures help to contribute to good health, but as already indicated, the 'sensitivity' of the SES measures depends on the choice of indicators used in the analysis.

2.2.4 Summary

The measurement of SES has been discussed and various measures are used to define SES including education, occupation, income, housing tenure and car availability. These measures are regarded both as central components for SES and as proxies for other factors which form an individual's material and social circumstances. Hence, the observations from the reviewed studies show that the role of SES varies not only across health indicators but also amongst different ethic groups (Chandola, 2001; Ebrahim et al., 2004; Grundy and Holt, 2001; Huisman et al., 2005; Kelaher et al., 2008). For example, poorer SES often leads to poorer health amongst different ethnic minority groups (Bangladeshi, Pakistani and Black Caribbean) and using different measures of health (CVD, LLSI, and disability). However, none of the measures of SES is adequate on its own to present a comprehensive view of SES as a measurement tool.

This Chapter has discussed that the traditional measures of SES are not without limitations (Chondola, 2001; Grundy and Holt, 2001; Graham, 2005; Nazroo, 2003). Such measures as education, occupation and income, are associated with life chances of different groups in society, for example of older people and ethnic minority groups. Thus, the conceptual and theoretical debates lead to a number of concerns about how SES measurement might vary depending on the particular SES measure used. For example, occupational class has been identified as one of the main measures of SES in health inequality studies in Britain (Chandola, 2001; Ebrahim et al., 2004; Grundy and Holt, 2001; Huisman et al., 2005; Kelaher et al., 2008; Nazroo, 2003). Although undoubtedly useful, social class seems to be inadequate on its own as a measure of SES, and as a measure of studying ethnic minorities and older people, social class has been criticised extensively because of its tendency to undermine the heterogeneity of such social groups.

The empirical evidence indicates that SES measures have proven useful in describing health inequalities even though there has not been much acknowledgment in studies of the importance of

the 'sensitivity' of SES measurements in relation to ethnicity and older age. If SES measures are considered in isolation, they provide only a partial observation of SES inequalities in health amongst ethnic elders. Empirically, the relationship amongst health, ethnicity and SES has changed, but the type of change depends on the SES measure used (Bowling, 2004; Graham, 2005; Kelaher et al., 2008). As a result, for older people, particularly ethnic elders, such measures as occupational social class and income provide overstated estimates of poor health among ethnic minority groups compared with the White population (Chandola, 2001; Graham, 2005; Kelaher et al., 2008; Nazroo, 2003). In general, the reviews of the different SES measures highlighted the fact that most researchers support the use of multiple SES measures when studying health inequalities at older ages (Bowling, 2004; Chandola, 2001; Grundy and Holt, 2001; Kelaher et al., 2008; Lynch and Kaplan, 2000; Nazroo, 2003). Therefore, employing appropriate SES indicators should be dependent on SES as a measurement tool and the 'sensitivity' of the different SES measures employed in studies on health inequalities. Thus, SES as a measurement tool may be capable of making a distinctive contribution to understanding the relationship amongst health, ethnicity and later life. The rest of the chapter identifies and discusses research on how SES relates to mortality and morbidity, older people particularly, health inequalities amongst ethnic elders, including the limited research done to date on the 'sensitivity' of SES measures in health, ethnicity and later life.

2.3 Socio-economic status in the study of mortality and morbidity

Evidence of the association of morbidity and mortality is long-standing and compelling (Acheson, 1998; Huisman et al., 2003; Marmot et al., 1997; Townsend, Davidson and Whitehead, 1988). Over forty years ago, for example, Antonovsky (1967) presented evidence for an inverse relationship between morbidity and mortality. During the 1980s in the UK, the Black Report renewed attention on SES health differences across socio-economic groups (Townsend et al., 1988). Since then, a number of reviews and studies have corroborated the profound influence that SES has on morbidity (Davey Smith et al., 2003; Howard et al., 2000) and mortality (Lynch et al., 2005; Lynch and Kaplan, 2000; Marmot et al., 1991). For example, studies such as the Whitehall longitudinal study showed a steep inverse relationship between employment grade and mortality. In 1967 the Whitehall I study was initiated and 17,530 British civil servants were assessed according to their employment grade and mortality from a wide range of diseases including coronary heart disease (CHD) (Marmot et al., 1991). During 1985 and 1988, data from the Whitehall II study examined the degree and cause of a social gradient in morbidity in a new cohort of 10,314 civil servants (i.e. 6,900 men and 3,414 women) aged between 35 -55 years (Marmot et al., 1991). The Whitehall studies showed that mortality rates followed a gradient and self-perceived health status and symptoms were worse in participants of lower employment status.

In recent years, several other studies in the UK (Acheson, 1998; Bowling, 2004; Davey Smith et al., 1998; Harding, 2004; Kuper and Marmot, 2003; Wannamethee and Shaper 1997) and studies in other developed countries (Alter et al., 2006; Bosma et al., 2001; Fiscella and Franks, 2000; de Groot et al., 2004; Lobmayer and Wilkinson, 2000) have all found consistent support for an inverse relationship between SES and mortality. The 1998 Acheson report, for example, indicated that whilst death rates have fallen amongst different socio-economic groups, the decline was significantly greater in the higher social classes, and mortality gaps were increasing. It was also evident that amongst older people, mortality data by social class were non-existent, because occupation is not recorded on the death certificates of men or women over the age of 75 years (Acheson, 1998).

However, the evidence for the association of SES and mortality among older people is sparse in the literature. It has been noted that most death occurs at older ages as a result of increased morbidity but several studies showed that marked differences in mortality are linked to SES of older people (Bassuk, Berkman and Amic III, 2002; Fiscella and Franks, 1997; Huisman et al., 2004; Mackenbach et al., 1997; Muller, 2002; Backlund et al, 1999; Wolfson et al., 1999). An example of this is the study by Huisman et al., (2004) using data from mortality registries linked with population Census data of 11 European countries and regions. The authors found that SES inequalities in mortality continued into old age. Although relative socio-economic inequalities in mortality decrease with increasing age, they still persist amongst older people in certain populations, as shown in studies in Britain. Breeze, Sloggett and Fletcher (1999) examined the association of SES in old age with limiting long-term illness (LLTI). They used longitudinal data for individuals from three successive Censuses in Britain (1971, 1981 and 1991), and the findings showed that there were differences amongst different age groups. For example, women aged 55-64 and 65-74 were more likely to live alone than men within both age groups. However, approximately 60% of men and women in both age groups lived in owner-occupied accommodation. Car access was more common amongst owner-occupied households, but varied by gender (Macintyre et al., 1998). Amongst those aged 55 to 64 years, men were more likely (66%) to have car access compared with 34% of women. Thus, SES disadvantage in old age explains much of the health inequalities, but fails to account for the gender differences amongst older men and women.

Similar to the UK studies, evidence from the United States shows an inverse relationship between SES, morbidity and differentials in mortality. Bassuk, Berkman and Amick (2002), add to the growing evidence on SES and all-cause mortality in a cohort study of community-based elders from four US communities. Analysis of the Established Populations for Epidemiologic Studies of the Elderly (EPESE) study is consistent with other studies, indicating that higher SES, whether measured by education or household income, was associated with lower mortality over a nine-year period. However, the

pattern of the findings varied by gender and communities. For example, for men there was a significant correlation in all three of the SES indicators for mortality and for women the only significant correlation was with income. Thus, this study shows that profound changes are affecting life at older ages even if there are significant differences amongst gender in the same age group, for example men who survive to old age are healthier than women.

Nonetheless, there has not been much attention paid to the heterogeneity of the strength of the relationships, in particular to understanding how different SES indicators and mortality might be linked to different outcomes for ethnic minorities. Davey Smith et al., (2003), for example, examined the extent to which differences in SES between Black and White men contributed to the differentials in all-cause and cause-specific mortality. Based on analysis of the Multiple Risk Factor Intervention Trial (MRFIT) amongst Black and White men aged 35 – 57 years in the USA, the evidence indicated that over 16-years of follow-up, SES expressed as household income is a significant indicator of the mortality gap that exists between Black and White men.

Howard et al. (2000), using the National Longitudinal Mortality Study (NLMS) data from the US examined the percentage of racial variation in morality attributable to SES by specific causes of death. Of the 38 disease-age strata considered in the analysis, there was a significantly higher correlation between disease and SES for Black men and women. Among these strata, SES, defined by income and education, was highly correlated with women's excess mortality. Although both Black men and women are more likely than their White counterparts to die of infectious diseases, the proportion of this excess that is explained by SES was larger for men (29%) than for women (12%). In another study, Thomas et al., (2005), examined the interaction effects of risk factor levels, income, and race or ethnicity on cardiovascular mortality rates for men. They reported a high mortality rate for cardiovascular disease (CVD) among Black and White men based on analysis of the MRFIT dataset. Thus, higher CVD mortality rates among Black men were largely mediated by risk factor levels and income. Davey Smith et al., (2003), Howard et al., (2000), and Thomas et al., (2005) shows the heterogeneity of the relationships between SES and cause-specific mortality in relation to ethnicity.

2.3.1 Summary

The studies explored in Section 2.3 illustrate that even today there are a number of ways of using SES to investigate the relationship between morbidity, mortality and ethnicity. It is evident that the mortality and morbidity risks are clearly marked amongst certain groups in society (i.e. older people and minorities). What was also clear in the literature is that regardless of the conceptual and

operational definitions of morbidity, mortality and ethnicity, SES impact life-course trajectories and can be explored through various measures. However, it is evident that different measures of SES represent different circumstances of an individual relating to mortality and morbidity. Hence, Section 2.4 looks at the existing research on SES and health inequalities of older people in general, in order to explore how studies using cross-sectional and longitudinal data vary according to the type of SES measures employed. The issue of SES as a measurement tool will be discussed, including the extent to which SES influences health in old age.

2.4 Socio-economic status in the study of morbidity amongst older people

As highlighted earlier, the relationship between morbidity, mortality and SES appears to operate in complex ways amongst different groups and this section considers the relationship between such factors in old age. The increased life expectancy in the UK's older population, together with epidemiological and technological changes, has led to a growing need to identify determinants of health in later life (Breeze, Sloggett and Fletcher, 1999; Grundy and Sloggett, 2003; Grundy and Holt, 2001; Huisman et al., 2003). Thus, researchers across disciplines such as Demography, Economics, Epidemiology, Gerontology and Sociology have studied the relationship between SES and health at older ages from their respective perspectives (Cooper et al., 2000; Curtis and Lawson, 2000; Ebrahim, Papacosta; Evandrou, 2003; Grundy et al., 2001; Lynch and Kaplan, 2000; Nazroo, 2001).

In the UK and elsewhere a limited number of studies have looked at SES and health at older ages. For example, Arber and Cooper (1999) analysed GHS data (1992-1994) from a sample of men and women 60 years and older, relating to gender inequalities in ill-health. There was a strong social class difference in health amongst older women and men, for example approximately 30% more men over the age of 80 years and formerly in a professional occupation, rated their health as 'good', compared to women with similar characteristics. Men in the age group of 70-74 years who had been in managerial or professional occupations were less likely to have moderate or greater functional impairments than men who were formerly in semi- or unskilled occupations. Similarly, about 18% of women aged between 70-89 years who were formerly in managerial or professional occupations were disabled, compared with 32% of women in the same age group who were previously in semi-skilled or unskilled occupations. The authors concluded that although their research supports previous findings, the data indicated that there were small gender differences in self-assessed health amongst older people in the mid-1990s.

The studies examined thus far seem to use more than one SES measure with wide-ranging results, and it is apparent as indicated in Section 2.2 that multiple SES measures could have a greater analytical power than a single measure. Grundy and Holt (2001) for example, illustrate this by analysing multiple measures, and found differences in self-reported health (presence or absence of any disability) among people aged 55-69 years. Although the focus of this study is on people in the lower scale of old age, the findings significantly contribute to the research on SES and older people, indicating that the most effective combination of measures for the study of health inequalities at older ages is educational qualification and social class, coupled with a deprivation measure. Two or more measures, namely educational qualifications and housing tenure, were reported to be independent factors for the prevalence of morbidity, reflected in the report of a LLSI and poor self-rated health, because of the onset of disability or impairments (see also Chapter 4).

Hence, there is a significant relationship between SES and health outcomes at older ages, and SES appears to be a strong mediating factor in producing particular health outcomes amongst older people. Huisman, Kunst, and Mackenbach (2003) add to the evidence on SES inequalities in morbidity amongst older people with their analysis from the first wave (1994) of the European Community Household Panel (ECHP) study. The sample included a total of 14,107 men and 17,243 women, categorised into three aged groups (60-69, 70-79 and 80+). The study gave a broad overview of socio-economic inequalities (i.e. education, income) in morbidity amongst older people from 11 European countries, based on self-assessed health, reduction in daily activities due to a physical or mental problem and long-term disability indicators. The findings were consistent with other studies indicating that socio-economic inequalities in morbidity by income and level of education persist amongst older people, especially in the oldest age groups. Significant international variations were found among all age groups and both sexes (e.g. inequalities decrease with age among women, but not among men) and using different indicators of SES in the countries. The authors concluded that despite the limitations in the ECHP dataset, such as having no information on specific diseases, SES plays an important role throughout old age. Thus, the relationship between SES and health suggests greater heterogeneity than might be expected amongst countries and improving material, social and cultural resources for older people may play a key role in their health.

2.4.1 Summary

In summarising this section, several of the studies on SES, morbidity and older people, indicated that SES and increased morbidity are most noticeable during the middle years of later life (60-70) but are also becoming more marked amongst the oldest old (80+). In these studies, different indicators of SES were used to relate to different indicators of health outcomes. The studies include both longitudinal and cross-sectional data, and although the analysis is broadly representative of the population studied, part of the sub-sample includes people who were in good health at the start of the survey. All of the studies used multiple SES measures. Even though there were certain variability and methodological issues based on the measurement techniques employed in the different models, the contribution of SES as a measure was still significant (see also Section 2.8).

The next section examines how research findings on SES and health amongst ethnic elders differ from those relating to the general population. Many of the key themes discussed thus far, such as the demographic and socio-economic characteristics of the ethnic population, are also evident in the literature for SES and morbidity amongst ethnic elders.

2.5 Health inequalities: The use of socio-economic status in the study of ethnic elders health

As noted in Sections 2.2 through 2.4, several of the studies have documented differences in SES and health amongst older people, and this was most evident amongst middle age and the oldest age groups. It has been shown by using different SES measures that ethnic elders have worse health patterns than their White counterparts and that such patterns are more complex (Davey Smith, 2000; Harding, 2004; Nazroo et al., 2007; Nazroo and Williams 2006). In addition, it has been argued that research on ethnicity and health fails to take into account factors such as healthy migrants' effect, which refers to migrants being more likely to be healthy than their cohort counterparts who remain in their country of origin (Harding, 2004).

Evidence from a national cohort study (1971 - 2000) investigating the mortality of Caribbean migrants (n=1,500) in England and Wales examined the length of residence and the age at migration of migrants to Britain. The findings indicated a link between the length of residence and declining health (Harding, 2004). This implies that the buoyant health qualities of the first generation migrants to Britain are not constantly maintained, and a deterioration of the healthy migrant effect is inevitable over time. It is evident from the empirical evidences that SES reflects the circumstances of different ethnic minority groups, however, the complexity of other factors, such as age at migration and circulatory disease mortality, also plays a role which can lead to differences in health status.

Inequalities in morbidity by SES across ethnic groups are well documented in the US, and there are several national data sets linking Censuses and longitudinal data (Davey Smith et al., 2000; Farmer and Ferraro, 2005; Hayward, et al., 2000; Howard et al., 2000; Nazroo, 2003). However, the literature shows that only in the last three decades has health and ethnicity become a subject for research in the UK, particularly at older ages and among ethnic elders (Cooper et al., 2000; Cooper, 2002; Curtis et al., 2000; Davey Smith et al., 2000; Evandrou, 2003; Karlsen et al., 2002; 2001 and 2003). Certain commentators argued that contributing to this lack of research on health and ethnicity is an assumption that older people from ethnic minority groups are too small a group to be at the centre of academic research (Cooper et al., 2000; Grewal et al., 2004). A lack of reliable quantitative data has also hampered such research (Davey Smith, 2000; Nazroo, 2002; 2003). Ethnic minority groups refer to minority populations of non-European origins, and are symbolised by their non-White status (Bhopal, 2004). There has been less systematic investigation of the association between health status and ethnicity which may be experienced by older people from ethnic minority groups living in Great Britain. However, there are several noteworthy studies from the UK and elsewhere that are specific to SES differences in morbidity and older people from ethnic minority groups.

A key finding from the analysis of datasets relating to ethnic minorities is the assertion that there is a high threshold for reporting ill health. For example, Cooper et al. (2000) used several cross-sectional datasets, including the GHS (1992 - 96), Black and Minority Ethnic Groups (BMEG) (1992 and 1994) and the HEA Health and Lifestyles Survey (HALS) (1992), in order to examine levels of reported ill health at different ages for different ethnic groups. For the most part, there was similarity between and within the different groups. The differences in reported health status amongst ethnic minorities and their White counterparts were more significant for the older age groups. For example, over 34% of ethnic minorities 60 years and older reported poor health compared with 21% of Whites of the same age. Also the levels of deprivation were not uniform for all older people from ethnic minority groups, as Caribbeans were more disadvantaged than their older White counterparts, but were relatively more advantaged compared with older Bangladeshi and Pakistani people. Analysis of the GHS and the HEA found that low educational qualifications, material resources and occupational social class were consistently associated with poor health for older men and women from ethnic minority groups. The authors argued that marked 'health disadvantages' of older ethnic minorities appear to refute the argument that older age 'levels out' ethnic differences in health (Cooper et al. 2000).

Curtis and Lawson (2000) explore quantitative and qualitative information on self-reported health, focusing on gender differences in reporting health problems in the Caribbean population. Findings from multivariate analysis, which indicated the relative levels of reported LLTI for men and women, were inconsistent in the GHS from year to year. Nonetheless, the Census data show there were no differences in reported levels of LLTI for Caribbean men compared with White men, however Caribbean women were more likely than White women to report a LLTI. Caribbean women were also more likely than their male counterparts to report a LLTI, but this gender difference was not evident in the White group. Several arguments regarding the methodology and the interpretation of the results, were raised as possible explanations. For example, Curtis and Lawson (2000) argue that quantitative data addressing these issues may suggest that Caribbean women are more likely than men to report illness due to social pressures, as reporting illness allows women to emphasise their indifference, while retaining their prescribed social roles. On the other hand, Caribbean men were more inclined to put emphasis on health fitness and as a result to under report their health problems. The authors stressed that interpreting the collected information on self-reported health differences is multi-faceted and does not always appear consistent across data sources.

Ginn and Arber (2000) employed three years of the British Family Resources Survey data (1994 – 1996) to analyse the growing inequality amongst older people from ethnic minority groups, and compared them with Whites who have a substantial income and those who rely on means-tested benefits. They hypothesised that older ethnic minorities are at risk of social exclusion because of the

lack of financial resources and their reliance on means-tested benefits or resources from their family. The lack of inadequate income among women, for example private pension income, was most present among Blacks, but was especially marked amongst older ethnic minority women from Indian, Chinese/other and Pakistani/Bangladeshi groups, impacting upon their health status.

Research by Farmer and Ferraro (2005) provides evidence for the continuing significance of SES in determining the health status of ethnic minorities over time. There were no significant ethnic differences in chronic and serious illness at the bivariate level. However, it has been shown that people with lower levels of education and income report poorer health, and in this study, ethnic minorities did not reap the same health benefit from a higher SES compared with the majority of the population. For example, ethnic inequality was largest at the highest level of education, that is, Black adults with the highest levels of education reported significantly poorer self-rated health than White adults. No correlation was found between ethnicity and morbidity, indicating that over 20 years (i.e. 1971-92) Black adults did not experience a higher incidence of morbidity than White adults. However, this did not mean that ethnic inequality in health did not diminish over the 20 years. Instead, the probability was that Black adults were in poor health at the start of the study and therefore they endured poor health throughout the study. Similar to other study designs, a number of limitations were acknowledged, for example there were missing cases on occupation prestige among Black and White people. Although this could have impinged upon the generalisability of the results, the study provides some evidence for the diminishing return hypothesis, which argues that persons from ethnic minority groups may face significant threats to their health and well being over the life-course, experiencing lower returns on the resources that they achieve, such as educational attainment and income (Farmer and Ferraro, 2005).

2.5.1 Summary

Similar to Sections 2.3 and 2.4 there were a number of different explanatory frameworks employed in the studies focusing upon the characteristics of older people from ethnic minority groups. Although most of the studies refer to SES as multidimensional, it is clear from the literature that empirically, the concept is operationalised more narrowly, for example through measures of social class, education, income or housing tenure. It is evident from the literature that such components are related to health, however the magnitude of the effect can vary and can include other factors, such as the impact of migration or discrimination, amongst different ethnic groups (see also Chapter 4).

Consequently, supporting evidence shows significant differences in self-reported health status by age and ethnicity. This unique disadvantage is the result of bias in two undervalued status groups, that

of old age and being a minority referred to as the 'double jeopardy' (Blakemore and Boneham, 1996; Cooper et al., 2005; Grewal et al., 2004; Manthorpe and Hettiaratchy, 1993). Such factors are significant when considering the relationship between SES, ethnicity and age in health inequality research (Davey Smith, 2000; Nazroo, 2006; Nazroo and Williams 2006), and will be explored to a greater extent in Chapters 5 and 6.

Section 2.6 turns to the impact of gender on these relationship, and considers in more detail the evidence of gender inequality in health and the role of SES amongst the different ethnic groups.

2.6 Gender inequalities: The role of SES and self-assessed indicators in the study of health inequalities

As alluded to in Section 1.6 and throughout Sections 2.3 - 2.5 of this thesis, gender-based inequalities in health are most marked amongst the older population. In many developed countries, health varies by SES, indicated by the level of occupation, education or the individual's or household's income (Arber and Cooper, 1999; Bartley et al., 2004; Curtis and Lawson, 2000; Galobardes, et al., 2007). The size of the observed SES in health differs amongst different groups in the population, particularly among ethnic men and women (Cooper, 2002; Curtis and Lawson, 2000). According to self-assessed indicators, including the report of general health and limiting long-standing illness, women generally experience poorer health than men (Arber and Ginn, 1999; Bartley et al., 2004; Cooper, 2002; Gerritsen and Deville, 2009; Gorman and Read, 2006). For example, Cooper (2002) examined socio-economic inequalities in the self-reported health of men and women from the White and minority ethnic groups in the UK using HSE data from 1993-1996. The findings indicated that women from Black Caribbean, Indian and Pakistani groups have poor health, however this is not the case for women from the White and Bangladeshi groups. Additionally, the findings showed increasingly higher morbidity among all men and women from ethnic minority groups even after adjusting for SES and compared with their White male counterparts. Finally, it has been emphasised that even though SES accounted for the report of higher morbidity in ethnic minority men and women compared to their White counterparts, this only partially explained gender differences in health within minority groups.

Gerritsen and Deville (2009) carried out a similar study in the Netherlands, examining gender differences in health and health care utilisation within and amongst different ethnic groups. Their study analysed data from the second Dutch National Survey of General Practice (2000-2002) with a sample size of 7,789 participants from the indigenous population and 1,512 participants from the four largest migrant groups (e.g. Morocco, Netherlands Antilles, Turkey and Surinam). The results showed that the magnitude of gender differences in men's and women's self-reported health status varies considerably by gender and ethnicity. Women showed higher morbidity than men, with the largest differences amongst Turkish, followed by Moroccan and Surinamese people, when compared to the indigenous and Antillean groups, even when adjusted for demographic and socio-economic status (Gerritsen and Deville, 2009). These studies indicated that there are marked gender differences among men and women, although the size of gender differences may vary according to particular health outcomes used in the study.

In another study, Cummins et al., (2010) examined gender differences in health behaviours, functioning problems, disability, disease prevalence and self-rated health at age 50 years and older, in 11 European countries, the nation of England and the US. They found a strong gender gradient in health particularly among women. For example, using Survey of Health, Ageing and Retirement (SHARE) data for 11 European countries, the English Longitudinal Study of Ageing (ELSA), and the Health and Retirement Survey (HRS) data for the US, Cummins and colleagues reported that women were more likely than men to have poor health in all the countries. For example, after controlling for age, a higher proportion of women than men reported fair or poor health. Conversely, when diseases were included in the model, the odds of women rating their health poorly were significantly higher in Greece, Sweden, Belgium, Italy and Spain. In contrast, in France, when controlled for the presence of diseases, only males rated their health poorly. The authors argued that there is significant reliability in the direction of gender differences in health across all the countries in their study, even though the size of the differences is affected in many cases by the similarity in health-risk behaviours such as obesity and smoking, among men and women.

2.6.1 Summary

Several commentators argued that even though socio-economic disadvantages account in large part for women's report of poorer health than men, SES only partially explained the gender differences in health and thus, gender difference could be an artefact of the measurement of SES (Arber and Cooper, 1999; Cooper, 2002; Denton & Walters, 1999; Read and Gorman, 2006). As indicated in previous studies, the role of SES and self-assessed indicators in the studies of health inequalities does not capture all the dimensions of poor health, particularly amongst women and ethnic elders (Arber and Cooper, 1999; Cooper, 2002; Read and Goreman, 2006). Consequently, gendered inequalities in health are the result of a stratification system that provides opportunities or challenges to men and women in relation to their health (Denton and Walters, 1999; Goreman and Read, 2006). For example, men and women of lower SES may report poorer health in part because they are exposed to more hardship, participate in health-damaging behaviours and have limited access to resources that can promote good health (Bartley et al., 2004; Cummins et al., 2010; Denton et al., 2004; Denton and Walters, 1999; Goreman and Read, 2006). Such questions will be explored further in Chapters 4, 5 and 6 of the thesis.

This section highlighted the importance of SES and the role of self-assessed health indicators for both gender and ethnic minority group member's health. However, other studies also noted that differential participation in health damaging behaviours is also important in the study of health inequalities, because behavioural experiences, such as smoking and drinking, may also include

gender differences (Goreman and Read, 2006; Jarvis and Wardle, 2006; Harman et al., 2006). Section 2.7 will discuss behavioural characteristics of smoking and drinking among the different groups in the population.

2.7 Health-risk factors: The impact of behavioural characteristics of smoking and drinking in later life

Cigarette smoking and alcohol consumption have been identified as two major behavioural problems driving mortality and morbidity in developed and developing countries (Edwards, 2004; Harman et al., 2006; Schaap et al., 2009; WHO, 2002). Personal choices, such as smoking and drinking, have major implications for health inequalities in Britain and elsewhere. The health-risks sustained by smoking and drinking are well documented (Cooper et al., 2000; Davey Smith et al., 2000; Read and Gorman, 2006; White et al., 2006). However, even though overall smoking prevalence rates have been declining since the 1990s, the SES gap in smoking incidence has been widening, that is people with a lower SES tend to smoke more than people with a higher SES (Lawlor et al., 2003; Jarvis & Wardle, 2006).

2.7.1 Smoking

It has been noted that cigarette smoking in Britain has declined steadily over the last 3 decades, levelling out during the 1990s (Department of Health (DOH) 1998, Lawlor et al., 2003; ONS, 2001). The decline in smoking, however, has been least marked amongst the most disadvantaged groups in the population, and over time these groups have come to form an increasing proportion of those who smoke (Evandrou and Falkingham, 2002; Lawlor et al., 2003; Jarvis & Wardle, 2006). Consequently, the prevalence of smoking behaviours is strongly related to SES as determined by education, individual or household income or occupational status and varies among older people, ethnic minorities and women (Davey Smith et al., 2001; Harman et al., 2006; ONS, 2001; Schaap et al., 2009; Sproston and Mindell, 2006; White et al., 2006). Evidence from the 1999 and 2004 HSE, for example, showed that cigarette smoking varied among and within ethnic minority groups aged 50 years and older (Erens et al., 1999; Sproston and Mindell, 2006). Smoking prevalence amongst Bangladeshi men is significantly higher at 40% than amongst Pakistani (29%), Indian (20%), Black Caribbean (25%), Black African (21%), Chinese (21%) or Irish (30%) men compared with the general population at 24%. Among women of the same ethnic backgrounds the patterns are very different. The prevalence of cigarette smoking amongst Asian and Black African women is relatively low, ranging from 2% amongst Bangladeshi to 10% amongst Black African women. However, 24% of Black Caribbean women and 26% of Irish women reported cigarette smoking, compared to 23% of women in the general population (Sproston and Mindell, 2006). Conversely, among men, smoking accounts for over half of the occurrence in risk of premature death between social classes (Jarvis and Wardle, 2006), and premature death from lung cancer was five times higher amongst men in unskilled manual work compared with those in professional employment (DOH, 1998, Sproston and Mindell, 2006), making smoking one of the most commonly recognised contributors to poor health and premature death (Evandrou and Falkingham, 2002; Department of Health (DOH), 1998; WHO, 2002).

In 1998, the White Paper, *Smoking Kills,* identified smoking as a major cause of preventable illness and premature death in the UK (DOH, 1998). In particular, the White Paper set targets to reducing the prevalence of cigarette smoking within the general population to 24% by 2010. However, in 2004, these targets were revised with the publication of the *Public Service Agreement Targets* which outlined new targets to reduce adult smoking prevalence to 21% or less by 2010. The government's overall target is to reduce health inequalities, including those experienced by minority ethnic groups and a reduction in the prevalence of smoking amongst routine and manual groups to 26% or less by 2010 (DOH, 2004), however these goals are yet to be actualised. At the same time, findings from one study on the prevalence and characteristics of 'hardcore' smokers in England indicated that smoking was associated with nicotine dependence, socio-economic deprivation and age. 'Hardcore smoking' is defined by four criteria, including going for less than a day without cigarettes in the past five years and having made no attempt to quit in the past year, all of which had to be satisfied (Jarvis et al., 2003). Age was most strongly associated with such type of smoking, with 30% of smokers aged 65 and over classified as 'hardcore smokers'. It was noted that older smokers were less likely to stop smoking even though their health was more imminently at risk (Jarvis et al., 2003).

These studies demonstrate that the patterns of cigarette smoking among ethnic minority groups and older people in Britain are different from those of the general population. Finally, even though it has been noted that deaths from smoking are falling, health inequalities in smoking related deaths are more pronounced amongst ethnic minorities and older people.

2.7.2 Alcohol consumption

There is a growing concern about the harmful effects of alcohol consumption in Britain (Breakwell et al., 2007; British Medical Association (BMA), 2008). Alcohol consumption is linked to personal choice, and the misuse of alcohol is associated with a wide range of dose-related adverse consequences that can lead to considerable health conditions (BMA, 2008; Jarvis and Wardle, 2006). Alcohol consumption is a significant cause of morbidity and premature deaths amongst different groups in the population (BMA, 2008; Breakwell et al., 2007; Heim et al., 2004; Hajat et al., 2004). Alcohol consumption contributes to a range of acute and chronic poor health including alcohol poisoning, alcoholic liver cirrhosis, cancer and cardiovascular diseases (BMA, 2008; Erskine et al., 2010; Emslie and Mitchell, 2009; ONS, 2008). In England a large proportion of people that is over 8.2 million, including 38% of men and 16% of women aged between 16 and 64 years, are affected by alcohol consumption (Erskine et al., 2010; ONS, 2008). Research has shown that the link between alcohol consumption and SES is an important marker for poor health (Erskine et al., 2010; Harrison and Gardiner, 1999) and that the socio-economically disadvantaged groups, such as ethnic minorities and

older people, may experience greater levels of alcohol-related mortality and morbidity (Breakwell et al., 2007; Erskine et al., 2010; Heim et al., 2004; ONS, 2008). In the UK over 85% of the alcohol-related deaths resulted from cirrhosis of the liver and this was more pronounced among men and women 55 – 74 years (ONS, 2008).

Breakwell and colleagues (2007) examined the patterns of alcohol-related mortality by socio-economic deprivation among men and women in the UK, and found a strong relationship between these factors. Alcohol-related death rates were more than five times higher in males (rising from 6.2 deaths per 100,000 to 31.9 deaths per 100,000) and more than three times higher in females (rising from 3.7 deaths per 100,000 to 11.3 deaths per 100,000) for those living in the most deprived areas compared with those in the least deprived areas between 1991 and 2004 (Breakwell et al., 2007). A similar study by Erskine and colleagues (2010) using data from 8,797 wards in the UK examined the differences in alcohol-related mortality in relation to SES, urban/rural locations and age. They found a significant association between alcohol-related mortality, especially among the middle-age groups (25-44 years) of men and women in the UK. However, over half of all alcohol-related deaths occurred in the older age groups (45 -64 years), and people living in urban areas experienced higher mortality compared with those living in rural areas, even after controlling for SES deprivation (Erskine et al 2010).

These studies show the impact of alcohol-related mortality and morbidity and the considerable variations amongst different groups (e.g. SES groups, age, gender) in the population. However, it has also been noted that a significant proportion of UK adults abstains from alcohol consumption for religious, cultural and other reasons (BMA, 2008; Bhopal et al., 2004; Heim et al., 2004). In Britain alcohol consumption appears to be lower in ethnic minority communities than in the general population (Heim et al., 2008, Bhopal et al., 2004). For example, preliminary findings from the 2004 HSE indicated that consumption patterns of ethnic minority men and women are reflected in their diverse attitudes towards alcohol. Among Irish participants, 56% of men and 36% of women consume alcohol, but these proportions are lower for all other ethnic groups including Black Caribbean (28% of men, 18% of women), Indian (22% men, 8% women), Chinese (19% men, 12% women), Black African (17% men, 7% women) and Pakistani (4% men, <1% women) people, and were the lowest amongst Bangladeshi participants (1% of male and <1% of female) and they were comparatively less than the general population (45% of men and 30% of women) (Sproston and Mindell, 2006). Similarly, the findings from the Fourth National Survey of Ethnic Minorities regarding the incidence of alcohol consumption were consistent showing that the total abstinence rates range from 40% in the Chinese population to 60% in the Indian and over 90% in the Pakistani population, compared with just 13% in the White population (Heim et al., 2004; Nazroo, 1997).

2.7.3 Summary

The relationships between health-risk behaviours (e.g. smoking, alcohol consumption), SES, demographic characteristics and health are multifaceted, for example smoking and alcohol-related mortality and morbidity rates are higher in men and increase with age (See also Chapters 5 and 6). However, while the proportion of individuals smoking and drinking remains high, the upward trend in these behaviours among adult men and women in the UK may be levelling out, and differences do exist between the different groups. The proportion of people smoking and alcohol consumption in ethnic minority groups, for example, is considerably lower than that of the general population. Socio-economic deprivation is also higher among men and the disadvantaged groups in the population who are disproportionately more likely to adopt such behaviours and are least likely to give up smoking and alcohol consumption. This implies that the burden of smoking and drinking-related disease and poor health falls unduly on the most disadvantaged groups.

Section 2.8 identifies and discusses the existing theoretical frameworks and how they relate to older people, particularly ethnic minority groups in order to provide a basis for the conceptual framework of this thesis.

2.8 Theoretical frameworks

2.8.1 Introduction

Throughout the literature, SES is the most commonly used concept in health inequality research and a number of studies have employed various theories and frameworks to understand the variations in health. Wadsworth (1997) referred to SES as a 'collective' term for a wide range of factors that consist not only of educational attainment from early life, occupational status and income security but also family circumstances which may impact upon health throughout the life-course. This section of the literature review focuses on the different theoretical models in relation to health, ethnicity and age. There are however, other theories used within health inequalities research, where measures of poverty such as income, have been operationalised in relation to poor health (Berney et al., 2000). A shift in the debate on morbidity and SES calls for explanations other than disease or poor health through overcrowding or the lack of resources in poor neighbourhoods.

The literature discusses a wide range of socio-economic factors which can impact upon health in later life (Breeze et al., 2004; Grundy and Sloggett, 2003; Nazroo, 2003). For example, Nazroo (2003) has reviewed evidence on variations in health across ethnic groups, and postulates that social and economic inequalities, underpinned by racism, are a significant cause of ethnic health inequalities. In general, ethnic elders have experienced multiple disadvantages (Blakemore and Boneham, 1996; Nazroo et al., 2007), for example they survived migration from UK's former colonies, racism and discrimination in their adopted country (Haug et al., 2002; Karlson and Nazroo, 2002). Older people from ethnic minority groups also experienced limited opportunities in such areas as education, employment and housing (Cooper et al., 2000; Karlson and Nazroo, 2002; Platt, 2007).

Thus, both ethnic minority background and long-term ill health are associated with reduced chances of employment in adulthood (Salway et al., 2007). Over 40% of ethnic minorities are in income poverty, which is double the rate of their White counterparts, and these factors add to differences among ethnic elders in terms of health inequalities (Kenway and Palmer, 2007). The study of health inequalities requires more systematic and integrated explanations capable of generating new theories within the context of older people's life trajectories.

This section will examine the different theoretical and empirical propositions that point to the salience of health inequalities and SES, particularly in the context of older ethnic minorities. There are a number of different theoretical explanations of the relationship between health and SES, however such models often stem from different disciplines using particular perspectives of the

health experiences of the different groups in society (Graham, 2002). Finally, although researchers draw on many different frames of reference (e.g. gerontology, sociology, psychology, epidemiology and political economy), such these explanations are not mutually exclusive and are closely interrelated (Graham, 2002 and Machenbach, 2005).

Mackenbach (2005) noted that research findings can come together from a number of 'complementary perspectives' (p. 268). Thus, for this reason the proposed framework discussed will refer to different SES and health inequality models which relate to this study. Firstly, the framework discusses the Barker hypothesis which focuses on conditions in utero and nutrition during early life that can be of importance for health later in life. Even though the analysis in this thesis is cross-sectional, the discussion of this model reveals important insights about health inequalities particularly in later life. The second approach is the life-course perspective, which expands on the links between early and later life morbidity. The third model refers to poverty and deprivation, and explains the underlying socio-environmental determinants of deprivation and how society is structured to limit opportunities for some groups. The final approach, the Dahlgren and Whitehead 'Model of Health' has identified the relationships among different factors affecting health inequalities and the key individual and community factors that influence health. The aim is to discuss the different theoretical models and develop a theoretical framework for the focus of this thesis that can illuminate the links between older people 50 years and over, health, ethnicity and SES in answering the research questions in Section 1.4.

2.9 Empirical underpinning of theoretical framework

This part of the chapter explores the empirical evidence underpinning each of the theoretical frameworks outlined above. The aim of this section is to discuss elements of such frameworks which can be useful in examining health inequalities among older people from ethnic minorities.

2.9.1 The Barker hypothesis

Empirical studies have examined how adverse socio-economic and environmental factors starting early in life, such as poverty, unemployment, poor housing and parental education, may have long-term consequences for the life-course, independently, cumulatively and interactively, thus impacting on mortality and morbidity as one ages (Berney et al., 2003; Ben-Shlomo and Kud, 2002; Frankel, Davey Smith and Gunnell, 1999; Naess, Erens and Blane, 2006). In this context, it has been noted that health status in early childhood is an important determinant of future adult's health. For example, the relationship between childhood SES and CHD spurred rigorous research into the 'in utero' and 'childhood programming' hypotheses (Baker 1991). It contributed to several CVD risk

factors, indicating that the majority of such diseases are socially patterned and distributed throughout the life-course (Davey Smith, Gunnell and Ben-Shlomo, 2001). A series of articles by Barker and colleagues drew attention to the association between low birth weight and an increased risk in adult life from chronic disease. In particular, Barker (1991) carried out a retrospective cohort study of men born between 1921-1925 in Hertfordshire to examine the relationship between geographical location and social class differences in adult health. Barker argues that there is a direct causal link between respiratory infection in early childhood and adult obstructive lung disease, and concluded that both geographical and social differences in adult health are the result of 'biological programming in utero' (1991: 64). Thus, an adult disease is seen as having 'foetal origins' (Ibid).

The 'foetal origin hypothesis' posited by Barker suggests that the environment during foetal and infant life programmes people from socio-economically disadvantaged backgrounds to be in an elevated risk for an adult disease (Barker, 1991). Stated another way, environmental exposures, such as poor nutrition during pregnancy, which is a critical period of growth and development, can lead to impaired foetal growth leaving the embryonic child with an inherent vulnerability to disease in later life. This may have long-term effects throughout adult life and the increased risk of chronic disease, known as 'biological programming'. Biological programming is a key concept in this theory and tends to increase lifetime vulnerability due to early childhood acquired risk that can lead to organ malfunction, for example CVD or health-risk behaviours such as obesity and smoking, which in turn may be exacerbated by risks encountered in adulthood and later life (Barker, 1991; Davey Smith et al., 1998 and Mackenbach, 2005).

In a series of articles, Barker and colleagues stressed that circumstances in utero were a main cause for low birth-weight. It was noted that low birth weight had an indirect link with a number of diseases such as CVD, HTN and diabetes in later life (Barker, 1991 and 2004). For example, inferences from data, based on an observational study drawn from a sample of 10,636 men born during 1911–1930 in Hertfordshire, suggest that the prevalence of type 2 diabetes fell steeply with increasing birth weight. Low birth weight at one year significantly increased the risk of CVD in adult's health (Barker, 2004). As a result, small body size at birth is observed as an indicator of poor foetal variations in nutrition or birth weight, which programme an individual's predisposition to adult disease. This study has widened the empirical debate of disease in later life from conventional lifestyle variables such as diet, exercise and smoking, to processes acting in embryonic life. Accordingly, Eriksson et al. (2001) carried out a longitudinal study to examine how growth during infancy and childhood increases the risk of CHD in a sample of 357 men who were either admitted to hospital with CHD or who died of the disease. The men belong to a cohort sample of 4,630 born at a Helsinki hospital between 1934 and 1944, and the findings indicated that low birth weight at age one is associated with an increased risk of CHD (Eriksson et al 2001).

Thus, similar to the findings from the Hertfordshire study (Barker, 1991), it is evident that low birth weight not only impacts upon fetal, infant, and childhood growth but is a good indicator of the development of chronic diseases in later life. In another population-based study, Eriksson et al. (2004) found a clear inverse relationship between birth weight and CVD risk (e.g., systolic blood pressure) in Swedish men 80 years old. A cohort of 478 single births in 1913 was followed in 1963 when the men were 50 years old. The study examined whether birth weight was associated with increased adult CVD risk factors amongst these men and they were re-examined at age 54, 60, 67, 75 and 80 respectively. At age 50, birth weight and systolic blood pressure was not significantly related as only 2.1% of the men had any anti-hypertensive treatment. However, at age 80 the prevalence rate of men who had anti-hypertensive treatment was significantly higher at 27%, with a cumulative incident rate of 23%. In addition, men who developed other CVD risk factors, such as diabetes, also had significantly lower birth weight (Eriksson et al., 2004). Thus, low birth weight may be a sign of inherent vulnerability to disease in later life, however there may also be exceptions to the strength of this relationship.

Although the Barker hypothesis and the empirical work which has contributed to the study of health outcomes over the life-course are useful in considering the origins of health inequalities in early life, certain insights from this framework are useful for the cross-sectional analysis conducted in this thesis. For example, this strand of work highlights the importance of lifelong characteristics, such as a person's SES, for the study of health status in later life (see also Chapter 4). In addition, the body of evidence for 'biological programming' serves as a reminder that health status in later life, even when studied at one point in time, is a culmination of processes producing advantages or disadvantages for individuals throughout the life-course.

2.9.2 The life-course perspective: Links between early life and later life morbidity

Barker's work on the early environment widened the debate on the different influences in early life which directly or indirectly interact with adult experience to determine health outcome in later life. Other studies demonstrate that it is not only the situation in utero that matters for adult health trajectories (Davey Smith and Hart, 2002; Kuh and Ben-Shlomo, 1997; Leon et al., 1998). In addition, research has expanded the links between early life and later life morbidity even further to show that health in adult life is multifaceted and intricate (Kuh and Ben-Shlomo, 1997; Kuh and Wadsworth, 1997). Consequently, research on the life-course examines a range of processes, such as adverse environmental and behavioural conditions, through which exposures act at different stages of life, on

their own or in combination, and influence health. A range of conceptual models have been employed to capture the different relationships throughout the life-course. Furthermore, the evidence shows that exposures acting across the life-course influence adults' health outcomes and continue throughout old age (Kuh et al., 2003; Naess, Erens, and Blane, 2006).

The life-course model in health theorises that 'factors acting in early life accumulate, and interact with factors acting in later life in the production of adult disease' (Davey Smith and Heart, 2002: 1295). A clear example of this is the explanation put forth by Ben-Shlomo and Kuh (2002) that children with lower SES are more likely to have a low birth weight, poor diets, to be exposed to passive smoking or other infectious agent, and to have few educational and employment opportunities in adulthood. Several studies pertaining to the life-course perspective corroborating this hypothesis not only indicate that lower childhood SES influences health, but also that it provides a predisposition to higher mortality and morbidity from certain diseases such as CVD, stroke, lung cancer, stomach cancer, disability and HTN. In other words, socio-economically disadvantaged childhood independently contributes to an increased health-risk in adulthood.

Davey Smith and colleagues have provided evidence for the contribution of childhood SES to adult health outcomes. Furthermore, Frankel, Davey Smith and Gunnell (1999) carried out analysis based on the Carnegie Survey of family diet and health in England and Scotland between 1937 and 1939. The sample consisted of 3,750 individuals and they examined the relationship between childhood SES and adult CVD mortality. Their findings indicated that even though the trend in CHD mortality across social position groups was not statistically significant ($p = 0.12$), there was a statistically significant relationship with mortality ($p = 0.01$). Follow-up adjustments to the Townsend deprivation index of area residence during adulthood showed the findings were not significantly altered. Thus, the effects of socio-economic influences upon particular CVD differ according to the age at which they are experienced, SES in childhood and adult employment. Similarly, evidence from another study by Davey Smith and Hart (2002) results from the Collaborative Observational Study focusing on men aged 35-64 years in the west of Scotland, indicated that higher risk of all-cause mortality was associated with poor childhood SES. Coupling cumulative SES measures with early (e.g. father's occupational class) and later-life (e.g. social class at time of survey) with CVD risk factors of smoking and alcohol consumption indicate that CVD is influenced by SES and behavioural factors, which act cumulatively over the life-course. The relative risk of CVD mortality ranged from 1.00 (most favourable life-course exposures) to 4.55 (least favourable). Thus, the cumulative SES indicators were stronger predictors of all-cause mortality than any of the other components.

Thus far, the studies indicate that it is not only the intra-uterine environment that matters but life after birth, in particular childhood SES. Childhood disadvantages, for example, influence the social

pathways into and through adulthood SES trajectories. This is especially the case for childhood disadvantage and adversity which are seen as restricting opportunities (e.g. education) which in turn influence SES and health related behaviours (e.g. smoking) later in life. Another main indicator of the life-course intra-uterine environment approach is that represented in the accumulation of risk models which focus on the sequence of exposure. It has also been noted that health behaviour, such as smoking or lack of exercise, raises the risk of disease and may accumulate gradually over the life-course, increasing the detrimental exposures to poor health (Jarvis and Wardle, 2000). This strand of work is useful in emphasising that health status in adult and later life, as explored in this thesis, may the product of circumstances during an individual's childhood, requiring the examination of key socio-economic factors related to the individual (see also Chapter 4).

2.9.3 The accumulation of risk and the life-course approach

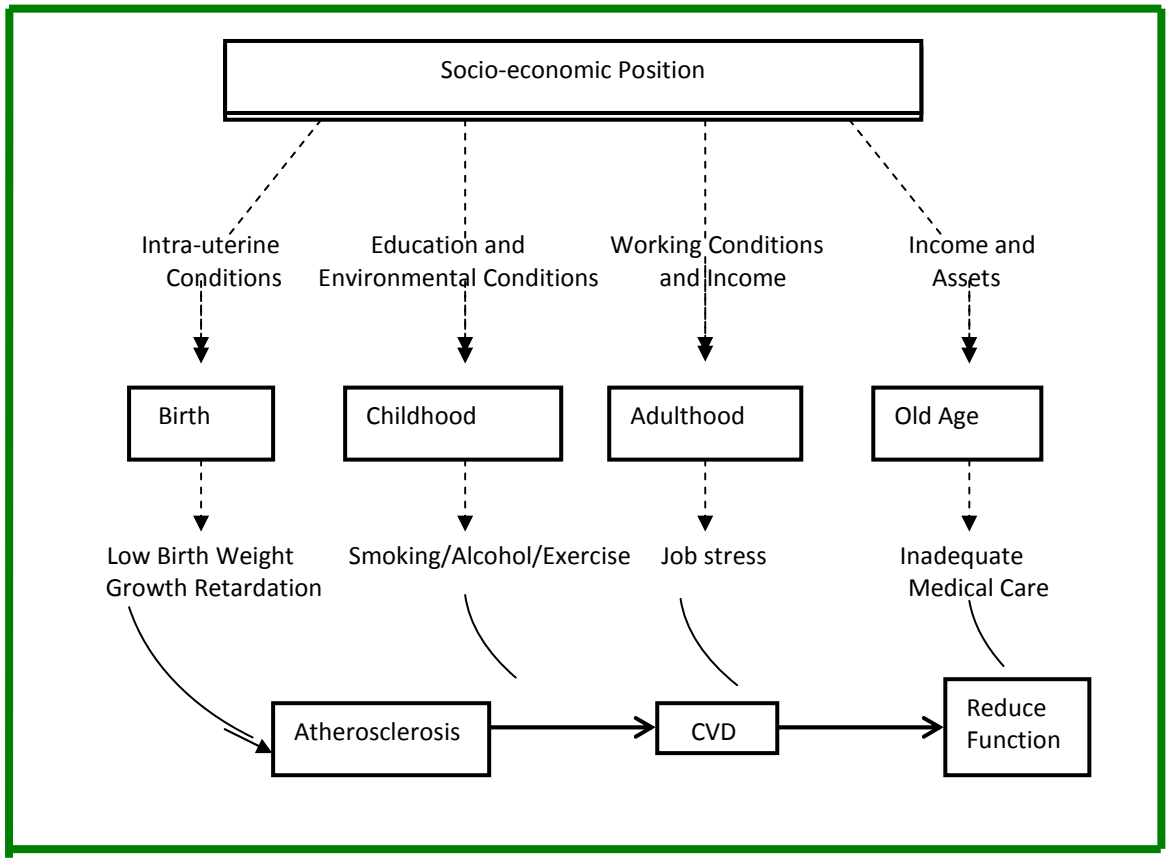
Based on studies using cross-sectional data, the 'accumulation of risk model' proposes that disadvantage at different periods in the life-course has a gradually cumulative relationship with health (Ben-Shlomo and Kud 2002; Singh-Manoux et al., 2004). For example, risk factors such as smoking at different life stages may accumulate over time, because of the 'chains of risk', where one adverse exposure or experience is inclined to lead to another, an idea represented by the work of Singh-Manoux et al., (2004) as the 'accumulation of risk model'. Using a composite measure of SES, including childhood SES, education and employment grade, the researchers examined the effect of accumulation of advantages and/or disadvantages stratified by adult SES. Participants were classified as having high, intermediate or low SES. Analysing data from the Whitehall II study of civil servants, aged 35-55 years, the findings are consistent with the accumulation of risk model, that is social disadvantage accumulates over the life-course and impacts on individuals' health. For example, men with a score of 6 were more likely to have poor physical and mental functioning, compared with men with a score of 0. The accumulation effect was also highly correlated for women with CHD and physical functioning. However, when stratified by adult SES combined with early deprivation, the effect was weaker. Although the study was stratified by adult SES, the health outcome most at risk was CHD and the study supportive of the accumulation risk model. However, in this study, the model appeared to be structured in a static way, which does not leave room for more dynamic mechanisms, for example the possibility that functionality may be a result of health patterns formed early in life. It has been indicated that poor conditions throughout one's life present the greatest risk of poor health in adulthood, while poor conditions during the life-course can be alleviated by better conditions earlier or later in life (Graham, 2002).

Thus far, most of the evidence cited in support of the life-course perspective has been focusing on men of a specific age cohort, however men and women are not homogenous as noted in the study by Lawlor, Ebrahim and Davey Smith (2005). It is plausible that the effect of early childhood behaviours that have an impact upon health in adulthood, such as diet or smoking, will vary amongst women and men throughout the life-course. Accordingly, Lawlor, Ebrahim and Davey Smith (2005) used data from the British Women's Heart and Health Study to examine the associations of childhood and adult indicators of SES across the life-course in a cohort of 4,286 British women who were aged 60-79 years. In the age adjusted models, all SES indicators were associated with an increased prevalence of CHD, and there was a cumulative effect on the incidence of CHD relating to SES across the life-course. The scale of the effect of life-course SES was the same amongst women who were lifelong non-smokers as in those who were ex- or current smokers. However, the cross-sectional design and the analytical strategy used had several limitations, such as a questionable reverse causality (association between childhood SES and adult CHD), survivor bias and prospective measurements problems. The generalisability of the study, however, was not mitigated, because it suggested that unfavourable SES across the life-course increases CHD risk cumulatively. Thus, this study seems to embody the life-course perspective in that it emphasises the significance of reducing socio-economic disadvantages in CHD early in life and adulthood in order to reduce economic and health disadvantages at later points of the life-course.

The theory of risk accumulation also needs to be contextualised in the framework of an epidemiological transition, which posits that population health evolves from one characterised by high mortality and infectious diseases to one in which mortality rates are low and non-communicable diseases cause the majority of morbidity and death. Socio-economic changes, which result in changes in people's lifestyle and behaviour and the onset of degenerative diseases, are the primary cause of this transition, and the study of risk factors in this research is directly linked to this framework (Omran, 2005; Olshansky and Ault, 1986).

Whether increased morbidity in adulthood is the result of the foetal origin hypothesis due to disadvantages in utero has been debated in the literature. Poor circumstances are more likely to confer the greatest risk over time, further exposing individuals to additional cumulative disadvantages. Lynch and Kaplan (2000) observed that the life-course approach proposes a way to conceptualise how underlying socio-environmental determinants of health, experienced at different stages of the life-course, can influence the progression of chronic diseases as mediated through different factors and processes. From such a life-course perspective they indicated that observations of SES health differences in adulthood would be seen in the result of intertwining links of biological social factors interacting over the life-course to influence adult health.

Figure 2.1 Socio-economic influences on cardiovascular disease from the life-course perspective



Source: Lynch and Kaplan 2000

Figure 2.1 by Lynch and Kaplan (2000) encapsulates the socio-economic influences on CVD using the life-course perspective. It illustrates that health and behaviour in older ages are the recapitulations of living situations and accomplishments of an individual's life-course trajectories. However, the particular outcome of health as depicted in the figure could apply to other diseases such as CHD, drawing comparable links with other health conditions. For example, as previously explained in Section 2.7.1, poor childhood conditions can influence SES and restrict opportunities, which in turn can influence health related behaviour and increased morbidity in later life. Using the above figure, Lynch and Kaplan (2000) emphasised that in adulthood, working environment and income levels can compound job stress and have direct implications for the onset and progression of CVD, whereas at older ages, income and assets can impact the quality of life due to lack of resources and availability of medical and other care.

Adopting the life-course perspective not only directs attention as to how health and SES intersect at every level of a person's development, for example from birth to childhood, adulthood and old age, but also provides the basis for projecting health outcomes later in the life-course. As shown in the literature, the life-course perspective has been used in many studies on the White population (Barker, 1991; Berney et al., 2000; Ben-Shlomo and Kud, 2002; Ebrahim et al., 2004; Lawlor et al., 2005; Lynch and Kaplan, 2000). The life-course perspective provides a very useful framework for exploring health inequalities at particular stages of the life-course, and it is complemented by insights relating to individuals' socio-economic circumstances, which may also impact on health status (see also Chapter 4). Section 2.7.4 turns to the framework of poverty and deprivation in understanding the development of health inequalities at older ages.

2.9.4 Poverty, deprivation and health

Individual behaviour is an important influence on an individual's health status over time, however research has shown that such behaviour can be affected by an individual's personal socio-economic circumstances. Since the publication of the Black Report, the evidence on the relationship between poverty and poor health continues to be overwhelming (Breeze, et al., 2005; Cummins, et al., 2005; Evandrou, 2000; Gordon et al., 2000; O'Riley, 2002 ; Platt, 2007a; Shaw, et al., 2000). Several researchers have highlighted higher rates of mortality and morbidity amongst specific groups who are at a higher risk of poverty, for example people in lower occupational groups, or living in deprivation, for example in poor housing, overcrowded housing or housing lacking amenities (Kenway and Palmer, 2007; Platt, 2007a; Salway et al., 2007). According to recent evidence from the Joseph Roundtree Foundation (JRF) (2007), poverty rates for ethnic minorities households are twice (40%) those of their White counterparts (20%). A household is defined as being in relative poverty if its income is less than 60% of the national median household income (Kenway and Palmer, 2007). In

2006/07, the median household income was £112 per week for a single adult with no dependent children, £193 per week for a couple with no dependent children or for a lone parent with two dependent children and £270 per week for a couple with two dependent children (The UK Poverty Site, 2009).

Research has found that 65% of Bangladeshis live in poverty, compared to 55% of Pakistanis and 30% of Indians and Black Caribbeans (Platt, 2007a). Poverty and deprivation have become important issues on the policy agenda and are recognised as multi-dimensional (Kenway and Palmer, 2007; Platt, 2007a). The most common operationalised definition of poverty is low income (Gordon and Townsend, 2000; Smith and Middleton, 2007; Kenway and Palmer, 2007), which has implications for poverty and long-term health. Studies of poverty in the UK have developed our understanding of deprivation to a great extent. For example, the second Breadline Britain Survey was carried out in 1990, and found that people experiencing multiple deprivations in terms of household income and budget standards – defined as the income needed to buy a basket of basic goods, were one-and-a-half times as likely to have a long standing illness and twice as likely to suffer from a disability, as those who were deprived to a lesser extent, for example having a small amount of money to spend each week and living in a centrally heated house (Townsend 1995). According to Townsend et al. (1991), deprivation is the cause of poverty, and to be deprived is an inability to participate in normal activities due to lack of material resources which allow the individual to fully participate in society. Material deprivation reflects the access people have to material goods and resources that enable them 'to play the roles, participate in relationships and follow the customary behaviour which is expected of them by virtue of their membership in society' (Townsend, 1962).

In the UK and elsewhere, deprivation indices are frequently used as measures of SES and the most commonly used are derived from the individual level or from small areas using the Census or other administrative data (Kenway et al., 2007). The Townsend deprivation index for example, is associated with capturing poverty using a 'check list' approach to find out about resources regarded as 'necessities'. For example, overcrowding, the absence of basic amenities such as access to running water or shower, the lack of access to a car and the absence of employment, are used as direct measures of deprivation (Bowling, 2004; Galobardes et al., 2006; Grundy and Holt, 1991). Deprivation indices are important when determining the prevalence and level of poverty. For example, O'Riley (2002) analysing 1990 and 1998 Census data, compared the effect of three measures of area deprivation indicators (e.g. Townsend, Carstairs, and Jarman) on mortality rates for individuals aged under and over 75 years, for each of the 566 electoral wards in Northern Ireland. There was a strong association between all three indices and mortality for those aged 75 years and over, although the relationships were weaker amongst women. In contrast, income support was significantly associated with mortality but more so amongst women. This study provides evidence on

the suitability of SES indicators for older people, and O'Riley (2002) argued that many of the items used in deprivation indices may be relevant to studying poverty among older age groups, as well as functional ability. For example, the lack of car availability may reflect an inability to drive in later life due to poor health, rather than poverty. Each of the measures of deprivation presents advantages and disadvantages in relation to older people's SES. For example, whilst many older people own their own homes, housing costs may be high in order to maintain them, leading to an exposure to excess winter or summer mortality (O'Riley, 2002).

Stafford and Marmot (2003) noted in their study that neighbourhood deprivation seems to affect rich and poor individuals' health differently. The positive effect of a non-deprived area on health may be more important for people with a lower SES than the negative effect of a deprived area on health of people with a higher SES. Stafford and Marmot (2003) present evidence from the Whitehall II (1997-1999) study addressing health, SES and self-perceived health status, which was linked to Census data on neighbourhood deprivation. They proposed two models. Model I theorised that living in a non-deprived neighbourhood is better for one's health because of the advantages of benefiting from collective materials and available social resources. In contrast, Model II proposed that being rich or poor depends on the compatibility between individual neighbourhood averages associated with good or poor health and an individual's situation. They found evidence for Model I, which posits that people in non-deprived neighbourhoods have better health than people in deprived neighbourhoods, after controlling for individual factors such as age, sex and deprivation indices. Thus, the poorer individuals in Model I neighbourhoods obtain the beneficial effect of the resources because even though they may be less able to purchase goods privately, they are able to meet their needs by depending more on collective resources which are locally provided in their neighbourhoods. This study seems to refute the suggested hypothesis that differences between an individual's own SES and the SES of those living nearby affect health status.

The findings on the causes and consequences of poverty and deprivation have been mixed. For example, it has been argued that income is a proxy for poverty, and poverty is in turn related to having a particularly low standard of living (Gordon and Pantazis, 1997; Gordon et al., 2000). Consistent with research on deprivation and income, Evandrou (2000) examined deprivation as well as income amongst older people. Using 6 years of pooled data from the GHS (1991-1996), including ethnic minority respondents (i.e. n = 12,368, including n = 2,989 Irish), the findings indicated significant levels of deprivation amongst the older population, with one in five being deprived on multiple measures (i.e. income, housing and consumer durables). However, there were some variations amongst ethnic groups. For example, Indian and White elders experienced the lowest levels of multiple deprivation, 13% and 17% respectively, but for Pakistanis and Bangladeshis the rates increased to around 39% and for Black Caribbeans to around 38%. It would appear that even

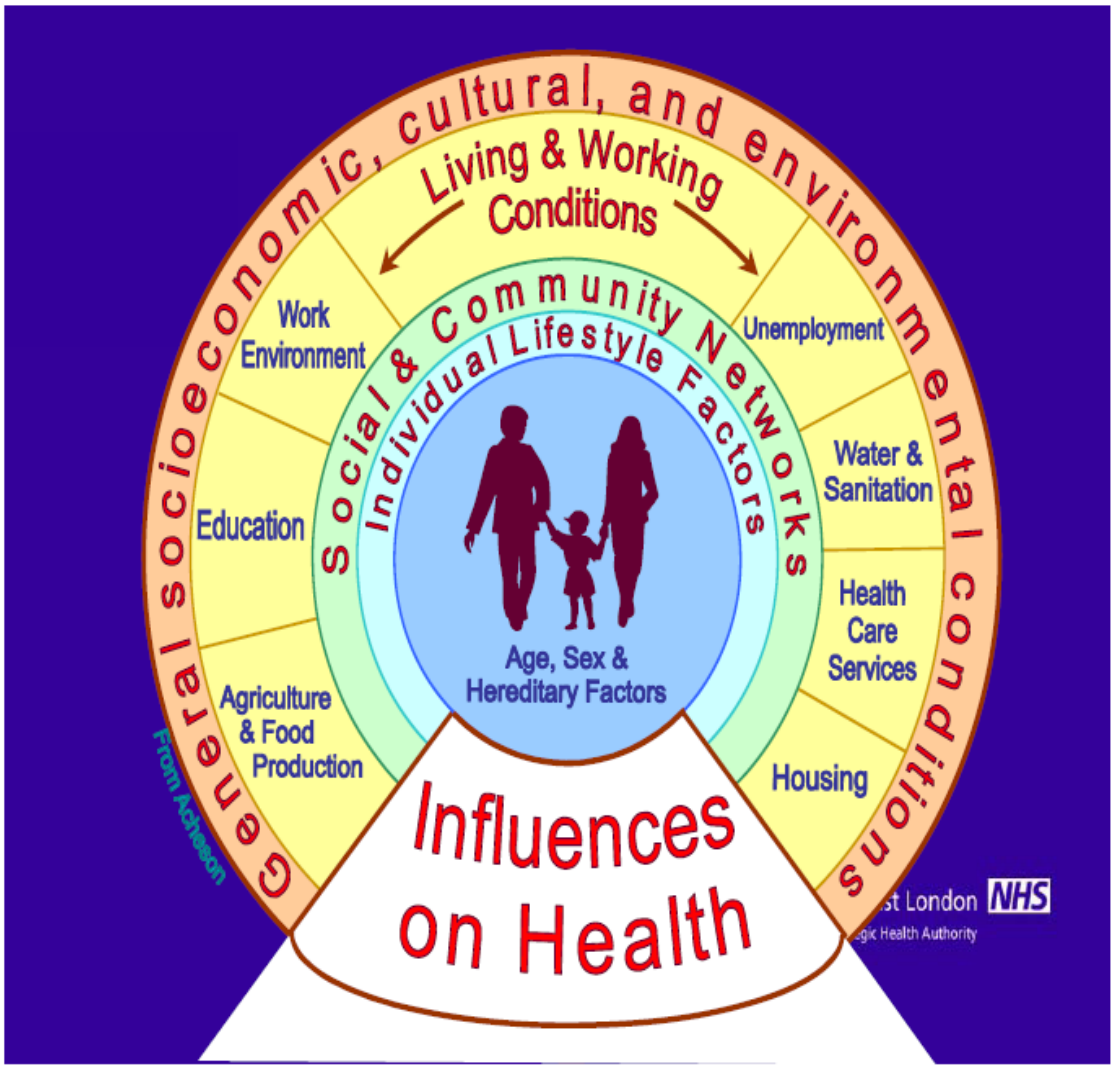
though some ethnic minorities are less exposed to deprivation, there are disadvantages amongst the majority of older people from ethnic minorities which affect their opportunities, resources and health outcomes in later life. That is, higher educational achievements earlier in life are predictive of greater rewards and opportunities to build on as one ages (i.e. rewarding jobs, working conditions, income and developed better lifestyles) which can promote better health throughout the life-course.

The findings on poverty, deprivation and health have drawn attention to the multi-faceted relationship that exists between poverty, deprivation and health, particularly in regard to ethnic elders' living conditions (Evandrou, 2000; Kenway and Palmer, 2007; Platt, 2007; Salway et al., 2007). This inequality largely resulted from life-course transitions such as migration and from disruptions in economic status and income that are associated with growing older. Factors related to deprivation, such as housing tenure and access to a car, are key determinants of an individual's SES, and will be explored analytically in Chapters 4, 5 and 6. The next model by Dahlgren and Whitehead (1991) aims at combining factors at the individual and collective level, affecting the health of an individual. Section 2.7.5 discusses the premise of the Model of Health, expanding on the different influences on health inequalities which may not be captured in the life-course perspective

2.9.5 Dahlgren and Whitehead's Model of Health

Thus far the theories of health and health inequalities seem to be woven together and the factors influencing adult health into old age morbidity, for the most part, fall under three broad headings: early life conditions, life-course transitions (i.e., transition into adulthood) and prevailing living conditions. These in turn can have major implications for health inequalities in later life. However, as highlighted in the literature, health inequalities cannot be reduced significantly by individuals altering their lifestyles without taking the broader social factors affecting health throughout the life-course into consideration (Blane, 2006; Graham, 2005; Lynch and Kaplan, 2000). For example, the World Health Organisation (WHO) defines health as a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity (WHO, 1948), and studies have shown that the health and well-being of an individual is determined by a wide range of social, economic and lifestyle factors. A simple way to conceptualise the socio-economic determinants of health is to think of the different layers of causation. Similar to the model of socio-economic influences on CVD for the life-course perspective proposed by Lynch and Kaplan (2000), the Model of Health proposed by Dahlgren and Whitehead (see Figure 2.2) illustrates several layers of determinants of health.

Figure 2.2: 'Model of Health



Source: Dahlgren and Whitehead (1991)

The 'Model of Health' by Dahlgren and Whitehead was first introduced in 1991 and provides a clear framework within which to discuss existing approaches to studying health inequalities. Furthermore, it develops the missing caveats not highlighted in the life-course perspective by expanding on the different modes of explanation in health inequalities. The Dahlgren and Whitehead model theorised that we are biologically structured based on 'hereditary' factors from our parents (i.e., age, sex) and these are factors over which individuals have no control, and which impact upon our health throughout our life. Each of these levels can impact upon the other levels, highlighting the importance of the wider social and cultural context for the individual's health outcomes as they age.

Hence, the model of health sets out to explain how different complex factors starting at birth interact with SES, cultural and the environmental factors but these factors cannot be reduced to fragments of individual behaviours or lifestyles. For example, the outer layer of the model indicates that the social context of individuals depends on SES, cultural and environmental conditions. Consistent with other

models, such as the life-course perspective, there are deeply rooted patterns of an individual's values that are often transmitted from one's SES, cultural and environmental backgrounds throughout one's life trajectory. Such factors may be present in particular groups in society, according to particular demographic and SES characteristics. Therefore, it is important to understand the nature of the pathways which connect the different factors of inequalities that may directly or indirectly determine adult health, or which interact with adult experiences to determine overall health outcome (see also Chapters 5 and 6).

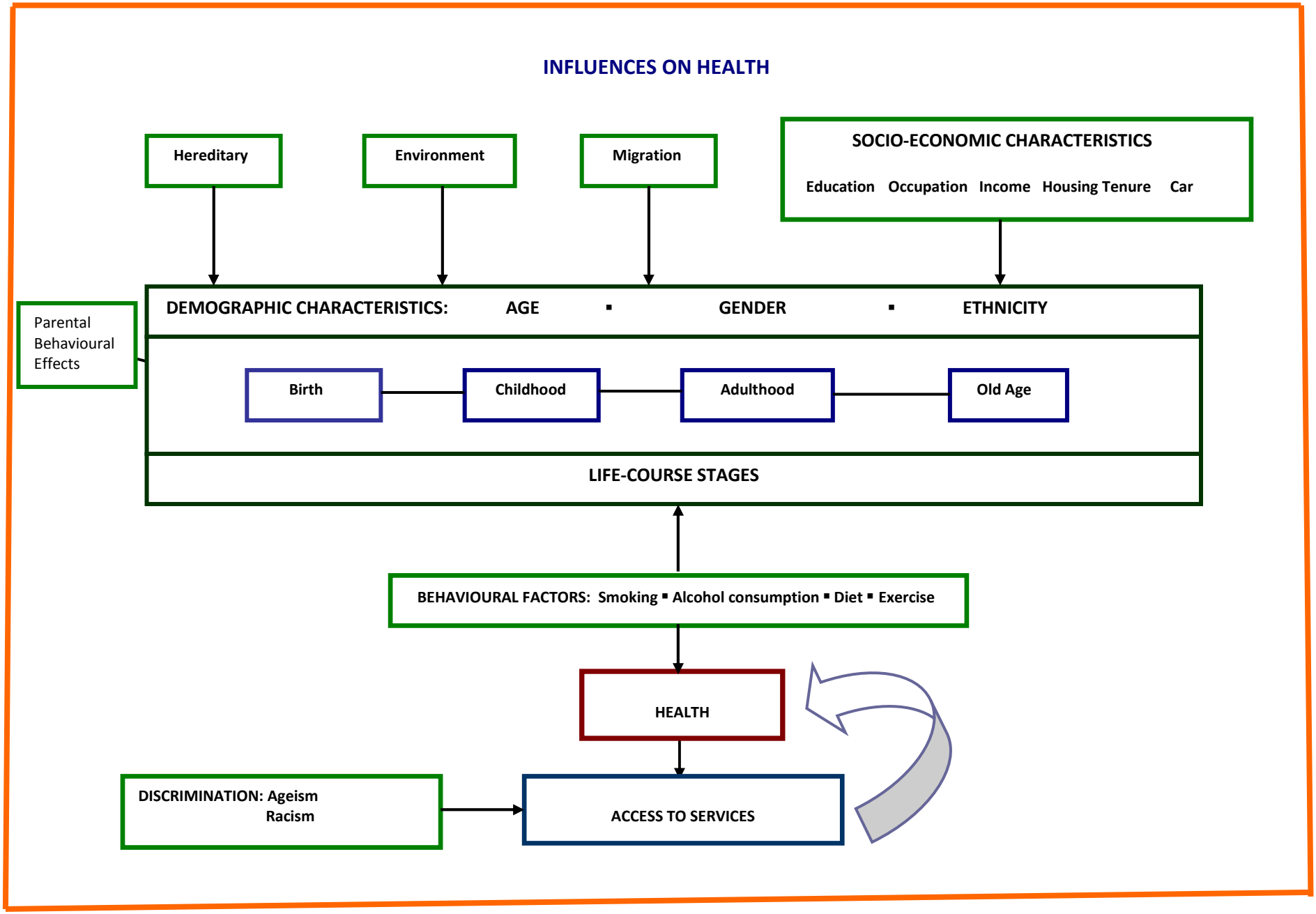
The model of health further shows the breadth of the challenges faced by different groups in society in terms of improving their health. For example, the effects of our own foetal or infant development may be carried over into several generations through socio-economic and environmental factors such as education, occupation, housing and access to health care services, through influences of our inherent health and our parent's health depending on their own developmental stages. In addition, the underlying inequalities in adult disease may be related to the poverty experienced by past generations. The effects of the early social environment on later health are mediated through the social conditions, including living and working conditions, by way of educational experience and achievement, work opportunities, housing and access to healthcare. Thus, similar to the life-course model, the 'Model of Health' also advocates that poor SES throughout life may be an important determinant for increased morbidity in adulthood or later life.

From this section of the literature, the different theoretical models suggest that health inequalities are caused by a number of different influences throughout the life stages starting with individuals hereditary, environmental and SES characteristics, and the impact of migration, as illustrated in Figure 2.3. At the same time, certain advantages or disadvantages of parental behaviour also have an impact throughout the life stages. Additionally, behavioural factors such as smoking and alcohol consumption, and underlying discrimination, which can affect a person's access to health services, can determine ethnic minorities and older people health outcome in the later stages of the life course (Barker, 1991; Ben-Shlomo and Kuh, 2002; Case et al., 2005; Lawlor et al., 2005; Kenway and Palmer, 2007; Nazroo, 2003). As a result, the study of health inequalities in later life requires a theoretical framework which encompasses the factors which can affect an individual's health status across the life-course, and especially in later life. In addition, such framework needs to combine 'complementary perspectives' as echoed by Mackenbach (2005), which can be applied to the study of ethnic minority populations. Our ability to understand the status and position of current cohorts of older ethnic minorities should begin with an appreciation of the multiple effects SES disadvantaged ethnic elders have endured over the course of their lives, and the heterogeneity characterising ethnic minority groups (see also Chapter 7).

2.9.6 Summary

In summary, in this section all the theoretical models examined (e.g. Barker hypothesis, life-course, poverty and health) illuminate the complementary perspectives on explanations of morbidity. In particular, such models formulate the argument for health inequalities because they encompass a number of multi-faceted layers in explaining how poor health can be the result of interactions amongst different factors at different levels throughout the life-course stages (i.e., individual, environmental, social and cultural) and into old age, as summarised in Figure 2.3.

Figure 2.3: Summarisation of the theoretical models highlighted in the literature reviewed on health inequalities.



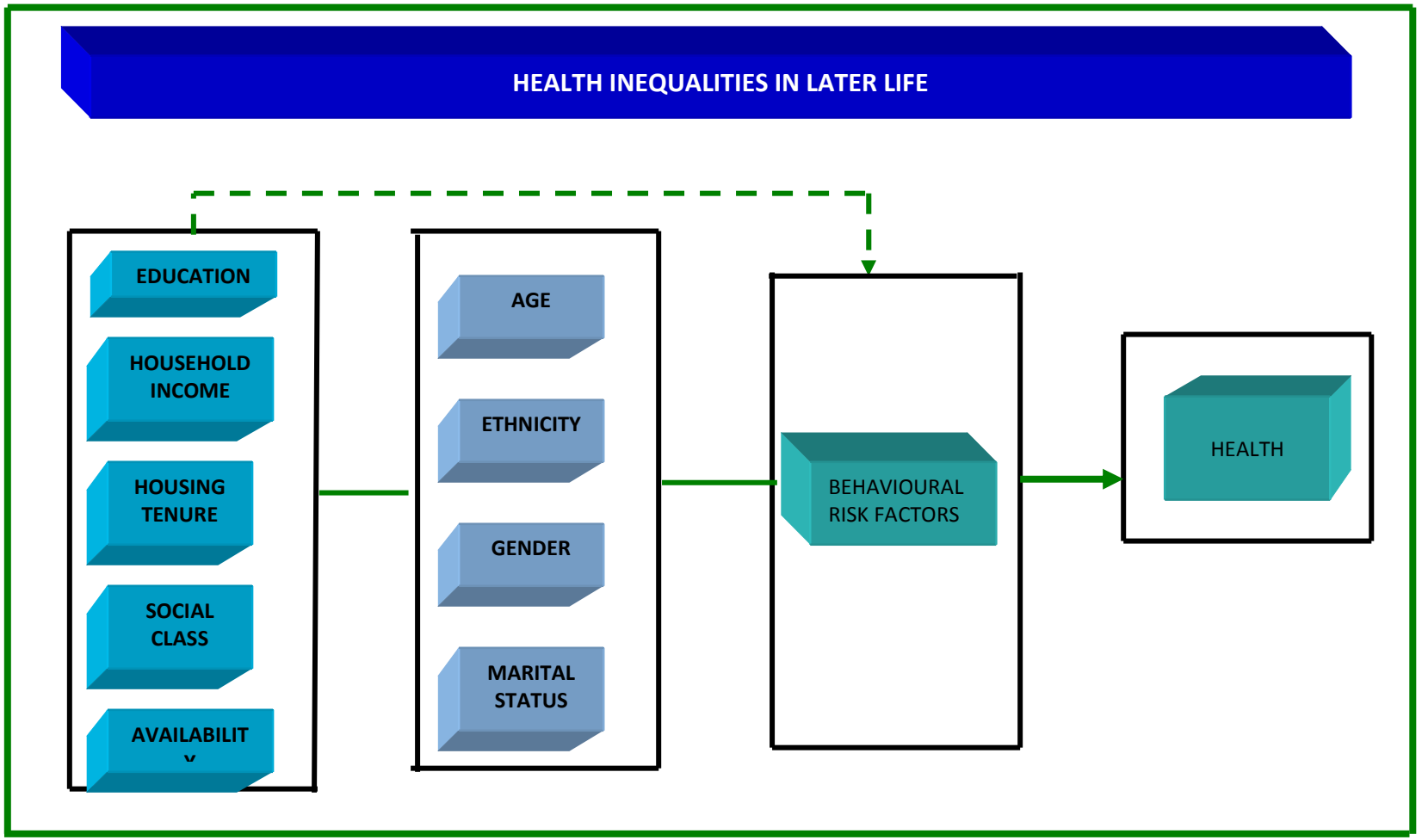
The rest of this section provides further details on the conceptual framework of this thesis, drawing on elements from the theoretical frameworks discussed earlier in this chapter.

2.9.7 Conceptual framework of this thesis

The theoretical framework of this thesis will echo the 'complimentary perspective' approach integrating the different individual characteristics (e.g. age, sex, marital status, ethnicity), SES measures (e.g. education, occupation, household income, housing tenure, car availability), behavioural factors (smoking status, alcohol consumption) and outcome measures (health) asserted in the reviewed literature as the key determinants of health inequalities as illustrated in Figure 2.4. As emphasised in several studies, SES is defined by a broad range of measures, such as occupation, income and education including such alternate measures as housing tenure and car access (Galobardes et al., 2006; Grundy and Holt, 2001; Huisman et al., 2003; Lynch and Kaplan, 2000). SES is significant in health research because it can capture important dimensions of people's material and social circumstances which have direct implications for their health. The reviewed studies emphasised that SES is a measure of an individual's position or status in society and is associated with differential access to social and material resources (Evandrou, 2000a; Galobardes et al., 2006; Grundy and Holt, 2001; Lynch and Kaplan, 2000). However, none of the studies concluded that any single SES indicator is comprehensive enough to present a complete picture of SES as a measurement tool, particularly in reference to ethnicity and health in later life.

The conceptual framework of the thesis, described in Figure 2.3, underscores the themes elucidated from the reviewed literature on health, SES and ethnic elders, and guides the study in terms of the research questions, the rationale, variable selection, strategy design and analysis.

Figure 2.4: Conceptualising Health and Ethnicity in Later Life



As indicated in Figure 2.4, the relationship between health and ethnicity in later life is a multi-faceted one, relating to a number of demographic characteristics (e.g. age, sex, marital status, ethnicity), socio-economic status characteristics (education, social class, income, housing tenure, car cess) and behavioural characteristics, such as smoking and alcohol consumption, which can impact on the health status of people aged 50 years and older. Whilst these indicators may mirror one's SES throughout life, they also represent different elements of one's socio-economic circumstances. For example, education reflects material conditions related to occupation and income, and such measures can place people into social positions with different rewards (e.g. housing, car) emulating their cultural values and lifestyle choices (Chandola, 2001; Grundy and Holt, 2001; Kelaher et al., 2008; Knesebeck et al., 2006; Lynch and Kaplan, 2000). For example, from Section 2.2 to Section 2.6, studies that used SES measures such as education, occupation, income and behavioural factors (e.g. smoking and drinking) suggest that SES and such behavioural factors contribute to poor health (Chandola, 2001; Curtis et al., 2000; Davey Smith et al., 2000; Harding, 2004; Kelaher et al., 2008; Nazroo et al., 2007).

In addition, it is evident from the literature that other factors such as the type of SES measure used should be considered in determining ethnic health inequalities. Thus, Figure 2.4 draws on other models reviewed in the literature (e.g. Dahlgren and Whitehead, 1991; Lynch and Kaplan, 2000; Mackenbach and Kunst, 1997), which point to SES as a key concept when exploring health and ethnicity in later life. Lynch and Kaplan, (2000) referred to the term SES to mean:

> The social and economic factors that influence what position(s) individuals and groups hold within the structure of society, i.e. what social and economic factors are the best indicators of location in the social structure that may have influences on health (p. 14)

This statement would suggest that attention should be paid to the different pathways (direct and indirect) that are possibly rooted within the structure of society that influence the social hierarchies and their impact on health throughout one's life trajectory (Lynch and Kaplan, 2000). Thus, an adequate theoretical understanding of the relationship between ethnicity and health should explore the impact of each SES measure on an individual's health status.. As shown in Figure 2.4, SES is defined by a broad range of measures to be used separately or combined (Bowling 2004; Davey Smith 2000, Galobardes et al., 2006; Grundy and Holt, 2001; Huisman et al., 2003; Krieger, 2001; Galobardes et al., 2008). These SES measures are significant in health research, because they capture important dimensions of older people's material and social circumstances (Galobardes et al., 2007). Furthermore, within the structure of society, SES influences individuals' social and economic stratification linking to poor health in later life (Grundy and Holt, 2001). This model will help guide the analysis in exploring the 'sensitivity' of SES as a measurement tool of understanding ethnic health

inequalities in later life. In Section 2.10, certain methodological issues and limitations of the different SES measures, theories on health, ethnicity and ageing from the evidence are discussed.

2.10 Summary and conclusions: Methodological issues and limitations in the literature

The reviewed literature shows that there is substantial evidence of the impact of SES on mortality and morbidity. The evidence is most compelling for the effects of SES on health, though, overall there continues to be a dearth of literature from the UK pertaining to SES and the health of older people, particularly older ethnic minorities. This provides some support to what Cooper et al., (2000) referred to as 'double jeopardy', that is, old age and minority ethnic status being associated with dual health disadvantages. The term double jeopardy is often associated with research carried out in the US, but more recently it has been used to recapitulate poor health and inequalities of ethnic minorities in Britain (Blakemore and Boneham, 1996; Cooper et al., 2000; Dowd, et al., 1978; Ebrahim, 1996; Nazroo, 2006). Although old age and minority ethnic status are related to poorer health outcomes, evidence of a double jeopardy is complex. For example, some researchers suggest that the combined effects of old age and minority group status, that is, occupying two or more labels, brings with it greater negative consequences than occupying one status alone (Dowd et al., 1978). Indeed, there is little disagreement that the degree of health inequalities reported by ethnic minorities has a cumulative effect on the choice of their living trajectories which is often explained by differences in SES (2001 Census; Erens et al., 2001; Evandrou, 2005; Kelaher et al., 2008; Nazroo and Williams, 2005). In addition, SES disadvantages such as in the quality of housing or the receipt of income benefits, are more likely to increase in old age and may be linked to increased morbidity.

The mortality and morbidity studies indicated that health-risks are markedly elevated for both men and women amongst different groups in society regardless of the level of one's education or income status (Backlund, et al., 1999; Bowling, 2004; Howard et al., 2000; Huisman et al., 2003; Mackenbach et al., 1997; Naess et al., 2005). In addition, although morbidity studies have often used longitudinal data (e.g. British Regional Heart Study, Boyd Orr Cohort, ECHP, HRS, NLMS, ONS, SENECA), they often fail to link early-life SES and later-life health behaviour, which may be evidence of the role SES plays in impacting upon morbidity and mortality. Furthermore, British longitudinal studies have tended to focus only on the White population, with little or no reference to people from ethnic minority groups. Although in Section 2.4 cross-sectional data show high mortality and morbidity were more marked amongst older ethnic minorities, still there were few studies from the UK focusing on ethnic elders, which may be partly explained by the lack of longitudinal studies on ethnic minorities.

Furthermore concerning the overall dearth of studies on SES measurements and health of ethnic elders there are several other methodological issues related to studies on ethnic elders. The lack of large sample size is often cited as a methodological issue in health and ethnicity research (Cooper et al., 2000; Curtis and Lawson, 2000; Ginn and Arber, 2000; Nazroo, 2001). Health status is regarded as

a multidimensional concept and health outcomes are significantly correlated with a number of SES measures, particular income poverty and poor housing (Kenway and Palmer, 2007). Studies of ethnic elders should include adequate sample size in quantitative analysis for satisfactory explanatory power (Bryman, 2004; Diamond and Jefferies, 2001). Thus, for older people and ethnic elders, SES and health are a reflection of access to resources over the life-course, as old age tends to deepen disadvantages for those who enter this phase of life with few or no resources.

As discussed in sub-sections 2.2 to 2.9, there is a lack of information on older ethnic minorities' health, although the decline in infectious diseases and the rise in CHD as a result of health-risk behaviours, such as smoking and alcohol consumption, were evident throughout the literature. However, only a few studies referred to environmental (e.g. migration, unemployment, stress) and cultural factors associated with disadvantages acting across different stages of the life-course, especially for ethnic minorities (Harding, 2004; Harding and Maxwell, 1997; Marmot, et al., 1997; Warnes and Williams, 2006; Warnes et al., 2004).

These studies not only covered a number of SES measures (e.g. education, occupational social class, income, housing tenure and car availability) but they also employed cross-sectional and longitudinal designs, and the statistical techniques used show that each measure merits its own strengths and weaknesses. For example, several studies using multivariate analysis indicated that there was considerable heterogeneity amongst different ethnic groups and the different measures used (Bowling, 2004; 2001; Cooper et al., 2000; Davey Smith et al., 2003; Erskine et al., 2010; Grundy and Holt, 2001; Kelaher et al., 2008; Lynch and Kaplan, 2000; Macintyre et al., 1998). Grundy and Holt (2001) for example, show that traditional measures of SES present problems of measurement and interpretation for older people and suggested a combination of measures with an indicator of deprivation as more suitable. Likewise, Nazroo (2001) argued that a single measure such as social class is not sensitive to older people and ethnic elders SES. Thus, the use for multiple measures of SES was supported by a number of researchers (Bowling, 2004; Chandola, 2001; Davey Smith, 2000; Kelaher et al., 2008; Lynch and Kaplan, 2000; Nazroo, 2003). The measurement of SES continues to be an important topic of debate, particularly about how the choice of a measure can influence the pattern of health amongst different groups of the population (Chandola, 2001; Ellaway and Macintyre, 1998; Harding and Maxwell, 1997; Kelaher et al., 2008; Nazroo, 2001). Nonetheless, it has been noted that all SES measures employed in the studies of health inequalities had some predictive power even though there is a potential that predictive ability will vary with the health outcomes under study (Ebrahim et al., 2004). Davey Smith (2000), Hayward et al. (2000) and Smith and Kingston (2004) noted that while different SES measures are predictive of health outcomes at a population level, they may not necessarily have the same meaning for people from different ethnic groups. Thus, establishing the strength of these measures (i.e. education, occupation, income) in

influencing the SES amongst older age groups needs to be examined in the context of such studies, but should also include specific measures of health status and SES representing ethnic minorities in the course of their living trajectories.

Although only a few of the studies addressed these issues directly, several of the authors were aware of the limitations in the research designs (cross-sectional and longitudinal) employed in the studies and acknowledged potential methodological problems (Blakemore, 1999; Davey Smith, 2000; Evandrou, 2000a; Farmer and Ferraro, 2005; Karlson and Nazroo, 2002; Kelaher et al., 2008; Nazroo, 2001). However, no in-depth explanations for the choice of SES measures were provided, except that SES is the fundamental cause of poor health among certain groups. Thus, the issue of how health questions are interpreted seem to complicate the issues of ethnic elders' health inequalities. For example, the Health Survey for England (1999) found no difference in the report of a limiting long-standing illness among Black Caribbeans and Whites, however research by Nazroo between 1997 and 2001 noted that Black Caribbeans were more likely to report poor health. Nazroo, however, controlled for SES but the HSE did not, and it was emphasised that possible contributing factors for ethnic minorities' poor health were genetic and referring to cultural differences, for example in terms of their lifestyle, values or access to health services. These different outcomes would suggest that the methodological approaches and choices of SES measures (e.g. occupational social class and income) should be clearly delineated between specific measures of health in relation to ethnic minority group members.

The traditional measure of occupational social classes is also increasingly called into question, mostly due to the transformation of the ageing population and increasing number of ethnic elders. The measure of occupational social class has been identified by several studies as crude (Benzeval, et al., 1995; Kelaher, et al., 2008; Krieger et al., 1997; Nazroo, 1997; 2001). For example, after examining a specific disease such as diabetes amongst different groups, the prevalence of diabetes was higher amongst ethnic minority groups, especially those in workless households than those engaged in manual occupations (Nazroo, 1997). Rather than using social class alone, an index of social conditions, including over-crowding, quality of household amenities and ownership of consumer durables, was created. Furthermore, Macintyre (1997) proposed that social class health inequalities can be a result of an artefact or measurement error, or relating to social selection, differential access to material resources or social class differences in health behaviour. This detailed definition of the groups involved in the study and the nature of the disadvantages experienced by ethnic minority group members allow some of the ethnic variations to be explained (Nazroo, 2001). Nazroo (2001), however, argued that after controlling for SES, significant differences remain among ethnic minority

groups, providing evidence for the possibility that SES is not the only explanation behind ethnic minority group's health inequalities.

In other studies from the UK and elsewhere it has been noted that there are significant variations among studies even when the same datasets (AHEAD, ECHP, FNS, GHS, HRS, HSF, ONS, OECD) and socio-economic measures (education, occupational social class, income, housing tenure) are used (Bowling, 2004; Cooper et al., 2000; Davey Smith et al., 2000; Evandrou, 2000a; Farmer et al., 2005; Fiscella and Frank, 19997 and 2000; Grundy and Holt, 2001; Hayward et al., 2000; Huisman et al., 2003 and 2005). As indicated by Nazroo (1997; 2001) heterogeneity is a key issue in the findings of ethnicity studies. However, few studies distinguished individuals from Asian ethnic groups (i.e. Gujarati, Indian, Hindu, Punjabi, Pakistani), and no distinction was made of individuals within Caribbean studies that had similar ethnic make-up with people from different regions of the Caribbean (i.e. Jamaicans, Barbadians, Trinidadians). It is important to make such distinctions, as heterogeneity between and within groups is an important construct and can help to explain the difference in the health status amongst different ethnic groups.

The majority of the reviewed studies included self-reported health outcomes from the UK and employed both cross-sectional or longitudinal designs (Barker, 1991; Berney et al., 2000; Blane et al., 2004; Blane et al., 1999; Breeze et al., 1999; Curtis and Lawson, 2000; Davey Smith et al., 1997; Ebrahim et al., 2004; Evandrou, 2000b; Holland et al., 2000; Nazroo, 2001; Platt, 2007; Salas, 2002; Salway et al., 2007; Townsend and Gordon, 1991). Where health outcomes are explored for the same individuals over time, longitudinal studies are most appropriate as they provide data on the sequence of events through time. An example of this is the Boyd Orr Cohort study, which is linked to different stages of the life-course such as early life, childhood and adulthood, and which has made a significant contribution to understanding health in adulthood (Berney et al., 2000). Similarly, the West of Scotland Collaborative Study provides evidence for childhood SES through adulthood influences on health status (Davey Smith et al. 1998). In particular, these longitudinal studies encapsulate class structure across and between generations, showing how disadvantages are linked from parent to child and from childhood to adulthood (Ben-Shlomo et al., 2002; Berney et al., 2000; Holland et al., 2000). However, such studies have not taken older people from ethnic minorities into account, and it is in this part of the literature that this thesis makes a unique contribution. Several of the cross-sectional studies corroborate the evidence for the need of research on ethnicity, SES measures and health at older ages (Chandola, 2001; Curtis and Lawson, 2000; Cooper et al., 2000; Davey Smith, 2000; Evandrou, 2000; Grundy and Holt, 2001; Kelaher, et al., 2008; Nazroo, 1998; 2004; Platt, 2007).

2.10.1 Conclusion

In conclusion, one of the most important issues emanating from the literature is the significance of studying the relationship between SES and health inequalities. The evidence from the literature provides robust data and helps to increase the understanding of health inequalities amongst different groups in society, particularly older people in Britain. For example, several of the studies examined used more than one SES measure, however this approach has not been applied to the study of ethnic elders. Few studies focus on older ethnic minority groups in Britain, and there has been little investigation on the 'sensitivity' of different measures of SES for understanding health inequality amongst different ethnic groups in later life. Furthermore, ethnic groups other than Caribbean and South Asians (e.g. Black African, Indian, Pakistani and Bangladeshi) have been studied to a lesser extent in terms of the SES significance on ethnic inequalities in health. The need for research on ethnic elders is considerable, because there is significant heterogeneity amongst ethnic group members and older ethnic minorities. The measures of SES reflect different theories and perspectives, for example certain measures reflect material circumstances (e.g. housing tenure, car availability), certain measures reflect a person's social position (e.g. social status and occupational class), and finally certain measures reflect opportunities throughout the life-course (e.g. education, income). The study of SES is pivotal in understanding the relationship between health, ethnicity and later life. Chapter 3 explains how the research was carried out, detailing the study design and methodology, operational definitions of key measurement concepts and the variables used in the study.

Chapter 3

3 Methodology

3.1 Introduction

Chapter 2 looked at both the empirical and theoretical literature, demonstrating the gaps in the evidence on health inequalities amongst older people from different ethnic groups, and in terms of exploring the 'sensitivity' of different measures of SES for understanding health inequality in later life (see also Section 1.4). The purpose of this chapter is to discuss the study design, introduce the data and present the study population. Furthermore, the operational definitions of the key measurement concepts and the variables used in the study will be discussed and the rationale behind the choice of these variables will be stated, followed by the data analysis strategy.

3.2 Study design

Cross-sectional designs are frequently employed in survey research when the research questions explore a particular point in time (Frankfort-Nachmias and Nachmias, 1996; Maxim, 1999), although the collection of data may take place for different individuals over a period of time (Bryman, 2004; Maxim, 1999; Singleton et al., 2004). Until recent years, particularly prior to the 2001 Census, the 1999 HSE ethnic boost, the Fourth National Survey of Ethnic Minorities and the 2004 HSE, cross-sectional data on morbidity among ethnic groups have been sparse (Cooper et al., 2000; Davey Smith et al., 2000; Nazroo, 2001). Since the datasets above became available, researchers have had the opportunity to carry out secondary analysis on health, ethnicity and ageing, in order to explore key policy issues (Bryman, 2004; Frankfort-Nachmias and Nachmias, 1996).

Bryman (2004) outlines a number of advantages that result from using secondary data analysis as part of a research study design. Firstly, it allows researchers the time that would be spent on the practical and methodological problems of collecting new survey data to be allotted to considering the theoretical aims and analytical procedures of the study (Bryman, 2004). Secondly, the datasets allow researchers the latitude to extend the scope of their study because such analysis is less expensive and less time consuming, as it does not involve data collection (Bryman, 2004; Singleton et al., 2004). Thirdly, it provides the researcher access to a nationally representative sample that would be difficult to secure by a single researcher due to time constraints. The datasets are free of access difficulties and such data provide the researcher with the opportunity to study different sub-groups and carry out cross-cultural analysis which might otherwise be more difficult (Bryman, 2004; Singleton et al, 2004 and Frankfort-Nachmias and Nachmias, 1998). At the same time, the use of secondary data poses a number of disadvantages. For example, lack of familiarity with the datasets

can be time consuming, particularly when it comes to extrapolating the data for the study (Frankfort-Nachmias and Nachmias, 1998). Bryman (2004) and Singleton et al (2004) recommend that prior to beginning the analysis time should be spent becoming familiar with the datasets, for example how the variables are coded, as the complexity of the datasets should not be underestimated. The next section discusses the suitability of the HSE Ethnic Boost Sample for this study.

3.3 Data: Health Survey for England

The main data for this study are related to ethnicity and health and are drawn from the 2004 HSE, which provides data at both the national and regional levels about the population living in private households in England. The survey is conducted by the National Centre for Social Surveys and Research (NatCen) and the Department of Epidemiology and Public Health at University College London (UCL) on behalf of the Department of Health for England. The HSE provides annual data for nationally representative samples to examine trends in the nation's health amongst men and women. The 2004 HSE was chosen for the study because it has the advantage of a larger number of minorities including ethnic elders, and similar to the 1999 survey, the 2004 survey focused on ethnic minority groups such as Black Caribbean, Black African, Indian, Pakistani, Bangladeshi, Chinese and Irish people. This dataset also includes a wide-ranging set of questions on ethnicity, SES and health in its core questionnaire. The survey used a three-stage sampling process, which included a general population sample, an 'ethnic boost' sample involving stratified multistage probability sampling, and a further Chinese boost sample was obtained by screening the electoral register for individuals with Chinese surnames (Sproston and Mindell, 2006). It was noted that the response rate was higher among women than among men (70% compared with 64% for men), and this difference between men and women persisted throughout the different stages of the survey (Sproston and Mindell, 2006). The ethnic boost sample (etha) was merged with the general population (gpa) for the analysis of this study. More details on the sampling frame and the methods for the 2004 HSE can be found in Sproston and Mindell (2006).

3.4 Data quality

The HSE is designed to produce a representative sample of the general population, including a similar sample of the seven most populous ethnic minority groups (see Section 3.5) in England. It provides regular information that cannot be obtained from other sources on a variety of issues pertaining to public health and several factors affecting health (see also Section 3.3). A disadvantage identified with secondary analysis is the lack of familiarity with the datasets and understanding the quality of the data (Bryman, 2004; Singleton et al, 2004), and documentation about the data was critically reviewed prior to organising the secondary data. For example, the provision of protocol and

comprehensive technical reports, such as, users' guide, record layout, codes and data entry instructions is essential in order to supply the necessary background information of the dataset. Thus, for the HSE Ethnic Boost Sample, the datasets and the technical reports were requested and downloaded with permission from the Economic and Social Research Council's UK Data Archive.

In addition, proper handling of missing values is important in all analyses. Missing data can introduce a form of bias into the analysis if the data that are missing do not form a random subset of those who have been sampled (Singleton et al, 2004). The documentations and users guide pertaining to the 2004 HSE dataset have been reviewed and missing data will be addressed throughout the analysis.

3.5 Study population

The study population is of older men and women aged 50 years and older from the seven largest ethnic minority groups in England (i.e. Black Caribbean, Black African, Indian, Pakistani, Bangladeshi, Chinese and Irish). Older men and women are defined in this study as being 50 years or older. In most of the UK publications addressing older people or ethnic minority health inequalities, a range of age groups have been used (Breeze et al., 1999; Curtis et al., 2000; Evandrou, 2003; Grundy et al., 2 001). However, some international studies use 60 years or older as the preferred age group (i.e. Farmer et al., 2005; Read and Gorman, 2006; Zimmer et al., 2004). Although there is no agreed point for defining older people in the literature, in many developed countries the age 65 is the marker for retirement and is used as a threshold for the definition of old age. For example, in the UK, the current pension age is 65 for men and 60 years for women (The Pension Service, 2009), however, from 2020 the pension age for both men and women will be 65 years. Although younger age groups (i.e. 35 – 45 years) have shown to have good health generally, it has been noted that the onset of chronic disease usually occurs in middle age (45 – 65 years) (Adler and Newman, 2002).

For the purpose of this study, the cut- off age of 50 years was selected to define ethnic elders because of the younger age structure of ethnic minorities' population (Cooper et al., 2000; Curtis and Lawson, 2000; Ebrahim et al., 2004; Grundy and Holt, 2001) (See also Chapter 4). There are additional advantages to using the age 50 as a threshold, for example such a threshold could achieve a greater sample size, and it is also more likely to capture those people from the first migration waves to the UK during the 1950s and 1960s. These age groups were also chosen because during the subsequent decade they would be passing through the early years of retirement based on the UK retirement age and the years when health can be expected to deteriorate. Additionally, the Office of National Statistics (ONS) and the English longitudinal Study on Ageing (ELSA) provided a sampling frame of people aged 50 and over for identifying older people, and this age group is often referred to in the literature as a period of transition for older people life-course trajectories (Cooper et al, 2000; Crimmins et al., 2010; Lynch & Kaplan, 2000, Naess et al, 2004; ONS, 2010). The sample size for this study population comprised of 5,086 people (i.e. 2,255 men and 2,831 women), broken down in the following sub-groups as shown in Table 3.1.

Table 3.1: Study population by ethnicity, 50 years and over 2004 HSE

Ethnic Groups	Sample (N)	Un-weighted (%)	Weighted (%)
White	2,931	57.6	83.1
Black Caribbean	398	7.8	2.2
Black African	141	2.8	0.8
Indian	398	7.8	2.6
Pakistani	199	3.9	0.8
Bangladeshi	142	2.8	0.3
Chinese	173	3.4	0.3
Irish	673	13.2	8.9
Other	31	0.6	1.0
Total sample size	**5,086**	**100**	**100**

N= sample number unweighted

Note: The 'other' group is a mixed category comprising of 'any other Asian background' (e.g. Sri Lankan), 'any other black background' and 'any other background' including diverse categories such as Japanese, Philippino or Vietnamese people.

Source: Author's analysis, 2004 HSE

Similar categories of ethnic groups have been used in previous UK studies on ethnicity (Chandola, 20001; Erens et al., 2004; Nazroo et al., 2008; Nazroo, 2001; Sproston and Mindell, 2004). In Section 3.6 the operational definitions and key measurement concepts of both outcome (dependent) and explanatory (independent) variables are discussed.

3.6 Key measurement concepts and variables

The study used both outcome and explanatory variables, including two health-related variables (see also Tables A.2 and A.3), which are defined and discussed below.

3.6.1 Outcome variables

The primary outcome of interest in this thesis is 'health' amongst older ethnic minorities, and the outcome variables used are two different health status indicators, each measuring particular aspects of health. The first indicator is self-assessed general health (GENHELF). The informants were asked: 'How is your health in general? Would you say it was 'very good', 'good', 'fair', 'bad' or 'very bad' thus rating their own health on a five-point scale (see also Table A.2). However, due to the small percentage of cell counts for individuals 50 years and over GENHELF was recoded into a three point scale, henceforth referred to as 'very good', 'good/fair' and 'bad/very bad' health (Cooper, 2002; Erens el al., 2001; Manor , Matthews and Power, 2000). For the regressions the variable was further recoded into a dichotomised variable combing 'very good' 'good', 'fair' into one category labelled as 'good', while the responses 'bad' and 'very bad' were included into a single 'bad' category. The new variable used in the regression analysis was named 'genhealthreg'. This dichotomy has been known

to capture the ordered characteristics of self-assessed general health and has been previously used in the HSE and other analyses (Chandola, 2001; Erens et al., 2001; Grundy & Holt, 2001; Manor, Matthews and Power, 2000; Nazroo, 2001).

For the second indicator, self-reported health limiting long-standing illness (LLSI) referred to as LIMITILL in the dataset is the report of a long-term illness, chronic health problem or disability that limits an individual's daily activities or work (Manor et al., 2000; Natarajan, 2006). The particular question posed in the questionnaire was generated through a combination of questions. First the respondents were asked: 'Do you have any longstanding illness, disability or infirmity? By long standing, I mean anything that has troubled you over a period of time, or that is likely to affect you over a period of time?'. Respondents who answered 'yes' to this first question were then asked: 'What is the matter with you?' and 'Does this illness or disability limit your activities in any way?' (see also Table A.2). For the regression analysis, LIMITILL is recoded into a dichotomised variable (LIMITREG) distinguishing between those with a 'limiting long-standing illness' and those who reported 'no limiting long-standing illness'. This indicator is particularly interesting when studying the health of ethnic minorities. For example, the 1999 and 2004 HSE indicated that limiting long-standing illness (LLSI) was only significantly higher amongst Pakistani and Bangladeshi groups compared to the other ethnic minority groups (Erens et al., 2001). Additionally, several studies have shown that limiting longstanding illness is a valid measure of health status in ethnic minority groups in Britain and a similar approach using LLSI has been employed in studies of health and ethnicity (Chandola and Jenkinson, 2000; Chandola, 2001; Davey Smith et al., 2000; Kelaher et al., 2008).

In contrast to LLSI, in the 1999 HSE, self-assessed general health indicated poor health for all ethnic minority groups, group compared with the general population, except for the Chinese (Erens et al., 2001). Thus, in previous studies GENHELF and LIMITILL indicators have been powerful predicators of health (Breeze et al., 1999; Chandola and Jenkinson, 2000; Evandrou, 2005; Grundy and Holt, 2001; Salas, 2002). Additionally, studies on health inequalities have found these indicators (GENHELF, LIMITILL) to be a valid measure in health inequality studies in different ethnic minority groups (Chandola and Jenkinson, 2000; Chandola, 2001; Curtis and Lawson, 2000; Kelaher et al., 2008; Nazroo et al., 2007). GENHELF and LIMITILL are strongly associated with each other as illustrated in Table 3.2. Self-rated general health is often reported as an overall assessment of health status, such as very good, good or bad, and in conjunction with other indicators of an individual's health status (Ayis et al., 2003; Manor et al., 2001; Sproston and Mindell, 2006).

Table 3.2: Relationship between general health and limiting long-standing illness (%)

General Health	Self reported health			Total
	Limiting long-standing illness	Non limiting long-standing illness	No long-standing illness	
Very good	11.1 (113)	25.0 (263)	63.8 (747)	**100** (1,123)
Good/fair	41.1 (1,266)	29.3 (889)	29.6 (1039)	**100** (3,194)
Bad/very bad	91.7 (684)	5.5 (46)	2.7 (34)	**100** (764)

X^2 **=1.070 (df 4, p< 0.001)**
(N) = sample numbers in brackets are unweighted
All calculations used sampling weight for the multistage sampling design
Source: Author's analysis, 2004 HSE

Table 3.2 shows that general health and limiting long-standing illness (LLSI), whilst not completely overlapping they are strongly associated with health amongst those 50 years and older. For example, (64%) of individuals aged 50 and over who report 'very good' general health (over the last year) reported 'no' long-standing illness (LSI). Similarly, 92% of those who reported their general health as 'bad/very bad' also reported a LLSI, compared with only 11.1% of those who reported their general health to be very good. A possible explanation for the discrepancies in these results is the perception of older people about their own health, for example older people who develop LLSI later in life may attribute it to normative ageing. In other words, even though older people may have LLSI, they may still perceive their general health as very good/, good/fair (Ayis et al., 2003; Manor et al., 2001). In addition, limiting long-standing illnesses are chronic conditions, disability or infirmity that have affected a person over a period of time, and which people may have gotten used to over their life-course (Sproston and Mindell, 2006).

Section 3.6.2 will discuss the different explanatory variables in the models (see also Table A.3). The choices of variables were based on the reviewed literature and the variables available in the 2004 HSE dataset. The variables are grouped into three categories: demographic, socio-economic and risk factor variables. The demographic variables are ethnicity, age, sex and marital status, the socio-economic variables are education, occupation, equivalised household income, housing tenure and car availability, and finally the risk factors are one's current smoking status and amount of alcohol consumption. The examination of regional differences is important in researching health inequalities for three reasons. Firstly, existing research shows regional disparities in patterns of mortality and morbidity (Evandrou, 2005; Curtis and Jones, 1998; Matthews et al, 2006). Secondly, we know from the 2001 Census that the older population is dispersed across England, with older people being concentrated in rural parts of the country and along the South Coast. Thirdly, the density of the ethnic population also varies across England, for example the ONS estimates that 13% of the ethnic

minority population is concentrated in the West Midlands and 8% in the South East (ONS, 2005). The inclusion of regional variables which allow the study of health inequalities between different regions is one of the planned expansions of this research at the post-doctoral stage. Similarly, behavioural risk factors can be represented with a range of additional indicators, such as diet and a person's Body Mass Index, which will be explored by this research at the post-doctoral stage.

3.6.2 Explanatory variables

Of the demographic variables, ethnicity is undoubtedly an important variable to use in studying the relationship amongst health, SES and ethnic minority groups, and has been used in several other studies (Bhopal, 2004; Chandola, 2001; Cooper et al., 2000; Davey Smith, 2000; Evandrou, 2000; Farmer and Ferraro, 2005; Kelaher et al., 2008; Nazroo et al., 2007). Other demographic variables that have also been identified in the literature as important in studying ethnicity and health were age (Grewal et al., 2004; Grundy and Holt, 2001; Nazroo and Williams, 2005), sex (Curtis et al., 2000; Evandrou, 2000; Tomassini, 2005), and marital status (Breeze et al., 1999; Glaser and Grundy, 1997; Grundy and Holt, 2001). (See also Table A.3).

Ethnicity: The concept of ethnicity is a crucial indicator within the literature on studies of ethnic minority groups (Bajekal et al., 2004; Bhopal, 2004; Curtis et al., 2000; Davey Smith, 2000; Evandrou, 2000; Kelaher et al., 2008; Nazroo, 2003; Nazroo et al., 2007; Smaje, 1995). Ethnicity refers to groups to which people belong who share cultural or physical characteristics, including geographical and ancestral histories and behaviours (Bhopal, 2001; Smaje, 1995). Ethnicity (ETHNIC1) was defined in the dataset according to informants' self-reporting of their family origins (Sproston and Mindell, 2006) (see also Table A.2). The descriptions of all target minority ethnic groups, except for the Irish, were defined in the 2001 Census (Craig, Deverill and Pickering, 2006). Ethnicity in this study is based on the definition in the 2004 HSE dataset and the choice of ethnic groups was guided by the 2004 HSE data (see also Table 3.1). The selection of ethnic minority groups that were comparable maximises the likelihood of finding differences among the groups, as well as significant patterns within the groups, which may be attributed to ethnicity (Nazroo, 2001).

Derived ethnicity (DMETHN04) is a categorical variable, and the different ethnic groups included in the sample are Black Caribbean, Black African, Indian, Pakistani, Bangladeshi, Chinese, Irish, other and White (see Table 3.1 and Table 4A). The White (reference group) group was critical to the study because it provides a point of comparison (Nazroo, 2001; Grewal et al., 2004). The 'other' group is a mixed category comprised of 'any other Asian background' (e.g. Sri Lankan), 'any other black background', and 'any other background' including diverse categories such as Arab and Japanese persons.

Age: Age (AGE) was initially entered as a continuous variable in the dataset, and was defined according to the informant's age on their last birthday (Sproston and Mindell, 2006). In this study, age was categorised into five groups (i.e. 50-54, 55-59, 60-64, 65-69, 70 and over) (AGEGROUP) due to small cell counts in some age categories. It has been emphasised that there are fewer ethnic elders compared with the general population (Cooper et al., 2000; Ebrahim et al., 2004), which makes studies of ethnic minority at older ages problematic due to small numbers (Cooper et al., 2000; Ebrahim et al., 2004; Grundy and Holt, 2001). Hence, collapsing age into five age categories makes it possible to achieve adequate cell counts for the purpose of these analyses.

Sex: Sex (SEX) remains a categorical variable (i.e. male, female) as in the original dataset and all analyses will control for sex. Separate analysis will be performed for each gender to highlight any gender differences in the regression models.

Marital status: Marital status (MARSTATB) is categorised into four categories: 'married', 'single' (never married), 'divorced' and 'widowed'. Those separated are combined with divorced whereas the cohabitees are combined with married.

SES variables: SES is a multi-faceted concept, which is key to health research as it captures important dimensions of people's material and social circumstances throughout their life (Bowling, 2004; Grundy and Holt, 2001; Huisman et al., 2004; Lynch and Kaplan, 2000). SES is ascribed by a broad range of measures, such as education, occupation and individual or household income (Davey Smith 2000, Evandrou, 2000; Galobardes et al., 2006; Grundy and Holt, 2001; Huisman et al., 2003; Krieger, 2001; Lynch and Kaplan, 2000). Thus, among the socio-economic variables, education, occupation, household income, housing tenure and car availability were identified in the literature as of central importance to the study of health inequalities (Galobardes et al., 2006; Grundy and Holt, 2001; Lynch and Kaplan, 2000; Oakes and Rossi, 2003; Nazroo et al., 2007). The operationalisation of these variables in the dataset is described in Table A.2.

Education: Education is fixed relatively early in life, and captures knowledge-related resources of individuals in the population (Galobardes et al., 2007; Lynch and Kaplan, 2000; Knesebeck et al., 2006). Education (TOPQUAL3) was recorded in the dataset as the highest qualification achieved by the informants, consisting of seven categories: 'NVQ4/NVQ5/ degree or equivalent', 'Higher education below degree', 'NVQ3/GCE: A level equivalent', 'NVQ2/GCE: O level equivalent', 'NVQ1/CSE: other grade equivalent', 'foreign' and 'no qualifications'. Based on explanatory analysis, due to small numbers in some cells and in order to achieve comparability with other studies,

education was ordered in five categories: 'degree' (reference category); 'diploma/A level', 'O level', 'CSE/NVQ1' and 'no qualification'.

NS-SEC8 – Occupational class: Occupational social class (NS-SEC) is a categorical variable classified according to NS-SEC occupational classification and is based on the individual's current or recent occupation. However, in the 2004 HSE dataset, there were three different versions of NS-SEC (e.g. NS-SEC8, NS-SEC5 and NS-SEC3). Thus, after exploring the data of all three options, the NS-SEC8 classification was selected in order to get maximum comparability with other studies (Chondola et al., 2003; Chondola, 2001; Chondola and Jenkinson, 2000). The NS-SEC8 classifications include the following classes: I – Higher managerial and professional occupations (reference category); II – Lower managerial and professional occupations; III – Intermediate occupations; IV – Small employers and own account workers; V –Lower supervisory and technical occupations; VI – Semi-routine occupations ((e.g. dental assistants, farm workers, housekeepers); VII – Routine occupations (e.g. domestic workers, painters, furniture makers) and VIII –Never worked and long-term unemployed and remained as coded in the dataset to maintain the richness of the data (See also Table A.1). It has been noted that the NS-SEC8 category of 'never worked and long-term unemployed' is not a part of the official classifications, but the ONS advocates its use when it can be created (Rose and Pevalin, 2002; Rose and O'Reilly, 1998). This is because the exclusion of people who are economically inactive may lead to considerable underestimation of occupational social class differences in health, and bias our understanding of the pathways underlying health inequalities (Chandola, 2001; Martikainen and Valkonen, 1999). Thus, the category of 'never worked and long-term unemployed' is an amalgamation of older people who may have never worked due to illness or long-term disability for the last two years, women looking after the home and retired people (Chondola, 2001; Rose and Pevalin, 2002).

As emphasised by Lynch and Kaplan (2000), one cannot understand SES or its health implications without considering how social position reflected by a person's occupation, structures people's lives. Ethnic minorities, for example, are more likely to be found in lower or less prestigious occupations (Nazroo, 2001) and this has implications in terms of their material resources or access to health, throughout their life-course trajectories. The variable of social class will be used to answer one of the research questions, namely *'How can SES be measured in later life'*.

Equivalised household income: Household income (EQVINC) is equivalised to account for the number of individuals in the household, and was coded into five groups to account for the highly skewed income distribution. The groups are as follows: 'no income', 'less than £10,000; 10,001 - 15,000; 15,001 – 25,000; and over £25,000. In previous studies, certain ethnic minority groups such as Bangladeshi and Pakistani, were over-represented in the lowest household income bracket, while

Indian and Caribbean people tended to be placed in the middle income group, compared to their White counterparts who were more evenly distributed across the income distribution and particularly the highest income groups (Davey Smith et al., 2000; Nazroo, 2006).

Housing Tenure: Housing tenure is a measure of material status of SES, particularly as a proxy for wealth and income (Macintyre et al., 1998), and it has been noted that housing tenure (e.g. owner occupied, rented from housing authority or privately rented) is associated with morbidity (Curtis et al., 2004; Ellaway and Macintyre, 1998; Evandrou, 2005; Macintyre et al., 1998). Housing tenure (TENUREB) was measured at the household level using five categories (e.g. 'owned outright', 'mortgage and/or loan', 'rent/part mortgage', 'rent' and 'live free'), and was used to create a dummy variable 'TenureType' that included four categories (e.g. 'own it outright', 'buying with the help mortgage/loan', 'rent' and 'other'). In creating the new variable TenureType, those who pay part rent and part mortgage, who made up 0.4% of the sample, were combined with those who rent, who made up 22% of the sample. The 'other' category includes those who live 'rent free' and 'no account of rent'.

Car: Car or van availability is often referred to as an alternative measure of SES. It has also been suggested that housing tenure and car availability are more refined indicators for material well being and are highly predictive of health and other life chances (Breeze et al., 2004; Ellaway and Macintyre, 1998; Grundy and Holt, 2001). Car (CAR) was recorded in the dataset based on the availability of a 'car' or a 'van' in the household and it has been indicated by prior studies to be a suitable measure of SES, particularly for older people (Bowling, 2004; Ellaway and Macintyre, 1998; Grundy and Holt, 2001). Prior studies also demonstrated that no car availability is an important barrier to preventing access to medical care and access to community resources (Bowling, 2004; Ebrahim et al., 2004; Macintyre et al., 1998).

Behavioural risk factors:

In recent years, risk factors, such as smoking and alcohol consumption, have been identified as contributing to health inequalities amongst different groups in the UK population (Cooper et al., 2000; Evandrou, 2000a; Lawlor et al., 2003; Jarvis and Wardle, 2006). In addition, research has found that smoking and alcohol consumption patterns amongst ethnic minorities in the UK are considerably different from those of the White majority (Bhopal et al., 2004; Erskine et al., 2010; Becker et al., 2006; Wardle, 2006) (see also Table A.4).

Smoking: Smoking has been identified as one of the major contributors to health inequalities in Britain, particularly amongst lower occupational class groups (DOH, 1998; Jefferies et al., 2004; Wardle, 2006; White et al., 2005). Evidence from the HSE indicated that smoking varied between and

within ethnic groups, and that men are more likely to smoke than women. For example, Wardle (2006) reported that among ethnic minority groups, the proportion of men who smoke ranges from 20% among Indians to 40% among Bangladeshis. For ethnic minority women, the patterns of cigarette smoking were very different from their male counterparts. Cigarette smoking ranges from 2% among Bangladeshi women to 10% amongst Black African women, while it is significantly higher for Black Caribbean women (24%) and Irish women (26%) (Wardle, 2006; White et al., 2005). Cigarette smoking status (CIGST1) was recorded in the data set based on informants' self-reports. Informants were asked if they ever smoked a cigarette and the information was used to create the following categories: 'never', 'ex-occasionally ', 'ex-regular' and 'current' cigarette smokers. The estimated daily use of cigarettes among current smokers is categorised as fewer than 10 cigarettes per day, 10 to fewer than 20 cigarettes per day and 20 or more cigarettes per day (Wardle, 2006), however this dimension is not captured in this analysis.

Alcohol consumption: In Britain, alcohol is consumed by the majority of people and it has been noted that the misuse of alcohol contributes to a number of health problems, including cirrhosis of the liver, CVD, cancer and high blood pressure (BMA, 2008; Becker et al., 2006; Heim et al., 2004). However, amongst ethnic minorities (excluding the Irish), there are lower frequency and levels of alcohol consumption compared to the White majority (Becker et al., 2006; Erens et al, 2001). At the same time, there exist differences between ethnic minority groups, for example Black Caribbeans were more likely to drink than their Asians counterparts (Becker et al., 2006). In the 2004 HSE, the frequency of alcohol use (DNOFT2) was ascertained by the question: 'How often have you had an alcoholic drink of any kind during the last 12 months?' and was broken down into eight categories (e.g. 'almost every day', 'five or six days a week', 'three to four days a week', 'once or twice a week', 'once or twice a month', 'once every couple of months', 'once or twice per year' and ' not at all in the last 12 months/non-drinker' (Sproston and Mindell, 2006). These categories were used to create a dummy variable of 'Alcohol consumption' that included five categories (e.g. 'almost every day', 'three to six days per week, 'once or twice per week', 'once every couple of months and ' not at all in the last 12 months/non-drinker). It was necessary to create the new variable 'alcohol consumption' due to low cell counts in some of the original categories, which made it difficult to achieve adequate numbers for the purpose of the analyses.

In Section 3.6.3 the explanatory and outcome variables of the correlation matrix and their relationships are discussed.

3.6.3 Explanatory and outcome variables: Correlation matrix and their relationships

Table 3.3 presents the correlation matrix for all explanatory and outcome variables, and this matrix assesses the strength of the relationship between the explanatory and outcome variables in this analysis. The correlation coefficients lie between -1 and +1, with the value of -1 indicating a perfect negative relationship between two variables, and the value of +1 indicating a perfect positive correlation, while a value of 0.00 indicates a lack of correlation (Bryman, 2004). The variables in the correlation matrix are based on three factors, (1) the explanatory and outcome variables in the analysis, (2) the empirical and theoretical evidences reviewed in the literature, and (3) the framework for this thesis.

Table 3.3 shows that the strength of the correlation is stronger for some of the variables. For example, education and income (0.57) are strongly positively correlated, and education is also positively correlated with car availability (0.30), alcohol consumption (0.30) and general health (0.30). Social class also appears to be positively and strongly correlated with alcohol consumption (0.30), car availability (0.30) and general health (0.30). Household income is negatively correlated with social class (0.31), with alcohol consumption and with general health (0.20). Although this correlation matrix is indicative of significant relationships between the variables, further analysis is required to disentangle these (see Chapters 4, 5 and 6)

In the next section, the data analysis methods, particularly the types of analyses this study entails are discussed.

Table 3.3: Correlation of all explanatory and outcome variables

	Age groups	Sex	Marital status	Ethnicity	Education levels	Equivalised household income	NS-SEC 8 (Social Class)	Housing tenure	Ever smoked	Alcohol consumption	Car availability	General health	Limiting long-standing illness
Age groups	**1.00**												
Sex	004	**1.00**											
Marital status	.293**	237**	**1.00**										
Ethnicity.	.113**	025	-.005	**1.00**									
Education levels	.273**	116**	.176**	-.031*	**1.00**								
Equivalised household income	-.197**	-047**	-.107**	.192**	-.341**	**1.00**							
NS-SEC 8 (Social class)	.089**	112**	.152**	-.181**	.570**	-.310**	**1.00**						
Housing Tenure	-.107**	008	.182**	-.148**	.151**	-.108**	.206**	**1.00**					
Cigarette Smoking	-.000**	-.192**	-.008	.226**	.060**	.060**	-.001	.095**	**1.00**				
Alcohol consumption	.037**	207**	.125**	-.305**	.253**	-.254**	.300**	.146**	.256**	**1.00**			
Car availability	.255**	131**	.403**	-.116**	.276**	-.195*'	.262**	.295**	.027	.189**	**1.00**		
General health	.120**	012	.082**	-.153**	.245**	-.210**	.269**	.160**	.006	.260**	.220**	**1.00**	
Limiting longstanding illness	-.179**	-015	-.101**	.013	-.153**	.103**	-.138**	-.080**	.053**	-.127**	-.148**	-.485**	**1.00**

Significance levels: *p < 0.01; **p >0.001
Source: Author's analysis, 2004 HSE

3.7 Data analysis strategy

3.7.1 Data analysis methods and plan

This study uses cross-sectional analysis to analyse the 2004 HSE dataset. A number of statistical methods will be utilised throughout the study, which are further explained within each chapter of the analysis (see Chapters 4, 5 and 6), however, the major techniques used throughout the thesis will be explained in this section. In the initial stage of the analysis, several descriptive statistics are used to assess the distribution, frequency of responses and the range of values for all the variables used in the study in order to present a quantitative description of the data. Bivariate analysis was conducted to examine the relationship between the variables, and the chi-square test is used to assess the independence of the variables. Multivariate regression analysis (i.e. logistics regression) will be used to measure the association between the dependent and explanatory variables. The rest of the section discusses the different statistical methods used.

3.7.2 Bivariate analysis

Bivariate analysis is concerned with the relationships between two variables (Bryman, 2004), employing a two-way frequency distribution called cross-tabulation or contingency table. In the contingency table, the sum of the frequencies for the total column must equal the sum of the totals listed across the bottom and each should equal the number (N) of cases in the analysis. The measure of association and statistical significance that are used with bivariate analysis varies by the level of measurement of the variables analysed (Diamond and Jefferies, 2001). The Chi square has been used to measure the statistical significance of the cross-tabulations between the variables (Diamond and Jefferies, 2001). Thus, the first part of the analysis carried out in this thesis in examining the association between health, ethnicity, age and sex, employed bivariate analysis. All calculations at the bivariate level use sampling weight to reflect population representation (see also Section 3.7.5).

3.7.3 Pearson Chi square test

The specific test used in examining the research questions in this study is the Pearson Chi square test which will be simply referred to as the Chi square, denoted by the symbol χ^2. The chi square test for independence tells us whether two variables are independent from each other (Diamond and Jefferies, 2001), and is used to determine whether there is a significant difference between the expected frequencies and the observed frequencies in one or more categories. The test computes the expected values in a cell of the cross-tabulation or contingency table that shows the distribution of two variables and is expressed as:

$$\text{Expected value} = \frac{\text{(column total) (row total)}}{\text{grand total}}$$

The numerical values or counts are used in the cells and the expected value in each cell should be five or greater (Diamond and Jefferies, 2001; Knapp, 1999). The values are compared with the observed values to see whether or not there is a significant difference between the observed and the expected value. The chi square test statistic formula is:

$$\chi^2 = \Sigma \frac{(O - E)^2}{E}$$

Where, O = observed values and E = expected values. In order to determine whether or not the χ^2 test is significant, the computed value is compared with the critical value in the chi square distribution table based on the set level of significance and the number of degrees of freedom (df).

df = (number of rows -1) x (number of columns -1)

The null hypothesis (Ho) is rejected if the test statistic is greater than the critical value, while if the test static is less than or equal to the critical value, then we accept the null hypothesis. The bivariate analysis is then extended to a multivariate form to evaluate whether the association can be interpreted as a relationship (Knapp, 1999). Bivariate analysis is critical in reflecting key associations which can be further explored through multivariate regression analysis (Knap, 1999).

3.7.4 Logistic regression analysis

The next method to be employed is logistic regression, which is also known as logit and which is a statistical method used to predict a dependent variable on the basis of continuous or categorical independent variables. The logit can determine the percentage of variance in the dependent variable (i.e., GENHELF, LIMITILL) which is explained by the independent variables (i.e. DMETHN04, SES), and to understand the impact of covariate control variables such as age, sex, marital status and ethnicity. It is also significant in ranking the relative importance of independent variables and in assessing interaction effects (Allison, P. 1999). In order to fix the logistic model, maximum likelihood estimation (MLE) is used, which uses the observed data to estimate the likelihood of the value of the data parameters in the model. The logit estimates the odds of the probability of a certain event occurring, for example the differences in age and sex distribution amongst ethnic elders reporting a particular health status. This method will also be employed in the analysis to aid in answering the research questions, particularly the 'sensitivity' of different SES measures on health, ethnicity and SES measures. The logit model is denoted by the following formula:

$$\log\left(\frac{p}{1-p}\right) = a + b_1 x_1 + b_2 x_2 \ldots$$

The expression on the left-hand side of the equation is called the logit of p. This helps convert a variable that is bound by 0 and 1 into a variable that has no upper or lower bounds (Alison, 1999). The maximum likelihood estimate is the most widely used method for estimating the logit coefficients and seeks to maximise the log likelihood, which reflects how likely it is that the observed values of the dependent (Y) variable will be predicted from the observed values of the independent (X) variables. This occurs through an interactive process of repeated estimation until a convergence is reached where the log likelihood does not change significantly. The results of the multivariate regression analysis are presented as odds ratios (ORs), where one category of each variable, usually the one with the lowest predicted risk, serves as the reference group and receives the value of 1.0 (Krzanowski, 2002). Finally, a more complete relationship of the relative significance of the categories of each variable can be judged from the odds ratios and their 95% confidence intervals.

All analyses are performed using PASW SPSS v17, and sample weights are used to account for different known probabilities in the selection of the sample. It has been noted in the 2004 HSE data that non-response weighting has been included in the weighting strategy of both the general population and ethnic boost samples (Sproston and Mindell, 2006). In order to answer the research questions in Section 1.4, examining the 'sensitivity' of different SES measures and health status, the same sequential model-building strategy is employed as indicated in Table 3.4 and Table 3.5.

Table 3.4: Modelling strategy for Dependent variable – Self-reported General Health

Model I	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Age	Age	Age	Age	Age	Age	Age
Sex	Sex	Sex	Sex	Sex	Sex	Sex
Ethnicity	Ethnicity	Ethnicity	Ethnicity	Ethnicity	Ethnicity	Ethnicity
Marital status	Marital status	Marital status	Marital status	Marital status	Marital status	-
Smoking	Smoking	Smoking	Smoking	Smoking	Smoking	Smoking
Alcohol	Alcohol	Alcohol	Alcohol	Alcohol	Alcohol	Alcohol
	Education	Education	Education	Education	Education	Education
		NS-SEC	NS-SEC	NS-SEC	NS-SEC	-
			Household Income	Household Income Housing tenure	Household Income Housing tenure Car availability	Household Income Housing tenure Car availability
-2 LLR	**Change in LLR**	**Change in LLR**	**Change in LLR**	**Change in LLR**	**Change in LLR**	**Change in LLR**
% Change-2 LLR						

Table 3.5: Modelling strategy for Dependent variable – Limiting long-standing Illness

Model I	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Age	Age	Age	Age	Age	Age	Age
Sex	Sex	Sex	Sex	Sex	Sex	Sex
Ethnicity	Ethnicity	Ethnicity	Ethnicity	Ethnicity	Ethnicity	Ethnicity
Marital status	Marital status	Marital status	Marital status	Marital status	Marital status	-
Smoking	Smoking	Smoking	Smoking	Smoking	Smoking	Smoking
Alcohol	Alcohol	Alcohol	Alcohol	Alcohol	Alcohol	Alcohol
	Education	Education	Education	Education	Education	-
		NS-SEC	NS-SEC Household Income	NS-SEC Household Income Housing tenure	NS-SEC Household Income Housing tenure Car availability	- Household Income Housing tenure Car availability
-2 LLR	**Change in LLR**	**Change in LLR**	**Change in LLR**	**Change in LLR**	**Change in LLR**	**Change in LLR**
% Change-2 LLR						

3.7.5 Weighting

Most large scale government sponsored surveys use weights to reflect the characteristics of the population from which the sample is drawn (Sproston and Mindell, 2006). In the ethnic boost sample, for example, the weight aims at approximating the ethnic minority composition of the general population. Information about demographic characteristics, such as age, sex, ethnicity, and household size, is used to develop the weights. For instance, it has been noted that in the HSE women are over-represented and males are under-represented (Sproston and Mindell, 2006), and weighting would correct this bias. Although the weight does not change a respondent's answer, rather it gives an appropriate relative importance to the answer. Thus, the weighting process involves computing and assigning a weight to each survey respondent in the sample (Craig et al, 2006).

In the HSE, weights were added for the general population sample and the ethnic boost sample. In the general population sample, weights were calculated at the household and individual informant levels. At these levels the weights corrected for the probability of selection where additional households were identified at a selected address (Sproston and Mindell, 2006). In the ethnic boost

sample, the household selection weights were also calculated in the same way for the core sample, with the exception of sample points where focused enumeration was carried out (Craig et al, 2006). However, the selection weights for addresses were calculated for each informant separately, because each informant from a minority ethnic group had a chance of being selected, either from the general population or the boost sample, with the probability of being interviewed for the boost sample depending on their ethnic group.

Thus, the weighted distribution of the ethnic minority groups using the combination of these selection weights was treated as the best estimate of the population distribution, and this distribution was therefore used to 'correct' weights at each stage of the weighting process. For example, for the Chinese sample, the combined weights for Chinese people from the core and boost samples were re-scaled so that they amounted to the number of Chinese informants from those samples (Craig et al., 2006). It has been noted that in the 2004 HSE, the weighted bases show the relative sizes of the different sample elements after applying the weight, reflecting the size of the English population (Sproston and Mindell, 2006). Specific background information on the 2004 HSE weighting data is described in detail elsewhere (see Craig et al., 2006). Weights are applied to all bivariate analyses in order to appropriately reflect each ethnic group in proportion to its sample size. Unweighted bases will be indicated in the given tables, showing the absolute number of participants involved. No weight is added to the logistic regression models as, this could lead to biased results (Pfeffermann et al., 1998).

3.7.6 Summary

This study employs bivariate and multiple logistic regression modelling in order to test for the 'sensitivity' of different SES measures of health status amongst ethnic elders as outlined in the research questions (see also Section 1.4). Levels of significance will be determined using the χ^2 statistic at the bivariate level and logistic regression models will be evaluated using the likelihood ratio test, which measures the 'goodness-of-fit' of the model. As the literature shows, the choice of methodology in this study reflects considerations of the particular research problem (Bryman, 2004). The HSE was chosen for this study because of the 'ethnic boost' sample, which allows for the study of health inequalities and SES measures in later life among ethnic minorities.

Chapter 4 presents the findings on the demographic characteristics (e.g. age, sex, marital status, ethnicity, education, NS-SEC occupation and income) of the British population, particularly on ethnic minority groups of those 50 years and older. The chapter also details the findings on the ethnic elder's demographic characteristics by exploring the 1991 and 2001 Censuses and the 2004 HSE. It

has been noted that most of what is known about the demographic profile of ethnic minorities comes from the 1991 Census, because for the first time it included a question on ethnicity (Curtis et al., 2000; Peach, 1996; Nazroo, 2001). The next chapter sets the context of the analysis by exploring the demographic characteristics of different ethnic groups.

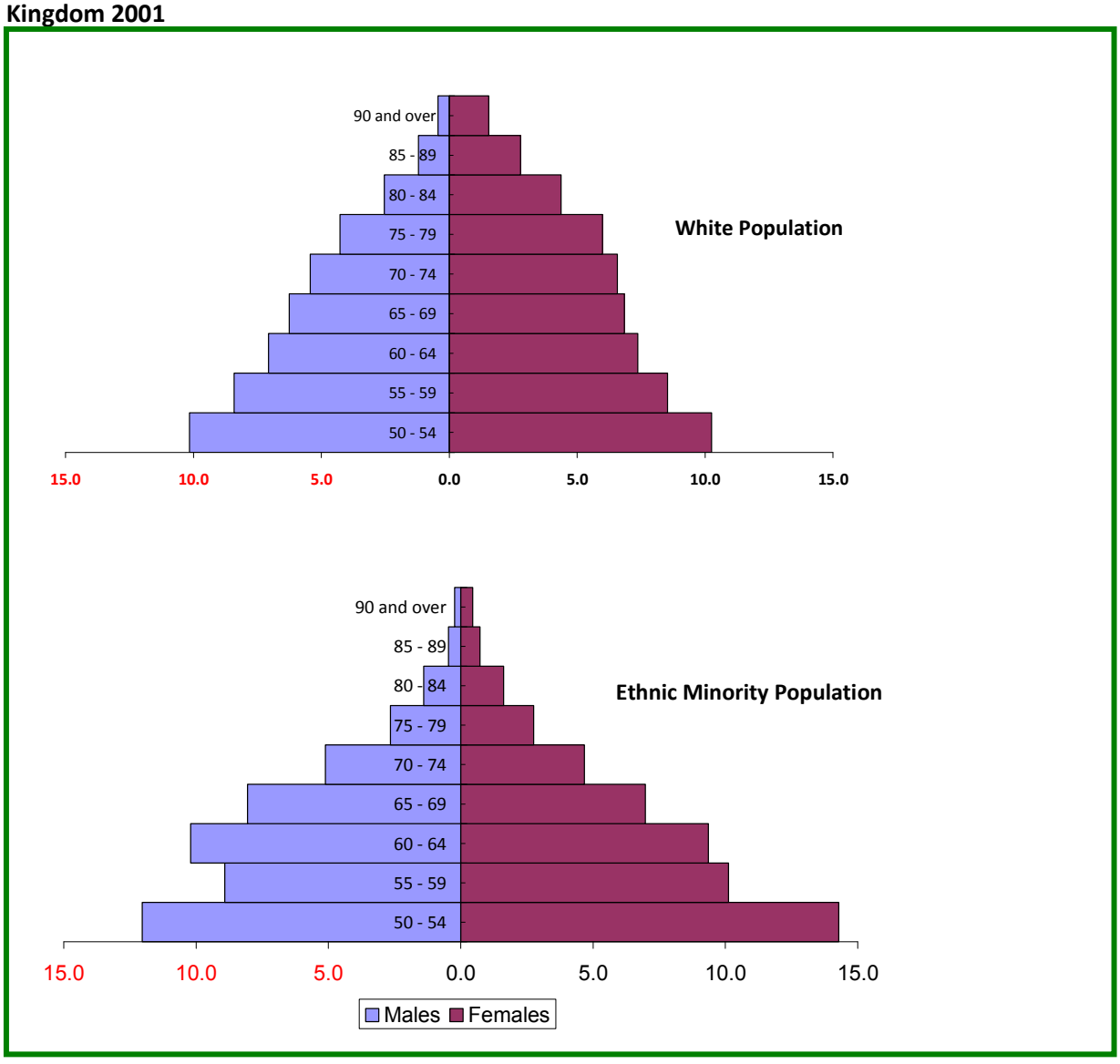
Chapter 4

4 Demographic characteristics of ethnic elders in Britain

4.1 Introduction

The demographic profile of the United Kingdom has changed significantly in the past decade (ONS, 2010). The changes include a steady growth in the overall ethnic minority population from 5.5% (3,015,050 persons) in the 1991 Census to 8.7% (4,521,050 persons) in the 2001 Census (1991 and 2001 Census). The changes also include a steep rise in the population of people aged 50 years and older, and this population is projected to increase rapidly as indicated in Figure 4.1.

Figure 4.1: Population pyramids for White and Ethnic minority groups aged 50 and over, United Kingdom 2001



Source: Census 2001

As a result, the demographic profile of the ethnic groups in the older population is also rapidly changing. In order to better understand the demographic make up of ethnic elders in the UK and set the context of the thesis, this chapter examines the demographic characteristics of persons aged 50 years and over from ethnic minority groups. It has been noted that most of what is known about the demographic characteristics of ethnic minorities comes from the 1991 Census, because for the first time it included a question on ethnicity (Curtis et al., 2000; Peach, 1996; Nazroo, 2001). Hence, understanding the changing composition of ethnic minorities, particularly that of ethnic elders, is important for informing the allocation of resources and the effective design of public policies in order to meet the changing needs of ethnic elders (see also Chapter 8). The exploration of the 2004 HSE ethnic boost sample and the 1991 and 2001 Censuses on ethnic origin will be the initial stage of the discussion in this chapter. The initial analysis includes descriptive statistics and an exploration of variables such as gender and marital status using the 2001 Census data (ONS, 2001). This Chapter discusses the demographic and socio-economic characteristics of ethnic elders before addressing the first research question of the thesis – *'How can SES be measured in later life'.*

4.2 Ethnic minority groups in Britain: Exploring the differences in the 2004 HSE and the 1991 and 2001 Censuses

Prior to the 1991 Census, the British Censuses only asked respondents about their nationality and country of birth (Nazroo, 2001). The 1991 Census, however, broke new ground in two respects which are relevant to this research. Firstly, it included a question on ethnicity, and secondly, it asked respondents whether or not they had a limiting long-standing illness (Evandrou, 2000a; Nazroo, 2001). The 1991 Census offered important evidence on the health patterns of the ethnic minority population, and provided researchers with the opportunity to analyse the data to study Britain's ethnic minority population (Bajekal et al., 2004; Evandrou, 2000a; Davey Smith et al., 2000; Nazroo, 2005). Although ethnic minority groups only account for a small proportion of the total population, as shown in Table 4.1, the population size of the ethnic minorities has continued to grow, particularly in recent decades. Table 4.1 shows the ethnic make-up of the UK population, subdivided by ethnic groups.

Table 4.1: Ethnic composition of the UK population at the 1991 and 2001 Census

Ethnic groups	1991		2001	
	Number	Percent	Number	Percent
Total population	54,888,844	100	52,041,916	100
White	51,873,794	94.5	46,879,062	90.1
White Irish	837,464	1.5	641,804	1.2
All Ethnic Minorities	3,015,050	5.5	4,521,050	8.7
All Black	890,727	1.6	1,139,577	2.2
Black Caribbean	499,964	0.9	563,843	1.1
Black African	212,362	0.4	479,665	0.9
Black Other[1]	178,401	0.3	96,069	0.2
All South Asian	1,479,645	2.7	2,032,463	3.9
Indian	840,255	1.5	1,036,807	2.0
Pakistani	476,555	0.9	714,826	1.4
Bangladeshi	162,835	0.3	280,830	0.5
Chinese and other	644,678	1.2	1,349,010	2.6
Chinese	156,938	0.3	226,948	0.4
Other Asians	197,534	0.4	461,028	0.9
Other Other[2]	290,206	0.5	661,034	1.3

[1] The 'Black Other' group contains people recorded as 'Black' with no further details, those identifying themselves as 'Black British', and people with ethnic origins classified as mixed black/white and black/other ethnic groups. It seems that most of the 'Black Other' groups had Caribbean family origins, but were born in Britain (Peach, 1996).
[2] The 'Other Other' group contains North Africans, Arabs, Iranians, together with people with mixed Asian/white, mixed Black/white and other mixed categories (Census, 2001; Peach, 1996).
Source: Author's analysis of 1991 and 2001 Census from ONS

Table 4.1 shows the changes of the ethnic composition in the British population between the 1991 and 2001 Censuses. In the 1991 Census, over 5.5% of the British population or just over 3 million people identified themselves as belonging to an ethnic minority (1991 Census; Nazroo, 2001). In contrast, the 2001 Census shows a distinct change in the ethnic composition of the British population with over 8.7% of people identifying as an ethnic minority. These changes indicate increasing diversity amongst the population, with Indians representing the largest (2%) ethnic minority group in Britain, which itself is made up of diverse sub-groups (see also Section 2.7). However, it has been noted that the 2001 Census has contributed to a marked improvement in the categorisation of Britain's ethnic minorities (Davey Smith, 2000; Nazroo, 2001). For example, prior to 1991, the Census data focused only on the mortality rate by country of birth. Data from the 2001 Census, however, included a more detailed assessment of the mortality patterns of ethnic minority groups by distinguishing amongst the black groups, i.e. Black Caribbean and Black African, as shown in Table 4.1.

4.2.1 Demographic characteristics of people aged 50 years and over from ethnic minorities from the 2004 HSE and the 2001 Census

Britain is still a predominantly White society, with over 91% of its population being White (2001 Census). This picture is changing with an increasing proportion of ethnic minorities amongst those 50 years and over, as shown in the population pyramid in Figure 4.1. Ethnicity is recorded in the HSE based on the informants' self-reports (see also Table A.3).

The ethnic minority population in Britain has a diverse history and composition compared to the White population (Haug et al., 2002; Nazroo, 2005). The changes in the ethnic make-up, particularly among ethnic elders in the 2004 HSE ethnic boost sample and 2001 Census indicate that the proportion of ethnic elders has increased. For example, the Irish made up 0.2% of the older population of Britain in 2001, and represent 13.2% of the ethnic elders in the 2004 HSE Ethnic Boost sample, forming the largest ethnic group in Britain. The Irish were followed by Indians who made up 1.2% and 7.8% of the two samples respectively, Black Caribbeans who made up 0.8% and 7.8% of the two samples, Pakistanis who made up 0.5% and 3.9% of the two samples, Chinese who made up 1.9% and 3.4% of the two samples, Black Africans who made up 0.3% and 2.8% of the two samples and Bangladeshis who made up 0.2% and 2.8% of the two samples respectively (see Table 4.2). Equally salient, however, are the continued trends of non-White ethnic elders, that is, Indians and Black Caribbeans include the highest proportion of ethnic elders as indicated in the HSE, and this proportion has more than doubled since the 1991 (Table 4.1) and 2001 Census (Table 4.2).

Table 4.2: Ethnic origin of the older population from the 2004 HSE and the 2001 Census, Great Britain

	2004 HSE gpa[1] General Population Sample (unweighted)		2004 HSE etha[2] (Merged) Ethnic Boost Sample & General Population (Unweighted)		2004 HSE[2] (Merged) Ethnic Boost Sample & General Population (Weighted)	2001 Census	2001 Census
	%	**(3,228)**	%	**(5,086)**	%	%	**(17,373,060)**
White	90.8	(2,931)	57.6	(2,931)	83.1	94.5	16,417,558
Ethnic minority groups							
Black Caribbean	1.3	(43)	7.8	(398)	2.2	0.8	135,634
Black African	0.5	(15)	2.8	(141)	0.8	0.3	43,641
Indian	1.2	(40)	7.8	(398)	2.6	1.2	201,901
Pakistani	0.4	(12)	3.9	(199)	0.8	0.5	82,644
Bangladeshi	(-)	(4)	2.8	(142)	0.3	0.2	27,006
Chinese	(-)	(4)	3.4	(173)	0.3	1.9	334,077
Irish	4.6	(148)	13.2	(673)	8.9	0.2	36,988
[3]Other groups	1.0	(31)	0.6	(13)	1.0	0.5	81,443
Total	**100**	**(3,228)**	**100**	**(5,086)**	**100**	**100**	**(17,373,060)**

[1]gpa: General Population Sample
[2]etha: Merged Ethnic Boost Sample with the gpa sample
[3]The 'other' group is a mixed category comprised of 'any other Asian background' (e.g. Sri Lankan) 'any other black background' and 'any other background' including diverse categories such as Japanese, Philippino or Vietnamese people (2004 HSE).
Source: Author's analysis, 2004 HSE; 2001 Census

In 2001, over 5.5 % of the population identified themselves as belonging to one of the listed ethnic minority groups in Table 4.2. However, in the 2004 HSE General Population Survey, over 9% of the ethnic minority population was made up of older people. The table also shows distinct diversity amongst people from ethnic minority groups in Britain. For example, Indians made up 2.6% of the older population, followed by Black Caribbeans, who made up 2.2% of the older population. Amongst Asians there is a diverse sub-group of people spreading across a range of categories including Pakistanis who made up 0.8%, Bangladeshis who made up 0.3% and Chinese who made up 0.3% of the older population. Several factors, such as mortality, fertility and migration patterns, played a role in the increase of the differences amongst ethnic minority groups (Evandrou, 2000b; Haug et al., 2002; Nazroo and Williams, 2006; Tomassini, 2005). For example, whilst there is a marked increase in the older Irish population from 0.2% in 2001 to 8.9% in 2004, there is a relatively low increase of the older Chinese population. In the 2001 Census, Chinese people represented 1.9% of the ethnic elders'

population, whilst in the 2004 HSE Ethnic Boost sample, only 0.3% identified themselves as Chinese. Black African (0.3%) and Bangladeshi (0.2%) groups were relatively small in the 2001 Census but showed a noticeable increase in the Ethnic Boost Sample (0.8% and 0.3% respectively). This could be due to the timing of the migration of these groups to Britain, as large numbers of migrants from the Caribbean and India arrived in the early 1950s and 1960s, and migrants from Pakistan and Bangladesh came in the early 1960s and 1970s (see also Section 1.5) (Haug et al., 2002; Nazroo, 2006). Migrants from such groups have now reached retirement age, as people across the world are living longer (Nazroo, 2006; Tomassini, 2005).

4.2.2 Age structure and sample size of ethnic minorities

It has been noted that the demographic structure of ethnic minority groups in Britain mirrors past migration patterns (Grewal et al., 2004; Haug et al., 2002; Tomassini, 2005; Nazroo, 2006) and fertility patterns (Evandrou, 2000b). As a result, there is a wide variation in the age structure of the ethnic minority population in the United Kingdom (Grewal et al., 2004; Warnes et al., 2004). Hence, this section discusses the age structure of ethnic minority groups and the percentages are presented in Table 4.3.

Table 4.3: Age structure and sample sizes of ethnic minorities (%), 2004 HSE

	50-54	55-59	60-64	65-69	70+	Total (%)
White (N)	17.6 (454)	18.4 (526)	16.6 (500)	12.6 (392)	34.7 (1,059)	**100 (2,931)**
Ethnic Minority groups (N)						
Black Caribbean	20.8 (77)	7.7 (46)	25.2 (75)	20.3 (88)	26.0 (112)	**100 (398)**
Black African	34.2 (47)	25.3 (35)	29.7 (27)	7.5 (18)	3.0 (14)	**100 (141)**
Indian	36.3 (134)	10.3 (57)	20.7 (78)	17.8 (63)	15.5 (66)	**100 (398)**
Pakistani	27.1 (59)	7.7 (23)	25.1 (44)	22.6 (40)	17.4 (33)	**100 (199)**
Bangladeshi	43.9 (41)	6.5 (18)	17.9 (29)	23.6 (31)	8.1 (23)	**100 (142)**
Chinese	22.1 (60)	27.0 (42)	17.2 (23)	24.6 (23)	9.0 (25)	**100 (173)**
Irish	23.2 (137)	20.2 (127)	18.2 (114)	11.9 (98)	26.5 (197)	**100 (673)**
Other groups	40.0 (10)	16.0 (5)	18.1 (6)	† (2)	20.7 (8)	**100 (31)**
TOTAL	**(1,019)**	**(879)**	**(896)**	**(755)**	**(1,537)**	**100 (5,086)**

X^2 **= 1212.259 (df 32, p< 0.001)**
(N) = sample numbers in brackets are unweighted
All calculations use sampling weight for the multistage sampling design
† Cell contain less than 5 counts
Source: Author's analysis, 2004 HSE

Table 4.3 shows that the age structure of ethnic minority groups is different from the White population. For example, amongst Bangladeshis, 43.9% are aged 50-54yrs and 8.1 % are aged 70 years and over; compared with 17.6% and 34.7% respectively amongst Whites. Among all ethnic minorities, people aged 50-54 represent the highest proportion among the Indian population (36%) and the lowest in the Black Caribbean population (21%). These findings are consistent with previous studies which observed that the non-White ethnic minority groups tend to reflect a younger age structure compared to the White population (2001 Census; Cooper et al., 2000; Nazroo, 2001; Nazroo et al., 2007; Tomassini, 2005). One explanation of the difference in the age structure of ethnic minority groups relates to differentiated migration patterns of different ethnic minority groups (Dustmann and Theodoropoulos, 2006; Warnes and Williams, 2006). This differentiation could be increasingly important in terms of the design of health care services for an increasing number of ethnic elders (see also Chapter 8).

4.2.3 Sex structure of population by ethnicity

Similar to the age structure, the sex structure of the ethnic minority population also reflects past patterns of mortality, fertility and migration (Blakemore, 1999; Evandrou, 2000b; Nazroo, 2006; Tomassini, 2005). When men and women of ethnic minority groups who are 50 years and over are compared with the equivalent groups in the total population, certain significant differences become immediately apparent as illustrated in Table 4.4.

Table 4.4: Sex structure of the population by ethnicity (%), 2004 HSE

	Total Population		Population 50+	
	Men (N)	Women (N)	Men (N)	Women (N)
White	72.2 (3,165)	73.9 (3,920)	82.8 (1,260)	83.3 (1,671)
Black Caribbean	2.9 (744)	3.2 (968)	2.2 (165)	2.2 (233)
Black African	2.5 (696)	2.4 (794)	1.0 (71)	0.7 (70)
Indian	4.1 (874)	4.3 (925)	2.7 (195)	2.4 (203)
Pakistani	2.5 (792)	2.6 (853)	1.0 (103)	0.6 (96)
Bangladeshi	1.1 (721)	1.2 (780)	0.3 (65)	0.3 (77)
Chinese	0.6 (479)	0.6 (498)	0.2 (87)	0.3 (86)
Irish	9.3 (940)	10.3 (1,173)	8.7 (297)	9.1 (376)
Other groups	1.7 (67)	1.6 (79)	1.0 (12)	1.0 (12)
Total	**100 (8,478)**	**100 (9,990)**	**100 (2,255)**	**100 (2,831)**

X^2 **= 41.83** (**df 8, p <0.001**)
(N) = Sample numbers in brackets are unweighted
All calculations use sampling weight for the multistage sampling design.
Source: Author's analysis, 2004 HSE

Table 4.4 confirms previous research findings (ONS, 2005), namely that women tend to outnumber men in both the total population and those aged 50 years and over, however there as some exceptions. For example, in the total population, the proportion of women outnumbers that of men in all ethnic groups except among Black Caribbeans and Other groups. By contrast, among the population aged 50 and over, the proportion of women tends to be equal or lower than that of men for all groups except for the White, Chinese and Irish groups. Such differences in the population structure for males and females could have implications for the design of health care policy (see also Chapter 8). These findings support the findings by Arber and Cooper (1999) that women in the UK have a longer life expectancy than men and therefore the ratio of women to men increases at higher ages.

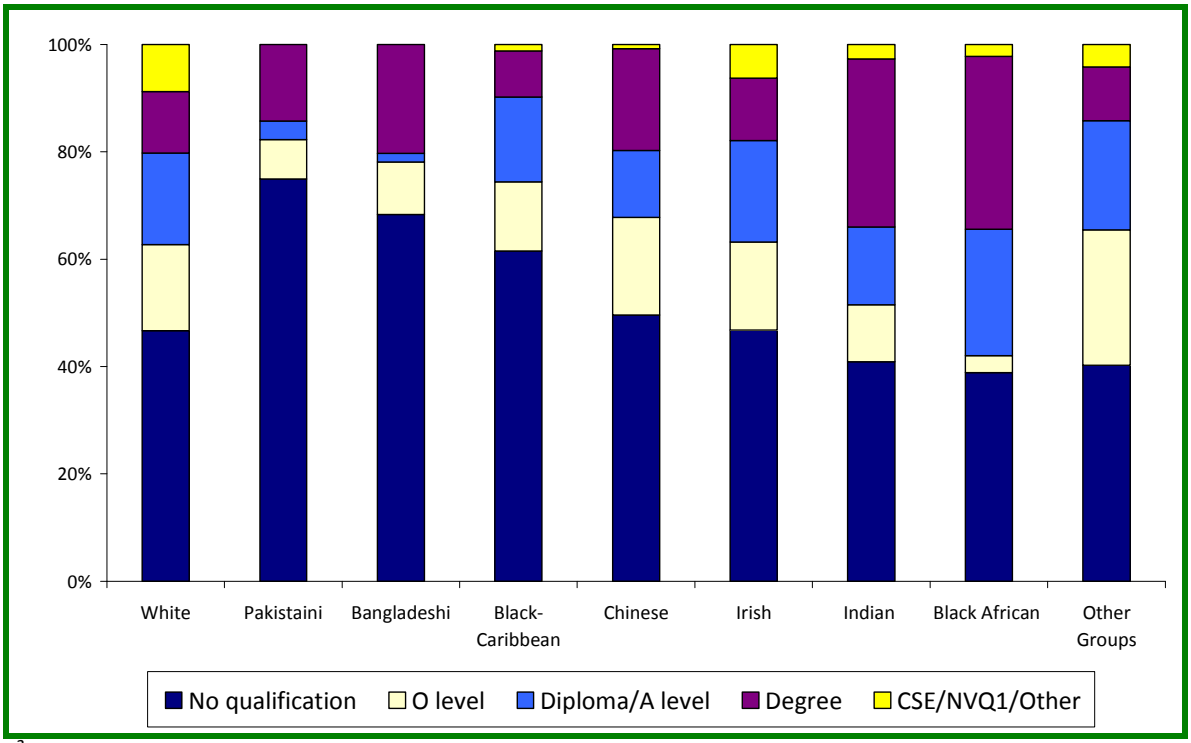
4.2.4 Socio-economic inequalities and ethnicity at older ages

Socio-economic status is a multidimensional concept and is measured in a number of ways, for example, employing education, occupation and income, but also include other measures such as housing tenure and car availability (Chandola, 2001; Galobardes et al., 2006; Lorant and Bhopal, 2011; Platt, 2007). Ethnic minority groups, in general, have a lower SES and different types of socioeconomic determinants may be relevant to ethnic minority groups as compared with the majority White population. For example, it has been argued that ethnic minorities may be particularly affected by the lack of employment, which can in turn affect an individual's income, housing tenure or health status (Chandola et al., 2003; Davey Smith, 2000; Evandrou, 2000b; Nazroo, 2004). This section will discuss the SES measures of education, NS-SEC occupation, household income, housing tenure and car availability, in relation to ethnic minority older people.

Evidence has shown that poorer SES leads to poorer health, and part of the explanation for ethnic differences in health outcomes is reflected in differences in such measures as education, occupation and income (Galobardes et al., 2007; Lynch and Kaplan, 2000). Education is one of the most widely used measures of SES and is generally perceived as one of the most significant SES determinants of morbidity (Bowling, 2004; Galobardes et al., 2007; Grundy and Holt, 2001). For example, educational qualifications vary across older age groups and ethnic minority groups (Bowling, 2004; Cooper et al., 2000; Grundy and Holt, 2001). Figure 4.2 shows different levels of educational attainment among ethnic minority groups, highlighting the heterogeneity of this part of the population. For example, Pakistanis (75%), Bangladeshis (68.3%), Black Caribbeans (62%), Chinese (50%) and Indians (41 %) had the highest rates of no qualifications, and Black Africans (32.2%) and Indians (31.3%) were more likely to have a degree than Whites (11.4%) (see also Table A.4). These findings are consistent with previous studies (Cooper et al., 2000; Farmer and Ferraro, 2005; Nazroo, 2001; ONS 2005).

It has been argued that educational attainment among different groups in the population plays an important role in determining potential earnings, life chances and health outcomes (Bowling, 2004; Galobardes et al., 2007; Grundy & Sloggett, 2003; Lynch and Kaplan, 2000). For example, the higher the level of qualification achieved, the greater the chances of an individual success for future employment and earning an adequate income (Galobardes et al., 2007). As indicated in Figure 4.2, some ethnic groups show lower educational qualifications than others.

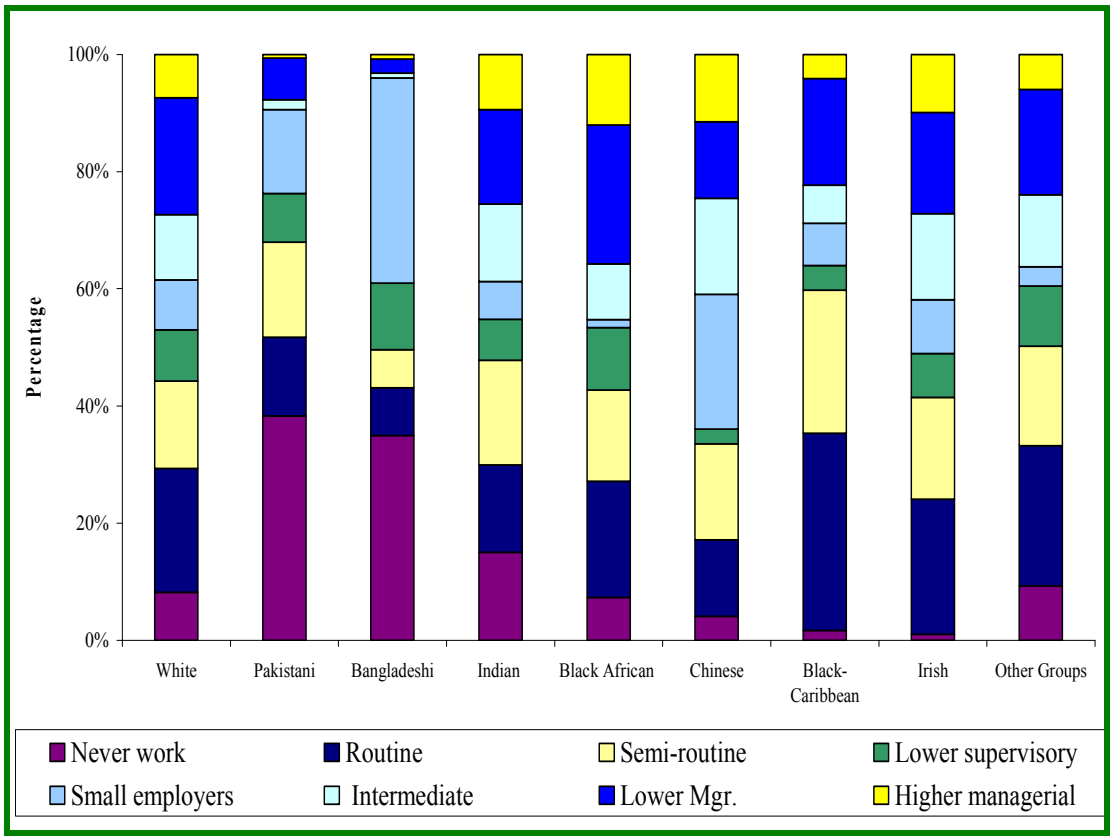
Figure 4.2: Highest educational qualification of persons aged 50 years and over by ethnicity (%)



X^2 =**1010.172** (**df 32, p <0.001**)
All calculations use sampling weight for the multistage sampling design
Source: Author's analysis, 2004 HSE

There also appear to be links between education and the NS-SEC social class, and these reflect marked inequalities amongst ethnic minority groups in the 2004 HSE (see Table A.2 for a description of NS-SEC classifications). Figure 4.3 suggests that social class disadvantage varies between older people from different ethnic groups, and that it is more prevalent among ethnic minorities than among the White population. For example, Black Caribbeans were more likely to be in routine (34%) and semi-routine (24.4%) occupations, whereas Pakistanis (38.3%) were more likely to have never worked (see also Table A.5).

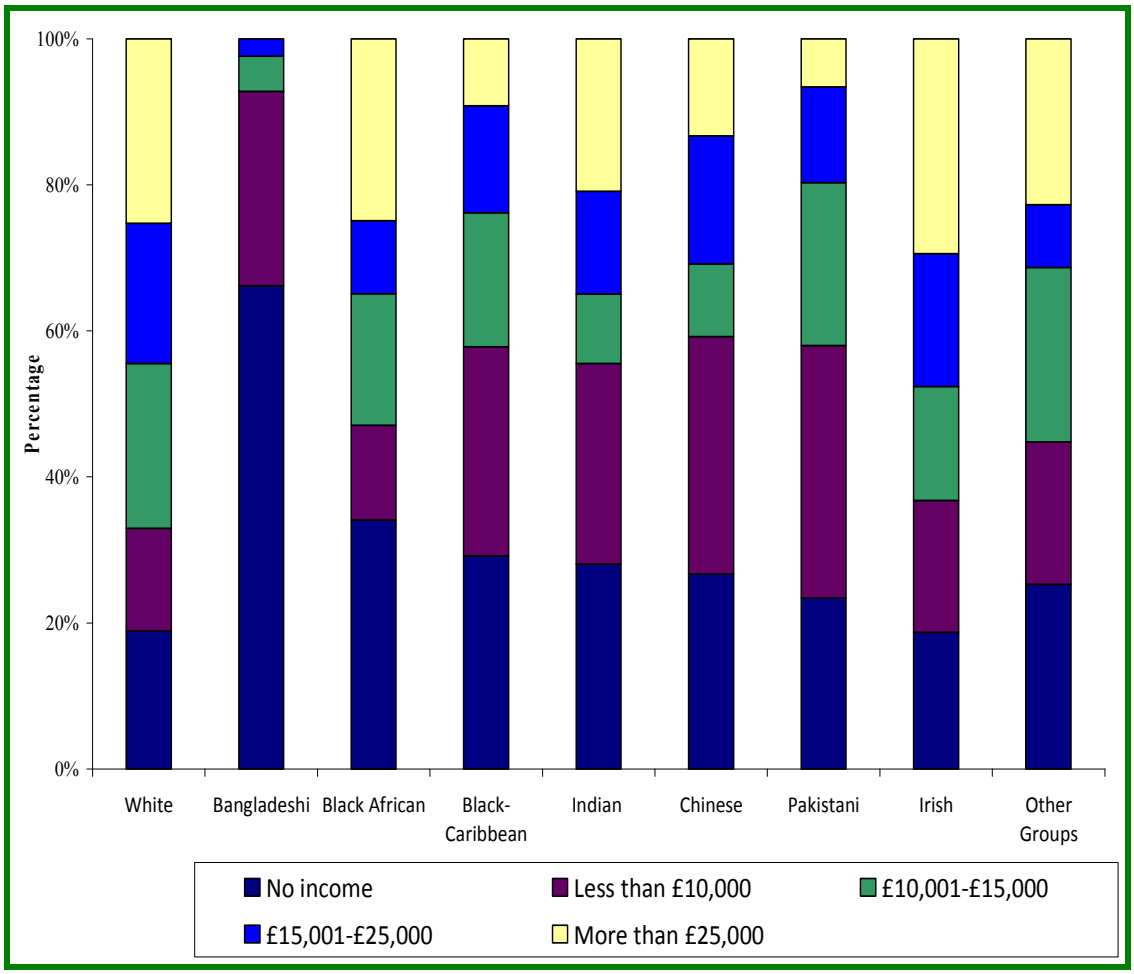
Figure 4.3: NS-SEC occupational class of persons aged 50 years and over by ethnicity (%)



X^2 =**3478.521** (**df 56, p <0.001**)
All calculations use sampling weight for the multistage sampling design
Source: Author's analysis, 2004 HSE

An additional indicator of socio-economic status is the income of the household in which individuals live (Nazroo, 2004; Platt, 2005a; Platt, 2007). The data on equivalised household income show that the Bangladeshi (66.1%) and Black African (34.1%) groups are more likely to live in a household which has no income than the White (18.9%) and Irish (18.7%) groups (see Figure 4.4 and Table A.7). Studies in the UK have shown that housing tenure and car availability can serve as important mitigators of low SES, particularly amongst the older population (Grundy and Holt, 2001; Macintyre et al., 1998; Macintyre et al., 2000; ONS, 2010). Significant ethnic differences have been found in housing arrangements, reflected in living in overcrowded accommodation (Evandrou, 2000a). The ONS (2005) found that the majority (57%) of older people are owner-occupiers, and home ownership is often regarded as an indicator of wealth (Macintyre et al., 1998). For example, in this analysis, high proportions of ethnic minorities aged 50 and over are owners-occupiers compared to the Whites, with the exception of Bangladeshi (19.4%) and Black African (12.5%) older people (see Figure 4.5).

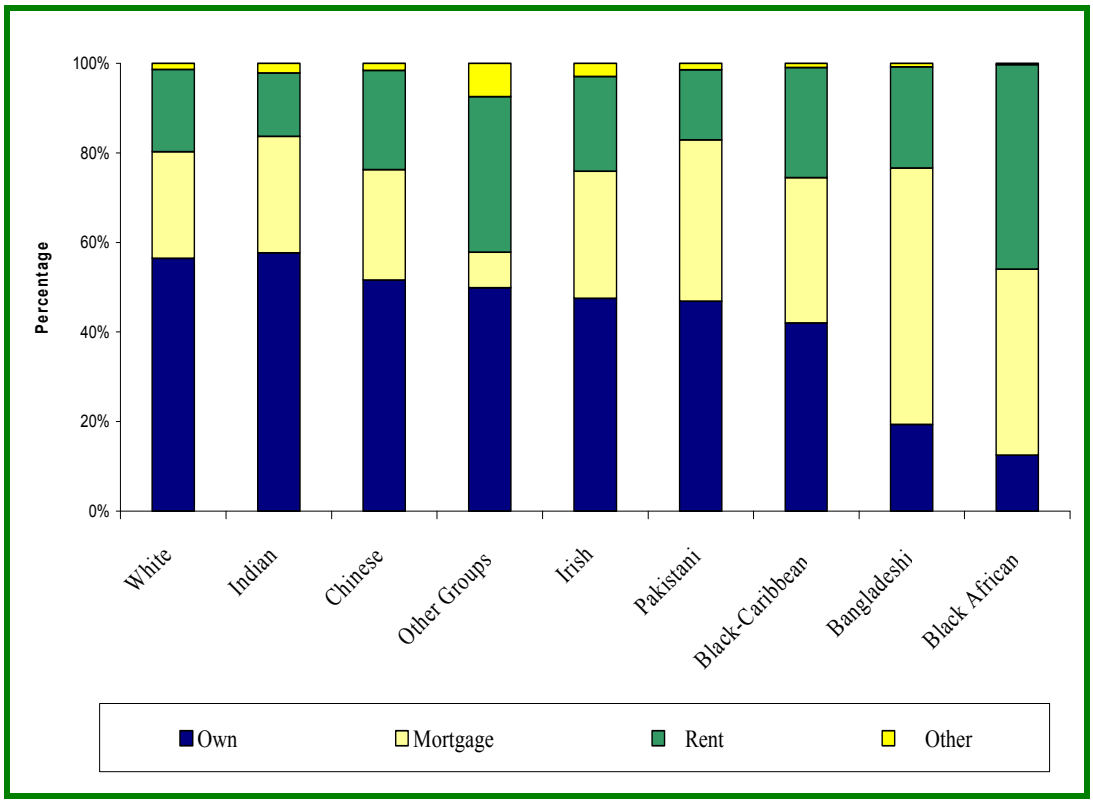
Figure 4.4: Equivalised household income of persons aged 50 years and over by ethnicity (%)



X^2 =**1161.111** (**df 32, p <0.001**)
All calculations use sampling weight for the multistage sampling design
Source: Author's analysis, 2004 HSE

The majority of Indians (57.6%) are owner-occupiers followed by the Chinese (52%), Pakistanis (47%) and Black Caribbeans (42%). Also, 57% of Bangladeshis have own a mortgage followed by 36% of Pakistanis and 33% of Black Caribbeans whereas only 24% of Whites have a mortgage. Amongst those in rented accommodation, Black Africans (46%) represent the highest proportion and the lowest in among the Indian population (14%) compared to 18% of Whites (Figure 4.5).

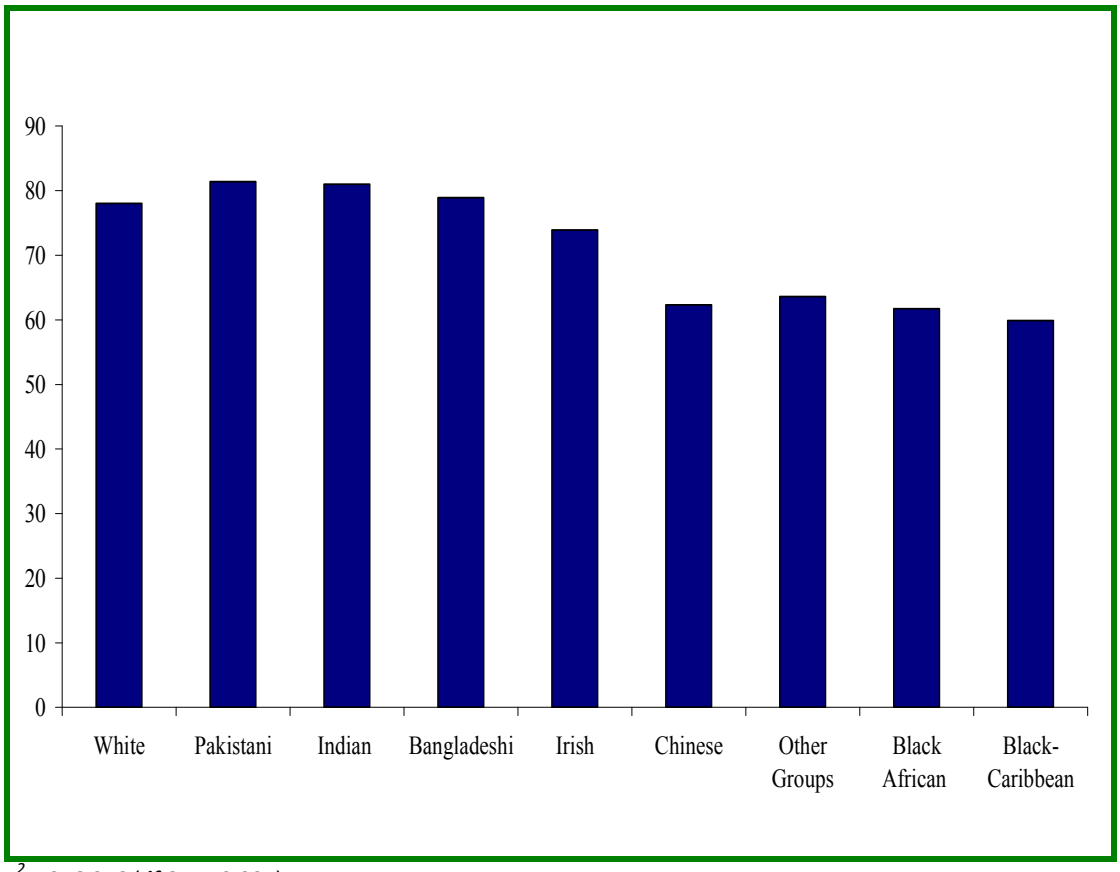
Figure 4.5: Housing tenure of persons aged 50 years and over by ethnicity, (%)



X^2 = **860.63** (**df 24, p <0.001**)
All calculations use sampling weight for the multistage sampling design
Source: Author's analysis, 2004 HSE

Similar to housing tenure, car availability is increasingly used in studies as an alternative measure of SES, which contributes to the material aspects of one's life, especially amongst older people (Bowling, 2004; Grundy and Holt, 2001; Macintyre et al., 1998). The findings in this study show that Indians and Pakistanis (81%) are the most likely to have car availability, whereas Black Caribbeans (60%) are the least likely to have car availability (see Figure 4.6 and Table A.9). Figure 4.6 also shows that a lower proportion of the White groups (White 78%; Irish 74%) have car availability compared with the Asian ethnic minority groups.

Figure 4.6: Car availability of persons aged 50 years and over by ethnicity (%)



X^2 = **316.046** (**df 8, p <0.001**)
All calculations use sampling weight for the multistage sampling design
Source: Author's analysis, 2004 HSE

4.2.5 Summary

The analysis on the demographic characteristics of ethnic elders from the 1991 and 2001 Censuses and the 2004 HSE shows that there are significant differences in the demographic meake-up of ethnic minority groups. Importantly, the findings indicated that even though ethnic minority groups account for a small proportion of the UK population (7.9%), while the majority of the population (92.1%) is White, the ethnic minority population is rapidly growing. There are several other significant trends that emerge from the bivariate results in examining the demographic characteristics of ethnic elders, which relate to the population size and age structure of different ethnic minority groups. For example, the Bangladeshi and Indian groups have the youngest age structure, and of the ethnic elders amongst the non-White groups, the Black Caribbeans have the oldest age structure.

In addition, there are significant differences between ethnic minority group's socio-economic characteristics such as education, occupational status, household income and housing tenure. It has been argued that a possible explanation for the higher prevalence of SES disadvantage among ethnic minorities may be due to fewer years of schooling and lower educational qualifications (Blackaby et al., 2000), however this argument has been refuted by a part of the literature (Davey Smith et al.,

2000; Platt, 2005; Platt, 2007a). Furthermore, the analysis in this thesis shows that the White groups tend to have lower educational qualifications than Black African, Indian, Bangladeshi, Chinese and Pakistani respondents, and that a higher proportion of the White population have no qualifications compared with the Black African and Indian groups (see Figure 4.2). However, in terms of NS-SEC occupational classifications and income, the analysis shows that ethnic minorities are more likely to be in semi-routine and routine employment (Figure 4.3), which can affect their chances of achieving an adequate income (Figure 4.4).

The findings based on these measures of SES (education, occupation, income) indicate that differences exist amongst ethnic minority groups aged 50 and over regardless of their educational qualifications. One school of thought in explaining these differences is the diminishing returns hypothesis, which argues that ethnic minorities do not benefit to the same extent as Whites from higher SES achievements such as educational qualifications and household income levels (Farmer and Ferraro, 2005). In addition, it has been argued that education, occupation and household income alone may not be sensitive enough measures of the SES for ethnic elders (Bowling, 2004; Grundy & Holt, 2001Macintyre et al., 1998). For example, as evident from the bivariate analysis of this thesis, even though ethnic minorities have higher levels of educational qualifications, ethnic minority group members are more likely to be found in semi-routine and routine jobs (Figure 4.3). Housing tenure and car availability appears to be significant mitigators of the SES of ethnic minority groups, and ethnic minorities aged 50 and over were more likely to be owner-occupiers and to have car availability than the majority White population. Such findings are important departure points for the analysis which follows in this thesis (see Chapters 5 and 6). Hence, the first part of the analysis combines the demographic and SES characteristics of ethnic minority groups of older people in order to explore health inequalities experienced between different groups. The following chapters explore the 'sensitivity' of different measures of SES in measuring the health outcomes among ethnic minority groups of older people.

Chapter 5

5 Results: Differences in health amongst older people

"While ageing is not in itself a disease, it tends to increase susceptibility to disease. The diseases of later life are the subjects of geriatrics, or the medical speciality of old age". (Maggie Kuhn, 1905-1995)

5.1 Introduction

The reporting of both self-assessed general health and limiting long-standing illness has been found to be useful indicators of measuring individual and population health (Chandola, 2001; Chandola & Jenkinson, 2000; Manor et al., 2001), and the literature indicates a link between health inequalities and different measures of socio-economic status (SES), with socially and economically disadvantaged groups reporting poorer health outcomes (Evandrou, 2000; Chondola, 2001; Kelaher et al., 2008; Nazroo, 2006). It has been noted, however, that the extent to which low SES may impact upon health at older ages is uncertain, and this may vary across the different ethnic groups (Nazroo, 2006). Furthermore, the complex interrelationships between health status and different SES measures have been a major concern for both health researchers and policy makers (Achenson, 1998; Davey Smith et al., 2000; Bowling, 2004; Ebrahim et al., 2004; Oakes and Rossi, 2003; Lynch and Kaplan, 2000). This is particularly the case since there is evidence of marked inequalities amongst ethnic minorities compared to their White counterparts (Chandola, 2001; Cooper, et al., 2000; Evandrou, 2005; Nazroo, 2006).

This chapter seeks to fill the gap in the research by investigating *the* ***association between health and ethnicity in later life*** **and by examining** ***how SES can be measured in later life*****?** Also, the research will investigate to ***what extent do differentials in demographic characteristics, health risk behaviours and SES explain the relationship between health and ethnicity in later life*** *and the* final research question will examine ***if the relationship between ethnicity and health change when alternative measures of SES (e.g. housing tenure and car availability) are used.*** The analysis focuses on examining the proportions of persons aged 50 years and over reporting self-assessed general health status and limiting long-standing illness in relation to each of the SES measures and risk factor variables.

5.2 Self-assessed general health

The reporting of self-assessed general health status has been used widely in previous studies for assessing health amongst different groups in the population (Chondola and Jenkinson, 2000; Erens et al., 2001; Evandrou, 2000a; Nazroo, 2001). The literature indicated that self-assessed general health

as an indicator shows that individuals with 'bad/very bad' health tend to have higher mortality and poorer physical functioning, compared to individuals rating their health as excellent or good (Davey Smith et al., 2000; Manor et al., 2001). Self-assessed general health represents an individual's perception of a range of different aspects of their health, and unlike other indicators based on the presence or absence of disease (Kaplan and Baron-Epel, 2003). In this Section, bivariate analysis is carried out to examine ethnic differences in health, based on self-assessed general health, as discussed in Section 3.6.1.

5.2.1 Self-assessed general health and age

Table 5.1 shows that the proportion of older people reporting 'bad/very bad' general health increased with age: for example, amongst those aged 50-54 years 8% reported 'bad/ very bad' health, compared to 14% amongst those aged 70 and over. Similarly, the proportion reporting 'very good' health appeared to decrease with age: for example, 32% of 50-54 year-olds compared to 17% of those aged 70 and over. The findings are consistent with previous studies (Breeze et al., 2004; Chandola et al., 2007; Cooper et al., 2000; Nazroo and Williams, 2005). Finally, across all age groups, the majority of people described their general health as 'good' or 'fair' (between 60%-69%).

Table 5.1: Self-assessed general health of persons aged 50 years and over (%)

Age Groups	Self-assessed general health			
	Very good	**Good/fair**	**Bad/very bad**	**TOTAL**
50-54	32.3 (279)	59.6 (618)	8.1 (120)	**100** (1,017)
55-59	32.0 (250)	58.6 (525)	9.4 (103)	**100** (878)
60-64	26.2 (204)	61.7 (545)	12.1 (147)	**100** (896)
65-69	24.1 (150)	63.9 (476)	12.0 (128)	**100** (754)
70+	17.4 (240)	68.6 (1,031)	14.0 (266)	**100** (1,537)
Total	**22.1** (1,123)	**62.9** (3,195)	**15.0** (764)	**100 (**5,082)

X^2 = **942.996** (**df 8, p <0.001**)
(N) = Sample numbers in brackets are unweighted
Source: Author's analysis, 2004 HSE

5.2.2 Self-assessed general health and sex

Previous research has found that women tend to experience poorer health than men after controlling for SES measures such as educational and employment status, reflecting a pattern of gender differences in health at the biverate and multivariate levels. For example, employment status (e.g. paid and domestic work) can have a different effect on men and women and as a consequence,

its impact on health may differ (Arber, 1997; Arber and Curtis, 1999; Cooper, 2002). In the analysis of this thesis, 26% of men reported their health as 'very good', 62% as 'good/fair' and 12% as 'bad/very bad'. However, there was not a significant difference between men and women's reporting, as 24% of women rated their general health as 'good', 64% as 'good/fair' and 11% as 'bad/very bad', as shown in Table 5.2.

Table 5.2: Self-assessed general health of persons aged 50 years and over, by sex (%)

Sex	Self-assessed general health			
	Very Good	**Good/fair**	**Bad/very bad**	**Total**
Men	26.4 (526)	62.1 (1,378)	11.5 (349)	**100** (2,253)
Women	24.3 (597)	64.3 (1,817)	11.4 (415)	**100** (2,829)
Total	**25.3** (1,123)	**63.3** (3,195)	**11.4** (764)	**100** (5,082)

X^2 = **26.739** (**df 2, p <0.001**)
(N) = Sample numbers in brackets are unweighted
Source: Author's analysis, 2004 HSE

5.2.3 Self-assessed general health and marital status

Studies on marital status and health show that married couples enjoy better health and have increased longevity compared to single persons (Goldman et al., 1995; Walker and Luszcz, 2009). Table 5.3 shows the percentage of persons aged 50 years and over reporting self-assessed general health for those who are married, single, divorced and widowed.

Table 5.3: Self-assessed general health of persons aged 50 years and over, by marital status (%)

Marital status	Self-assessed general health			
	Very good	**Good/fair**	**Bad/very bad**	**TOTAL**
Married	27.2 (783)	62.6 (2,065)	10.2 (445)	**100** (3,293)
Single	25.9 (78)	62.6 (179)	11.6 (47)	**100** (304)
Divorced	24.6 (118)	60.9 (342)	14.6 (111)	**100** (571)
Widowed	17.9 (143)	67.6 (609)	14.4 (161)	**100** (913)
Total	**25.3** (1,122)	**63.3** (3,195)	**11.4** (764)	**100 (**5,081)

X^2 = **361.167** (**df 6, p <0.001**)
(N) = Sample numbers in brackets are unweighted
Source: Author's analysis, 2004 HSE

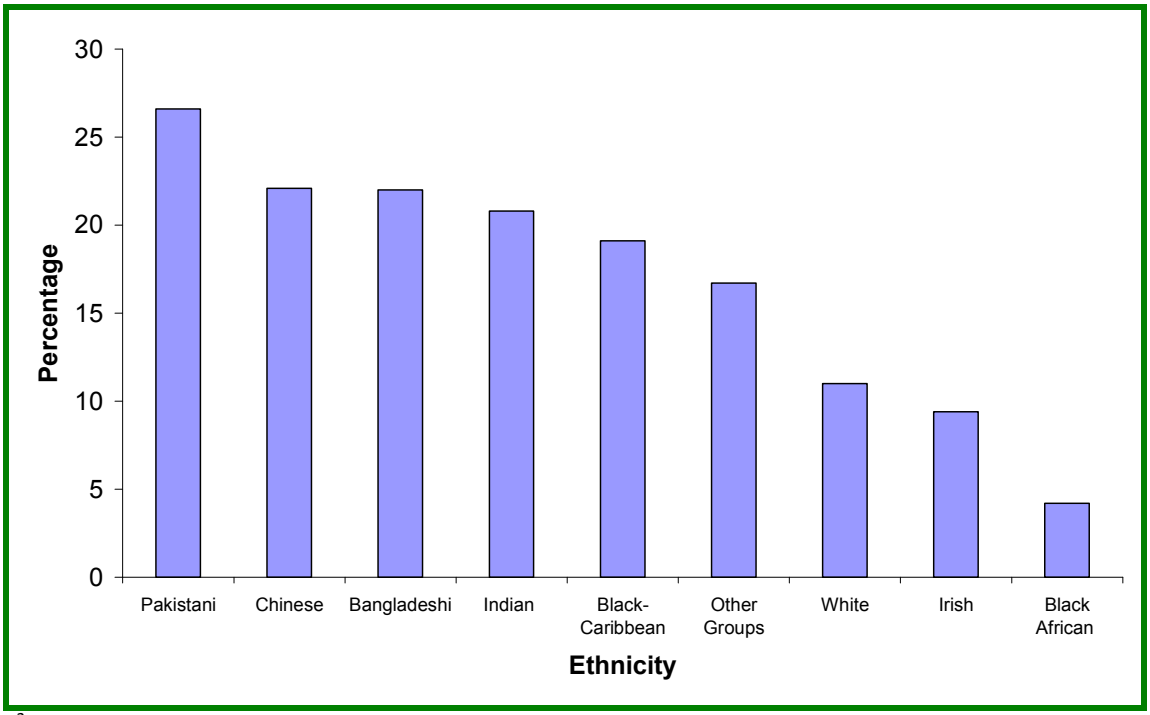
The results show that amongst respondents who are divorced, 15% reported 'bad/very bad' health and amongst those who are widowed 14% reported 'bad/very bad' health respectively, compared to 10% amongst respondents who are married. Very good health is associated with being married, For example, 27% of respondents who are married compared to 18% of respondents who are widowed reported 'very good' health. As this and other studies show, married people are the least likely to report bad/very bad health (Arber et al., 1993; Curtis et al., 2004; Walker and Luszcz, 2009). However, when age is taken into account, different patterns emerge (Table A.14). For example, amongst those aged 50-54 years, 36% of those married reported bad/ very bad health compared to 19%, 14% and 16% of those single, divorced and widowed (respectively). However, amongst those aged 70 and over, similar proportions of those married reported such poor health (15%, 15% and 14% respectively). Caution needs to be taken when analysing these figures as the sub-sample sizes amongst particular age groups, for example those single, are very low. The interrelationship between health, age and marital status in later life is further investigated in the multivariate analysis in the next Chapter.

5.2.4 Self-assessed general health and ethnicity

Similarly to the relationship between self-assessed general health and marital status, a growing body of literature documents significant differences between different ethnic groups in terms of self-assessed general health (Erens, et al., 2001; Evandrou, 2000b, Manor et al., 2000; Nazroo et al., 2007). Bivariate analysis of the 2004 HSE shows that self-assessed general health varies by ethnicity group, which is consistent with previous studies (Chondola, 2001; Kelaher, 2008; Nazroo, 2001). Figure 5.1 shows health differentials amongst ethnic minority groups. For example, 27% of Pakistanis,

22% of Chinese, 22% of Bangladeshis, 21% of Indians and 19% of Black Caribbeans assessed their health as 'bad/very bad'.

Figure 5.1: **Self-assessed 'bad or very bad' general health of persons aged 50 and over, by ethnicity (%)**



X^2 = **565.236** (**df 16, p <0.001**)
All calculations use sampling weight for the multistage sampling design
Source: Author's analysis, 2004 HSE

Overall, ethnic elders were more likely than their White counterparts to report 'bad/very bad' health especially those from South Asian ethnic minority groups (See Figure 5.1and Table A.10). The bivariate results indicate that older people from ethnic minority groups are more likely to describe their health as 'bad/very bad' and is consistent with previous studies from Britain, the US and Sweden (Acheson, 1998; Erens, et al., 2001; Salway et al., 2007; Sundquist, 1995; Nazroo et al., 2007). It has been theorised that the way people report their health depends on whether they perceive their health as a 'private' or 'public' issue (Curtis and Lawson, 2000). According to the public perspective hypothesis, public perceptions of their own health are masked explanation of their understanding of poor health, which may be a culturally acceptable way of talking about health in a given culture (Curtis and Lawson, 2000).

In the next Section 5.3, the bivariate results of the second outcome variable, the reporting of a limiting long-standing illness and the explanatory variables are presented.

5.3 Self-reported limiting long-standing illness (LLSI)

Similarly to the debate on the relationship between self-assessed general health and ethnic origin, several studies have shown consistently higher rates of a report of a limiting long-standing illness (LLSI) amongst UK ethnic minority groups (Chandola and Jenkinson, 2000; Chandola, 2001; Davey Smith et al., 2000; Erens et al., 1999; Nazroo, 2001). In this section, the prevalence of a limiting long-standing illness by age, sex, marital status and ethnicity based on respondents' self-report over the past 12 months is explored (see also Section 3.6.1). The self-reporting of a limiting long-standing illness is measured by the following questions in the HSE: 'Do you have any longstanding illness, disability or infirmity?' 'By long standing, I mean anything that has troubled you over a period of time, or that is likely to affect you over a period of time'. Respondents who answered 'yes' were then asked, 'What is the matter with you?' and 'Does this illness or disability limit your activities in any way?' (see Table A.2). Additionally, limitations may result from health problems as diverse as asthma, diabetes, cancer and depression (Bowling, 2004; Cooper et al., 2000; Manor et al., 2001; Sproston and Mindell, 2006). In this section, bivariate analysis is used to examine ethnic differences in health based on the second outcome measure of health, that is the reporting of a LLSI.

5.3.1 Limiting long-standing illness and age

Table 5.4 shows the proportion of ethnic elders reporting a LLSI, and highlights the differences by age groups. There is an age gradient in the report of a LLSI, for example, amongst those aged 50-54 years 31% reported a LLSI, compared to 50% amongst those aged 70 and over. Conversely, there were no differences in reporting a non-LLSI amongst these same age groups (24%), but amongst those aged 50-54 years 45% reported no LI compared to 26% of those aged 70 and over.

Table 5.4: Percentage of persons aged 50 years and over reporting a LLSI by age group (%)

Age Groups	Report of a limiting long-standing illness			
	LLSI	**Non-LLSI**	**No LI**	**TOTAL**
50-54	31.1 (325)	24.3 (214)	44.6 (479)	**100** (1,018)
55-59	31.3 (285)	26.6 (214)	42.1 (379)	**100** (878)
60-64	37.0 (355)	26.6 (223)	36.4 (318)	**100** (896)
65-69	39.4 (318)	27.2 (187)	33.4 (250)	**100** (755)
70+	49.8 (783)	24.3 (360)	25.8 (394)	**100** (1,537)
Total	**39.3** (2,066)	**25.5** (1,198)	**35.2** (1,820)	**100** (5,084)

X^2 = **1357.342** (**df 8, p <0.001**)
(N) = Sample numbers in brackets are unweighted
Source: Author's analysis, 2004 HSE

5.3.2 Limiting long-standing illness and sex

Bivariate analysis was also conducted separately by sex as previous studies found substantial gender inequalities in health (Curtis and Lawson, 2000; Cooper et al., 2002; Evandrou, 2005; Nazroo, 2001). Existing research shows that women are more likely to report high levels of morbidity than men (Curtis and Lawson, 2000) and to have a greater life expectancy overall (Tomassini, 2005). In this study the findings at the bivariate level were modest between men (38%) and women (41%) reporting a LLSI (Table 5.5). Earlier evidence on gender differences in reporting bad/very bad health suggested that women tend to report poorer health than men (Chandola and Jenkinson, 2000) and these sex differences may increase as people age (Breeze et al., 1999; Curtis et al., 2000). Interestingly, it has been noted that after age 65, women could expect to live for an additional 19 years, with 10 years of this time spent in good health, compared with 16 years and 9 years respectively for men (ONS, 2008).

Table 5.5: Persons aged 50 years and over reporting a LLSI, non-LLSI and no LI by sex, (%)

Sex	Report of limiting long-standing illness			
	LLSI	Non-LLSI	No LI	Total
Men	37.9 (890)	27.0 (550)	35.1 (814)	**100** (2,254)
Women	40.6 (1,176)	24.1 (648)	35.3 (1,006)	**100** (2,830)
Total	**39.3** (2,066)	**25.5** (1,198)	**35.2** (1,820)	**100** (5,084)

X^2 = **53.341 (df 2, p=0.001)**
(N) = Sample numbers in brackets are unweighted
Source: Author's analysis of 2004 HSE

5.3.3 Limiting long-standing illness and marital status

Several studies have documented that people who are married tend to live longer and to enjoy better health than those who are not married (Manzoli et al., 2007; Murphy et al., 1997; Waldron et al., 1997). In examining the report of a LLSI by marital status for persons aged 50 years and older, the findings show that amongst the four distinct groups of married, single, divorced and widowed people, those who were widowed were the most likely to report a LLSI. For example, the report of a LLSI was highest amongst those who were widowed (49%), followed by the divorced (40%) and the

married persons (37%). Single persons were the least likely to report a LLSI (35%). Interestingly, amongst those who were married, there were no differences amongst reporting a LLSI (37%) and no-LI (37%) (Table 5.6). Similarly, amongst those who were married and those who were widowed there were no differences in reporting a non-LLSI (26%) and no-LI (26%), whereas, the lowest percentage of reporting non-LLSI were amongst those who were widowed (25%).

Table 5.6: Persons aged 50 years and over reporting LLSI by marital status, 2004 HSE (%)

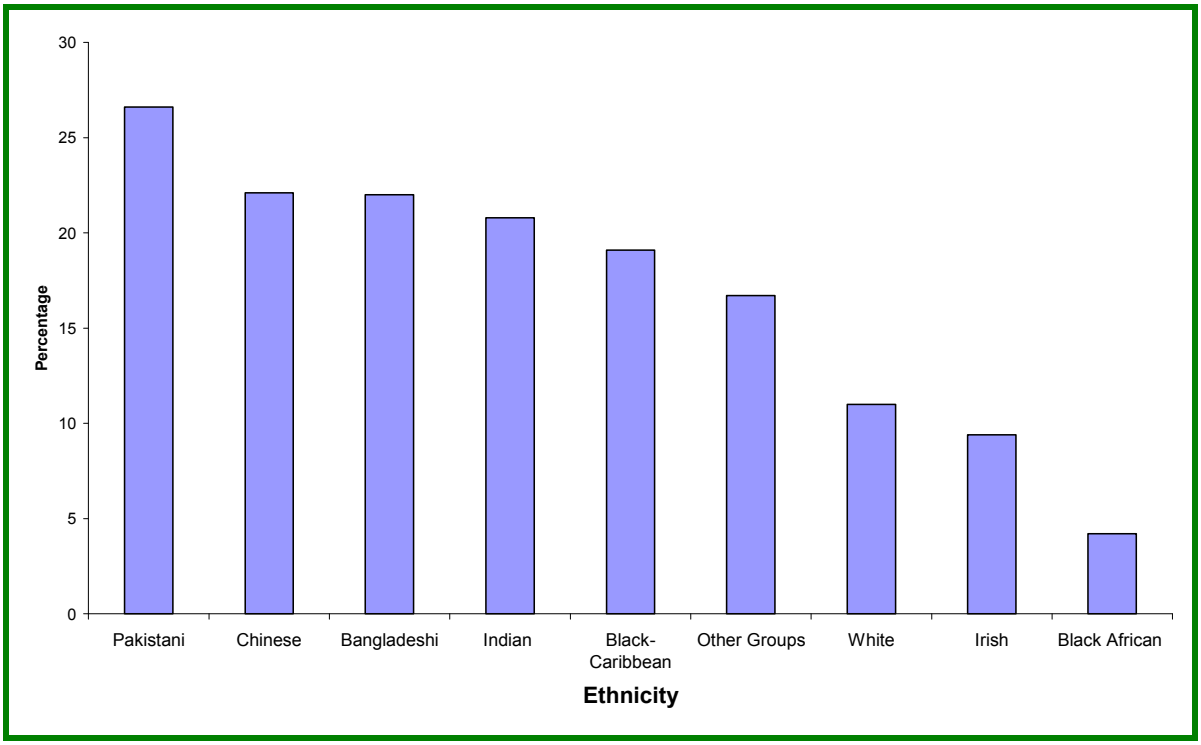
Marital status	Report of a LLSI			
	LLSI	**Non-LLSI**	**No LI**	**TOTAL**
Married	37.1 (1,251)	25.5 (770)	37.4 (1,272)	**100** (3,293)
Single	35.3 (109)	29.0 (86)	35.7 (109)	**100** (304)
Divorced	39.6 (253)	25.2 (125)	35.2 (194)	**100** (572)
Widowed	49.2 (452)	24.5 (217)	26.3 (244)	**100** (913)
Total	**39.3** (2,065)	**25.5** (1,198)	**35.2** (1,819)	**100 (**5,082)

X^2 = 452.954 (**df 6, p <0.001**)
(N) = Sample numbers in brackets are unweighted
Source: Author's analysis, 2004 HSE

5.3.4 Limiting long-standing illness and ethnicity

It has been noted that ethnic minority groups are at a higher risk than their White counterparts by most measures of morbidity (Cooper et al., 2000; Natarajan, 2006; Salway et al., 2007). At the same time, there exist important differences between ethnic minority groups in terms of reporting a LLSI (Chandola 2001; Erens et al., 2001; Evandrou, 2005; Harding and Maxwell, 1997; Nazroo, 2006). Likewise, in this study, differences in the reporting of a LLSI were observed amongst older ethnic minority groups (Figure 5.2 and Table A.11).

Figure 5.2: Percentage reporting a LLSI by ethnicity among people aged 50 and over (%)



X^2 **=226.758 (df 16, p< 0.001)**
All calculations use sampling weight for the multistage sampling design
Source: Author's analysis, 2004 HSE

For example, the highest rates of a report of a LLSI were observed among Pakistani people (57%), followed by the Black Caribbean (46%), Indian (44%) and Bangladeshi (40%) people, and the lowest rates are observed among Black Africans (19%). The Chinese (36%) and the Irish (35%) were less likely to report a LLSI than the White (40%) population.

Previous studies have shown similar health patterns among these ethnic groups (Erens et al., 2001; Natarajan, 2006; Nazroo and Williams, 2005), using different data sets. For example, employing data from the Fourth National Survey of Ethnic Minorities (1993-1994), Chandola (2001) found that out of all the South Asian ethnic sub-groups in Britain, the Pakistani and Bangladeshi groups were the most likely to report a LLSI. There are several different theories that posit an explanation of the inequalities in reporting a LLSI, mainly poor acculturation, discrimination and SES (Karlson and Nazroo, 2000b; Salway et al., 2007).

In summary, at the bivariate level ethnic inequalities in reporting a LLSI are complex and multifaceted. For example, respondents in the older age groups were more likely to report a LLSI and there were negligible gender differences, as women were slightly more likely to report a LLSI

compared to their male counterparts. Marital status was also an important indicator and those who are divorced were more likely to report a LLSI than other marital status groups, and similarly, Pakistani ethnic elders were more likely to report a LLSI than any other ethnic minority group, with Chinese and Irish being the least likely to report a LLSI. Section 5.4 discusses ethnic minority differences in health by measures of SES.

5.4 Differences in health by socio-economic status characteristics

As indicated in Sections 5.2 and 5.3, there are distinct patterns amongst ethnic elders in terms of their demographic characteristics and health, and as people grow older, their health tends to deteriorate. In Britain, a number of SES measures have been used to measure health, and these are described in greater detail in Section 3.6.2. Many analyses on morbidity in the UK used the previous RGSC and found consistent health inequalities among the lower social classes (Acheson, 1998; Craig and Forbes, 2005; Davey Smith, 2000). Similarly, the new NS-SEC occupational classification, as a measure of socio-economic status, has also been used to examine health inequalities, showing consistent patterns of increasing morbidity amongst the more disadvantaged and lower social classes (Chandola, 2000; Erens et al., 2001; Karlsen and Nazroo, 2002; Drever et al., 2004; Sproston and Mindell, 2006). The evidence also suggests that ethnic minorities from lower occupational social classes are more disadvantaged in terms of their health status (Chandola, 2001; Sproston and Mindell, 2006; Whitehead et al., 2005). Socio-economic status, defined by education, household income and social class differences in material resources, lifestyle and behavioural factors, has been identified as a major cause of health inequalities (Achenson, 1998; Barker, 1991; Jarvis and Wardle, 2006; Kenway and Palmer, 2007).

5.4.1 Self-assessed general health and socio-economic status amongst older people

In Section 2.2, a number of explanations were discussed for the way in which SES is measured, and previous studies identified a person's educational level, social class and equivalised household income as key measures of SES (Cooper, 2000; Galobardes et al., 2006; Krieger et al., 2005; Lynch & Kaplan, 2000). Additionally, housing tenure and car availability have also been identified as measures of SES (Ellaway and Macintyre, 1998; Grundy and Holt, 2001). Table 5.7 shows the proportion of older people reporting their general health by different measures of SES.

In general, the findings show clear differences between the reporting of health and gradients in the different SES measures analysed (educational level, social class, income, housing tenure and car availability) amongst older people. Looking at educational level, amongst those reporting bad/very bad health, the proportion ranged from 4% amongst those with a Degree to 8% amongst those with O Level education, to 17% amongst those with no qualifications. Conversely, the proportion reporting very good health fell from 39% amongst those with a degree to 17% amongst those without any qualifications (Table 5.7). With regards to occupational social class, the results indicated that amongst older people reporting bad/very bad health, the proportion increased from 5%

amongst Higher Managerial and Professional occupations (e.g. doctors), to 18% amongst Routine occupations (e.g. factory workers), to 24% amongst those who have never worked and the long-term unemployed. A clear gradient is found between social class and the likelihood of reporting very good health (i.e. from 39% for Higher managerial to 10% amongst the never worked). The gradient found between social class and the likelihood of reporting good/fair health was less steep (i.e. from 56% for Higher managerial to 66% amongst the never worked) (Table 5.7).

A clear gradient was also found between equivalised annual household income and the likelihood of reporting bad/very bad health; i.e. 4% amongst those with over £25,000, 16% amongst those with £10,000-£15,000, to 22% amongst those with less than £10,000. Interestingly, this compared to 11% of those who reported no household income with bad/very bad health. With regards to housing tenure, outright owner occupiers (9%) and with a mortgage (7%) were less likely to report bad/very bad health compared to those renting (24%) or those in 'other' renting categories, including living rent free (11%). In addition, older people with access to a car are markedly less likely to report bad/very bad health (9%) compared to those without car availability (20%) (Table 5.7).

Table 5.7: Percentage of persons aged 50 and over reporting self-assessed general health by SES (%)

SES characteristics	Self-assessed general health			
	Very good	**Good/fair**	**Bad/very bad**	**TOTAL**
Educational level* **				
Degree	39.2 (227)	56.7 (369)	4.0 (31)	**100** (627)
Diploma/A level	34.1 (255)	59.5 (474)	6.5 (74)	**100** (803)
O level	30.6 (195)	61.4 (447)	8.0 (76)	**100** (718)
CSE/NVQ1/Other	24.5 (76)	67.9 (226)	7.7 (271)	**100** (329)
No qualification	16.9 (370)	66.2 (1,679)	16.9 (556)	**100** (2,605)
Social class* **				
Higher managerial and professional occupations	39.2 (145)	55.7 (209)	5.3 (23)	**100** (377)
Lower managerial and professional occupations	32.9 (306)	61.5 (596)	5.6 (70)	**100** (972)
Intermediate occupations	29.7 (161)	62.4 (373)	7.8 (278)	**100** (588)
Small employers and own account workers	29.5 (122)	60.0 (287)	10.5 (51)	**100** (460)
Lower supervisory and technical occupations	20.9 (85)	67.1 (273)	12.1 (64)	**100** (422)
Semi-routine occupations	19.3 (158)	65.1 (628)	15.6 (170)	**100** (956)
Routine occupations	15.2 (125)	67.0 (619)	17.8 (206)	**100** (950)
Never work and long-term unemployed	10.4 (21)	66.0 (210)	23.6 (126)	**100** (357)
Equivalised household income * **				
No household income	26.2 (241)	62.7 (722)	11.1 (174)	**100** (1,137)
Less than £10,000	12.5 (96)	65.5 (614)	22.2 (268)	**100** (978)
£10,001-15,000	15.8 (160)	67.7 (707)	16.4 (198)	**100** (1,065)
£.15,001-25,000	27.2 (200)	65.1 (535)	7.7 (78)	**100** (813)
Over £25,000	39.0 (432)	57.4 (612)	3.6 (46)	**100** (1,081)
Housing tenure* **				
Owner occupier	26.7 (628)	64.2 (1,642)	9.1 (295)	**100** (2,565)
Mortgage	30.5 (333)	62.8 (830)	6.7 (125)	**100** (1,288)
Rent	13.8 (142)	61.9 (677)	24.2 (330)	**100** (1,149)
Other	33.5 (20)	55.1 (46)	11.4 (14)	**100** (80)
Car availability* **				
Yes	28.6 (962	62.6 (2,303)	8.8 (399)	**100** (3,664)
No	14.2 (161)	65.6 (892)	20.2 (365)	**100** (1,418)
Total	**25.3** (1,123)	**63.3** (3,195)	**11.4** (764)	**100** (5,082)

Significance levels ***$p < 0.001$**
(N) = Sample numbers in brackets are unweighted
Source: Author's analysis, 2004 HSE

In short, older people who were more disadvantaged in terms of lower or no educational qualifications, with routine or semi-routine occupational backgrounds, or never worked/long-tem

unemployed, with lower household income, renting their accommodation rather than owning, and less likely to have had access to a car, were significantly more likely to report poorer health. This analysis was repeated for men and women (see Table A.18 and Table A.19) in order to examine whether the SES gradients in health remained. The gradients generally remained, although some categories suffered from low cases.

The findings from this study have been found in previous studies. For example, SES disadvantage has been found nested amongst the lower occupational social classes (Craig and Forbes, 2005; Whitehead et al., 2005). Whitehead and colleagues found that regional differences contribute to differences in self-assessed health among the lower occupational social classes, and that the unemployed were more likely to report themselves as permanently sick (Whitehead et al., 2005). Income is a primary resource for access to goods and services, and facilitates an individual's participation in society, and research shows that income is associated with occupational social class (Galobardes et al., 2007; Rose and O'Reilly, 1998). Studies have suggested that those who have higher qualifications are more likely to have better jobs in terms of a higher earning potential (Grundy and Holt, Knesebeck et al., 2007; Whitehead et al., 2005). In addition, Nazroo (2001) using data from the FNS (1993-1994) found that material factors, such as income, to be a major contributor to differences in health among different ethnic minority groups. Patterns of housing tenure and health outcomes among older people in Britain have also been found by Grundy & Holt (2001). Similarly, car availability has been found to be associated with health status across the general population in the UK (Davey Smith, 2000; Ellaway and Macintyre, 1998; Grundy & Holt, 2001).

Section 5.4.2 discusses the findings from the bivariate analysis of the second outcome measure, which is the reporting of a LLSI, in relation to different measures of SES.

5.4.2 Report of a LLSI and socio-economic status amongst older ethnic minority groups

The previous section examined self-reported general health in later life by different SES measures. The findings were found to be congruent with previous studies, either on older people, ethnic minorities or for the population in general. This section repeats this analysis but for limiting long-standing illness (LLSI), non-limiting long-standing illness and no long-standing illness.

Table 5.8 shows the patterns of the reporting of a LLSI by different SES measures in later life. Taking educational level into account, the reporting of a LLSI was associated with no qualifications but a clear cut gradient was not evident; i.e. ranging from 28% amongst those with Degree, 32%

Diploma/A Level, 34% O Level, 30% for those with CSE/NVQ1/Other, to 47% amongst those with no qualifications. In addition, those with higher educational qualifications were less likely to report having a long standing illness, compared to those with lower or no qualifications. Similar gradients in educational qualifications and LLSI were found by gender (Tables A.20 and A.21). For example, 45% of men with no qualifications reported a LLSI compared to 28% of men with a degree. Similarly, a higher proportion of women without educational qualifications (48%) compared to women with a degree (28%) reported a LLSI.

Marked differences were also found in the reporting of a LLSI by NS-SEC occupational social class in later life. The results indicated that amongst older people reporting a LLSI, the proportion increased from 31% amongst Higher Managerial and Professional occupations (e.g. dentists), to 45% amongst Routine occupations (e.g. refuse collectors), to 55% amongst those who have never worked and the long-term unemployed. However, there were exceptions to the gradient between social class and LLSI, with a higher proportion of older people reporting LLSI from Semi-routine occupations (48%) than those from Routine occupations (45%). In addition, those in higher occupational social classes were less likely to report having a long standing illness, compared to those in higher occupational social classes or never worked/long-term unemployed (Table 5.8). The analysis was repeated by gender and gradients in social class by LLSI were generally found to remain for men and women (Tables A.20 and A.21). For example, 64% of men who never worked/long-term unemployed reported a LLSI compared to 32% of men in Higher managerial/Professional class. Also, 53% of women who never worked and long-term unemployment reported a LLSI compared to 30% of their Higher managerial/Professional counterparts. Economic inactivity has been found in previous studies to be associated with poor health (Drever et al., 2004).

With respect to income, a clear gradient was also found between equivalised annual household income and the likelihood of reporting LLSI: that is, 26% amongst those with over £25,000, 37% amongst those with £15,000-£25,000, 49% amongst those with £10,000-£15,000, to 52% amongst those with less than £10,000. This compared to 38% of those who reported no household income with LLSI. In relation to housing tenure, outright owner occupiers (37%) and with a mortgage (33%) were less likely to report LLSI compared to those renting (56%) or those in 'other' renting categories, including living rent free (34%) (although the cell counts here were low). In addition, older people with access to a car are significantly less likely to report LLSI (35%) compared to those without car availability (53%) (Table 5.8). Similar gradients in income, housing and car availability with LLSI were found by gender (Tables A.20 and A.21).

Table 5.8: Percentage of persons aged 50 and over reporting a LLSI, a non-LLSI or no LI, by SES (%)

SES characteristics	Report of a LLSI			
	Limiting long-standing illness	Non-limiting long-standing	No long-standing illness	TOTAL
Educational level* **				
Degree	28.0 (169)	31.1 (175)	40.9 (283)	**100** (627)
Diploma/A level	32.4 (258)	25.9 (208)	41.7 (337)	**100** (803)
O level	33.5 (255)	29.6 (196)	36.9 (269)	**100** (720)
CSE/NVQ1/Other	30.2 (130)	24.9 (82)	35.8 (117)	**100** (329)
No qualification	46.7 (1,254)	22.6 (537)	30.7 (814)	**100** (2,605)
Social class* **				
Higher managerial and professional occupations	31.2 (110)	28.2 (102)	40.5 (165)	**100** (377)
Lower managerial and professional occupations	32.9 (310)	28.1 (264)	39.0 (397)	**100** (971)
Intermediate occupations	34.6 (204)	27.4 (159)	38.0 (225)	**100** (588)
Small employers and own account workers	38.6 (174)	25.9 (111)	35.5 (176)	**100** (461)
Lower supervisory and technical occupations	38.0 (170)	30.8 (121)	31.2 (131)	**100** (422)
Semi-routine occupations	47.5 (453)	20.5 (184)	32.1 (321)	**100** (958)
Routine occupations	44.6 (445)	23.7 (208)	31.7 (297)	**100** (950)
Never work and long-term unemployed	55.1 (186)	16.2 (46)	28.7 (94)	**100** (326)
Equivalised household income* **				
No equivalised household income	38.1(445)	23.0 (246)	38.9 (445)	**100** (1,136)
Less than £10,000	52.4 (526)	19.3 (176)	28.2 (278)	**100** (980)
£10,001-15,000	49.2 (516)	23.7 (245)	27.1 (304)	**100** (1,065)
£15,001-25,000	36.8 (309)	27.9 (207)	35.3 (297)	**100** (813)
Over £25,000	25.6 (270)	31.0 (322)	43.4 (490)	**100** (1,082)
Housing tenure* **				
Own	36.8 (975)	27.1 (677)	36.1 (912)	**100** (2,564)
Mortgage	32.5 (431)	25.9 (299)	41.6 (559)	**100** (1,289)
Rent	55.8 (634)	20.0 (198)	24.2 (319)	**100** (1,151)
Other	34.0 (26)	29.6 (24)	36.3 (30)	**100** (80)
Car availability* **				
Yes	35.3 (1,317)	26.5 (913)	38.2(1,434)	**100** (3,664)
No	52.9 (749)	22.0 (285)	25.1 (386)	**100** (1,420)
Total	**39.3** (2,066)	**25.5** (1,198)	**35.2** (1,820)	**100** (5,084)

Significance levels ***p **<0.001**
(N) = Sample numbers in brackets are unweighted
Source: Author's analysis, 2004 HSE

In summary, socio-economic status as measured by education, social class, income, housing tenure and car availability were associated with LLSI in later life. In particular, the results have shown that

those with lower SES characteristics, such as having lower or no qualifications, in routine or semi-routine occupational backgrounds, or never worked/long-tem unemployed, with lower household income, renting their accommodation rather than owning, and less likely to have had access to a car, were significantly more likely to report LLSI.

Lindstrom and colleagues (2001) argued that individuals of a lower SES are more likely than those with a higher SES to engage in behaviour which can have a detrimental effect on their health status, such as smoking and alcohol consumption (Adler and Newman, 2002). The next section examines health risk behaviour among older people.

5.5 Behavioural risk factors among older people: smoking status and alcohol consumption

Relatively little attention has been paid to the empirical analysis of behavioural factors, such as smoking status and alcohol consumption, among the UK's older population, and in particular among older ethnic minorities (Bhopal et al., 2004; Harrison et al., 1997; McGrath et al., 2005). Smoking and alcohol consumption are referred to as an 'invisible epidemic' among older people because most studies on smoking and alcohol focus on the younger population (Harman et al., 2006; McGrath et al., 2005; Widlitz, et al., 2002). Previous research shows that smoking patterns among ethnic minority groups in the UK are considerably different from those of the White majority (Erens et al., 1999; Sproston and Mindell, 2006). For example, amongst Asian groups, a higher proportion of Bangladeshi men (40%) reported smoking than among the general population (24%) (Sproston & Mindell, 2006).

This section examines the behavioural risk factors in relation to demographic characteristics, ethnicity and health. The first part of the discussion relates to smoking behaviour, showing the findings from the bivariate analysis. In Table 5.9, smoking status is examined by age, sex, marital status and ethnicity in later life. The results show that the occurrence of cigarette smoking varies considerably amongst the different age groups. Among those aged 50-54 years, 24% are current smokers, 42% of this age group never smoked and 29% were ex-regular smokers. There is little difference between the proportion of current smokers aged 55-59 years and 60-64 years (19.7% and 19.6% respectively). Interestingly, the occurrence of current smokers decreases with age, for example 24% of those 50-54 years, 12% of those 65-69 years, and 10% of those 70 years and older were current smokers (Table 5.9). These findings are consistent with existing studies which argue that the low occurrence of smoking in the oldest age groups is partly due to the increased risk of smokers dying (see Twigg et al., 2004).

In terms of gender differences, the prevalence of current smoking status did not vary significantly according by sex: 16.4% of men aged 50 plus and 16.2% of women 50 pus (Table 5.9). A higher proportion of men (47%) were ex-regularly smokers, compared to women (30%). Furthermore, a higher proportion of women were 'never smokers' (48%) compared to men (32%).

Similar to age and sex, smoking by marital status is also statistically significant ($p<0.001$). The prevalence of smoking varied considerably according to marital status. Among those who were divorced and those who were single, 28% and 19% respectively were current smokers and a similar proportion of those who were married (15%) and widowed (15%) were current smokers. Those who were divorced were most likely to have ever smoked and those single were least likely to have ever smoked (cf 31% of those divorced never smoked compared to 48% of those who are single). Of those who were married, 40% were ex-regular smokers, compared with 37% of those divorced, 35% of those widowed and 28% of those single (Table 5.9). One explanation for these differences is the marriage protection theory (Waldron et al., 1996), which poses that married people may benefit from one or more characteristics of the typical married life such as social integration, greater economic resources and reduction in risk behaviours like smoking and alcohol consumption (Waldron et al., 1996).

Table 5.9: Smoking status amongst persons aged 50 years and over, by demographics characteristics (%)

Demographic characteristics	Smoking status				
	Never smoked	Ex- occasionally	Ex- regularly	Current smoker	TOTAL
Age group ***					
50-54 years	41.5 (516)	5.1 (54)	29.4 (223)	24.0 (222)	**100** (1015)
55-59 years	40.5 (414)	5.1 (48)	34.6 (252)	19.7 (164)	**100** (878)
60-64 years	37.9 (404)	4.3 (37)	38.2 (286)	19.6 (164)	**100** (891)
65-69 years	39.4 (354)	6.6 (44)	41.5 (261)	12.4 (95)	**100** (754)
70+	41.0 (669)	6.3 (91)	43.0 (613)	9.8 (162)	**100** (1,535)
Sex ***					
Men	31.8 (783)	4.6 (115)	47.1(944)	16.4 (403)	**100** (2,245)
Women	47.8 (1,574)	6.4 (159)	29.6 (691)	16.2 (404)	**100** (2,828)
Marital status ***					
Married	39.8 (1,514)	5.8 (184)	39.6 (1,110)	14.8 (477)	**100** (3,285)
Single	47.7 (146)	4.9 (16)	27.9 (76)	19.4 (64)	**100** (302)
Divorced	31.0 (226)	4.1 (27)	36.9 (184)	28.0 (135)	**100** (572)
Widowed	44.6 (471)	5.7 (46)	35.1 (264)	14.7 (131)	**100** (912)
Ethnicity ***					
White	38.5 (1,129)	5.5 (165)	40.0 (1,167)	16.0 (468)	**100** (2,929)
Black Caribbean	59.5 (245)	8.0 (28)	28.5 (83)	4.0 (40)	**100** (396)
Black African	76.5 (104)	8.9 (9)	1.7 (9)	12.8 (16)	**100** (138)
Indian	71.0 (295)	4.0 (12)	9.7 (44)	15.3 (47)	**100** (398)
Pakistani	70.6 (142)	1.4 (7)	20.6 (24)	7.4 (25)	**100** (198)
Bangladeshi	51.2 (89)	† (2)	22.0 (26)	26.0 (24)	**100** (141)
Chinese	82.2 (126)	3.3 (9)	8.2 (23)	5.7 (15)	**100** (173)
Irish	32.2 (207)	6.5 (41)	38.3 (256)	23.0 (165)	**100** (669)
Other	64.7 (20)	† (1)	† (3)	24.1 (7)	**100** (31)
TOTAL	**40.3** (2,357)	**5.5** (274)	**37.9** (1,635)	**16.3** (807)	**100** (5,073)

Significance levels ***p **<0.001**
(N) = Sample numbers in brackets are unweighted
† Percentages not presented for cell counts below 5
Source: Author's analysis, 2004 HSE

Cigarette smoking status also varied between different ethnic minority groups with the highest proportion of never-smoked amongst the Chinese (82%), followed by Black Africans (77%), compared to 39% of Whites and 32% of those of Irish decent. However, the proportion of current smokers ranged from 4% among the Black Caribbeans, to 26% of Bangladeshis, 23% of Irish, and 16% of the White older persons. Studies show that smoking behaviour tends to be more prevalent among the

most economically deprived groups (Bush et al., 2003; Evandrou & Falkingham, 2002; Jarvis and Wardle, 2006). Such prevalence is reflected in this study, for example the Bangladeshis, who were the most likely to be current smokers, were also more likely than persons in other ethnic groups to be in routine and semi-routine occupations (see Figure 4.1).

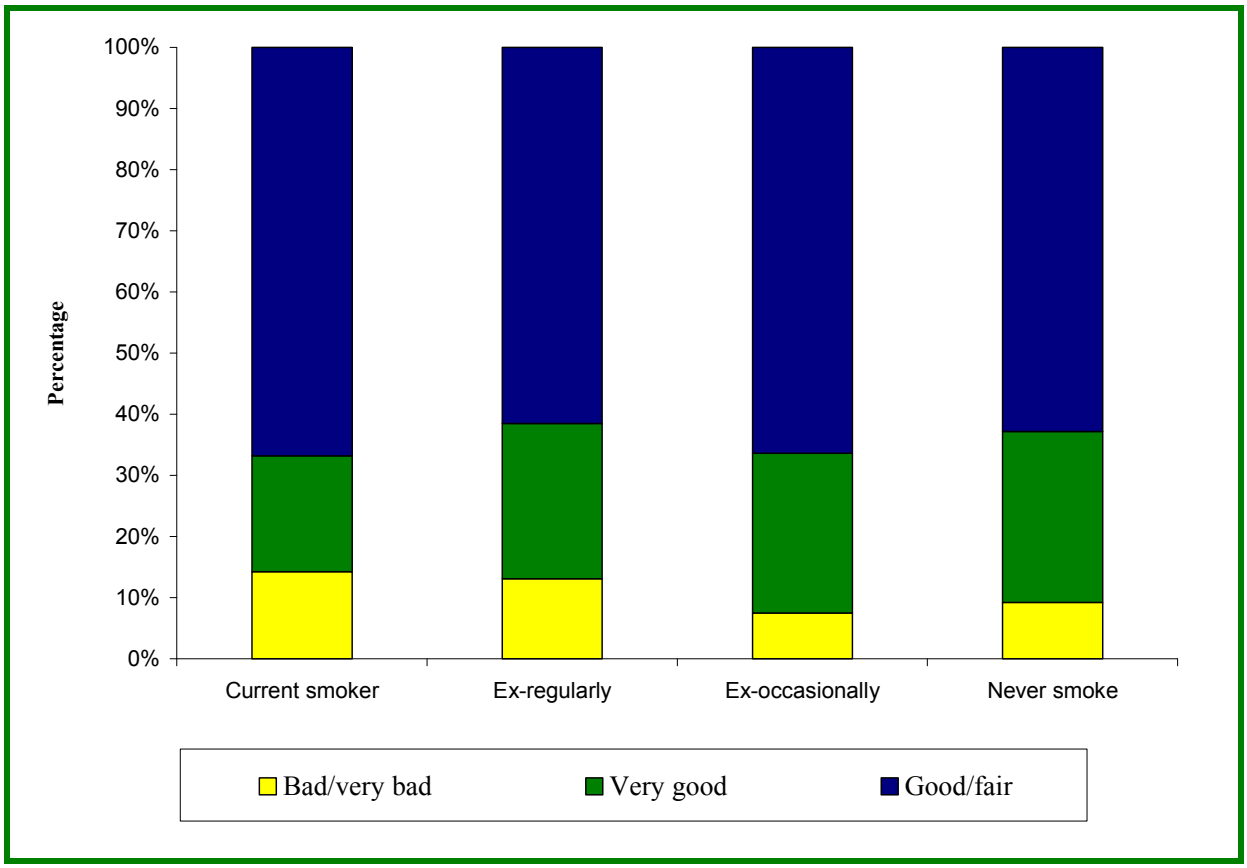
There were also distinct gender differences in smoking patterns by demographic characteristics and ethnicity (Tables A.22 and A.23). For example, similar proportions of married men (32%) never smoked and divorced men (32%) were current smokers. There were also a high proportion of smokers among ethnic minority men and 46% of Bangladeshi men were current smokers compared to 15% of White men (Table A.22). Equally, there were distinct smoking patterns among women: 23% of women aged 50-54 years were current smokers, whereas 11% of women aged 70 years and over were current smokers. Similarly, 25% of divorced women were current smokers while, 36% were ex-ex-regularly smokers. Women from different ethnic minority communities also have a low smoking prevalence compared to the White and Irish groups; only 5% of Indian women and 2% of Black Caribbean women were current smokers, compared to 20% of Irish women 17% of White women (Table A.23).

5.5.1 Smoking status and health

In the UK there are over 13 million smokers and it is well known that the adverse health effects of smoking are wide-ranging (Department of Health, 1998). For example, research has shown that the long duration of smoking is associated with morbidity risks such as the prevalence of chronic obstructive pulmonary disease, coronary heart disease and lung cancer (Allender, et al., 2009; Edwards, 2004). Smoking is also identified as a major contributor to health inequalities (Achenson, 1998), and smokers are at an increased risk of other chronic and non fatal conditions such as cataracts, male infertility and osteoporosis (Bush et al., 2003; Edwards, 2004).

As indicated in Figure 5.3 (and Table A.12), a higher proportion of current smokers reported 'bad/very bad' health (14%), compared to those who were ex-occasional smokers (8%) and also those who never smoked (9%).

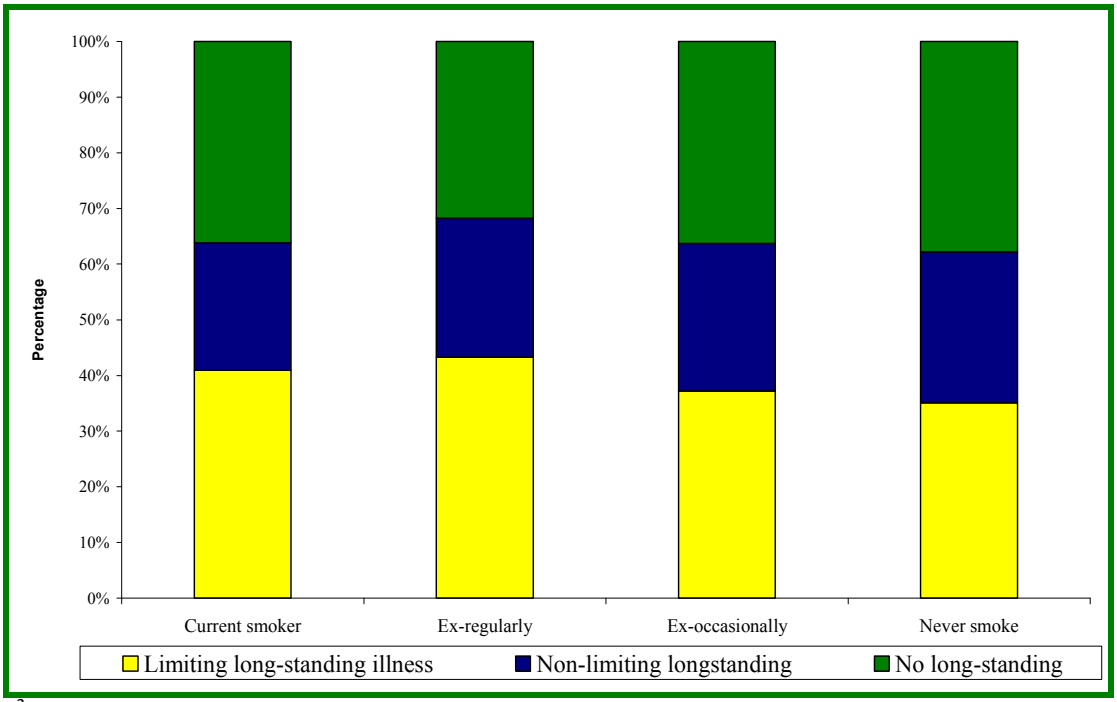
Figure 5.3: Percentage of persons aged 50 and over reporting self-assessed general health by smoking status, 2004 HSE



X^2 = **363.674** (**df 6, p <0.001**)
All calculations use sampling weight for the multistage sampling design
Source: Author's analysis, 2004 HSE

It is known that different demographic characteristics are associated with health, and in this sample, smoking and reporting a LLSI among ethnic elders were significantly associated as shown in Figure 5.4 and Table 13.

Figure 5.4: Percentage of persons aged 50 and over reporting self-assessed general health by smoking status, 2004 HSE



X^2 = **286.314** (**df 6, p <0.001**)
All calculations use sampling weight for the multistage sampling design
Source: Author's analysis, 2004 HSE

Smoking and reporting a LLSI among older people were significantly associated as shown in Figure 5.4 (and Table A.13). A higher proportion of current smokers reported LLSI (41%), compared to those who were ex-occasional smokers (37%) and also those who never smoked (35%). Interestingly, there is also a reverse gradient for no-LLSI, indicating that those who never smoked were more likely to report a LLSI than current smokers. In summary, cigarette smoking patterns amongst older people vary significantly according to different demographic factors and ethnicity. For some groups, such as Asian ethnic minority groups, smoking occurrence is high, particularly among Bangladeshi ethnic elders. The next section examines alcohol consumption.

5.5.2 Alcohol consumption and health

The number of alcohol related deaths in the UK has been increasing since the early 1990s: for example from 6.7 per 100,000 in 1992 to 13.6 per 100,000 in 2008 (ONS, 2010). Furthermore, studies in the UK show that alcohol consumption amongst ethnic minority groups are significantly lower than the general population (Erskine et al., 2010; Harrison et al., 1997; Nazroo, 1997). However, alcohol consumption varies greatly by demographic characteristics and ethnicity, as evident in this study. Most older people reported alcohol consumption of 'once every couple of months', and when examined across age groups, ethnic elders in the older age groups were less likely to consume

alcohol compared to their younger counterparts. Hence, the prevalence of 'no alcohol consumption at all' varies with age, with 18% of those 70 years and older, compared with 9% of those aged between 50-54 years, findings that are consistent with a recent study (Erskine et al., 2010).

Similar to other studies, this study has found that gender is significantly associated with alcohol consumption (Erskine et al., 2010; Hajat et al., 2004). As indicated in Table 5.10, older women were significantly less likely to consume alcohol compared to older men. For example, 15% of women reported consuming alcohol 'almost every day', compared to slightly over a quarter of their male counterparts (26%). Marital status also showed a significant relationship with alcohol consumption. For example, married (21%) and single (21%) older people were more likely to consume alcohol 'almost every day', while widowed elders were amongst those who consumed alcohol occasionally or not at all.

Table 5.10: Alcohol consumption amongst person aged 50 years and over by demographic characteristics, 2004 HSE

Demographic characteristics	Frequency of alcohol consumption					
	Almost every day	Three to six days per week	Once or twice a week	Once every couple of months	Not at all	TOTAL
Age group* **						
50-54 years	19.4 (135)	25.4 (198)	23.8 (205)	22.1 (235)	9.2 (242)	**100** (796)
55-59 years	18.7 (134)	20.3 (152)	24.6 (200)	26.6 (226)	9.9 (165)	**100** (738)
60-64 years	17.6 (127)	18.4 (132)	23.5 (183)	27.0 (230)	13.4 (216)	**100** (976)
65-69 years	19.9 (115)	15.5 (100)	21.0 (137)	26.0 (180)	17.6 (222)	**100** (1,342)
70+	21.6 (285)	11.4 (156)	16.9 (242)	32.5 (471)	17.7 (378)	**100** (1,223)
Sex * **						
Men	25.6 (470)	21.9 (421)	23.7 (495)	19.5 (427)	9.3 (429)	**100** (2,242)
Women	14.5 (326)	13.4 (317)	19.1 (427)	34.9 (915)	18.1 (794)	**100** (2,824)
Marital status * **						
Married	20.8 (554)	19.5 (545)	23.0 (666)	25.0 (781)	11.7 (734)	**100** (3,280)
Single	20.7 (47)	16.3 (46)	19.9 (63)	30.9 (95)	12.2 (51)	**100** (302)
Divorced	18.9 (83)	17.1 (75)	17.6 (97)	29.4 (176)	17.1 (140)	**100** (571)
Widowed	15.7 (113)	10.0 (71)	16.9 (141)	35.8 (289)	21.6 (298)	**100** (911)
Ethnicity * **						
Whites	21.3 (611)	17.9 (507)	21.4 (615)	28.1 (839)	11.4 (353)	**100** (2,925)
Black Caribbean	9.1 (32)	10.7 (38)	19.6 (73)	38.2 (156)	22.5 (97)	**100** (396)
Black African	1.7 (5)	15.3 (12)	21.4 (28)	37.6 (45)	24.0 (48)	**100** (138)
Indian	4.3 (23)	9.4 (32)	14.3 (50)	22.3 (67)	49.6 (226)	**100** (398)
Pakistani	† (0)	† (0)	0.9 (5)	6.0 (6)	93.1 (187)	**100** (198)
Bangladeshi	† (0)	† (0)	† (0)	† (1)	99.3 (140)	**100** (141)
Chinese	6.6 (17)	4.1 (12)	18.0 (24)	41.0 (57)	30.3 (63)	**100** (173)
Irish	18.0 (105)	22.1 (136)	24.6 (163)	23.6 (161)	11.7 (102)	**100** (667)
Other	† (3)	† (1)	30.3 (9)	32.0 (10)	27.4 (7)	**100** (26)
Total	**19.7** (796)	**17.4** (738)	**21.3** (967)	**27.6** (1,342)	**13. 9** (1,223)	**100** (5,066)

Significance levels ***$p < 0.001$**
(N) = Sample numbers in brackets are unweighted
† Percentages are not presented for cell counts below 5
Source: Author's analysis, 2004 HSE

On the whole, ethnic minority groups were less likely to consume alcohol than the Whites or Irish, however, there was significant diversity in consumption patterns between different ethnic minority groups: for example, almost all Bangladeshis (99%) and Pakistanis (93%) did not consume alcohol at

all, compared to 50% of Indians, 30% of Chinese, 24% of Black Africans, 23% of Black Caribbeans, 12% of Irish and 11% of Whites (Table 5.10). White older people were more likely to consume alcohol 'almost every day' (21%) compared to the Irish (18%), Black Caribbeans (9%), Chinese (7%) and Indians (4%). These findings are consistent with the literature (Cooper et al., 2000; Emslie et al., 2009), particularly the distinct gender differences in alcohol consumption patterns (see Tables A. 24 and A.25).

The results from this study show that women aged 50 and over and were less likely to consume alcohol than their male counterparts, and when they do, it is consumed less frequently. For example, 23% of men aged 60-64 years consume alcohol every day compared to 13% of women of that age group. However, 34% of women of this age group consume alcohol every couple of months, compared to 20% of their male counterparts. Interestingly, the likelihood of alcohol consumption increased for men aged 65 and over, whereas for women the level fell and then rose in the 70s age group (see Tables A. 24 and A.25).

5.5.3 Summary

In summary, the patterns of behavioural risk factors of cigarette smoking and alcohol consumption vary significantly by age, gender, marital status and ethnicity. There are several interesting trends that emerge from the bivariate results. The incidence of morbidity amongst the different ethnic minority groups increases in line with age, and there were marked differences amongst ethnic minority groups in reporting bad/very bad general health and a LLSI. For example, amongst ethnic minority groups, the Pakistani, Indian and Bangladeshi groups were the most likely to report bad/very bad general health and/or a LLSI. On the other hand, the Chinese and Black Africans were the least likely among all ethnic minority groups to report bad/very bad health or a LLSI. In previous studies, Black Caribbeans and Bangladeshis showed consistently higher rates of reporting poor health amongst ethnic groups with the Chinese being the least likely than all other ethnic minority groups to report poor health (Ahmad et al., 2005; Cooper et al., 2000; Erens et al., 2001; Nazroo, 2001).

The different measures of SES (education, NS-SEC occupational class, equivalised household income, housing tenure and car availability) performed well in relation to examining patterns in self-reported general health and LLSI in later life. The findings indicated that older people who were more disadvantaged in terms of lower or no educational qualifications, with routine or semi-routine occupational backgrounds, or never worked/long-tem unemployed, with lower household income, renting their accommodation rather than owning, and less likely to have had access to a car, were significantly more likely to report poorer health, both self-reported general health and also LLSI. This

analysis also indicated that the SES gradients in health generally remained by gender, although some categories suffered from low cases. These findings were generally born out by previous studies. Of course there may be a causal relationship between the experience of long-term unemployment and ill health, unemployment causing ill health, as well as ill health causing disruptions in the labour market which could lead to unemployment. However, the analysis in this study was confined to cross-sectional analysis (HSE). Finally, the bivariate analysis showed that particular SES characteristics are associated with particular ethnic groups, for example Pakistanis, Bangladeshis and Black Caribbeans were more likely to be disadvantaged in terms of educational qualifications and occupational social class, while Black Africans and Indians were more likely to have a degree than the White population or other ethnic groups. Such findings reflect the heterogeneity of the ethnic population, and raise questions about the relationship between SES measures and health outcomes.

In terms of gender differences, the findings do not appear to show significant differences between men and women, and this finding diverges from previous studies, which show that men tend to experience higher morbidity levels than women (Arber and Curtis, 1999; Cooper, 2000; Erens et al., 2001). The bivariate results show that women were as likely as men to report very good/ good general health, and only slightly more likely than men to report a LLSI. This difference may be partly due to the different meaning of the two health outcome indicators used, and how these are perceived by men and women (Grundy and Holt, 2001; Lynch and Kaplan, 2000; Manor et al., 2001).

This Chapter has used bivariate analysis to emphasise key relationships between ethnicity, health and different SES characteristics. Chapter 6 turns to multivariate analysis, which is aimed at identifying the relative importance of different factors in explaining the reporting of poor health among ethnic elders.

Chapter 6

6 Results: The relationship between health, ethnicity in later life and the 'sensitivity' of different SES measures

6.1 Introduction

The findings from the bivariate analysis, described in Chapters 4 and 5, show that the examination of demographic, SES and health-risk behaviour characteristics in exploring health inequalities in later life can improve our understanding of the relationship between such factors, contributing to existing literature in this field (Cooper et al., 2000; Evandrou and Falkingham, 2002; Curtis and Lawson, 2000; Grundy and Sloggett, 2003; Jarvis and Wardle, 2006; Jarvis and Wardle, 2006). This Chapter builds on this analysis by examining the use of different indicators of SES in such relationships. It has been postulated that SES is multidimensional, and the dimensions most relevant to health inequalities are argued to be education, occupational social class and income (Galobardes et al., 2007; Lynch and Kaplan, 2001; Nazroo, 2001; Weich et al., 2002). However, research on ethnic differences in health has been criticised for not adequately taking into consideration SES differences between ethnic groups (Davey Smith et al., 2003; Harding, 2003; Kelaher et al., 2009; Nazroo 2001). Furthermore, little is known about the 'sensitivity' of different SES measures in studying the health status of this increasing segment of the British population (Davey Smith et al., 2000; Kelaher et al., 2009; Nazroo 2001). This chapter builds on the previous two chapters by focusing on answering the following research questions (See Section 1.4):

> **RQ2**. *How can SES be measured in later life?*
>
> **RQ3**. *To what extent do differentials in behavioural risk factors and SES explain the relationship between health and ethnicity in later life?*
>
> **RQ4.** *Does the relationship between ethnicity and health change when alternative measures of SES (e.g. housing tenure and car availability) are used?*

The chapter sets out the findings of the more frequently used SES measures (e.g. education, occupation, income) and alternative SES measures in British studies (e.g. housing tenure and car availability), employing multivariate analysis (logistic regression) and a sequential modelling approach informed by earlier parts of the thesis (see Chapters 2 and 3). The models are systematically built by adding SES variables one by one, in order to test the significance of the relationship between health outcomes and ethnicity, using different SES measures. Prior to the regression analysis, and in order to avoid instances of multi-collinearity between highly correlated variables, a preliminary correlation analysis was performed, which showed that none of the variables were highly correlated (see Table 3.3).

The Chapter is structured as follows. Section 6.1 discusses the logistic regression modelling of the first outcome measure, the report of bad/very bad self-assessed general health, and the findings are presented, while Section 6.2 presents the separate models for men and women in this respect. In Section 6.3, the second outcome measure, the report of a limiting long-standing illness, is discussed, and in Section 6.4, the separate models for men and women are presented.

6.1.1 The odds of reporting 'bad/very bad' general health amongst persons aged 50 and over, by demographic characteristics, health-risk behaviour and SES characteristics: Models I– VI

Previous work has shown that multi-dimensional measures of SES are better predictors of health differences among older people (Chandola, 2001, Grundy and Sloggett, 2003; Grundy and Holt, 2001; Nazroo, 2001). It is also evident that there are marked differences in health amongst ethnic minority group members according to differences in SES and demographic characteristics (Chandola, 2001; Grundy and Sloggett, 2003). Table 6.1 presents the estimated odds ratios for reporting 'bad/very bad' general health. The analysis in this Chapter confirms the relationships identified in the bivariate analysis, that is, the report of 'bad/very bad' general health status is significantly associated with different demographic characteristics such as age and sex, and with different measures of SES, such as educational qualifications and equivalised household income.

Model I controlled for demographic characteristics of persons aged 50 and over, including age, ethnicity and marital status, and for behavioural factors, such as smoking and alcohol consumption. The adjusted Models II through VI test for the 'sensitivity' of the different SES measures adopting a sequential modelling approach, which reveals the strength of each group of SES measures in explaining the likelihood of different ethnic groups assessing their general health as 'bad/very bad'. Table 6.1 shows the results of the models with improvement in the R^2 as each SES measure is introduced. For example, Model I can explain 8% of the differences in reporting 'bad/very bad health' ($R^2 = 0.083$), while Model VI can explain approximately 12% of the differences.

Model I includes age, sex, ethnicity, marital status, smoking and alcohol consumption as explanatory variables, and confirms that there are significant differences in reporting 'bad/very bad' health amongst the younger old groups. Among the younger old people (50- 54 and 55-59), the odds of reporting 'bad/very bad' health were 0.56 and 0.68 times respectively the odds among those aged 70 and over, who are the reference group. Women were slightly less likely than men to report bad/very bad health, however this result was not statistically significant. Older people from certain ethnic minority groups were more likely to report 'bad/very bad' health compared to the older White population. For example, among Black African, Bangladeshi and Chinese people, the odds of

reporting 'bad/very bad' health were 1.90; 2.52 and 3.52 times respectively the odds amongst Whites. Marital status was also an important factor, as those who were divorced were 45% more likely to report 'bad/very bad' health than those who were married. Among ex- regular smokers, the odds of reporting 'bad/very bad' health were 1.63 times the odds among those who had never smoked, and among current smokers the odds were 1.76 times the odds among those who had never smoked. People who consumed alcohol, whether almost every day or less frequently, were less likely to report 'bad/very bad' health compared to those who do not drink at all, a finding which will be discussed further in Chapter 7.

Model II controlled for all demographic covariates in Model I, and education was introduced. Lower educational qualifications were significantly associated with the report of 'bad/very bad' health. For example, among respondents with a Diploma/ A-levels, O-levels or no qualifications, the odds of reporting 'bad/very bad' health were significantly higher compared to the odds among those with a degree. Age was overall not statistically significant once education had been introduced, however the younger age group (e.g. 50-54) was 32% less likely than those aged 70 years and older to report 'bad/very bad' health (Model I).

After controlling for education, ethnicity remained a significant predictor of reporting 'bad/very bad' health, and all ethnic groups except for the Irish were more likely to report 'bad/very bad' health (Model II). For example, among Black African, Pakistani, Bangladeshi and Chinese people, the odds of reporting 'bad/very bad' health were 1.76; 1.76; 2.41 and 3.18 times respectively the odds amongst Whites. Although marital status remained statistically significant, only those who were divorced were more likely to report 'bad/very bad' health than those who were married. Finally, except for the ex-occasional smokers, smoking status and alcohol consumption also remained statistically significant in the model.

Table 6.1: Odds ratios of reporting 'bad/very bad' health by demographic, health-risks and SES characteristics, aged 50 and over, 2004 HSE

Demographics characteristics, health-risk and SES controls	Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII
	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)
N = 5086							
Age groups							
50 – 54	0.56 (0.43 –0.74) ***	0.68 (0.52 –0.90) *	0.67 (0.50 –0.88) **	0.76 (0.57 –1.10)	0.76 (0.57 –1.02)	0.82 (1.11 –1.11)	0.90 (0.68 –1.20)
55 - 59	0.68 (0.52 –0.89) **	0.77 (0.59 –1.02)	0.73 (0.55 –0.97)	0.86 (0.64 –1.14)	0.91 (0.68 –1.22)	0.96 (0.72 –1.29)	1.08 (0.82 –1.44)
60 - 64	0.85 (0.67–1.09)	0.93 (0.72 –1.19)	0.90 (0.70 –1.16)	1.01 (0.78 –1.30)	1.03 (0.79 –1.33)	1.09 (0.84 –1.41)	1.19 (0.92 –1.52)
65 - 69	0.81 (0.63–1.05)	0.85 (0.66 –1.10)	0.84 (0.65 –1.09)	0.89 (0.68 –1.15)	0.91 (0.71 –1.19)	0.74 (0.74 –1.25)	1.00 (0.77 –1.30)
70+ **(ref)**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Sex							
Men **(ref)**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Women	0.86 (0.71–1.030)	0.80 (0.67– 0.97)	0.74 (0.61 – 0.91) **	0.74 (0.61– 0.91) **	0.76 (0.762–0.93)	0.60 (0.60–0.90) **	0.76 (0.63–0.91) **
Ethnicity							
White **(ref)**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Black Caribbean	1.52 (0.56–4.13)	1.61 (0.59 –4.41)	1.42 (0.50 - 3.98)	1.37 (0.49 - 3.89)	1.16 (0.40 -3.31)	1.07 (0.37 -3.05)	1.15 (0.41 -3..21)
Black African	1.90 (1.42 –2.53) ***	1.76 (1.32 –2.35) ***	1.66 (1.23 -2.22) **	1.57 (1.17 - 2.11) **	1.54 (1.14 -2.08) **	1.42 (1.05 -1.93)	1.50 (1.11 -2.01) **
Indian	0.99 (0.57–1.71)	1.17 (0.67 –2.03)	0.96 (0.54 - 1.70)	0.89 (0.50 - 1.58)	0.74 (0.39 -1.26)	0.67 (0.37 -1.20) *	0.75 (0.42 -1.33)
Pakistani	1.62 (1.19–2.20) **	1.76 (1.28–2.41) ***	1.53 (1.11 -2.11) **	1.42 (1.02 - 1.97) *	1.56 (1.13 -2.20) **	1.52 (1.09 -2.12) *	1.67 (1.20 -2.31) ***
Bangladeshi	2.52 (1.75 –3.62) ***	2.41 (1.67– 3.49) ***	1.88 (1.27 -2.78) **	1.69 (1.14 - 2.51) **	1.95 (1.31 -2.91) ***	1.10 (1.23 -2.85) **	2.34 (1.60 -3.42) ** *
Chinese	3.52 (2.36 –5.25) ***	3.18 (2.13–4.77) ***	2.49 (1.62 -3.81) ***	2.31 (1.49 - 3.57) ***	2.21 (1.41 -3.45)	2.06 (1.31 -3.23) **	2.50 (1.64 -3.83) ***
Irish	0.86 (0.51 –1.45)	0.98 (0.58– 1.67	0.01 (0.59 - 1.73)	0.90 (0.52 - 1.54)	0.96 (0.56 -1.65)	0.95 (0.55 -1.63)	0.95 (0.55 -1.62)
Other ethnic groups	1.09 (0.83 –1.42)	1.06 (0.81 –1.39)	1.05 (0.80 - 1.38)	1.03 (0.78 - 1.35)	0.96 (0.74 -1.28)	0.93 (0.70 -1.23)	0.91 (0.69 -1.20)
Marital status							
Married **(ref)**	1.00	1.00	1.00	1.00	1.00	1.00	- - -
Single	1.38 (0.98 - 1.95)	1.39 (0.98 - 1.96)	1.34 (0.94 -1.91)	1.31 (0.92 - 1.87)	1.05 (0.73 -1.51)	0.92 (0.63 -1.33)	- - -
Divorced	1.45 (1.13 - 1.86) *	1.45 (1.13 - 1.87) *	1.43 (1.11 -1.84) **	1.43 (1.11 - 1.85) **	1.18 (0.90 -1.54)	1.06 (0.80 -1.39)	- - -
Widowed	1.08 (0.86 - 1.36)	1.01 (0.80 - 1.27)	0.95 (0.751-1.21)	1.00 (0.79 - 1.27)	0.87 (0.68 -1.11)	0.77 (0.60 -1.00)	- - -
Smoking status							
Never smoked **(ref)**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ex- occasionally	0.97 (0.64 -1.49)	0.98 (0.64 -1.51)	1.04 (0.67 -1.60)	1.02 (0.66 -1.58)	0.95 (0.61 -1.47)	0.94 (0.61 -1.45)	0.91 (0.58 -1.41)
Ex- regular	1.63 (1.32 - 2.01) ***	1.59 (1.29 - 1.97) ***	1.63 (1.31 -2.02) ***	1.62 (1.30 -2.01) ***	1.54 (1.24 -1.92) ***	1.54 (1.23 -1.91) ***	1.51 (1.22 -1.88) ***
Current smoker	1.76 (1.38 - 2.24) ***	1.59 (1.25 - 2.04) ***	1.62 (1.26 -2.08) ***	1.54 (1.20 -1.99) **	1.36 (1.05-1.76) *	1.35 (1.04 -1.74) *	1.30 (1.01 -1.68) *
Alcohol consumption							
Not at all **(ref)**	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Almost every day	0.25 (0.18 - 0.34) ***	0.30 (0.22 -0.41) ***	0.31 (0.22 -0.43) ***	0.36 (0.25 - 0.49) ***	0.38 (0.27 -0.52) ***	0.38 (0.27 -0.52) ***	0.38 (0.27 -0.53) ***

3 - 6 times a week	0.17 (0.11 - 0.24) ***	0.20 (0.14 -0.30) ***	0.21 (0.15 - 0.31) ***	0.24 (0.17 - 0.36) ***	0.26 (0.18 -0.38) ***	0.26 (0.18 -0.36) ***	0.26 (0.18 -0.38) ***
1 - 2 times a week	0.34 (0.26 - 0.44) ***	0.37 (0.29 -0.49) ***	0.38 (0.29 - 0.50) ***	0.42 (0.32 - 0.56) ***	0.44 (0.33 -0.59) ***	0.44 (0.33 -0.58) ***	0.44 (0.33 -0.58) ***
Once every 2 months	0.46 (0.36 - 0.57) ***	0.50 (0.40 -0.63) ***	0.53 (0.42 - 0.66) ***	0.56 (0.44 - 0.71) ***	0.55 (0.43 -0.70) ***	0.55 (0.42 -0.70) ***	0.55 (0.42 -0.67) ***
Education							
Degree **(ref)**		1.00	1.00	1.00	1.00	1.00	1.00
Diploma/A-level		2.14 (1.37 -3.35) ***	2.07 (1.30 -3.28) **	1.97 (1.23 -3.16) **	2.04 (1.27 - 3.21) **	2.04 (1.27 -3.28) **	1.94 (1.23 -3.07) **
O-level		2.33 (1.49 -3.65) ***	2.01 (1.25 -3.24) **	1.89 (1.17 -3.16) *	1.98(1.22 - 3.22) **	2.02 (1.24 -3.28) **	2.02 (1.28 -3.0) **
CSE/NVQ1		1.92 (1.11-3.33)	1.52 (0.85 -2.72)	1.29 (0.72 -2.32)	1.41(0.78 - 2.54) **	1.40 (0.78 -2.54)	1.49 (0.84 -2.61)
No qualification		3.70 (2.50-5.48) ***	2.66 (1.71 -4.12) ***	2.23 (1.42 -3.48) ***	2.20(1.10 – 3.43) ***	2.15 (1.37 -3.37) ***	2.38 (1.58 -3.58) ***
Occupation							
Professional **(ref)**			1.00	1.00	1.00	1.00	- - -
Lower managerial			0.94 (0.56 -1.56)	0.86 (0.51 -1.44)	0.82 (0.49 -1.38)	0.84 (0.50 -1.42)	- - -
Intermediate			1.03 (0.60 - 1.79)	0.91 (0.52 -1.58)	0.90 (0.51 -1.57)	0.88 (0.50 - 1.55)	- - -
Small employer			1.01 (0.58 -1.75)	0.84 (0.48 -1.47)	0.83 (0.47 -1.45)	0.85 (0.48 -1.49)	- - -
Supervisory/technical			1.30 (0.75 -2.24)	1.05 (0.61 -1.83)	0.99 (0.57 -1.72)	0.98 (0.56 -1.71)	- - -
Semi-routine			1.46 (0.87- 2.43)	1.14 (0.68 -1.92)	1.05 (0.62 -1.77)	1.02 (0.60 -1.73)	- - -
Routine			1.74 (1.05 -2.90) *	1.36 (0.81 -2.28)	1.22 (0.73 -2.06)	1.20 (0.71 -2.02)	- - -
Never worked			2.53 (1.43 -4.48) **	2.02 (1.13 -3.61) *	2.75 (0.98 -3.15)	1.75 (0.97 -3.15)	- - -
Equivalised household income							
Over £25,000 **(ref)**				1.00	1.00	1.00	1.00
No income				1.93 (1.33 -279) ***	1.77 (1.22 -2.58) **	1.72 (1.19 -2.50) **	1.76(1.22 -2.57) **
Less than £10,000				3.36 (2.34 -5.84) ***	2.74 (1.89 -3.97) ***	2.61 (1.80 -3.78) ***	2.77 (1.92 -3.98) ***
£10,001 –15,000				2.41 (1.67 -3.48) ***	2.09 (1.44 -3.04) ***	1.92 (1.33 -2.80) ***	1.98 (1.37 -2.87) ***
£15,001 – 25,000				1.63 (1.10 -2.40) *	1.56 (1.05 -2.32) *	1.54 (1.04 -2.28) *	1.59 (1.07 -2.35) *
Housing tenure							
Own **(ref)**					1.00	1.00	1.00
Mortgage					0.89 (0.69 -1.14)	0.90 (0.70 -1.16)	0.89 (0.70 -1.14)
Rent					2.04 (1.65-2.51) ***	1.85 (1.49 -2.29) ***	1.90 (1.54 -2.34) ***
Other					1.34 (0.71 -2.52)	1.26 (0.66 -2.38)	1.24 (0.66 -2.35)
Car availability							
Yes **(ref)**						1.00	1.00
No						1.58 (1.29 -1.93) ***	1.56 (1.28-1.90) ***
-2 LLR	**3848.833**	**3779.511**	**3723.580**	**3663.499**	**3608.775**	**3589.855**	**3628.822**
% Change –2 LLR		**1.80**	**3.25**	**4.82**	**6.24**	**6.73**	**5.72**

R Square	0.083	0.095	0.101	0.112	0.121	0.125	0.212

Adjusted by: Demographic and SES characteristics
Significance levels: 95% CI *p < 0.01; **p < 0.005; ***p < 0.001;
Source: Authors analysis, 2004 HSE

In Model III, the NS-SEC occupational classifications are added, and this variable is statistically significant ($p< 0.01$) (see Table A.26). There are significant differences in self-assessed general health by certain categories of occupational class. For example, among respondents in the routine class, the odds of reporting 'bad/very bad' health were 1.74 times the odds among those in the professional category. The highest odds of reporting 'bad/very bad' health were among respondents who have never worked, whose odds were 2.53 times the odds among those in the professional category. Following the introduction of social class in the model, the effect of education decreased slightly, but the variable remained significantly associated with 'bad/very bad' general health. For instance, the respondents with no qualifications had significantly higher odds of reporting 'bad/very bad' health compared to those with a degree. Age and sex were also significant, with younger old people (50-54) being 33% less likely than those aged 70 and over to report bad/very bad health, and women being 26% less likely than men to assess their general health as 'bad/very bad'. With the exception of ex-occasional smokers, smoking remained significantly associated with the report of 'bad/very bad' health, for example among ex-regular smokers, the odds of reporting 'bad/very bad' health were 1.63 times the odds among those who had never smoked. Alcohol also remained statistically significant, with those who consumed alcohol almost every day being 69% less likely than those who did not drink alcohol at all to report 'bad/very bad' health.

In Model IV, equivalised household income is added to the previous explanatory variables, and this variable is statistically significant at the $p< 0.001$ level. Lower equivalised household income was significantly associated with the report of 'bad/very bad' health, for example among those living in a household with an income of less than £10,000, the odds of reporting 'bad/very bad' health were 3.36 times the odds among those living in a household with an income over £25,000. The effect of occupational class is marginally significant in this model and those who have never worked were twice as likely as those in the professional category to report bad/very bad health. Age became not significant once household income was introduced, but gender and marital status remained significant, with women being 26% less likely than men to report 'bad/very bad' health, and those who were divorced being 43% more likely to report 'bad/very bad' health compared to those who were married. Except for the ex-occasional smokers, smoking and alcohol consumption remained statistically significant, for example, among ex- regular and current smokers the odds of reporting 'bad/very bad' health were 1.62 and 1.54 times respectively the odds among those who had never smoked. Finally, the odds among those who consumed alcohol almost every day and 3 -6 times per week were 0.36 and 0.24 times respectively the odds among those who did not drink at all.

In Model V, housing tenure is added and it is statistically significant (see Table A.26). Among renters, the odds of reporting 'bad/very bad' health were 2.04 times the odds among those who own and occupy their accommodation. However, the variable of NS-SEC classifications was no longer

statistically significant, but the effect of education and household income still remains highly significant. The variables of age, sex and marital status became insignificant. Also, in this model, among Black Africans, Pakistanis and Bangladeshis, the odds of reporting 'bad/very bad' health were 1.54; 1.56 and 1.95 times respectively the odds among Whites. Among smokers, ex-regular smokers have the highest odds of reporting 'bad/very bad' health compared to the odds among those who had never smoked, and even though the odds of 'bad/very bad' health reduce among current smokers compared to those who had never smoked, they remained significant at the $p< 0.05$ level.

In Model VI, car availability is introduced and housing tenure, education and household income remain significantly associated with the report of 'bad/very bad' health, however occupational class remains not significant. Age and marital status remain not significant, however gender is significant with women being 40% less likely than men to report 'bad/very bad health'. The effects of certain ethnic groups remain significant, for example the odds amongst Chinese, Pakistani and Bangladeshi people, the odds of reporting 'bad/very bad' health were 2.06; 1.52 and 1.10 times respectively the odds amongst Whites, while Indians were 33% less likely to report 'bad/very bad' health than Whites. Among ex-regular and current smokers, the odds of reporting 'bad/very bad' health are 1.54 and 1.35 times respectively the odds among those who had never smoked. Finally, people who consumed alcohol, regardless of the frequency, were less likely than those who did not drink at all to report bad/very bad health, and this result will be discussed in detail in Chapter 7.

In the final model (VII), marital status and social class were removed because these variables were not significant at the 10% level. Age, although not significant, was retained in the model because it was a key variable and its inclusion in the model allows for comparability with other studies in this area (see for example Grundy and Glaser, 2000). In addition, an additional final model was re-run excluding age (see Table A.14). The next section discusses the results of Model VII, highlighting the differences between the different SES measures as shown in Table 6.1 and Figure 6.1.

6.1.2 The odds of reporting 'bad/very bad' health among persons aged 50 and over by demographic characteristics and health-risk behaviour: Model VII

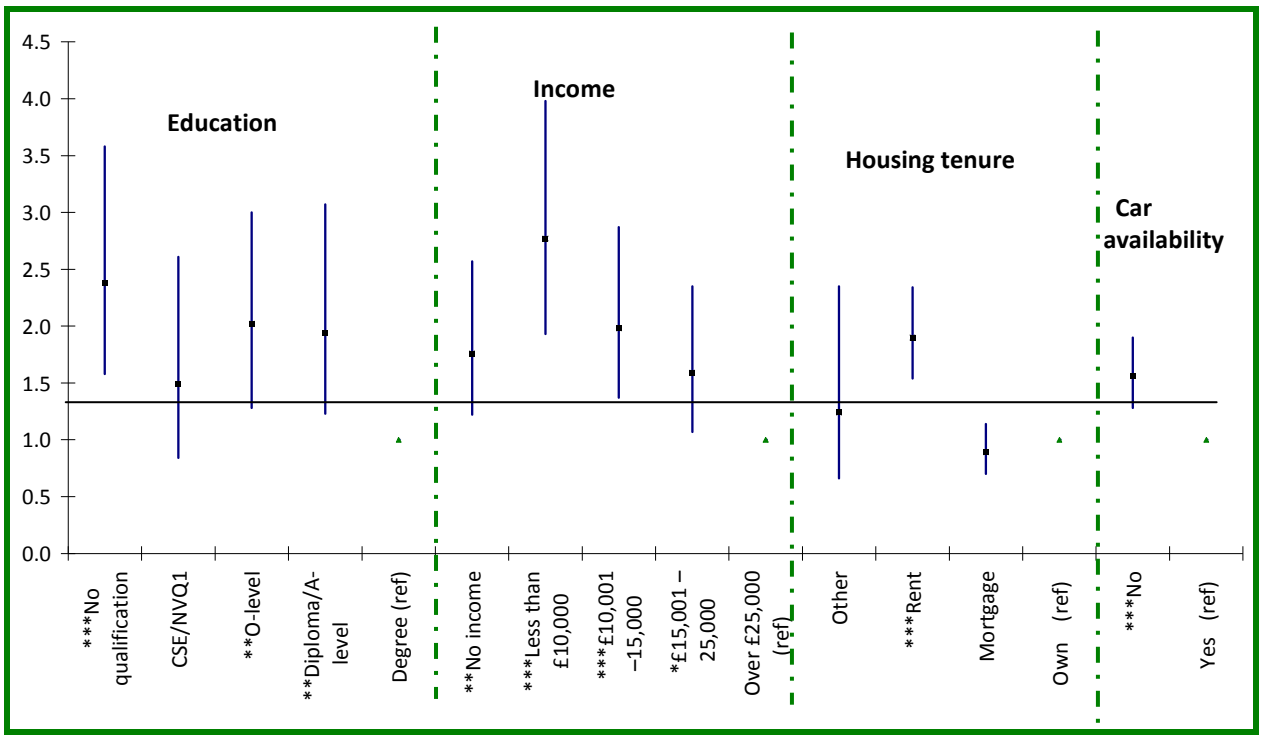
The final model discusses the estimated odds of reporting bad/very bad health among older people, taking into account the significant variables produced by earlier models. Literature shows that ethnic differences in reporting 'bad/very bad' health become more marked with increasing age (Cooper et al., 2000; Erens et al., 2001; Evandrou, 2000), however in Model VII, the effect of age has been lost once a combination of SES variables were introduced. However, other demographic characteristics and health-risk behaviour variables are still important in explaining the report of bad/ very bad health. For example, women were 24% less likely to report 'bad/very bad' health compared to their

male counterparts, and amongst Black African, Pakistani, Bangladeshi and Chinese people, the odds of reporting 'bad/very bad' health were 1.50; 1.67; 2.34 and 2.50 times respectively the odds amongst Whites. Smoking is highly significant at the $p< 0.01$ level, and among ex-regular and current smokers, the odds of reporting 'bad/very bad' health were 1.51 and 1.30 times respectively the odds among those who had never smoked. Finally, those who consumed alcohol, regardless of the frequency of their consumption, were *less* likely to report 'bad/very bad' general health. For example, among those who consume alcohol almost every day, the odds of reporting 'bad/very bad' health were 0.38 times the odds among those who do not drink at all. This result will be discussed in greater detail in Chapter 7.

6.1.3 The odds of reporting 'bad/very bad' health among persons aged 50 and over by SES characteristics: Model VII

Socio-economic status measures (e.g. education, household income, housing tenure and car availability), controlling for demographic characteristics, show a significant association with the outcome indicator of self-reported general health. Model VII shows that there is a significant association between low education and reporting 'bad/very bad' general health. For example, among those with a Diploma/A-level and those with no qualifications, the odds of reporting 'bad/very bad' health were 1.94 and 2.38 times respectively the odds amongst those with a degree.

Figure 6.1: Odds ratios of reporting 'bad/very bad' health by SES, aged 50 and over, 2004 HSE



Significance levels: *p < 0.01; **p < 0.005; ***p < 0.001;
Δ Reference group
Source: Authors analysis, 2004 HSE

Low equivalised household income was a strong predictor for 'bad/very bad' general health. For example, amongst those with a household income of less than £10,000 and those between £10,000 – 15,000, the odds were 2.77 and 1.98 times respectively the odds among those living in a household with an income of over £25,000. At the same time, however, among people living in a household with no income, the odds of reporting 'bad/very bad' health were 1.76 times the odds among those with a household income of over £25,000, a result which is further discussed in Chapter 7. In the model, housing tenure is also a statistically significant predictor of reporting 'bad/very bad' health. The odds of reporting 'bad/very bad' health among respondents in rented accommodation were 1.90 times the odds among owner-occupiers. Finally, respondents with no car availability were 56% more likely to report bad/very bad health compared with those who have car availability.

6.1.4 Summary

In this section the different demographic, health-risk behaviour and SES characteristics including education, NS-SEC, income, housing tenure and car availability were examined. In models I through VII, there were statistically significant differences in reporting 'bad/very bad' general health according to different demographic, SES and health-risk behaviour characteristics. For example, age

was not statistically significant for models IV-VII, however, the younger old age groups (e.g. 50-54) in Model I were less likely than respondents aged 70 years and older to report 'bad/very bad' health. Conversely, in models I and II, there were no statistical significant differences between men and women in reporting 'bad/very bad' health, but after controlling for other demographic characteristics including NS-SEC, and household income, in the subsequent models including the final model (VII), sex was statistically significant ($p< 0.01$), and women were 20 – 40% less likely than men to report 'bad/very bad' health.

There were also significant differences amongst ethnic minority groups. For example, Black African, Pakistani, Bangladeshi, and Chinese people were more likely to report 'bad/very bad' health compared to White people (Models I – VII). Divorced people were also more likely to report bad/very bad health, however the effect of marital status lost statistical significance once the demographic characteristics were controlled for (Model I – VI) and it was removed from the final model. Amongst the health-risk variables, smoking status was statistically significant at the $p< 0.001$ level except for the ex-occasional smokers' category, and ex-regular and current smokers were between 50 – 63% more likely than those who never smoked to report 'bad/very bad' health (Model I – VII). Alcohol consumption also remained statistically significant at the $p< 0.001$ level among all groups, and respondents who drank every day were less likely than those who do not drink at all to report 'bad/very bad' health.

There were also statistically significant differences in reporting 'bad/very bad' health when examining the different SES measures (see Figure 6.1). For example, respondents with no qualifications were more likely than those with a degree to report 'bad/very bad' health (Model I-VII). Occupational class was not strongly significant in most of the models unlike the other SES measures, which remained statistically significant in all the models, and NS-SEC occupational classifications were removed from the final model. The findings from this section of the analysis suggest that there are significant differences amongst ethnic elders in reporting 'bad/very bad health, however, the differences are not simply a result of SES characteristics. In the next Section, 6.2, gender differences in reporting 'bad/very bad' general health are examined in more detail.

6.2 Explaining the relationship between reporting 'bad/very bad' health, demographic characteristics and health-risk behaviour, for men and women aged 50 and over

Studies have shown that the male and female populations are not homogeneous and that considerable differences in health inequalities exist amongst people of different ethnicity and gender (see for example Cooper (2002). In order to understand the effect of SES on older men's and women's likelihood of reporting 'bad /very bad health, sequential models are run separately for men and women. This allows the effects of age group, ethnicity, marital status, smoking status, alcohol consumption, education, occupational class, household income, housing tenure and car availability to be controlled for. In the next section, Section 6.2.1, the findings are presented for men.

6.2.1 The odds of reporting bad/very bad general health among men aged 50 and over by demographic characteristics and health-risk behaviour and SES characteristics: Models I– VI

Table 6.2 presents a series of logistic regression models for men's odds ratios of reporting 'bad/very bad' general health. In Model I, the demographic variables of age, ethnicity and marital status, and the risk factors of smoking status and alcohol consumption were introduced, while additional demographic and socio-economic characteristics were added in later models.

Model I shows that age is a significant determinant of 'bad/very bad' general health for men, with men in the younger age groups being less likely to report 'bad/very bad' health compared to those aged 70 and over, and this was still the case after education (Model II) and NS-SEC classification (Model III) were added to the model. In Models IV through VI, age no longer has an effect for men, but as explained with the previous models, in the final model aged was retained, while the final model was re-run excluding age (see Table A.16). There were also increased odds among men from certain ethnic minority groups of reporting 'bad/very bad' health compared to White men. For example, in Model I, amongst Chinese, Bangladeshi, Pakistani and Black African men, the odds of reporting 'bad/very bad' health were 3.22; 1.79, 1.65 and 1.75 times respectively the odds among White men. Marital status was statistically significant, and among divorced men the odds of reporting 'bad/very bad' health were 1.56 times the odds among married men. The equivalent odds amongst widowed men were 0.78 times the odds amongst married men (Model II).

In Model III, the NS-SEC occupational classifications were added to education and this variable is statistically significant. There were significant differences in self-assessed general health by occupational class. For example, among men in the routine class, the odds of reporting 'bad/very

bad' health were 1.74 times the odds among men in the professional category, while men who have never worked were 153% more likely to report bad/very bad health than men in the professional category. Once occupational class is introduced, the effect of ethnicity is weakened, but is still significant. For example, among Pakistani and Chinese men, the odds of reporting 'bad/very bad' health were 1.77 and 2.95 times respectively the odds amongst White men.

In Model IV, household income is added to the previous explanatory variables, and this variable is statistically significant in all the models (IV – VI) for men (also see Table A.27). Lower equivalised household income was significantly associated with the report of 'bad/very bad' health, for example, among men with a household income of less than £10,000, the odds of reporting 'bad/very bad' health were 3.34 times the odds among men with a household income over £25,000. The effect of age and occupational class is no longer significant in the model, and in terms of marital status, divorced men were 50% more likely than married men to report bad/very bad health.

In Model V, housing tenure is added and it is statistically significant. Amongst men in rented accommodation, the odds of reporting 'bad/very bad' health were 2.01 times the odds among men who were owner-occupiers. Finally, in Model VI, car availability is introduced and men with no car availability were 82% more likely to report 'bad /very bad' health compared with men who had car availability.

Table 6.2: Odds ratios of reporting 'bad/very bad' health among men aged 50 and over, 2004 HSE

Demographic characteristics, health-risk behaviour and SES controls	Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII
	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)
MEN (n = 2,255)							
Age groups							
50 – 54	0.45 (0.30 -0.68) ***	0.54 (0.35 -0.82) **	0.53 (0.35 -0.82) **	0.67 (0.43 -1.05)	0.66 (0.42 - 1.04)	0.70 (0.44 -1.12)	0.77 (0.49 -1.20)
55 - 59	0.55 (0.36 -0.83) **	0.63 (0.41 -0.96) *	0.61 (0.39 -0.94) *	0.78 (0.50 - 1.23)	0.82 (0.52 -1.31)	0.88 (0.55 -1.40)	0.97 (0.62 -1.52)
60 - 64	0.89 (0.62 - 1.26)	0.97 (0.68 - 1.38)	0.92 (0.64 -1.33)	1.11 (0.76 - 1.61)	1.12 (0.77 -1.64)	1.22 (0.83 -1.80)	1.36 (0.94-1.98)
65 - 69	0.83 (0.58 - 1.20)	0.85 (0.59 - 1.23)	0.84 (0.58 -1.22)	0.90 (0.62 -1.31)	0.91 (0.62 -1.33)	0.95 (0.65 -1.40)	1.03 (0.71-1.49)
70+ (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ethnicity							
White (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Black Caribbean	1.85 (0.48 - 9.18)	1.84 (0.37 -9.29)	1.68 (0.32 -8.76)	1.52 (0.28 – 8.25)	1.19 (0.21 -6.77)	1.06 (0.18 -5.98)	1.22 (0.22–6.65)
Black African	1.75 (1.12 - 2.74) *	1.62 (1.04 - 2.54) *	1.47 (0.93 -2.32)	1.43 (0.90 - 2.28)	1.38 (0.86 -2.21)	1.25 (0.76 -2.02)	1.33 (0.83–2.13)
Indian	0.43 (0.15 - 1.24)	0.56 (0.19 - 1.64)	0.51 (0.17 -1.50)	0.43 (0.25 - 1.28)	0.34 (0.11 -1.02) *	0.31 (0.10 -0.93)	0.33 (0.11–0.98) *
Pakistani	1.65 (1.06 - 2.56) *	1.92 (1.23 – 3.01) **	1.77 (1.12 -2.80) *	1.61 (1.01- 2.59) *	1.75 (1.09 -2.83) *	1.66 (1.02 -2.69)	1.73 (1.08–2.77) *
Bangladeshi	1.79 (1.04 - 3.10) *	1.78 (1.02 - 3.12) *	1.54 (1.87 -2.76)	1.33 (0.74 - 2.39)	1.52 (0.84 -2.77)	1.49 (1.82 -2..72)	1.68 (0.94–3.01)
Chinese	3.22 (1.75 - 5.92) ***	3.26 (1.75 -6.07) ***	2.95 (1.55 -5.59) ***	2.78 (1.45 -5.36) * *	2.50 (1.28 -4.93) **	2.23 (1.13 -4.42)	2.47 (1.28–4.78) **
Irish	1.13 (0.56 – 2.26)	1.38 (0.68 - 2.82)	1.49 (0.73 -3.04)	2.23 (0.60- 2.55)	1.30 (0.63 -2.70)	0.31 (0.63 -2.72)	1.30 (0.64–2.66)
Other ethnic groups	1.57 (1.08 - 2.27) *	1.49 (1.03 - 2.17) *	1.43 (0.98 - 2.08)	1.42 (0.98 – 2.11)	1.31 (0.89 -1.93)	0.20 (0.81 -1.79)	1.17 (0.79–1.73)
Marital status							
Married (ref)	1.00	1.00	1.00	1.00	1.00	1.00	- - -
Single	1.30 (0.77 - 2.19)	1.24 (0.73 - 2.09)	0.98 (0.50 -1.93)	1.08 (0.63 - 1.86)	0.88 (0.51 -1.54)	0.74 (0.42 -1.30)	- - -
Divorced	1.56 (1.07 - 2.27) *	1.47 (1.01 -2.16) **	1.57 (1.16 -1.14) **	1.50 (1.01 - 1.23) *	1.20 (0.80 -1.81)	1.05 (0.69 -1.60)	- - -
Widowed	0.86 (0.54 - 1.35)	0.78 (0.49 -1.24) **	1.72 (1.20-2.47)	0.78 (0.49 - 1.25)	0.65 (0.40 -1.05)	0.58 (0.36 -1.95)	- - -
Smoking status							
Never smoked (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ex- occasionally	0.93 (0.48 -1.80)	0.92 (0.47 -1.80)	1.04 (0.67 -1.60)	0.95 (0.48 -1.87)	08 (0.44 -1.76)	0.84 (0.42 -1.69)	0.82 (0.42 -1.64)
Ex- regular	1.61 (1.19 -2.18) **	1.55 (1.14 -2.10) **	1.63 (1.31 -2.02) **	1.59 (1.17 -2.18) **	1.54 (1.12 -2.11) **	1.51 (1.11 -2.08) *	1.50 (1.10 -2.05) *
Current smoker	1.95 (1.37 -2.78) ***	1.74 (1.22 -2.48) ***	1.62 (1.26 -2.08) **	1.63 (1.13 -2.35) **	1.44 (1.00-2.10	1.41 (1.97 -2.06)	1.39 (0.96 -2.01)
Alcohol consumption							
Not at all (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Almost every day	0.25 (0.16 - 0.38) ***	0.30 (0.20 -0.47) ***	0.31 (0.20 -0.48) ***	0.36 (0.23 - 0.56) ***	0.38 (0.24 -0.60) ***	0.37 (0.24 -0.59) ***	0.38 (0.24 -0.60) ***
3 - 6 times a week	0.23 (0.14 - 0.37) ***	0.28 (0.17 -0.44) ***	0.29 (0.18 -0.46) ***	0.33 (0.21 - 0.54) ***	0.35 (0.22 -0.58) ***	0.36 (0.22 -0.58) ***	0.35 (0.22 -0.57) ***
1 - 2 times a week	0.36 (0.25 - 0.54) ***	0.39 (0.26 -0.58) ***	0.39 (0.26 - 0.59) ***	0.44 (0.30 - 0.67) ***	0.47 (0.31 -0.71) ***	0.47 (0.31 -0.71) ***	0.48 (0.32 -0.72) ***
Once every 2 months	0.44 (0.30 - 0.65) ***	0.47 (0.31 -0.70) ***	0.46 (0.31 - 0.69) ***	0.51 (0.34 - 0.76) ***	0.50 (0.33 -0.76) ***	0.50 (0.33 -0.76) ***	0.51 (0.34 -0.77) ***

Education							
Degree (ref)		1.00	1.00	1.00	1.00	1.00	1.00
Diploma/A-level		1.92 (1.06 -3.48) *	1.93 (1.03 -3.60) *	1.82 (0.96 -3.43)	1.83 (0.97 - 3.48)	1.87 (0.98 -3.56)	1.68 (0.91 -3.10)
O-level		2.41 (1.32 -4.41) **	2.21 (1.15 -4.24) *	1.03 (1.04 -3.94) *	2.04 (1.05 - 3.97) *	2.02 (1.08 -4.12) *	1.91 (1.03 -3.56) *
CSE/NVQ1		1.96 (1.51-5.83) **	2.49 (1.18 -5.23) *	1.00 (0.94 -4.26)	2.15 (1.00 - 4.61) *	1.14 (1.00 -4.61)	2.02 (1.00 -4.00) *
No qualification		3.48 (2.09-5.83) ***	2.82 (1.55 -5.12) **	2.31 (1.26 -4.25) **	2.24 (1.22 -3.13) **	2.19 (1.18 -4.06) *	2.14 (1.25 -3.67) **
Occupation							
Professional (ref)			1.00	1.00	1.00	1.00	
Lower managerial			0.94 (0.56 -1.56)	0.78 (0.42 -1.45)	0.78 (0.42 -1.46)	0.84 (0.50 -1.42)	- - -
Intermediate			1.03 (0.60 - 1.79)	1.85 (0.38 -1.89)	0.82 (0.36 -1.86)	0.88 (0.50 - 1.55)	- - -
Small employer			1.01 (0.58 -1.75)	0.62 (0.32 -1.20)	0.66 (0.34 -1.27)	0.85 (0.48 -1.49)	- - -
Supervisory/technical			1.30 (0.75 -2.24)	0.83 (0.44 -1.57)	0.78 (0.41 -1.50)	0.98 (0.56 -1.71)	- - -
Semi-routine			1.46 (0.87- 2.43)	1.33 (0.55 -1.93)	0.91 (0.48 -1.73)	1.02 (0.60 -1.73)	- - -
Routine			1.74 (1.05 -2.90) *	1.16 (0.62 -2.15)	1.04 (0.56 -1.95)	1.20 (0.71 -2.02)	- - -
Never worked			2.53 (1.43 -4.48) **	2.65 (0.99 -7.11)	2.65 (0.96 -7.36)	1.75 (0.97 -3.15)	- - -
Equivalised household income							
Over £25,000 (ref)				1.00	1.00	1.00	1.00
No income				2.06 (1.23 -3.46) **	1.93 (1.14 -3.25) *	1.83 (1.09 -3.10) *	1.83 (1.09 -3.07) *
Less than £10,000				3.34 (2.00 -5.57) ***	2.71 (1.61 -4.58) ***	2.51 (1.48 -4.26) ***	2.65 (1.58 -4.33) ***
£10,001 –15,000				3.02 (0.80 -5.05) ***	2.70 (1.60 -4.56) ***	1.45 (1.45 -4.16) ***	2.49 (1.48 -4.19) ***
£15,001 – 25,000				1.25 (1.10 -2.20)	1.20 (0.68 -2.14)	1.18 (1.66 -2..08)	1.21 (0.69 -2.15)
Housing tenure							
Own (ref)					1.00	1.00	1.00
Mortgage					1.01 (0.70 -1.46)	1.01 (0.71 -1.47)	1.03 (0.72 -1.48)
Rent					2.01 (1.59 -305) ***	1.99 (1.43 -2.77) ***	1.96 (1.42 -2.68) ***
Other					1.93 (0.30 -2.88)	0.87 (0.28 -2.72)	0.86 (0.28 -2.65)
Car availability							
Yes (ref)						1.00	1.00
No						1.82 (1.33 -2.47) ***	1.79 (1.33 -2.39) ***
-2 LLR	**1718.108**	**1686.100**	**1657.621**	**1621.464**	**1595.919**	**1581.744**	**1607.415**
% Change –2 LLR		1.86	**3.52**	**5.63**	**7.11**	**7.94**	**6.44**
R square	0.089	0.102	0.111	0.125	0.135	0.140	0.133

Adjusted by: Demographic and SES characteristics
Significance levels: 95% CI *p < 0.01; **p < 0.005; ***p < 0.001;
Source: Authors analysis, 2004 HSE

The health-risk behaviour characteristics, such as smoking and alcohol consumption, were significantly associated with men's reporting of 'bad/very bad' health. Ex-regular smokers had significantly higher odds of reporting 'bad/very bad' health in all the models, compared with men who never smoked. For example, in the Models I – IV, ex-regular smokers were between 50-60% more likely than those who never smoked to report 'bad/very bad' general health. Alcohol consumption among men was also significantly and consistently associated with a lower likelihood to report 'bad/very bad' general health. For example, men who drank almost every day were between 61-75% less likely than men who do not drink at all to report 'bad/very bad' general health (Models I-VI).

Hence, in models I through VI, there were statistically significant differences in reporting 'bad/very bad' general health in examining the demographic characteristics and health- risk behaviour among older men (see Table 6.2). The effect of age was not significant in Models IV-VI, but was retained in the final model because of the centrality of age in this analysis. However, a final Model excluding age has been run but not discussed here (see Table A.16). Marital status also lost statistical significance once the other demographic characteristics were controlled for, and NS-SEC was not statistically significant in the latter models unlike the other SES measures such as education, household income, housing tenure and car availability which remained statistically significant in all the models. Therefore, a final model (VII) was added, and the variables of marital status and NS-SEC occupational classification were not included in this. The next section discusses the results of Model VII, and presents the findings for the different SES measures as shown in Table 6.2 and Figure 6.2.

6.2.2 The odds of reporting 'bad/very bad' health among men aged 50 and over by demographic characteristics and health-risk behaviour: Model VII

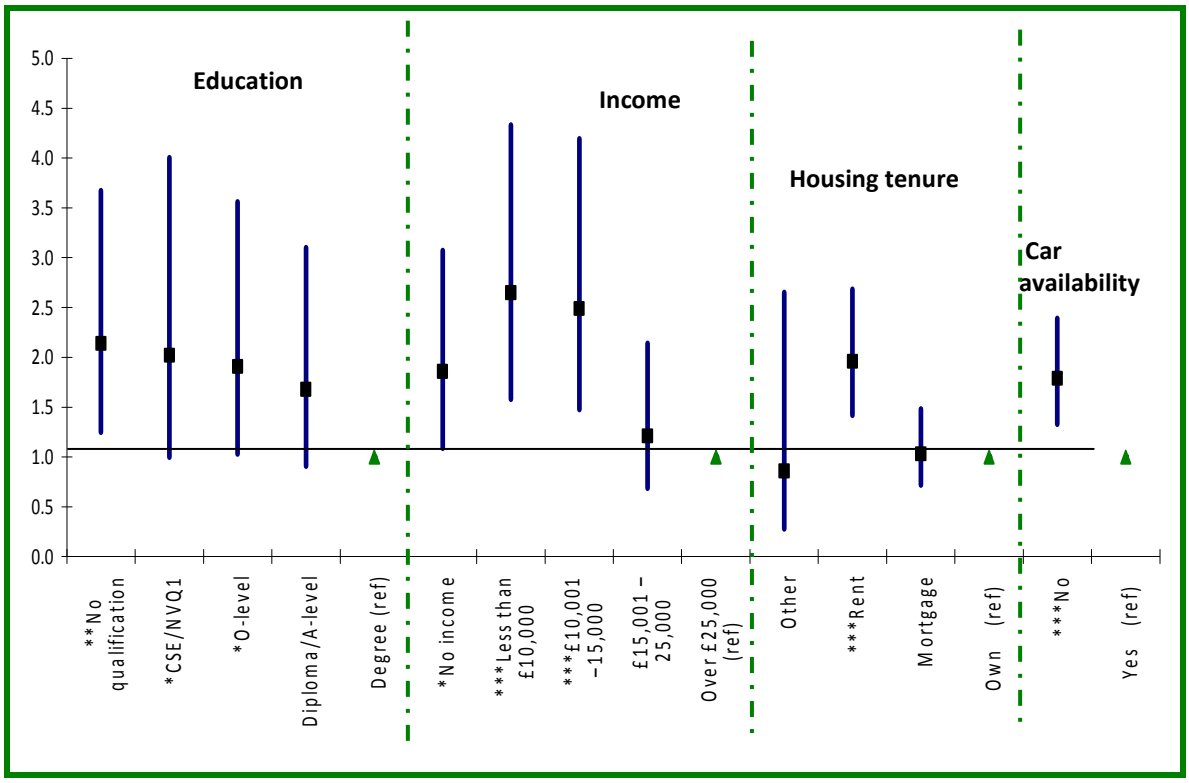
Amongst Chinese and Pakistani men, the odds of reporting 'bad/very bad' health were 2.47 and 1.73 times respectively the odds among White men, whereas Indian men were 67% less likely than White men to report 'bad/very bad' general health. Ex-regular smokers were 50% more likely to report 'bad/very bad' health compared with those who never smoked, and the analysis showed that there is a strong relationship between alcohol consumption and a lower likelihood of reporting 'bad/very bad' health amongst men. For example, men who consumed alcohol almost every day were 62% less likely to report 'bad/very bad' health than men who never drank at all. Section 6.2.3 will examine the differences in reporting 'bad/very bad' health by SES amongst men.

6.2.3 The odds of reporting 'bad/very bad' health among men aged 50 and over by SES characteristics: Model VII

In this section, the adjusted odds ratios of men reporting of 'bad/very bad' health are discussed, using different SES measures. Higher education is significantly associated with a reduced likelihood of reporting 'bad/very bad' general health. For example, among men with O-levels, the odds of reporting 'bad/very bad' health were 1.91 times the odds among those with a degree, and among those with no qualifications, the odds of reporting 'bad/very bad' health were 2.14 times the odds among those with a degree.

A low equivalised household income was also significantly associated with reporting 'bad/very bad' health. For example, men in the higher household income group (over £25,000) were the least likely to report 'bad/very bad' health, while amongst those with a household income of less than £10,000, the equivalent odds were 2.65 times the odds among those household income over £25,000. Interestingly, among men with no household income, the odds of reporting 'bad/very bad' health were 1.83 times the odds among those household income over £25,000, and this result will be discussed in greater detail in Chapter 7.

Figure 6.2: Odds ratios of reporting 'bad/very bad' health by SES: Men aged 50 and over, 2004 HSE



Significance levels: *p < 0.01; **p < 0.005; ***p < 0.001;
Δ Reference group
Source: Authors analysis, 2004 HSE

Differences in the report of 'bad/very bad' health were also associated with housing tenure among men and being an owner-occupier is associated with a lower likelihood to report 'bad/very bad' health. For example, among those in rented accommodation, the odds of reporting 'bad/very bad' health were 1.96 times the odds among owner-occupiers (See Table 6.2). Finally, men with no car availability were 79% more likely than men with car availability to report bad/very bad health.

6.2.4 Summary

This section of the thesis examined the odds of reporting 'bad/very bad' health by demographic, health-risk behaviour and SES characteristics amongst older men from ethnic minorities. In the Models I – VII, amongst older men with different demographic characteristics there were statistically significant differences in reporting 'bad/very bad health. For example, age was only statistically significant amongst younger old men in Models I – III, and younger old men were between 47 – 55% less likely than men aged 70 and over to report 'bad/very bad' health. Ethnicity was also a significant predictor amongst older men reporting 'bad/very bad health. For example, Chinese and Pakistani men consistently reported higher odds of reporting 'bad/very bad' health compared with White men. However, Indian men were less likely to report 'bad/very bad' health but this result was weaker statistically in the final model (p< 0.005).

Amongst health-risk behaviour characteristics, smoking status was statistically significant throughout the models, with ex-regular smokers among men having higher odds of reporting 'bad/very bad' health compared to those who never smoked. Alcohol consumption also remained statistically significant at the p< 0.001 level among all groups, and men who drank 3 – 6 days a week were between 65 – 77% less likely to report 'bad/very bad' health compared with men who do not drink at all.

There were also statistically significant differences in reporting 'bad/very bad' general health in terms of different SES measures, for example between men with no qualifications and men with a degree (Model I- VII). For example, men with no qualifications were 148% more likely to report 'bad/very bad' health compared to men with a degree. Occupational class was not strongly significant in most of the models unlike the other SES measures, and was not retained in the final model. Conversely, equivalised household income was statistically significant, and men whose equivalised household income was less than £10,000 were 165% more likely to report 'bad/very bad health' compared to those whose household income was over £25,000. Finally, differences in reporting 'bad/very bad' health among men were also significantly associated with housing tenure and car availability at the (p< 0.001) level in all the models, with male renters being more likely to report bad/very bad health than male owner-occupiers, and men with no car availability being more likely to report bad/very bad health than men with car availability.

In order to better understand the full extent of gender differences in reporting 'bad/very bad' health, Section 6.2.5 presents the findings for women.

6.2.5 The odds of reporting 'bad/very bad' general health amongst women aged 50 and over by demographic characteristics and health-risk behaviour and SES characteristics: Models I– VI

This section of the analysis examined the likelihood of older women of 'bad/very bad' health using a number of demographic characteristics, health-risk behaviours and SES measures. Similar to Section 6.2.1, a series of logistic regression models were run, in which the odds ratios represent women's likelihood of reporting 'bad/very bad' general health compared with the reference category. Table 6.3 show the results of the analysis. Thus, in Model I, the demographic variables of age, ethnicity and marital status, and the risk factors of smoking status and alcohol consumption were introduced, and subsequent Models included additional measures of SES, such as education and equivalised household income. In Model VII, the variables marital status and NS-SEC occupational classification were not included in the model. Although age was retained in the final Model, Model VII was re-run excluding age (see Table A.17).

It is evident from the results that there are marked differences among women in reporting 'bad/very bad' health. In the Models I – VI, age is not a significant determinant of the report of 'bad/very bad' health among women, even after adjusting for demographic and SES characteristics. Ethnicity was a strong predictor of reporting 'bad/very bad' health, and ethnic minority women reported higher odds of 'bad/very bad' health compared with the odds of White women, as indicated in Table 6.3. For example, in Model I, amongst Chinese, Bangladeshi, Black African and Pakistani women, the odds of reporting 'bad/very bad' health were 3.63; 3.51 and 1.97 and 1.53 times respectively the odds of White women.

Equally, in Model II, education proved to be a significant predictor of 'bad/very bad' health amongst women, for example women with no qualifications were 254% more likely than women with a degree to reporting 'bad/very bad' health. There were also significant differences between ethnic minority women in reporting 'bad/ very bad' health, with Bangladeshi and Pakistani women being 222% and 58% respectively more likely than White women to report 'bad/very bad' health. Finally, marital status was not statistically significant in the women's model.

Table 6.3: Odds ratios of reporting 'bad/very bad' health among women aged 50 and over, 2004 HSE

Demographic characteristics, health-risk behaviour and SES controls	Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII
	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)
WOMEN (n = 2,831)							
Age groups							
50 – 54	0.67 (0.46 – 0.97)	0.83 (0.57 – 1.21)	0.82 (0.56 –1.19)	0.86 (0.59 –1.27)	0.87 (0.58 –1.29)	0.92 (0.62–1.39)	0.98 (0.67–1.43)
55 - 59	0.75 (0.52 –1.09)	0.87 (0.60 –1.26)	0.84 (0.57 – 1.23)	0.91 (0.62 – 1.34)	0.96 (0.65 –1.43)	1.91 (0.68–1.50)	1.09 (0.75–1.58)
60 - 64	0.81 (0.71 –1.15)	0.89 (0.62 – 1.26)	0.89 (0.62– 1.27)	0.94 (0.66 – 1.35)	0.96 (0.67 –1.38)	1.00 (0.69–1.44)	1.04 (0.74–1.49)
65 - 69	0.79 (0.56 –1.13)	0.85 (0.50 –1.21)	0.85 (0.59– 1.22)	0.88 (0.61 –1.26)	0.91 (0.63 –1.31)	0.96 (0.66 –1.38)	0.99 (0.69–1.41)
70+ (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ethnicity							
White (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Black Caribbean	1.40 (0.39 –5.03)	1.59 (0.43 –5.81)	1.41 (0.37 – 5.31)	1.46 (0.39 –5.49)	1.27 (0.34 –4.77)	1.18 (0.31 –4.50)	1.24 (0.34 -4.55)
Black African	1.97 (1.35–2.89) ***	1.81 (1.24 – 2.68) *	1.76 (1.19 – 2.60) **	1.67 (1.12 – 2.28)	1.64 (1.09 –2.45)	1.54 (1.03 –2.31)*	1.56 (1.05 -2.31) *
Indian	1.70 (0.87–3.32)	0.74 (0.89 – 3.42)	1.39 (0.69 – 2.81)	0.37 (0.67– 2.77) *	0.11 (0.54 –2.29) *	1.10 (0.53 –2.25)	1.22 (0.61 -2.45)
Pakistani	1.55 (1.00–2.40) *	1.58 (1.01 – 2.48) **	1.43 (0.41 – 2.14)	1.27 (0.79 – 2.04)	1.43 (0.88 –2..31)	1.40 (0.87 –2.27)	1.55 (0.98 -2.51)
Bangladeshi	3.51 (2.13–5.80) ***	3.22 (1.94 – 5.35) *	1.33 (1.32 – 4.10) **	2.28 (1.28 – 4.04) * *	1.66 (1.49 –4.76) ***	2.64 (1.48 –4.47)***	3.28 (1.95 -5.52) ** *
Chinese	3.63 (2.09 –6.28)***	2.98 (1.71– 5.20) ***	2.22 (1.19 – 4.11) *	2.14 (1.14 – 4.02) *	2.15 (1.13 –4.09) *	2.09 (1.10 –3.99)*	2.51 (1.41 -4.47) ***
Irish	0.63 (0.28 –1.41)	0.66 (0.29 – 1.50)	0.63 (0.28 – 1.45)	0.59 (0.26 – 1.37)	0.63 (0.27 –1.47)	0.62 (0.27 –1.46)	0.66 (0.28 -1.51)
Other ethnic groups	0.74 (0.50 –1.10)	0.76 (0.59 – 1.13)*	0.78 (0.53 – 1.07)	0.73 (0.49 – 1.02)	0.72 (0.48 –1.08)	0.69 (0.46 –1.05)	0.67 (0.44 -1.01)
Marital status							
Married (ref)	1.00	1.00	1.00	1.00	1.00	1.00	- - -
Single	1.27 (0.79 – 2.03)	1.32 (0.82–2.13)	1.37 (0.85 –2.24)	1.31 (0.80 – 2.15)	1.03 (0.62–1.71)	0.92 (0.55 –1.54)	- - -
Divorced	1.33 (0.94 – 1.87)	1.37 (0.97–1.93)	1.39 (0.98 –1.97)	1.36 (1.95 – 1.93)	1.12 (0.78 –1.62)	1.02 (0.70 –1.48)	- - -
Widowed	1.13 (0.86– 1.50)	1.08 (0.08–1.43)	0.04 (0.78 –1.39)	1.10 (0.83 - 1.47)	0.96 (0.72 –1.30)	0.88 (0.65 –1.19)	- - -
Smoking status							
Never smoked (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ex- occasionally	0.07 (0.6 –1.89)	1.09 (0.61–1.93)	1.09 (0.61 –1.93)	1.08 (0.60 –1.92)	1.01 (0.57 –1.80)	1.02 (0.57 –1.83)	1.02 (0.57 -1.83)
Ex- regular	1.77 (1.31 –2.40) **	1.71 (1.26–2.32 ***	1.70 (1.25 –2.33) ***	1.71 (1.25 –2.34) ***	1.61 (1.17 –2.22) **	1.62 (1.18 –2.23) **	1.63 (1.19 -2.24) **
Current smoker	1.77 (1.24–2.52) ***	1.58 (1.10–2.26) *	1.55 (1.08 –2.23) *	1.52 (1.06 – 2.19) *	1.36 (0.93–1.97)	1.35 (0.93 –1.97)	1.36 (0.94 -1.97)
Alcohol consumption							
Not at all (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Almost every day	0.24 (0.15– 0.38) ***	0.29 (0.18 -0.47) ***	0.31 (0.19–0.51)***	0.36 (0.22 - 0.59) ***	0.37 (0.23 –0.62) ***	0.38 (0.23 –0.62) ***	0.36 (0.22 -0.60) ***
3 - 6 days a week	0.07 (0.30– 0.15)***	0.09 (0.04– 0.20)***	0.09 (0.04 –0.21)***	0.11 (0.05– 0.25) ***	0.11 (0.05 –0.26) ***	0.11 (0.05 –0.27) ***	0.11 (0.05 -0.26) ***
1 - 2 times a week	0.31 (0.21– 0.46)***	0.35 (0.23– 0.51)***	0.35 (0.24 –0.53)***	0.38 (0.25– 0.57) ***	0.39 (0.26 –0.59) ***	0.39 (0.26 –0.59) ***	0.39 (0.26 -0.58) ***
Once every 2 months	0.47 (0.35– 0.62)***	0.52 (0.39– 0.70)***	0.55 (0.41 –0.74)***	0.58 (0.43– 0.77) ***	0.57 (0.42–0.76) ***	0.57 (0.42 –0.76) ***	0.54 (0.40 -0.73) ***
Education							

Degree (ref)		1.00	1.00	1.00	1.00	1.00	1.00
Diploma/A-level		2.23 (1.11 – 4.45)*	2.12 (1.05 –4.29)*	2.01 (0.98 –4.11)	2.13 (1.03 –4.41) *	2.09 (1.00 – 4.32)	2.07 (1.01 -4.22) *
O-level		2.12 (1.06 – 4.22)*	1.76 (0.86 –3.57)	1.68 (0.83 –3.46)	1.82 (0.88– 3.77)	1.82 (0.88 – 3.76) *	1.95 (0.96 -3.96)
CSE/NVQ1		0.70 (0.24– 2.06)	0.56 (0.19 –1.67)	0.51 (0.17 –1.53)	0.55 (0.18 –1.67)	0.55 (1.18 – 1.66)	0.60 (0.20 –1.81)
No qualification		3.54 (1.90– 2.56)***	2.40 (1.24 –4.65)*	2.03 (1.04 –3.98) *	2.05 (1.05 –4.04) *	2.00 (1.02 – 3.95) *	2.36 (1.24 -4.50) * *
Occupation							
Professional (ref)			1.00	1.00	1.00	1.00	
Lower managerial			1.53 (0.45–5.27)	1.34 (0.39–4.66)	1.19 (0.34–.4.14)	1.24 (0.36 –4.31)	- - -
Intermediate			1.74 (0.50 – 6.02)	1.51 (0.43 –5.25)	1.38 (0.40 –4.79)	1.37 (0.39 –4.76)	- - -
Small employer			2.37 (0.64 – 8.74	0.88 (0.50–7.02)	1.73 (0.46–6.42)	1.72 (0.46–6.43)	- - -
Supervisory/technical			2.46 (0.66– 9.07)	0.88 (0.50–7.01)	1.62 (0.43– 6.02)	1.61 (0.43 –6.03)	- - -
Semi-routine			2.52 (0.71– 8.26)	1.84 (0.43–6.34)	1.55 (0.45–5.33)	1.56 (0.45–5.36)	- - -
Routine			2.81 (1.82– 9.62)	2.13 (0.62–7.38)	1.79 (0.52 –6.18)	1.75 (0.51 –6.06)	- - -
Never worked			3.64 (1.03– 12.86)*	2.76 (0.77–9.87)	2.17 (0.61–7.74)	2.15 (0.60 –7.69)	- - -
Equivalised household income							
Over £25,000 (ref)				1.00	1.00	1.00	1.00
No income				1.75 (1.02–2.29) *	1.59 (0.92 –2.72)	1.55 (0.09 –2.66)	1.62 (0.95 -2.78)
Less than £10,000				3.28 (1.93 –5.57) ***	2.66 (1.55 –4.55)***	2.56 (1.49 –4.39 ***	2.78 (1.64 -4.73) ***
£10,001 –15,000				1.98 (1.16–3.38) *	2.68 (0.98 –2.88)	1.55 (0.89 –2.68)	1.63 (0.95 -2.79)
£15,001 – 25,000				1.88 (1.08 –3.28) *	1.81 (1.04 –3.18)*	1.79 (1.02 –3.14) *	1.89 (1.08 -3.30) *
Housing tenure							
Own (ref)					1.00	1.00	1.00
Mortgage					0.79 (0.56 –1.12)	0.81 (0.57 –1.15)	0.81 (0.57–1.16)
Rent					1.94 (1.46 –2.56) ***	1.78 (1.33 –2.37) ***	1.82 (1.37–2.41) ***
Other					1.77 (0.80 –3.91)	0.69 (0.76 –3.77)	1.68 (0.60–3.72)
Car Availability							
Yes (ref)						1.00	1.00
No						1.43 (1.08 –1.89) ***	1.44 (1.10 -1.87) ***
-2 LLR	**2091.305**	**2050.046**	**2023.968**	**1993.685**	**1962.492**	**1956.214**	**1971.137**
% Change –2 LLR		**1.97**	**3.22**	**4.67**	**6.11**	**6.46**	**5.75**
R -square	0.090	0.103	0.107	0.116	0.126	0.128	0.127

Adjusted by: Demographic and SES characteristics
Significance levels: 95% CI *p < 0.01; **p < 0.005; ***p < 0.001;
Source: Authors analysis, 2004 HSE

In Model III the NS-SEC occupational classifications were added to education and it was a significant predictor of reporting 'bad/very bad' health amongst women. For example, amongst women who never worked, the odds of reporting 'bad/very bad' health were 3.64 times the odds among women in the professional category. Ethnicity remains statistically significant, and amongst Chinese, Black African and Bangladeshi women, the odds of reporting 'bad/very bad health were 2.22, 1.76 and 1.33 times respectively the odds amongst White women.

In Model IV when equivalised household income is added to the analysis, low equivalised household income was a strong predictor for reporting 'bad/very bad' health among women. For example, amongst women with a household income of less than £10,000 and women with a household income between £10,001 – 15,000, the odds were 3.28 and 1.98 times respectively the odds among women with a household income over £25,000. However, amongst women with no household income, the odds of reporting 'bad/very bad' health were 1.75 times the odds among women with a household income over £25,000, a result which is further discussed in Chapter 7. Ethnicity also remains statistically significant in the model, and among Bangladeshis and Chinese women, the odds of reporting 'bad/very bad health were 2.28 and 2.14 times respectively the odds among White women. However, among Indian women the odds of reporting 'bad/very bad' health were 63% less likely than White women.

In Model V, housing tenure is added and it is statistically significant. The findings show that among women renters, the odds of reporting 'bad/very bad' health were 2.66 times the odds among owner-occupiers. The differences in reporting 'bad/very bad' health amongst ethnic minority women also remain significant, and were consistently higher amongst Chinese women compared with White women.

In model VI car availability is introduced and it is significantly associated with the report of 'bad/very bad' health, and women having no car availability were 1.43 times more likely than women with car availability to report 'bad/very bad health. Ethnicity remains significant in reporting 'bad/very bad health amongst women. There were no significant differences amongst women in reporting 'bad/very bad' health in the marital status categories throughout the models (I – IV).

The health-risk behaviour characteristics, such as smoking and alcohol consumption, were significantly associated amongst women reporting 'bad/very bad' health. Hence, smoking was statistically significant and ex-regular smokers had significantly higher odds of reporting 'bad/very bad' health in all the models, compared with women who never smoked. For example, in the Models I – VI, ex-regular smokers were between 60 – 70% more likely than women who never smoked to

report 'bad/very bad' general health (also see Table A.28). Alcohol consumption amongst women was also significantly associated with a lower likelihood to report 'bad/very bad' general health. For example, women who drank 3 – 6 days a week were between 89 - 93% less likely than women who do not drink to report 'bad/very bad' general health (Models I-VI).

Thus, in models I through VI, there are statistically significant differences in reporting 'bad/very bad' general health in examining the demographic and health- risk behaviour characteristics among older ethnic minority women. The effect of age was not significant in the models (I – VI) but was retained in the models in order to compare the effects of demographic and SES characteristics on the change in 'bad/very bad' general health. Marital status also lost statistical significance once the other demographic characteristics were controlled for. Similarly, NS-SEC was only significant in model (I) and was not statistically significant in the subsequent models (IV – VI) unlike the other SES measures (e.g. education, income, housing tenure and car availability) that were statistically significant in all the models. Therefore, a final model (VII) was added and marital status and NS-SEC occupational classifications were not included in this final model. The next section discusses the results of Model VII, and presents the findings for the different demographic characteristics as shown in Table 6.3 and Figure 6.3.

6.2.6 The odds of reporting 'bad/very bad' health among women aged 50 and over by demographic characteristics and health-risk behaviour: Model VII

This section discusses the results from the final model, which included all variables except occupational class and marital status, as these were found to be statistically not significant. The literature argues that the relationship between men and women's health status is complex, with women experiencing poorer health on a number of demographic characteristics (Arber and Cooper, 1999; Macintyre et al., 2003). The findings in this thesis also show significant differences, for example, amongst Bangladeshi, Chinese and Black African women, the odds of reporting 'bad/very bad' health were 3.28, 2.51 and 1.56 times respectively the odds among White women.

Amongst women, the health-risk behaviour, smoking and alcohol consumption were statistically significant with reporting 'bad/very bad' health. For example, amongst ex-regular smokers, the odds of reporting 'bad/very bad' health were 1.63 times the odds among women who had never smoked. The results further show that women who consume alcohol were less likely to report 'bad/very bad' general health. For instance, among women who consume alcohol almost every day, the odds of reporting 'bad/very bad' health were 0.36 times the odds among women who never drink. These results will be discussed in details in Chapter 7.

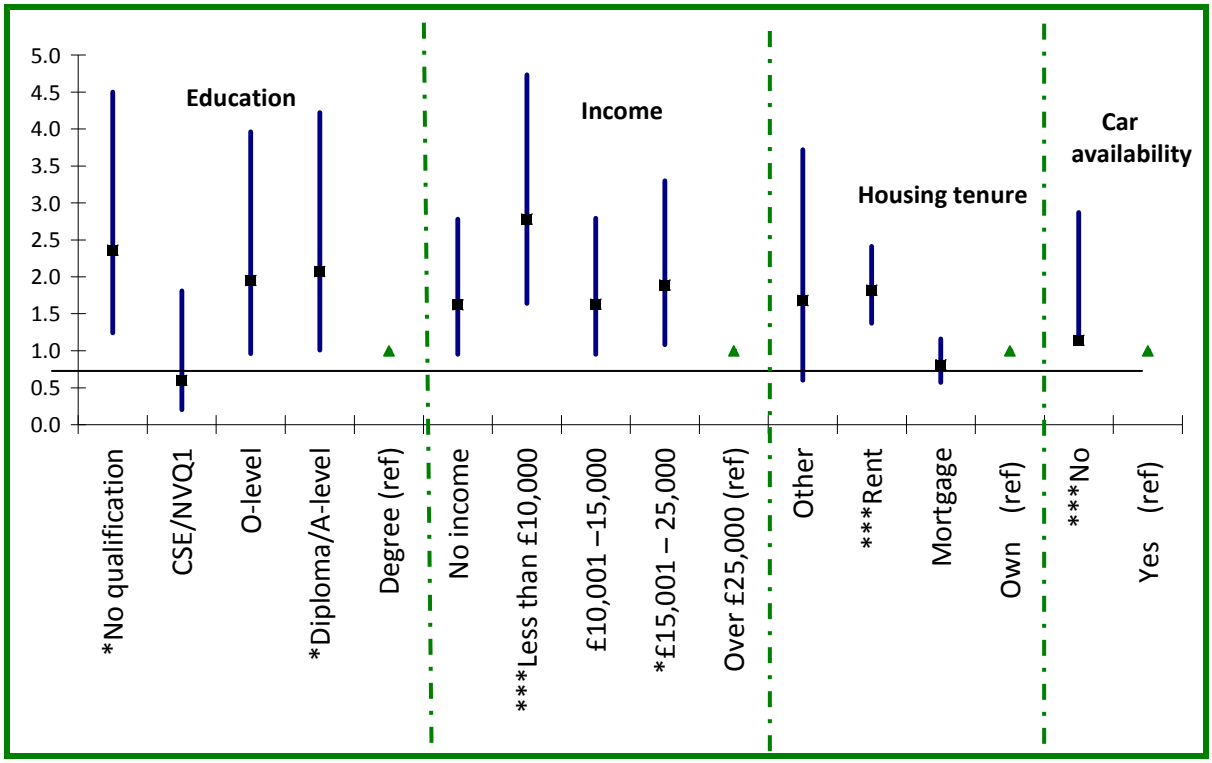
6.2.7 The odds of reporting 'bad/very bad' health amongst women aged 50 and over by SES characteristics: Model VII

This section of the analysis examines the differences in reporting 'bad/very bad' health by SES among women.

There is some evidence of a gradient in health among women in terms of the effect of the SES measures employed in the analysis on the likelihood of reporting 'bad/very bad' health. For example, lower education is associated with the likelihood of reporting 'bad/very bad' general health. Among women with no qualifications, the odds of reporting 'bad/very bad' health were 2.36 times the odds among women with a degree.

Similarly, lower household income was also significantly associated with 'bad/very bad' health among women. For example, women in the richest households (over £25,000) had lower odds of reporting 'bad/very bad' health. For example, among women with an equivalised household income of less than £10,000, the odds of reporting 'bad/very bad' health were 2.78 times the odds among women in households with an income of over £25,000. Differences in the report of 'bad/very bad' health were also associated with housing tenure, with women in rented accommodations being 81% more likely to report 'bad/very bad' health than female owner-occupiers (Figure 6.3).

Figure 6.3: Odds ratios of reporting 'bad/very bad' health by SES: Women aged 50 and over, 2004 HSE



Significance levels: *p < 0.01; **p < 0.005; ***p < 0.001;
Δ Reference group
Source: Authors analysis, 2004 HSE

Finally, car availability was also significantly associated with the report of 'bad/very bad' health among women, and amongst women with no car availability, the odds of reporting 'bad/very bad' health were 1.44 times the odds among women with car availability.

6.2.8 Comparing the reporting of 'bad/very bad' general health for men and women

As indicated from the findings of this study, there are considerable differences between men and women in terms of the factors which explain their reporting of 'bad/very bad' general health. In terms of demographic characteristics, age groups were not significant in any of the models (I –VI) for either men or women even after controlling for other demographic and SES characteristics. The results of certain ethnic groups were also significant, for example Bangladeshi and Chinese women were much more likely than White women to report bad/very bad health, while Pakistani and Chinese men were more likely than White men to report bad/very bad health, and Indian men were less likely to do so. Marital status was not a strong predictor for women, however among men, those who were divorced were more likely to report bad/very bad health than married men. The patterns in terms of the health-risk behaviour variables, smoking status and alcohol consumption, were

similar among men and women, with ex-regular smokers being more likely to report bad/very bad health than those who had never smoked, and with those who consumed alcohol –regardless of the frequency, being less likely to report bad/very bad health than those who did not drink at all.

In terms of the SES indicators, there were interesting similarities in the significance of different variables for the report of bad/very bad health between men and women. A lower education was significantly associated with the report of bad/ very bad health compared to higher education, for example men and women with no qualifications were 114% and 136% respectively more likely than men and women with a degree to report bad/very bad health. Similarly, a lower equivalised household income was associated with poor health, with men and women living in a household with an equivalised income of less than £10,000 being much more likely to report bad/very bad health than their counterparts living in a household with an equivalised income of more than £25,000. Housing tenure had a similar effect for men and women, with renters among men and women being 96% and 82% respectively more likely to report bad/very bad health than owner-occupiers. Finally, the lack of car availability was significantly associated with the report of bad/very bad health for both men and women.

6.2.9 Summary

Our understanding of the patterns of ethnic elders' health depends on a deeper understanding of the factors which can explain the report of poor health for different groups in the population (Evandrou 2000; Salway et al., 2007). This section has explored the determinants of reporting bad/very bad health for older men and women together, and separately. The findings reveal complex relationships between the report of bad/very bad health and different demographic, health-risk behaviour and SES characteristics, which vary not only between different ethnic groups, but also between women and men. Interestingly, the findings show that there were gender differences in terms of the demographic characteristics, but that the health-risk behaviour and SES characteristics behaved in a similar manner for men and women. These findings will be discussed in depth in Chapter 7.

In Section 6.3, the second outcome indicator of the report of a LLSI will be examined in order to contribute to our understanding of the role which SES plays on health inequalities in later life.

6.3 The odds of reporting a LLSI among persons aged 50 and over by demographic characteristics, health-risk behaviour and SES characteristics: Models I– VI

Research has shown that there is a strong association between low SES and health across a range of health conditions, functional status and risk factors (Breeze et al., 1999; Davey Smith et al., 2000; Manor et al., 2001; Salway et al., 2007). In addition, the empirical evidence shows that long-term health conditions can also affect a person's employment chances and, by extension, their earnings (Salway et al., 2007). The report of a limiting long-standing illness (LLSI) is an indicator of chronic conditions among older people and ethnic minority groups (Beydoum and Popkin, 2005; Gooberman-Hill et al., 2003; Manor et al., 2001; Natarajan, 2006). A LLSI is defined as a chronic condition or disability that can limit an individual's daily activities or work (Manor et al., 2000; Natarajan, 2006), and such illnesses are not easily cured but can be controlled to some extent (Ayis et al., 2003). Some of the more common LLSIs are chronic heart disease, stroke, diabetes, hypertension and arthritis (Ayis et al., 2003; Nazroo, 2001; ONS, 2008). Several theories have been put forward to explain the report of a LLSI and its relationship with socio-economic indicators. For example, according to the materialist/structural hypothesis, the physical environment, including one's workplace, housing conditions and material resources, is likely to contribute to the report of a LLSI. On the other hand, the behavioural /lifestyle perspective argues that individual behavioural risk factors, such as smoking and alcohol use, are underlying factors of the prevalence of a LLSI (Achenson, 1998; Manor et al., 2001; Macintyre, 1997; Townsend et al., 1988).

This section focuses on the second outcome measure of reporting of a LLSI, and the results of the logistic regression modelling are discussed. Table 6.4 shows the results of the odds ratios for reporting a LLSI for ethnic minority groups aged 50 and over.

Table 6.4: Odds ratios of reporting a LLSI by demographic characteristics, health-risks and SES, aged 50 and over, 2004 HSE

Demographic characteristics, health-risk behaviour and SES controls	Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII
	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)
N = 5086							
Age groups							
50 – 54	0.49 (0.41 -0.59) ***	0.55 (0.46 -0.67) ***	0.54 (0.45 -0.66) ***	0.60 (0.49 -0.73) ***	0.57 (0.47 -0.71) ***	0.59 (0.48 -0.73) ***	0.58 (0.47 -0.70) ***
55 - 59	0.52 (0.43 -0.63) ***	0.56 (0.46 -0.68) ***	0.55 (0.45 -0.66) ***	0.62 (0.51 -0.75) ***	0.61 (0.50 -0.75) ***	0.63 (0.51 -0.77) ***	0.63 (0.52 -0.76) ***
60 - 64	0.64 (0.53 -0.77) ***	0.67 (0.56 -0.81) ***	0.66 (0.55 -0.79) ***	0.71 (0.59 -0.85) ***	0.71 (0.59 -0.85) ***	0.73 (0.60 -0.88) ***	0.73 (0.61 -0.88) **
65 - 69	0.69 (0.57 -0.83) ***	0.71 (0.59 -0.86) ***	0.70 (0.58 -0.84) ***	0.72 (0.60 -0.88) **	0.73 (0.61 -0.89) **	0.75 (0.62 -0.91) **	0.76 (0.63 -0.92) **
70+ (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Sex							
Men (ref)	1.00	1.00	1.00	1.00	1.00	1.00	- - -
Women	1.00 (0.88 – 1.13)	0.97 (0.85 – 1.11)	0.95 (0.83 – 1.10)	0.96 (0.84 – 1.11)	0.97 (0.85 – 1.12)	0.97 (0.84 – 1.11)	- - -
Ethnicity							
White (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Black Caribbean	1.26 (1.01 -1.58)	1.22 (0.97 -1.53)	1.19 (0.95 -1.49)	1.16 (0.92 -1.46)	1.12 (0.89 -1.41)	1.08 (0.86 -1.36)	1.08 (0.86 -1.36)
Black African	0.63 (0.42 -0.94)	0.67 (0.45 -1.00)	0.63 (0.42 -0.95)	0.60 (0.40 -0.90)	0.51 (0.34 -0.77)**	0.51 (0.34 -0.76)**	0.49 (0.33 -0.73)**
Indian	1.12 (0.89 -1.43)	1.17 (0.92 -1.49)	1.09 (0.85 -1.39)	1.05 (0.82 -1.34)	1.08 (0.84 -1.39)	1.07 (0.83 -1.37)	1.10 (0.87 -1.41)
Pakistani	1.49 (1.07 -2.08)	1.46 (1.05 -2.04)	1.26 (0.89 -1.79)	1.17 (0.82 -1.66)	1.22 (0.86 -1.73)	1.21 (0.85 -1.72)	1.38 (0.99 -1.93)
Bangladeshi	1.34 (0.92 -1.96)	1.26 (0.86 -1.84)	1.09 (0.73 -1.62)	1.05 (0.70 -1.58)	0.98 (0.65 -1.47)	0.95 (0.63 -1.42)	1.10 (0.75 -1.61)
Chinese	0.41 (0.28 -0.61)***	0.44 (0.29 -0.65)***	0.43 (0.29 -0.64)***	0.40 (0.27 -0.60)***	0.41 (0.28 -0.61)***	0.41 (0.27 -0.61)***	0.41 (0.28 -0.61)***
Irish	0.85 (0.71 -1.02)	0.84 (0.70 -1.01)	0.84 (0.70 -1.00)	0.83 (0.69 -1.00)	0.81 (0.67 -0.97)	0.79 (0.66 -0.95)	0.78 (0.65 -0.74)
Other ethnic groups	1.39 (0.67 – 2.92)	1.44 (0.69 – 3.03)	1.48 (0.69 – 3.18)	1.45 (0.67 – 3.14)	1.40 (0.64 – 3.08)	1.36 (0.62 – 2.99)	1.26 (0.59 – 2.71)
Marital status							
Married (ref)	1.00	1.00	1.00	1.00	1.00	1.00	- - -
Single	0.96 (0.74 – 1.24)	0.96 (0.74 – 1.24)	0.94 (0.73 – 1.22)	0.92 (0.71 – 1.19)	0.84 (0.64 –1.09)	0.79 (0.60 –1.03)	- - -
Divorced	1.25 (1.03 – 1.51)	1.26 (1.04 – 1.53)	1.24 (1.02 – 1.50)	1.21 (1.00 – 1.47)	1.09 (0.89 – 1.33)	1.04 (0.85 – 1.27)	- - -
Widowed	1.12 (0.94 - 1.32)	1.08 (0.91 - 1.28)	1.05 (0.88 - 1.25)	1.08 (0.90 - 1.28)	1.00 (0.84 – 1.20)	0.95 (0.79 – 1.14)	- - -
Smoking status							
Never smoked (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ex- occasionally	1.12 (0.85 –1.46)	1.12 (0.86 –1.48)	1.15 (0.88 –1.51)	1.13 (0.86 –1.49)	1.09 (0.83 –1.44)	1.10 (0.83 –1.44)	1.07 (0.81 –1.41)
Ex- regular	1.48 (1.28 – 1.71) ***	1.45 (1.26 –1.68) ***	1.46 (1.26 –1.70) ***	1.45 (1.25 –1.68) ***	1.41 (1.22 –1.65) ***	1.42 (1.22 –1.65) ***	1.43 (1.24 –1.65) ***
Current smoker	1.37 (1.15 – 1.64) ***	1.28 (1.08 –1.53) **	1.29 (1.08 –1.54) **	1.24 (1.04 –1.49)	1.15 (0.96 –1.38)	1.15 (0.96 –1.38)	1.16 (0.97 –1.38)
Alcohol consumption							
Not at all (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Almost every day	0.45 (0.36 – 0.56) ***	0.51 (0.41–0.64) ***	0.53 (0.42–0.66) ***	0.58 (0.46–0.73) ***	0.60 (0.48–0.75) ***	0.60 (0.48–0.76) ***	0.58 (0.46–0.72) ***
3 - 6 times a week	0.40 (0.32 – 0.50) ***	0.45 (0.36–0.57) ***	0.47 (0.38–0.60) ***	0.52 (0.41–0.66) ***	0.53 (0.42–0.67) ***	0.54 (0.42–0.68) ***	0.51 (0.40–0.64) ***
1 - 2 times a week	0.50 (0.41 – 0.62) ***	0.53 (0.44–0.65) ***	0.55 (0.45–0.67) ***	0.58 (0.47–0.71) ***	0.59 (0.48–0.73) ***	0.59 (0.48–0.73) ***	0.58 (0.47–0.71) ***
Once every 2 months	0.71 (0.59 – 0.85) ***	0.74 (0.62–0.89) **	0.77 (0.64–0.92) *	0.80 (0.66–0.96)	0.79 (0.66–0.95)	0.79 (0.66–0.96)	0.77 (0.64–0.92) *

Education							
Degree		1.00	1.00	1.00	1.00	1.00	- - -
Diploma/A-level		1.23 (0.97 -1.56)	1.19 (0.93 -1.52)	1.12 (0.87 -1.43)	1.12 (0.87 -1.43)	1.11 (0.87 -1.43)	- - -
O-level		1.30 (1.02 -1.66)	1.21 (0.93 -1.57)	1.13 (0.87 -1.47)	1.14 (0.88 -1.49)	1.15 (0.88 -1.49)	- - -
CSE/NVQ1		1.51 (1.12- 2.02)*	1.36 (0.99- 1.86)	1.20 (0.88- 1.66)	1.23 (0.89- 1.69)	1.23 (0.89- 1.69)	- - -
No qualification		1.73 (1.41- 2.13)***	1.46 (1.14- 1.85)**	1.28 (1.00- 1.64)	1.25 (0.97- 1.59)	1.23 (0.96- 1.60)	- - -
Occupation							
Professional (ref)			1.00	1.00	1.00	1.00	- - -
Lower managerial			0.97 (0.74 -1.28)	0.94 (0.71 -1.24)	0.94 (0.71 -1.24)	0.94 (0.71 -1.25)	- - -
Intermediate			0.92 (0.67 -1.26)	0.86 (0.63 -1.19)	0.86 (0.63 -1.20)	0.87 (0.63 -1.20)	- - -
Small employer			1.14 (0.83 -1.56)	1.04 (0.75 -1.44)	1.03 (0.75 -1.42)	1.04 (0.76 -1.44)	- - -
Supervisory/technical			1.05 (0.76 -1.45)	0.93 (0.67 -1.29)	0.90 (0.65 -1.25)	0.90 (0.65 -1.25)	- - -
Semi-routine			1.35 (1.00- 1.83)	1.17 (0.87- 1.59)	1.12 (0.83- 1.53)	1.12 (0.82- 1.51)	- - -
Routine			1.25 (0.93 -1.70)	1.08 (0.79 -1.47)	1.02 (0.75 -1.39)	1.01 (0.74 -1.37)	- - -
Never worked			1.71 (1.16 -2.51) *	1.50 (1.02 -2.22)	1.43 (0.96 -2.11) *	1.43 (0.96 -2.11)	- - -
Equivalised household income							
Over £25,000 (ref)				1.00	1.00	1.00	1.00
◊No income information				1.31 (1.07 -1.61)	1.29 (1.05 -1.58)	1.27 (1.04 -1.56)	1.37 (1.12 -1.67) **
Less than £10,000				2.12 (1.71 -2.63) ***	1.96 (1.57 -2.44) ***	1.92 (1.53 -2.40) ***	2.12 (1.71 -2.61) ***
£10,001 –15,000				1.66 (1.35 -2.05) ***	1.59 (1.28 -1.96) ***	1.53 (1.23 -1.89) ***	1.63 (1.33 -2.01) ***
£15,001 – 25,000				1.46 (1.19 -1.80) ***	1.47 (1.19 -1.81) ***	1.46 (1.18 -1.80) ***	1.53 (1.25 -1.88) ***
Housing tenure							
Own (ref)					1.00	1.00	1.00
Mortgage					1.10 (0.94 -1.29)	1.11 (0.94 -1.30)	1.13 (0.96 -1.32)
Rent					1.62 (1.37 -1.91)***	1.53 (1.29 -1.82)***	1.58 (1.34 -1.87)***
Other					0.74 (0.45 -1.21)	0.72 (0.44 -1.19)	0.73 (0.45 -1.19)
Availability							
Access (ref)						1.00	1.00
No access						1.25 (1.06 -1.46) **	1.26 (1.08 -1.46) **
-2 LLR	**6493.294**	**6457.636**	**6411.633**	**6354.318**	**6318.324**	**6310.825**	**6356.436**
% Change –2 LLR		**0.55**	**1.26**	**2.14**	**2.69**	**2.81**	**2.12**
R Square	0.066	0.073	0.077	0.086	0.092	0.094	0.090

Adjusted by: Demographic and SES characteristics
Significance levels: 95% CI *p < 0.01; **p < 0.005; ***p < 0.001;
◊ Missing data on equivalised household income
Source: Author's analysis, 2004 HSE

Model I, the base model, includes age, sex, ethnicity, marital status, smoking and alcohol consumption as explanatory variables. This model confirms the expected relationship between age and the odds of reporting a LLSI, with the likelihood of reporting an LLSI rising with increasing age. For example, those aged 65 -69 were 24% less likely to report an LLSI compared with those aged 70 and over. The variables sex and marital status were found not to be significant throughout the modelling process. There were differences among ethnic minority groups in reporting a LLSI compared with Whites. For example, after controlling for demographic and SES, Chinese were 59% less likely to report an LLSI than the majority White older population. The Model I demonstrated an association between health risk behaviours (smoking and drinking) and the likelihood of reporting an LLSI, with ex-regular and current smokers being more likely to report an LLSI compared with non-smokers, whilst alcohol drinkers were less likely to report an LLSI compared with elders who reported that they do not drink at all.

Model II introduced education in the model, and the effect of education was statistically significant even after controlling for demographic characteristics. For example respondents with CSE/NVQ1 and no qualifications were significantly more likely to report a LLSI compared to those with a degree (51%, and 73% more likely respectively). In addition, ethnicity remained statistically significant and Chinese people were 56% less likely to report a LLSI than Whites. Model III shows that NS-SEC occupational class was not a good discriminator of the likelihood of reporting an LLSI, with only those who 'never worked' having a statistically significant difference as compared with professionals.

The introduction of equivalised household income in Model IV shows that there is a clear gradient in the relationship between equivalised household income and health, with those whose equivalised household income is less than £10,000 being over twice as likely to report an LLSI compared with those with an equivalised household income of over £25,000. However, once income was introduced education and occupational class cease to be significant in the model. These effects persisted even after controlling for SES, although once income was introduced into the model (Model IV), the association with current smoking was not statistically significant. Interestingly the coefficients for 'almost every day', '3-6 times a week' and '1-2 times a week' were not statistically different from each other – all showing a reduced likelihood of reporting an LLSI of around 40-50% compared to the reference category, whilst those who drink once every 2 months show a reduced likelihood of reporting an LLSI of around 23% compared with non-drinkers.

In Model V, housing tenure is added to the other exploratory variables from the previous models, and NS-SEC occupational class remained not being a good discriminator of the likelihood of reporting an LLSI, and only those who 'never worked' having a statistically significant difference as compared with professionals. Income also remains statistically significant in the model. Renters were

associated with a higher likelihood of reporting a LLSI, as they were 62% more likely than owner-occupiers to report a LLSI. Finally, in Model VI, car availability is introduced, and car availability is significantly associated with the report of a LLSI, as those having no car availability were 26% more likely than those with car availability to report a LLSI.

Also, interactions were included in the Model VII – individual interactions between alcohol and age, ethnicity, income and housing tenure. In addition, interactions between smoking and age, ethnicity, income, and housing tenure were added to the model. However, these interactions did not contribute to improving the overall fit of the model, as measured by the log-likelihood ratio. As a consequence it was decided not to include the interactions. It might be possible that the interaction between ethnicity and alcohol for example, introduce an element of collinearity that prevents getting a better improvement in adjustment of the models.

Table 6.4 shows that certain demographic characteristics were significant predictors of reporting a LLSI compared to others. For example, age groups were statistically significant in all of the models (Models I –VI), and the likelihood of reporting a LLSI increased in line with age. On the other hand, sex and marital status were not significant throughout and these variables were not retained in the final model. Although ethnicity remained statistically significant, Chinese elders were less likely to report an LLSI than the majority White older population. For example, the coefficient for Chinese elders was remarkably stable across all the models (Model I – VI). In addition, the health-risk behaviour characteristics, smoking and alcohol consumption were statistically significant in explaining the report of a LLSI but in different directions, that is smoking increased one's odds of reporting a LLSI, while alcohol consumption reduced one's odds to do so. For example, in Models I – VI, ex-regular smokers were between 48 – 42% more likely than those who never smoked to report a LLSI (also see Table A.29). By contrast, the odds of reporting a LLSI amongst those who drank almost every day and 3- 6 times per week, were 0.45 and 0.40 times respectively, the odds among those who do not drink at all (Model I).

6.3.1 The odds of reporting a LLSI among persons aged 50 and over by demographic characteristics and health-risk behaviour: Model VII

Previous studies have found that ethnic minority groups are more likely to report a LLSI compared with their White counterparts (Salway et al., 2009; Erens et al., 2001; Sproston and Mindell, 2006). In this section, the findings of the final model, Model VII are presented. The likelihood of reporting a LLSI decreased in line with increasing age, for example those aged 50-54 were 42% less likely to report an LLSI compared with those aged 70 and over, whilst those aged 65-69 were 24% less likely to report an LLSI compared with the reference group (70+). Sex and marital status have been omitted from the final model, as they were not significant throughout. Two minority ethnic groups were

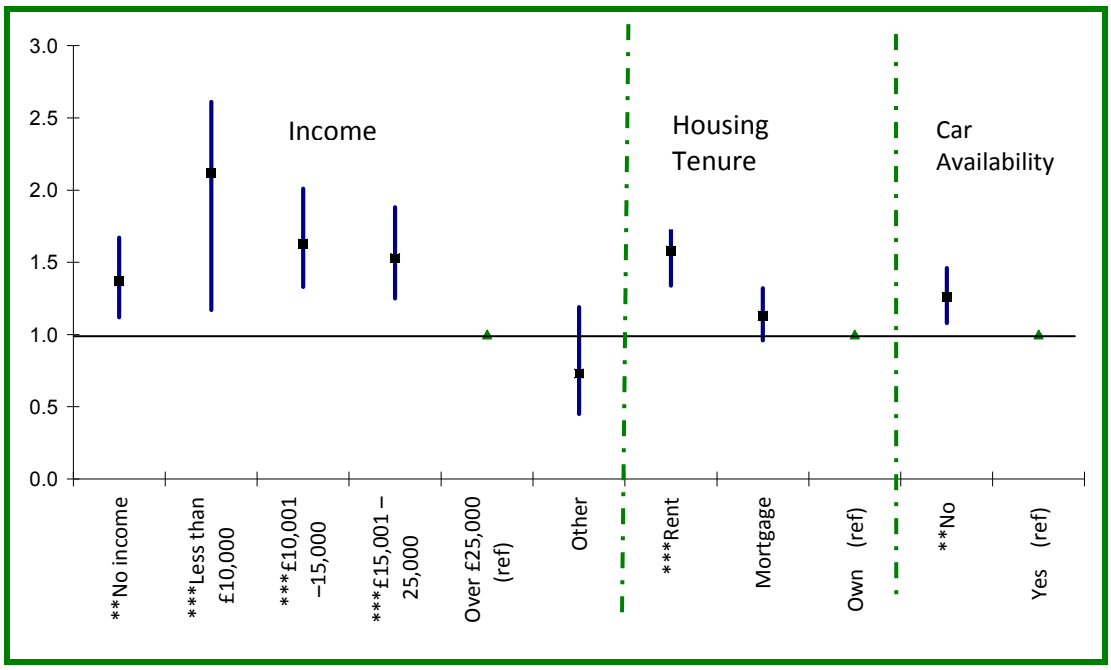
found to be much less likely to report an LLSI compared with White elders. After controlling for demographic and SES, Black African elders were around half (51%) as likely to report an LSSI than Whites, whilst Chinese were 59% less likely to report an LLSI than the majority White older population. The findings also indicated that ex-regular smokers were 57% more likely than those who never smoked to report a LLSI. Also, the negative relationship between alcohol consumption and the likelihood of reporting an LLSI was surprising and may reflect the fact that those older people who do not drink at all are a select group. Interestingly the coefficients for 'almost every day', '3-6 times a week' and '1-2 times a week' are not statistically different from each other – all showing a reduced likelihood of reporting an LLSI of around 40-50% compared to the reference category, whilst those who drink once every 2 months show a reduced likelihood of reporting an LLSI of around 23% compared with non-drinkers. In summary, certain demographic and health-risk characteristics of ethnic elders, such as age, ethnicity, smoking and alcohol consumption, are important indicators of reporting a LLSI.

6.3.2 **The odds of reporting a LLSI among persons aged 50 and over by SES characteristics: Model VII**

The general pattern of better health among those who are socio-economically better off is confirmed using different demographic factors, as discussed in Section 6.3.2. However, such health patterns are not the same for all ethnic minority group members, as illustrated in the analysis of this thesis and previous studies (Ahmad et al., 2005; Chandola, 2001; Nazroo, 2001; 2003). Figure 6.4 presents the odds ratios of reporting a LLSI by different SES characteristics amongst ethnic minority groups aged 50 and over (Model VII). However, because educational qualifications were not significant in the previous models (IV – VI), it was not included in the final model. Occupational group NS-SEC does not appear to be a good discriminator of the likelihood of reporting an LLSI, with only those who 'never worked' having a statistically significant difference as compared with professionals and was not significant in the proceeding model (Model VI) and was not included in the final model.

The introduction of equivalised household income results in the greatest reduction in the log likelihood ratio and improvement in the model fit. There is a clear gradient in the relationship between income and health, with those whose income is less than £10,000 being over twice as likely to report an LLSI compared with those with an income of over £25,000. Income remains significant after the introduction of housing tenure (Model V) and car ownership (Model VI). Housing tenure also results in a large improvement in the model. Older people living in rented accommodation are over 58% more likely to report an LLSI than those living in their own house which is mortgage free. Older people without access to a car are a quarter more likely (26%) to report an LLSI than those with a car (Figure 6.4).

Figure 6.4: Odds ratios of reporting a LLSI by SES: aged 50 and over, 2004 HSE



Significance levels: *p < 0.01; **p < 0.005; ***p < 0.001;
Δ Reference group
Source: Authors analysis, 2004 HSE

The findings in this section show that certain demographic characteristics are significant predictors of the report of a LLSI, while others have less explanatory strength. For example, age groups were statistically significant in all of the models, and the likelihood of reporting a LLSI decreased in line with age, the younger old aged groups (50-54) were less likely to report an LLSI compared with those aged 70 and over, whilst those aged 65-69 were less likely to report an LLSI compared with the reference group (70 and over). At the same time, sex and marital status were removed from the final model, as they did not contribute to the explanation of reporting a LLSI. The results for certain ethnic minority groups were also significant, for example, the Black African and Chinese elders were less likely to report a LLSI compared with the majority White older people. The two health-risk behaviour variables behaved in opposite directions, that is smoking status was associated with a higher likelihood of reporting a LLSI, while alcohol consumption was associated with a lower likelihood. In summary, income, housing tenure and car availability are key discriminators in affecting the probability of an older person reporting an LLSI, after controlling for age, ethnicity and health risk behaviour. These results are discussed further in Chapter 7.

Section 6.4 examines the relationship between the report of a LLSI and different demographic, health –risk behaviour and socio-economic characteristics for older men and women.

6.4 Explaining the relationship between reporting a LLSI, demographic characteristics and health-risk behaviour among men and women aged 50 and over

Whilst women live longer than men on average (Crimmins et al., 2010; Cooper 2002), it has also been argued that women tend to experience poorer health on a number of outcome measures (Gorman and Read, 2006; Lehelma et al., 2003). At the same time, such gender differences, according to Macintyre and colleagues (1996), are varied according to particular symptoms or conditions such as arthritis and rheumatism. For example, arthritis and rheumatism was much more common amongst older women, whereas asthma was more prevalent among men (Macintyre et al., 1996). As men and women tend to undertake particular roles in the private and public spheres, patterns of men's and women's health status may be partly explained by different kinds of disadvantage associated with such roles, for example as in terms of one's working hours or income, which can place women at a disadvantage (Arber, 1997; Annandale & Hunt, 2000; Lahelma et al., 2003). In addition, research shows that gender differences in health become more marked for men and women from ethnic minorities (Cooper, 2002; Curtis and Lawson, 2000). Considering such gender differences in the literature, and although gender was not significant in the models in Table 6.4, it was decided to run the models separately for men and women in order to investigate whether the independent variables operated differently for men and women (Table 6.5 and 6.6) shown in Sections 6.4.1 for men and 6.4.5 for women, respectively.

6.4.1 The odds of reporting a LLSI among men aged 50 and over by demographic characteristics and health-risk behaviour and SES characteristics: Models I- VI

Table 6.5 presents a series of logistic regression models for men in which the odds ratios represent the likelihood of one category of men reporting a LLSI compared with the reference category. In Model I, only the demographic variables of age, ethnicity and marital status, and the health-risk behaviours of smoking status and alcohol consumption, were introduced in the analysis as explanatory variables of reporting a LLSI. In the following models, Model II through VI, the SES variables of education, NS-SEC classification, equivalised household income, housing tenure and car availability are added sequentially. A final model, Model VII, is added, which excluded marital status and education, as these did not have a significant effect on health throughout the modelling, unlike the other explanatory variables in the models among men (see Table 6.5).

Previous studies suggested that reporting a LLSI among older men increased with old age (Breeze et al., 1999; Grundy and Glaser, 2000), however this is not evident in this analysis. For example, Model I shows that amongst men aged 50 -54 years, the odds of reporting a LLSI are 0.42 times the odds

among men aged 70 years or older. There are also increased odds of reporting a LLSI among men in certain ethnic minority groups. For example, in the Model I through Models VI, older Black African and Chinese men were found to be much less likely to report a LLSI compared with White older men. For example, Black African men were between 70-78% less likely to report an LSSI than Whites, whilst Chinese men were between 52-55% less likely to report a LLSI than the majority White older men (Table 6.5).

Table 6.5: Odds ratios of reporting a LLSI among men aged 50 and over, 2004 HSE

Demographic characteristics, health-risk behaviour and SES controls	Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII
	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)
MEN (n = 2,255)							
Age groups							
50 – 54	0.42 (0.32 -0.55) ***	0.47 (0.35 -0.63) ***	0.46 (0.35 -0.62) ***	0.54 (0.40 -0.72) ***	0.53 (0.39 -0.73) ***	0.55 (0.40 -0.75) ***	0.55 (0.40 -0.75) ***
55 - 59	0.41 (0.31 -0.54) ***	0.44 (0.33 -0.59) ***	0.44 (0.33 -0.59) ***	0.51 (0.38 -0.70) ***	0.53 (0.38 -0.72) ***	0.54 (0.40 -0.74) ***	0.55 (0.41 -0.75) ***
60 - 64	0.60 (0.46 -0.79) ***	0.63 (0.48 -0.83) **	0.61 (0.46 -0.80) ***	0.69 (0.52 -0.91) *	0.69 (0.52 -0.92)	0.72 (0.54 -0.96)	0.74 (0.56 -0.98)
65 - 69	0.62 (0.47 -0.82) **	0.63 (0.48 -0.83) **	0.63 (0.48 -0.83) **	0.66 (0.50 -0.87) **	0.66 (0.50 -0.88) *	0.68 (0.51 -0.91) *	0.70 (0.53 -0.93)
70+ (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ethnicity							
White (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Black Caribbean	1.34 (0.94 -1.90)	1.27 (0.89 -1.81)	1.21 (0.84 -1.73)	1.15 (0.80 -1.65)	1.12 (0.77 -1.61)	1.07 (0.74 -1.55)	1.08 (0.75 -1.57)
Black African	0.30 (0.15 -0.61)**	0.34 (0.17 -0.70)**	0.32 (0.16 -0.65)**	0.27 (0.13 -0.56)***	0.23 (0.11 -0.48)***	0.22 (0.11 -0.46)***	0.22 (0.11 -0.45)***
Indian	1.23 (0.88 -1.72)	1.32 (0.94 -1.86)	1.21 (0.85 -1.71)	1.10 (0.77 -1.57)	1.15 (0.80 -1.64)	1.12 (0.78 -1.60)	1.08 (0.76 -1.53)
Pakistani	1.10 (0.68 -1.79)	1.10 (0.67 -1.81)	0.98 (0.59 -1.63)	0.82 (0.49 -1.37)	0.87 (0.52 -1.47)	0.86 (0.51 -1.45)	0.85 (0.51 -1.42)
Bangladeshi	1.62 (0.89 -2.94)	1.62 (0.89 -2.96)	1.53 (0.82 -2.83)	1.37 (0.73 -2.58)	1.27 (0.67 -2.42)	1.19 (0.63 -2.26)	1.18 (0.62 -2.23)
Chinese	0.48 (0.28 -0.83)*	0.53 (0.31 -0.93)	0.53 (0.30 -0.92)	0.44 (0.25 -0.78)**	0.45 (0.26 -0.80)*	0.45 (0.26 -0.80)*	0.44 (0.25 -0.78)*
Irish	1.00 (0.76 -1.32)	0.98 (0.74 -1.30)	0.97 (0.74 -1.29)	0.97 (0.73 -1.28)	0.92 (0.69 -1.23)	0.88 (0.66 -1.17)	0.85 (0.64 -1.13)
Other ethnic groups	2.41 (0.71 – 8.12)	2.42 (0.71 – 8.30)	2.38 (0.69 – 8.20)	2.37 (0.67 – 8.37)	2.30 (0.63 – 8.41)	2.14 (0.59 – 7.83)	2.30 (0.64 – 8.30)
Marital status							
Married (ref)	1.00	1.00	1.00	1.00	1.00	1.00	- - -
Single	1.02 (0.70 – 1.50)	0.99 (0.68 – 1.46)	0.90 (0.61 – 1.34)	0.92 (0.62 – 1.36)	0.83 (0.56 –1.24)	0.76 (0.50 –1.14)	- - -
Divorced	1.30 (0.96 – 1.76)	1.26 (0.93 – 1.71)	1.23 (0.90 – 1.67)	1.31 (0.96 – 1.79)	1.17 (0.85 – 1.61)	1.09 (0.78 – 1.51)	- - -
Widowed	0.84 (0.61 - 1.18)	0.80 (0.57 - 1.11)	0.79 (0.56 - 1.10)	0.84 (0.60 - 1.18)	0.78 (0.55 – 1.10)	0.74 (0.52 – 1.04)	- - -
Smoking status							
Never smoked (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ex- occasionally	0.66 (0.42 –1.04)	0.66 (0.42 –1.05)	0.67 (0.42 –1.07)	0.65 (0.40 –1.03)	0.62 (0.39 –1.00)	0.61 (0.38 –0.99)	0.62 (0.38 –0.99)
Ex- regular	1.44 (1.16 – 1.78) **	1.40 (1.13 – 1.74) **	1.41 (1.14 – 1.75) **	1.41 (1.13 – 1.75) **	1.39 (1.11 – 1.72) **	1.38 (1.11 – 1.71) **	1.40 (1.13 – 1.74) **
Current smoker	1.23 (0.95 – 1.61)	1.14 (0.87 – 1.49)	1.13 (0.86 – 1.48)	1.07 (0.81 – 1.41)	0.99 (0.75 – 1.31)	0.99 (0.75 – 1.30)	1.00 (0.75 – 1.32)
Alcohol consumption							
Not at all (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Almost every day	0.45 (0.33 – 0.63) ***	0.52 (0.37–0.72) ***	0.53 (0.37–0.74) ***	0.58 (0.41–0.82) **	0.60 (0.42–0.85) **	0.60 (0.43–0.85) **	0.59 (0.42–0.83) **
3 - 6 times a week	0.43 (0.30 – 0.60) ***	0.48 (0.34–0.67) ***	0.50 (0.35–0.70) ***	0.54 (0.38–0.78) **	0.56 (0.39–0.80) **	0.56 (0.39–0.80) **	0.55 (0.39–0.79) **
1 - 2 times a week	0.51 (0.37 – 0.70) ***	0.53 (0.39–0.73) ***	0.54 (0.39–0.74) ***	0.58 (0.42–0.81) **	0.60 (0.43–0.83) **	0.60 (0.43–0.84) **	0.60 (0.43–0.83) **
Once every 2 months	0.61 (0.44 – 0.85) **	0.63 (0.45–0.87) *	0.63 (0.45–0.88) *	0.67 (0.48–0.93)	0.66 (0.47–0.93)	0.67 (0.47–0.93)	0.67 (0.48–0.93)
Education							
Degree (ref)		1.00	1.00	1.00	1.00	1.00	- - -
Diploma/A-level		1.23 (0.89 -1.72)	1.18 (0.84 -1.67)	1.11 (0.78 -1.58)	1.11 (0.78 -1.58)	1.12 (0.79 -1.59)	- - -
O-level		1.57 (1.11 -2.22)	1.44 (0.99 -2.08)	1.34 (0.92 -1.95)	1.33 (0.91 -1.94)	1.35 (0.92 -1.97)	- - -
CSE/NVQ1		1.83 (1.21- 2.77)**	1.63 (1.04- 2.55)	1.34 (0.84- 2.12)	1.38 (0.87- 2.19)	1.37 (0.86- 2.18)	- - -

No qualification		1.80 (1.35- 2.41)***	1.55 (1.10- 2.18)	1.32 (0.93- 1.88)	1.28 (0.90- 1.82)	1.26 (0.89- 1.80)	- - -
Occupation							
Professional (ref)			1.00	1.00	1.00	1.00	1.00
Lower managerial			0.98 (0.70 -1.39)	0.96 (0.68 -1.36)	0.95 (0.67 -1.34)	0.96(0.68 -1.36)	1.01(0.72 -1.42)
Intermediate			1.24 (0.75 -2.05)	1.10 (0.66 -1.84)	1.11 (0.66 -1.86)	1.10 (0.66 -1.85)	1.18 (0.71 -1.95)
Small employer			1.00 (0.68 -1.47)	0.87 (0.58 -1.29)	0.86 (0.58 -1.28)	0.89 (0.60 -1.32)	0.97 (0.67 -1.42)
Supervisory/technical			1.08 (0.73 -1.61)	0.93 (0.62 -1.39)	0.91 (0.61 -1.36)	0.91 (0.61 -1.36)	1.00 (0.69 -1.46)
Semi-routine			1.44 (0.97- 2.14)	1.20 (0.80- 1.80)	1.18 (0.79- 1.77)	1.13 (0.75- 1.70)	1.28 (0.88- 1.85)
Routine			1.17 (0.79 -1.72)	0.98 (0.66 -1.45)	0.92 (0.62 -1.38)	0.91 (0.61 -1.36)	1.02 (0.71 -1.46)
Never worked			4.53 (1.81 -11.33) **	3.68 (1.46 -9.30) *	3.82 (1.49 -9.78) *	3.88 (1.51 -9.96) *	4.11 (1.66 -10.2) *
Equivalised household income							
Over £25,000 (ref)				1.00	1.00	1.00	1.00
◊No income information				1.53 (1.13 -2.08)*	1.49 (1.09 -2.02)	1.45 (1.07 -1.97)	1.48 (1.10 -2.01)
Less than £10,000				2.78 (2.02 -3.84) ***	2.51 (1.80 -3.49) ***	2.42 (1.74 -3.37) ***	2.57 (1.86 -3.54) ***
£10,001 –15,000				1.66 (1.21 -2.29) **	1.57 (1.13 -2.17) *	1.48 (1.06 -2.05)	1.52 (1.10 -2.11)
£15,001 – 25,000				1.40 (1.03 -1.90)	1.39 (1.02 -1.89)	1.37 (1.01 -1.87)	1.43 (1.05 -1.94)
Housing tenure							
Own (ref)					1.00	1.00	1.00
Mortgage					1.01 (0.79 -1.29)	1.01 (0.79 -1.29)	1.03 (0.81 -1.32)
Rent					1.62 (1.24 -2.11)***	1.51 (1.15 -1.97)**	1.48 (1.14 -1.92)**
Other					0.64 (0.30 -1.37)	0.62 (0.29 -1.33)	0.59 (0.27 -1.26)
Availability							
Access (ref)						1.00	1.00
No access						1.45 (1.13 -1.87) **	1.41 (1.10 -1.81) *
Constant							
-2 LLR	**2816.769**	**2796.185**	**2773.692**	**2731.818**	**2715.622**	**2707.349**	**2716.358**
% Change –2 LLR		**0.73**	1.53	3.02	3.59	3.88	3.56
R-square	0.081	**0.089**	**0.096**	**0.113**	**0.119**	**0.122**	**0.120**

Adjusted by: Demographic and SES characteristics
Significance levels: 95% CI *p < 0.01; **p < 0.005; ***p < 0.001
◊ Missing data on equivalised household income
Source: Authors analysis, 2004 HSE

The behavioural risk factors, smoking status and alcohol consumption are statistically significant in the model, however in different directions, as ex-regular smoking status appears to increased men's odds of reporting a LLSI, while drinking alcohol were associated with a decreased in such odds (see Table A.30). For example, ex-regular smokers were between 38-44% more likely to report a LLSI than men who never smoked (Models I – VI), while amongst men who consumed alcohol between 3-6 times per week, the odds of reporting a LLSI were between 0.43 and 0.56 times the odds among those who do not drink at all (Model I – Model VI).

6.4.2 The odds of reporting a LLSI among men aged 50 and over by demographic characteristics and health-risk behaviour: Model VII

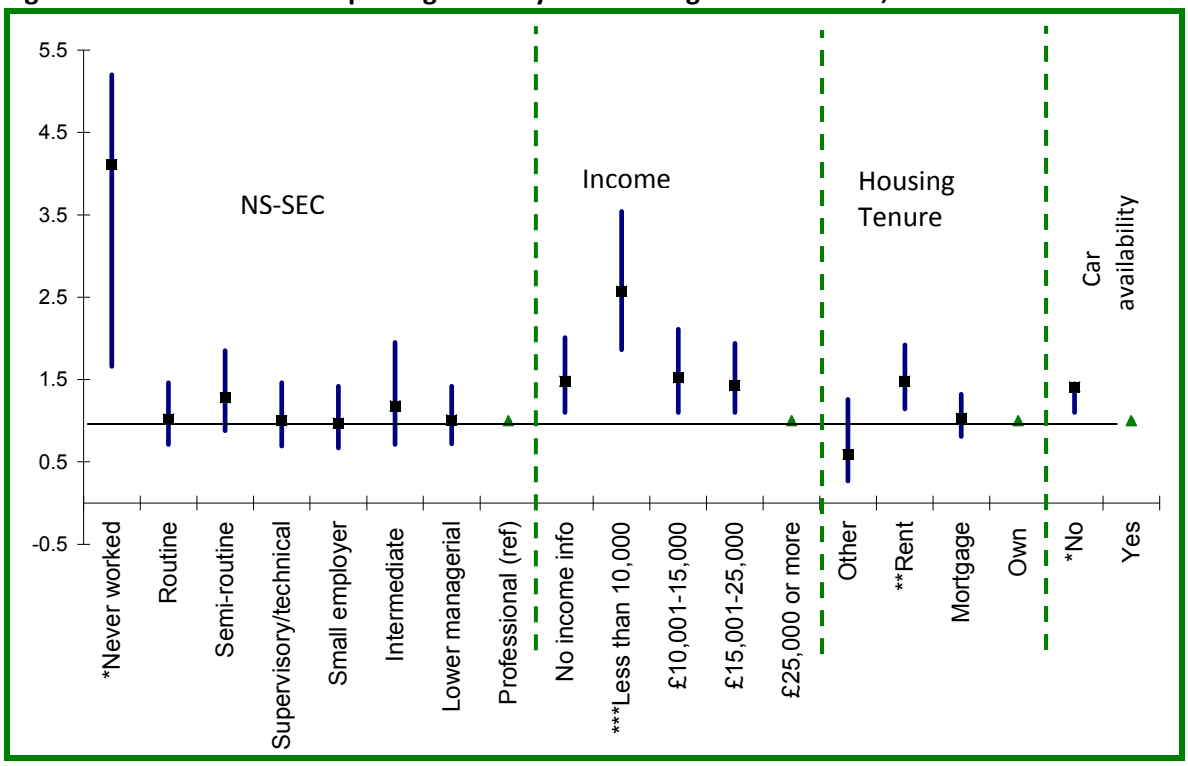
In terms of demographic characteristics, Model VII shows that men in younger age groups were less likely to report a LLSI than men aged 70 and over, for example men aged 50 – 54 years were 45% less likely to report a LLSI than men aged 70 years or older. Ethnicity was a significant determinant for certain groups, as amongst Black African and Chinese men, the odds of reporting a LLSI were 0.22 and 0.44 times respectively the odds among the majority older White men. The final model shows an interesting pattern in terms of the impact of health-risk behaviour on men's report of a LLSI, with ex-regular smokers being 40% more likely to report a LLSI. Men who consumed alcohol, regardless of the frequency, were consistently less likely to report a LLSI than men who did not drink at all, for example those who consumed alcohol between 3-6 times per week were45% less likely to report a LLSI compared with those who did not drink at all.

6.4.3 The odds of reporting a LLSI among men aged 50 and over by SES characteristics: Model VII

Figure 6.5 shows the odds of reporting a LLSI by SES amongst men aged 50 and over, corroborating previous studies which show that SES contributes to differences in reporting a LLSI between ethnic minority groups in the UK (Cooper et al., 2000; Evandrou, 2000; Sproston and Mindell, 2006). The variable of NS-SEC occupational classifications was statistically significant at the $p<0.001$ level, and never worked remains a significant discriminator even after income, tenure and car ownership/access have been taken into account. Interestingly, living in a household with a low equivalised household income was associated with a higher likelihood of reporting a LLSI. For example, men living in a household with less than £10,000 were being over twice more likely to report a LLSI than men living in a household with an income over £25,000. Differences in the report of a LLSI are also associated with housing tenure among men. For example, among men in rented accommodation, the odds of reporting LLSI were 48% more likely than the odds among owner-

occupiers as shown in Figure 6.5. Finally, among men with no car availability, the odds of reporting a LLSI were 41% higher than the odds among men who had car availability.

Figure 6.5: Odds ratios of reporting a LLSI by SES: men aged 50 and over, 2004 HSE



Significance levels: *p < 0.01; **p < 0.005; ***p < 0.001;
Δ Reference group
Source: Authors analysis, 2004 HSE

The findings from this model seem to suggest that, among men, lower SES is associated with a higher likelihood of reporting a LLSI, as men who had never worked, men living in a household with less than £10,000, men who rent and men with no car availability were more likely to report a LLSI. Such findings are consistent with the literature which argues for a link between a lower SES and poor health, and they will be discussed in greater detail in Chapter 7.

6.4.4 Summary

The analysis in this section confirms some of the existing studies on health inequalities amongst men reporting a LLSI (Arber, 1997; Davey Smith et al., 2000; Natarajan, 2006), but there were also some interesting patterns that emerge from the results in examining the association between reporting a LLSI and different demographic, health-risk behaviour and SES characteristics amongst ethnic men aged 50 and over. In terms of demographic characteristics, the expected relationship between age and the odds of reporting a LLSI, with the likelihood of reporting an LLSI rising with increasing age. As such, those aged 50-54 were 45% less likely to report an LLSI compared with those aged 70 and over.

Ethnicity was significantly associated with the reporting of a LLSI and men from both Black African (78%) and Chinese (56%) minority ethic groups have a statistically significant lower likelihood of

reporting an LLSI than White older males, The health-risk-behaviours, smoking and alcohol consumption were also statistically significant, however they appear to show a mixed pattern of association with the report of a LLSI. In particular, ex-regular smokers appear to be positively associated with the report of a LLSI, while drinking – regardless of the frequency (except for those who drink once every 2 months), appear to be negatively associated with the report of a LLSI among men. Finally, a lower SES status, reflected in equivalised household with less than £10,000, having never worked, renting and having no car availability, was associated with a higher likelihood of reporting a LLSI.

Section 6.4.5 presents the findings for the report of a LLSI by demographic, health-risk behaviour and SES characteristics amongst women.

6.4.5 The odds of reporting a LLSI among women by demographic characteristics, health-risk behaviour and SES characteristics: Models I -VI

This section presents the results of a series of logistic regression models run for women, in which the odds ratios represent the likelihood of a group of women reporting a LLSI compared with the reference category. In Model I, only the demographic variables of age group, ethnicity and marital status, and the risk factors of smoking status and alcohol consumption, are introduced in the analysis. Subsequent models (Models II-VI) introduce additional SES variables, such as educational qualifications and NS-SEC occupational classifications. Model VII is the final model used to explain the report of a LLSI among older women.

Model I confirms the expected relationship between age and the odds of reporting a LLSI, with the likelihood of reporting a LLSI rising with increasing age. For example, women aged 50-54 were 43% less likely to report an LLSI compared with women aged 70 and over. There were also increased odds among some ethnic minority women of reporting a LLSI compared with White women. For example, amongst Pakistani women, the odds of reporting a LLSI were 2.00 times the odds amongst White women, while Chinese women were 63% less likely to report a LLSI than White older women. Marital status was not significant in Model 1. Model II shows that the effect of education was statistically significant, with women with no qualifications being 59% more likely than women with a degree to report a LLSI, while the variable of age behaved similarly as before, that is women aged 70 and over were the least likely to report a LLSI.

Table 6.6: Odds ratios of reporting a LLSI among women aged 50 and over, 2004 HSE

Demographic characteristics, health-risk behaviour and SES controls	Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII
	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)	% OR (95% CI)
WOMEN (n = 2,831)							
Age groups							
50 – 54	0.58 (0.45 -0.75) ***	0.66 (0.51 -0.86) **	0.65 (0.50 -0.85) *	0.70 (0.54 -0.92)	0.65 (0.49 -0.86) *	0.66 (0.50 -0.88) *	0.57 (0.44 -0.74) ***
55 - 59	0.64 (0.49 -0.82) **	0.70 (0.54 -0.90) *	0.69 (0.53 -0.90)	0.75 (0.58 -0.98)	0.73 (0.56 -0.96)	0.74 (0.57 -0.98)	0.67 (0.52 -0.86) **
60 - 64	0.70 (0.55 -0.90) *	0.74 (0.57 -0.95)	0.72 (0.56 -0.93)	0.76 (0.58 -0.98)	0.75 (0.58 -0.97)	0.76 (0.59 -0.99)	0.71 (0.56 -0.91) **
65 - 69	0.76 (0.59 -0.98)	0.78 (0.61 -1.01)	0.77 (0.59 -0.99)	0.79 (0.61 -1.03)	0.80 (0.62 -1.04)	0.82 (0.63 -1.06)	0.78 (0.61 -1.01)
70+ (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ethnicity							
White (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Black Caribbean	1.22 (0.91 -1.65)	1.18 (0.87 -1.59)	1.18 (0.88 -1.60)	1.20 (0.88 -1.63)	1.13 (0.83 -1.54)	1.12 (0.82 -1.52)	1.08 (0.80 -1.46)
Black African	1.06 (0.64 -1.78)	1.07 (0.64 -1.78)	1.04 (0.62 -1.77)	1.05 (0.62 -1.79)	0.89 (0.52 -1.53)	0.89 (0.52 -1.53)	0.84 (0.50 -1.42)
Indian	1.04 (0.74 -1.46)	1.05 (0.74 -1.48)	0.98 (0.69 -1.40)	0.97 (0.68 -1.40)	1.01 (0.70 -1.45)	1.01 (0.70 -1.44)	1.06 (0.75 -1.50)
Pakistani	2.00 (1.24 -3.21)**	1.89 (1.18 -3.05)**	1.61 (0.96 -2.71)	1.63 (0.97 -2.74)	1.70 (1.00 -2.86)	1.69 (1.00 -2.86)	2.00 (1.24 -3.21) **
Bangladeshi	1.09 (0.66 -1.81)	0.97 (0.58 -1.62)	0.85 (0.48 -1.49)	0.89 (0.50 -1.56)	0.83 (0.47 -1.48)	0.83 (0.47 -1.46)	1.00 (0.59 -1.67)
Chinese	0.35 (0.20 -0.62)***	0.36 (0.21 -0.63)***	0.35 (0.20 -0.62)***	0.35 (0.20 -0.62)***	0.35 (0.20 -0.63)***	0.35 (0.20 -0.63)***	0.37 (0.21 -0.66)***
Irish	0.75 (0.59 -0.95)	0.75 (0.59 -0.96)	0.76 (0.59 -0.97)	0.76 (0.59 -0.97)	0.74 (0.58 -0.95)	0.74 (0.57 -0.95)	0.74 (0.58 -0.95)
Other ethnic groups	1.03 (0.40 – 2.65)	1.08 (0.42 – 2.77)	1.12 (0.42 – 2.96)	1.08 (0.41 – 2.89)	1.05 (0.39 – 2.85)	1.04 (0.39 – 2.81)	0.97 (0.37 – 2.52)
Marital status							
Married (ref)	1.00	1.00	1.00	1.00	1.00	1.00	- - -
Single	0.89 (0.63 – 1.26)	0.91 (0.64 – 1.29)	0.92 (0.64 – 1.31)	0.86 (0.60 – 1.23)	0.78 (0.54 –1.13)	0.76 (0.52 –1.10)	- - -
Divorced	1.21 (0.95 – 1.55)	1.25 (0.98 – 1.61)	1.23 (0.96 – 1.58)	1.15 (0.89 – 1.49)	1.05 (0.81 – 1.35)	1.02 (0.78 – 1.32)	- - -
Widowed	1.27 (1.03 - 1.56)	1.23 (1.00 - 1.51)	1.21 (0.98 - 1.49)	1.21 (0.98 - 1.49)	1.13 (0.91 – 1.40)	1.09 (0.88 – 1.37)	- - -
Smoking status							
Never smoked (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ex- occasionally	1.57 (1.11 – 2.21)	1.58 (1.12 –2.23)	1.59 (1.12 –2.25)*	1.56 (1.10 –2.21)	1.50 (1.06 –2.14)	1.51 (1.07 –2.15)	1.48 (1.04 –2.09)
Ex- regular	1.47 (1.20 – 1.81) ***	1.45 (1.18 –1.78) ***	1.45 (1.18 –1.78) ***	1.43 (1.16 –1.76) **	1.39 (1.12 –1.71) **	1.39 (1.13 –1.71) **	1.39 (1.13 –1.70) **
Current smoker	1.51 (1.19 - 1.93) **	1.41 (1.10 –1.80) **	1.41 (1.10 –1.80) *	1.37 (1.07 –1.76)	1.27 (0.98 –1.63)	1.27 (0.98 –1.63)	1.29 (1.01 –1.66)
Alcohol consumption							
Not at all (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Almost every day	0.44 (0.33 – 0.60) ***	0.50 (0.37–0.67) ***	0.53 (0.39–0.72) ***	0.56 (0.41–0.77) ***	0.58 (0.42–0.80) **	0.58 (0.43–0.80) **	0.53 (0.39–0.73) ***
3 - 6 times a week	0.35 (0.26 – 0.48) ***	0.40 (0.29–0.55) ***	0.42 (0.31–0.59) ***	0.46 (0.33–0.64) ***	0.47 (0.34–0.66) ***	0.48 (0.34–0.66) ***	0.43 (0.31–0.60) ***
1 - 2 times a week	0.48 (0.36 – 0.62) ***	0.51 (0.39–0.66) ***	0.52 (0.40–0.69) ***	0.54 (0.41–0.71) ***	0.55 (0.42–0.72) ***	0.55 (0.41–0.72) ***	0.53 (0.40–0.69) ***
Once every 2 months	0.75 (0.60 – 0.94)	0.80 (0.64–1.00)	0.83 (0.66–1.05)	0.85 (0.68–1.07)	0.84 (0.67–1.06)	0.84 (0.67–1.06)	0.79 (0.63–0.99)
Education							
Degree (ref)		1.00	1.00	1.00	1.00	1.00	- - -
Diploma/A-level		1.17 (0.82 -1.66)	1.15 (0.80 -1.64)	1.08 (0.75 -1.55)	1.08 (0.75 -1.56)	1.08 (0.75 -1.55)	- - -

O-level		1.07 (0.76 -1.52)	1.02 (0.70 -1.47)	0.95 (0.65 -1.38)	0.97 (0.66 -1.41)	0.97 (0.66 -1.40)	- - -
CSE/NVQ1		1.19 (0.78- 1.83)	1.13 (0.72- 1.77)	1.03 (0.66- 1.63)	1.06 (0.67- 1.67)	1.05 (0.70- 1.66)	- - -
No qualification		1.59 (1.16- 2.16) **	1.35 (0.95- 1.92)	1.22 (0.85- 1.74)	1.19 (0.83- 1.70)	1.18 (0.83- 1.69)	- - -
Occupation							
Professional (ref)			1.00	1.00	1.00	1.00	- - -
Lower managerial			0.92 (0.54 -1.55)	0.87 (0.51 -1.48)	0.86 (0.51 -1.47)	0.89 (0.51 -1.48)	- - -
Intermediate			0.84 (0.49 -1.45)	0.79 (0.45 -1.36)	0.78 (0.45 -1.36)	0.79 (0.45 -1.36)	- - -
Small employer			1.36 (0.74 -2.48)	1.26 (0.69 -2.32)	1.24 (0.68 -2.29)	1.25 (0.68 -2.30)	- - -
Supervisory/technical			0.93 (0.49 -1.75)	0.81 (0.43 -1.54)	0.77 (0.40 -1.46)	0.77 (0.41 -1.46)	- - -
Semi-routine			1.25 (0.73- 2.14)	1.09 (0.63- 1.89)	1.03 (0.59- 1.78)	1.03 (0.59- 1.78)	- - -
Routine			1.24 (0.72 -2.16)	1.08 (0.61 -1.89)	1.01 (0.58 -1.78)	1.01 (0.57 -1.76)	- - -
Never worked			1.42 (0.78 -2.61)	1.25 (0.67 -2.31)	1.16 (0.62 -2.15)	1.16 (0.62 -2.15)	- - -
Equivalised household income							
Over £25,000 (ref)				1.00	1.00	1.00	1.00
◊ No income				1.14 (0.86 -1.51)	1.13 (0.85 -1.50)	1.13 (0.85 -1.50)	1.25 (0.95 -1.64)
Less than £10,000				1.69 (1.25 -2.28) **	1.60 (1.18 -2.17) **	1.58 (1.17 -2.15) **	1.79 (1.34 -2.38) ***
£10,001 –15,000				1.63 (1.23 -2.17) **	1.58 (1.18 -2.11) **	1.54 (1.15 -2.07) **	1.70 (1.29 -2.23) ***
£15,001 – 25,000				1.48 (1.11 -1.98) *	1.50 (1.12 -2.01) *	1.50 (1.12 -2.00) *	1.56 (1.18 -2.07) **
Housing tenure							
Own (ref)					1.00	1.00	1.00
Mortgage					1.19 (0.96 -1.48)	1.20 (0.96 -1.49)	1.23 (0.99 -1.53)
Rent					1.61 (1.30 -2.00)***	1.57 (1.25 -1.96)***	1.73 (1.41 -2.12)***
Other					0.82 (0.42 -1.60)	0.81 (0.41 -1.58)	0.83 (0.43 -1.60)
Availability							
Access (ref)						1.00	- - -
No access						1.12 (0.91 -1.39)	- - -
Constant							
-2 LLR	**3632.270**	**3614.536**	**3579.876**	**3554.954**	**3534.721**	**3533.513**	**3572.731**
% Change –2 LLR		**0.49**	1.44	2.13	2.69	2.72	1.64
R-square	**0.068**	**0.074**	**0.079**	**0.085**	**0.092**	**0.092**	**0.115**

Adjusted by: Demographic and SES characteristics
Significance levels: 95% CI *p < 0.01; **p < 0.005; ***p < 0.001
◊ Missing data on equivalised household income
Source: Authors analysis, 2004 HSE

In Model IV, once equivalised household income is added to the previous explanatory variables, the variables of marital status, education and NS-SEC occupational class became not significant in the model. A lower household equivalised income is associated with a higher likelihood of reporting a LLSI amongst women. For example, among women living in a household with an income less than £10,000, the odds of reporting a LLSI were 69% higher than the odds among women living in a household with an equalised household income over £25,000. Model V shows that women renters are 61% more likely than women owner-occupiers to report a LLSI, while Model VI car ownership/ access was not significant in the model for women. The effect of certain ethnic groups and age groups, as well as the effect of smoking status and alcohol consumption, has remained statistically significant through Models I-VI, although the variables themselves have remained significant (see Table A.30). For example, Pakistani women were 69% more likely to report a LLSI compared to White older women, while Chinese women were 65% less likely to report a LLSI than White older women (Model VI).

Section 6.4.6 discusses the results of the final model for reporting a LLSI among women, which excludes marital status, education and occupational class.

6.4.6 **The odds of reporting a LLSI among women aged 50 and over by demographic characteristics and health-risk behaviour: Model VII**

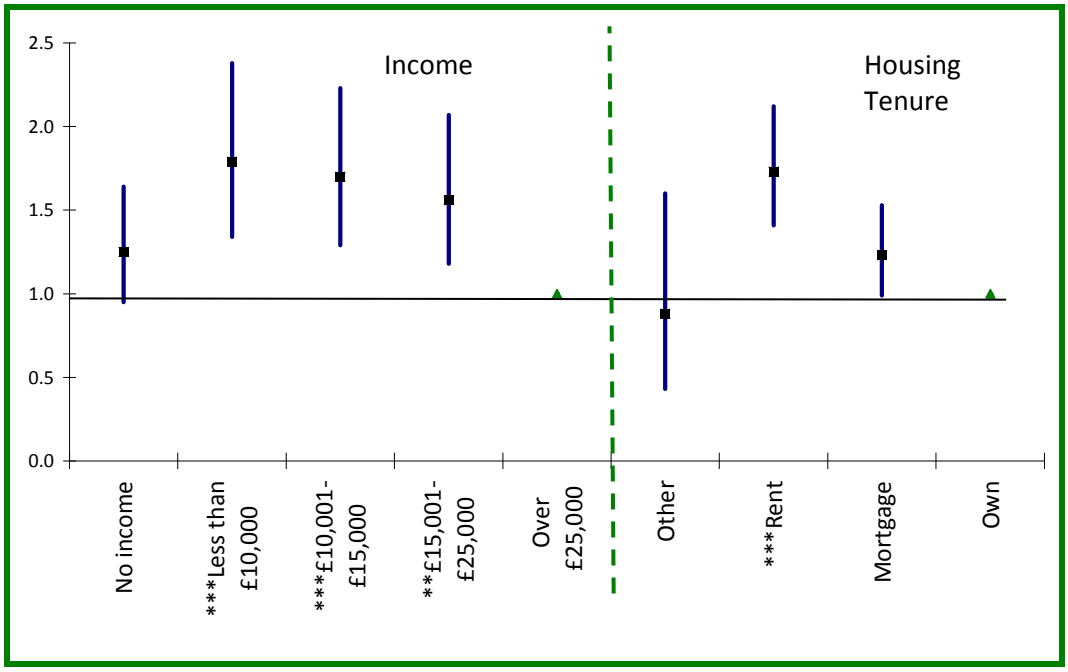
The multivariate analysis shows that there are considerable differences amongst women by demographic and health-risk behaviours in reporting a LLSI, a finding that is consistent with existing studies (Arber and Cooper, 1999; Cooper, 2002). In Model VII, younger old age is significantly associated with a lower likelihood of reporting a LLSI amongst women. For example, among women aged 50 – 54 years, the odds of reporting LLSI were 0.57 times the odds among women 70 years or older. Women from certain ethnic minority groups have higher odds of reporting a LLSI compared to White women, for example, older women from Pakistan have a heighten risk of reporting a LLSI being twice more likely as their White counterparts, whilst older Chinese women have a reduced risk, that is 63% less likely to report a LLSI compared to White elderly women. Amongst ex-regular smokers, the odds of reporting a LLSI were 1.39 times the odds among women who never smoked, while alcohol consumption decreased women's likelihood of reporting a LLSI.

Section 6.4.7 presents the final results of the multivariate analysis in reporting a LLSI by socio-economic characteristics amongst women (Model VII).

6.4.7 The odds of reporting a LLSI among women aged 50 and over by SES characteristics: Model VII

Several studies indicated a strong relationship between socio-economic status and chronic illness and reporting a LLSI in later life (Breeze et al., 1999; Harding, 2003). Figure 6.6 shows the odds ratios of reporting a LLSI by SES amongst women aged 50 and over. As indicated by the findings, a lower equivalised household income is a strong predictor of reporting a LLSI amongst ethnic women, for example women living in a household with an equivalised household income of less than £10,000 were 79% more likely than women who lived in a household with an income of over £25,000 to report a LLSI. Differences in the report of a LLSI amongst women were also associated with housing tenure, with women in rented accommodation being 73% more likely than women who were owner-occupiers to report a LLSI (see Figure 6.6). Education, occupational class and car availability were not presented in the final model, as they were not significant.

Figure 6.6: Odds ratios of reporting a LLSI by SES: women aged 50 and over, 2004 HSE



Significance levels: *p < 0.01; **p < 0.005; ***p < 0.001;
Δ Reference group
Source: Authors analysis, 2004 HSE

6.4.8 Comparing the reporting of a LLSI for men and women

As indicated from the findings, the demographic, health-risk behaviour and SES factors explaining the report of a LLSI were different for men and women. For example, age was a significant part of the explanation for both men and women, and younger old age was associated with a lower likelihood of

reporting a LLSI among both men and women. Men aged 50-54 were 45% less likely to report a LLSI than men aged 70 and over, while women aged 50-54 were 43% less likely to report a LLSI than women aged 70 and over (Models VII respectively). Marital status was not significant for either men's or women's model, however the results for certain ethnic groups were significant. Both Chinese men (56%) and women (63%) were less likely than their older White counterparts to report a LLSI, but other results by ethnic groups were different for men and women. For example, Black African men were 78% less likely than White men to report a LLSI, while Pakistani women were twice more likely than White women to report a LLSI. In terms of the health-risk behaviour variables, the men's and women's models produced similar effects for alcohol consumption, with those who consumed alcohol being less likely than those who never drank, to report a LLSI. For example, men who drank 3-6 times a week were 45% less likely to report a LLSI than men who did not drink, and women who drank 3-6 times a week were 57% less likely to report a LLSI than women who did not drink at all (Model VII respectively). The effects of smoking status were slightly different for men and women. Ex-regular smokers among men and women were between 39%-40% more likely than men and women who had never smoked to report a LLSI (Model VII respectively).

In terms of SES characteristics, there patterns were similar between the models explaining the reporting of a LLSI for men and women. Education, occupational class and car availability were not significant for women, while education was not significant for men. Among men who had never worked, the odds of reporting a LLSI were four times higher than among those who were in the professional class (Model VII). The results for equivalised household income were similar, in that a lower equivalised household income decreased a person's odds of reporting a LLSI. For example, men and women in a household with an income below £10,000 were 57% and 79% more likely than men and women in a household with an income of over £25,000, to report a LLSI (Model VII respectively). Renting a property was associated with a lower likelihood of reporting a LLSI for both men and women, while men who had no car availability, were 41% more likely than men with car ownership/ access to report a LLSI (Model VII). These results show that there are certain differences in the determinants of the reporting of a LLSI among older men and women, and ethnicity is one of the strongest determinants in this respect.

6.4.9 Summary

This Chapter has explored the determinants of reporting bad/very bad health or a LLSI among older men and women, drawing conclusions about the total older population first, and then about men and women separately. For the model reflecting the reporting of bad/very bad health by the total older population (Table 6.1), the variables of age, marital status and occupational class were not significant. However, the report of bad/very bad health was associated with being a woman; being

Black African, Pakistani, Bangladeshi or Chinese; being a current or ex-smoker; consuming no alcohol at all; having low educational qualifications; living in a household with a low income; renting accommodation and having no car ownership/access. By contrast, in the model explaining the reporting of a LLSI, the variables of sex, marital status, education and occupational class were not significant (Table 6.4). In this case, being younger; being Black African and Chinese lower one's odds of reporting a LLSI, whereas being an ex-regular smoker; not consuming any alcohol; living in a household with an income less than £10,000; living in rented accommodation and having no car availability were associated with reporting a LLSI.

There were also statistically significant gender differences in the final Models for both men and women. In terms of the model for men's reporting of bad/very bad health (Table 6.2), being Indian lowered one's odds and being Pakistani or Bangladeshi increased one's odds of reporting bad/very bad health, while being an ex-regular smoker, consuming no alcohol at all; having low educational qualifications, having a low household income, renting and having no car availability, were associated with the reporting of bad/very bad health. In the equivalent model for women (Table 6.3), age, marital status and occupation were not significant, and it was being Black Caribbean, Bangladeshi or Chinese; being an ex-regular smoker; consuming no alcohol at all; having low educational qualifications; having a low household income; renting and having no car availability, which were associated with the reporting of bad/very bad health. In terms of the model for men's reporting of a LLSI (Table 6.5), marital status and education were not significant. However, being younger old; being Black African or Chinese and consuming no alcohol at all lowered one's odds of reporting a LLSI. Conversely, rented accommodation and having no car availability were associated with a higher likelihood of reporting a LLSI. For the equivalent model for women (Table 6.6), marital status, education, occupational class and car availability were not significant. By contrast, the likelihood of women's reporting of a LLSI was explained by being younger old; being Pakistan (Chinese women and alcohol consumption were associated with a lower likelihood); ex-regular smoker; living in a household with an income less £10,000 and being in rented accommodation.

Chapter 7 turns to the key findings of Chapters 4, 5 and 6, and discusses them in relation to the research questions of the thesis, and the existing literature in the area of health and ethnicity in later life.

Chapter 7

7. Discussion

"Old age is not a disease - it is strength and survivorship, triumph over all kinds of vicissitudes and disappointments, trials and illnesses" _____Maggie Kuhn (1905-1995)

7.1 Introduction: the relationship between health status, demographic characteristics, health-risk behaviours in later life and the 'sensitivity' of different SES measures

As indicated in the epidemiological literature, there are ethnic inequalities in health outcomes, but most of the emphasis of research on health inequalities has been on early childhood and the working age population with less attention on older people, particularly older people from ethnic minority groups (Cooper et al., 2000; Grundy and Holt, 2001; Huisman et al., 2004). Furthermore, ever since the Black Report was published in 1980, there has been an increased focus on the measurement of SES and health inequalities, particularly relating to health inequalities by ethnic origin (Achenson, 1998; Bowling, 2004; Erens et al., 2001; Nazroo, 1997; Sproston et al., 2006). Generally, people who are poorer and who have fewer socio-economic advantages are more likely to report high levels of morbidity (Harding, 2003; Read and Gorman, 2006; Salway et al., 2007). For example, patterns of health inequalities have been observed using a range of health outcomes, including general health, limiting long-standing illness, diabetes and hypertension, and ethnic minorities report higher rates of disease than the majority White population (Chandola and Jenkinson, 2000; Salway et al., 2007). For instance, amongst Pakistanis and Bangladeshis, the incidence of diabetes is more than five times that among Whites (Nazroo, 2001). Possible explanations of such health inequalities have been linked to socio-economic inequalities among ethnic groups (Nazroo and Williams, 2006; Nazroo, 2003).

For example, in 1994, the Fourth National Survey of Ethnic Minorities (FNS) was one of the first detailed surveys of its kind, focusing only on people from ethnic minority groups. It collected a wide range of information including on ethnic identity, economic position, education, housing, health, health risk behaviour and experiences of racial harassment and discrimination. The 1991 Census was the first Census in the UK to include a question on 'ethnicity' and 'limiting long standing illness', both providing important evidence of the general make up and specific health issues of ethnic minorities in the U.K. Nazroo (2001) explores the relationship between health, ethnicity and SES showing differences within and amongst different ethnic minority group members in Britain. The findings indicated that differences in the health of ethnic minorities increased markedly with age. There were very small differences in early childhood, disappearing in late childhood and early adulthood, recurring in early middle age and increasing significantly throughout the rest of adulthood (Nazroo,

2001). For example, Black Caribbean people were more likely than Whites to describe their health as fair, poor or very poor, and Pakistani and Bangladeshi people, who rated their health worse than all other ethnic groups, were 50% more likely than Whites to report fair, poor, or very poor health (Nazroo, 2001).

Other population-based studies in the UK have also investigated ethnic differences in SES and health. For example, Evandrou (2000a) analysed cross-sectional data from the GHS (1991-1996), exploring health differences amongst ethnic minorities and assessing the extent to which this accounts for differences in material resources of ethnic minorities in later life. Results from the multivariate analysis corroborate existing evidence (e.g. Nazroo, 2001; Salway et al., 2007) indicating that SES disadvantage makes a significant contribution to ethnic disadvantage in health. For instance, after controlling for age, income and deprivation, there were no significant ethnic differences in reporting LLSI amongst men aged 60 and over. Amongst women, differences in morbidity among ethnic groups were highly significant, confirming that SES measures only to some extent explain the disadvantage faced by different ethnic minorities. This suggests that other factors may also play a role in contributing to ethnic minority groups SES disadvantage in morbidity, and was further illustrated by Nazroo (2003), who reviewed evidence from the US and UK on the structuring of ethnic inequalities in health. This research found that the association between ethnicity and health is mostly an effect of SES, but that other factors such as experiences of racial harassment or discrimination, and perceptions of living in a discriminatory society, may also contribute to ethnic health disadvantages (Nazroo, 2003). Additionally, it has been emphasised that studies on ethnic health inequalities often compare ethnic elders to the White population, ignoring intra-group heterogeneity, for example, merging all South Asian groups or all Black groups together (Cooper et al., 2005; Davey Smith et al., 2003; Nazroo, 2003). This approach overlooks the positive experience of participating in ethnic minority groups in which shared cultural values make it possible for an individual adjustment to ageing (Nazroo, 2006). Thus, the health disadvantages experienced by ethnic minority groups must be studied within a wider framework, encapsulating their migratory history and inequalities in SES and exploring how the latter influences the lives of ethnic minority group members, in particular the disadvantages and health inequalities they face at older ages.

The aim of this thesis was to investigate how different socio-economic characteristics may be better explanatory factors in assessing the national evidence on health inequalities amongst older people from ethnic minority groups in Britain. In particular, the thesis aimed at ascertaining the 'sensitivity' of the different SES measures and their appropriateness and validity in assessing health inequalities among ethnic elders.

The research questions for this thesis are:

RQ 1. *What is the association between health and ethnicity in later life?*

RQ 2. *How can SES (e.g. education, occupation and income) be measured in later life*?

RQ 3. T*o what extent do differentials in demographic characteristics, health risk behaviours and SES explain the relationship between health and ethnicity in later life?*

RQ 4. *Does the relationship between ethnicity and health change when alternative measures of SES (e.g. housing tenure and car availability) are used?*

This chapter will discuss each of the research questions in turn, drawing on the evidence from the bivariate and multivariate analysis, and contextualising the findings within existing research in the area of health inequalities among older people from ethnic minority groups. The chapter is structured as follows: The first section, Section 7.2, considers the extent of the association between health and ethnicity in later life. Section 7.3 examines the measurement of SES in later life, while Section 7.4 discusses the role of demographic and health-risk characteristics in explaining health status in later life. Section 7.5 discusses the findings on the 'sensitivity' of the different SES measures in examining health inequalities in later life and the final Section 7.6 concludes with a summary of the findings.

7.2 The association between health and ethnicity in later life

This section discusses the findings of the research in relation to the first research question, which is: ***What is the association between health and ethnicity in later life?***. Studies on ethnic minority groups in Britain have shown consistent differences between the health of Black Caribbeans, Black Africans, Indians, Pakistanis and Bangladeshis, compared with that of the White majority, and of Chinese people who in several studies are similar to Whites in reporting bad/very bad health (Davey Smith et al., 2000; Erens et al., 2001; Evandrou, 2000a; Kelaher et al., 2008; Nazroo, 2001; Nazroo, 2003). Kelaher et al. (2008) for example, carried out analysis of a community survey with a sample of 227 White, 233 Indian and Pakistani, and 213 Black Caribbean respondents living in Leeds. Their findings indicated that ethnic minority group members were more likely than Whites to describe their health as fair or poor, with Indians and Pakistanis reporting poorer health. In an earlier study, analyses of the Fourth National Survey (FNS) of Ethnic Minorities, show that Black Caribbean people were more likely than Whites to describe their health as fair, poor or very poor, and that Pakistani and Bangladeshi people, who are more likely to report poor health than all other ethnic groups, were 50% more likely than Whites to report fair, poor, or very poor health (Nazroo, 2001). Similarly, Chandola (2001), using data also from the FNS, with a sample size of 2,860 Whites, 1,268 Indians and

1,771 Pakistanis and Bangladeshis respondents, found that Pakistanis and Bangladeshis, followed by Indians, were more likely to report poor health compared with Whites, a finding that is notable in this study using cross-sectional data from the 2004 Health Survey for England. The sample size for the study population of this thesis comprised of 5,086 men and women (i.e. 2,255 men and 2,831 women) aged 50 year and over. As indicated in Figure 5.1, the bivariate analysis shows that all ethnic minority groups except for the Irish (9%) and Black Africans (4%) were more likely than the White group (11%) to report bad/very bad health. The results indicate that people from ethnic minority groups were more likely to report their health as bad/very bad and are in agreement with other findings from Britain (Chandola, 2001; Kelaher et al., 2008).

Equally, it has also been observed that ethnic minority groups are at higher risk than Whites for reporting a LLSI (Evandrou, 2000a; Harding, 2003; Natarajan, 2006). Limiting long-standing illnesses are illnesses, disabilities and infirmities that have affected a person over a period of time and may limit individual activities (e.g. arthritis, diabetes, hypertension, trouble walking and CVD) (Natarajan, 2006). There are some suggestions that although mortality rates in older people have been decreasing, the proportion of older people who report a LLSI has been increasing, especially among ethnic minority groups (Breeze et al., 1999; Grundy and Holt, 2001, Nazroo, 2001). For example, amongst Pakistani and Bangladeshi people, rates of diabetes are over five times those of Whites (Nazroo, 2001). Preliminary findings of the HSE 2004 also show that over 52% of Bangladeshi men and 60% of Pakistani women reported a LLSI. In contrast, the HSE found that Black African men, and both Chinese men and women, were less likely to report a LLSI than the White population. The multivariate analysis from this thesis shows that the Black African and Chinese people were less likely than the White people to report a LLSI (table 6.4). There were also differences among men and women in reporting a LLSI. For example, Pakistani women were less likely than the White women to report a LLSI (Table 6.6).

In addition, all ethnic groups except the Irish (35%) and Black African groups (19%) were more likely than White group to report a LLSI (Figure 5.2). This is peculiar, because as migrants to Britain, ethnic minority groups would be expected to show the healthy migrant effect, which means that migrants are characteristically healthier (Harding, 2004; Sundquist, 1995). Thus, a possible explanation for this study finding could be that the migratory process influences health in a negative way. The assumption would be that the cumulative changes and transitions affect healthy migrants and contribute to reports of a LLSI over time, influencing the health gradient found amongst ethnic minority groups. Consequently, the health status of many ethnic minorities, particularly of the first generation Pakistanis, diminishes, affecting their initial good physical health status (Harding 2004). However, there are important differences between ethnic minority groups in terms of reporting a LLSI.

Previous cross-sectional studies employing logistic regression analyses have shown consistently higher occurrences of reported bad/very bad health between different ethnic minority groups in Britain (Chandola and Jenkinson, 2000; Harding, 2004; Nazroo and Williams, 2006). For example, Chandola and Jenkinson (2000) employing two sources of data (1991-1996 HSE and the FNS) used logistic regression models to examine the association between different ethnic groups and self-rated health. Their results indicated that poorer self-rated general health was associated with greater morbidity within each ethnic group, with Pakistanis and Bangladeshis having the poorest health, followed by Black Caribbeans and Indians. The results of the multivariate regression models of this thesis support the findings in much of the existing literature (Chandola, 2001; Grundy and Holt, 2001; Kelaher et al., 2009; Nazroo, 2001; 2003; 2006), emphasising the association between ethnicity and the report of bad/very bad health. For example, Chinese and Bangladeshi people were more likely to report bad/very bad health than White people, followed by Pakistanis and Black Africans (Table 6.1).

The analysis also found significant gender differences, and Indian men were less likely than White men to report bad/very bad health, while Pakistani and Chinese men were more likely to do so (Table 6.2). Furthermore, Chinese and Bangladeshi women, followed by Black African women, were more likely to report bad/very bad health than White women. Such findings appear to be compatible with the existing literature. For example, Cooper (2002) found significantly poorer general health status amongst working age ethnic minority women from Black Caribbean and Indian groups, but not among women from the White, Pakistani or Bangladeshi groups. Additionally, the analysis also showed poorer health status amongst all ethnic minority men and women compared with the White population. However, it has been postulated that gender differences in reporting 'bad/very bad' health are complex and other factors should be considered. One possible explanation for this incongruity in findings can be attributed to the fact that studies have used different health outcomes, definitions of ethnic minority groups, SES measures and differences in datasets. A second explanation is the differential vulnerability hypothesis, which argues that women report poorer health because of a combination of pre-disposed factors including biological, social, and behavioural differences (Arber and Cooper, 1999; Crimmins et al., 2010; Curtis and Lawson, 2000; Denton et al., 2004; Gorman and Read, 2006). However, it has been noted that ethnic minority women are becoming more resilient and are positively adapting to their health problems (Arber and Cooper, 1999; Curtis and Lawson, 2000; Salway et al., 2007). Arber and Cooper (1999), refer to this new resilience as a 'new paradox' (p.75), whereby older women are more perceptive of their own health status and are more likely to report better health than men, after controlling for different demographic and SES characteristics.

The results confirm differentials generally found in the literature in relation to ethnicity and health in later life (Chandola, 2001; Chandola and Jenkinson, 2000; Davey Smith et al., 2000; Evandrou, 2001a; Nazroo, 2001, Nazroo, 2004). The findings also indicated that the report of 'bad/very bad' health differs amongst the different ethnic minority groups, for example Pakistanis and Bangladeshis are the most likely to report poor health. Interestingly, Black African and Chinese people also appear to be likely to report poor health, although parts of the existing literature argue that the health status of these two groups is closer to that of the White population (Ahmad et al., 2005; Davey Smith et al., 2000; Kelaher et al., 2008). The differences in reporting a LLSI also vary between ethnic minority groups and the White population. Hence, the reporting of a LLSI amongst ethnic minority groups was not entirely consistent with other studies. In previous studies, Black Caribbean and Bangladeshi people showed consistently higher odds of reporting LLSI amongst ethnic groups with the Indians and Chinese being less likely than all other ethnic minority groups to report a LLSI (Arber, 1997; Curtis and Lawson, 2000; Davey Smith et al., 2000; Erens et al., 2001; Nazroo, 2001). Hence, even though there is a strong association between health and ethnicity in later life, it is not clear cut, but this further confirms the complexity of ethnic inequalities in health. That is, the differences in reporting 'bad/very bad' health and a LLSI among and between members of the same ethnic groups

7.3 The measurement of SES in later life

This section discusses the findings of the research in relation to the second research question, which is: ***How can SES be measured in later life?.*** A strong relationship between health and SES has been documented in Britain and elsewhere, particularly among older people with increased health inequalities among older people from ethnic minority groups (Achenson, 1998; Evandrou, 2005; Farmer and Ferraro, 2005; Grundy and Holt, 2001; Harding, 2004; Huisman et al., 2003; Kelaher et al., 2009, Nazroo, 2004). Socio-economic status is a multi-faceted concept and SES measures are regarded as fundamental in health research, as they capture important dimensions of people's material and social circumstances throughout their life (Bowling, 2004; Grundy and Holt, 2001; Huisman et al., 2004; Lynch and Kaplan, 2000). Studies in Britain often employed a wide range of SES characteristics including education, occupation, individual or household income, house tenure and car availability (Evandrou, 2000b; Grundy and Sloggett, 2003; Kelaher et al., 2009; Sacker et al., 2005). Studies showed that marked differences in morbidity are linked to the SES of older people (Grundy and Holt, 2001; Huisman et al., 2004; Mackenbach et al., 1997).

For example, Huisman et al., (2004), using data from mortality registries linked with population census data of 11 European countries and regions, found that SES inequalities (i.e. housing tenure, education) in mortality continued into old age. Although relative socio-economic inequalities in mortality decreases with increasing age, they still persists amongst older people in some population groups, as shown in studies in Britain. Breeze, Sloggett and Fletcher (1999) examined the association of SES (i.e. housing tenure, car availability) in old age with limiting long-term illness. They used longitudinal data for individuals from three successive censuses (1971, 1981 and 1991) in Britain, and found that there were differences in SES measures amongst different age groups (e.g. 55 to 64 and 65 to 74 years). Thus, approximately 60% of men and women in both age groups lived in owner-occupied accommodations and car availability was more common amongst owner-occupied households, but varied by gender. Amongst those aged 55 to 64 years, men were more likely (66%) to have car availability compared with (34%) of older women. Although, SES disadvantage in old age explains many of the health inequalities in this study, they fail to account for the gender differences amongst older men and women at the multivariate level. Analysing data of the FNS (1993-1994), and using a new measure of SES, the National Statistics Socioeconomic Classification (NS-SEC), Chandola (2001) examined the contribution of SES to inequalities in self-rated health among White, Indian, and a combined Pakistanis and Bangladeshis group. After controlling for standard of living, the NS-SEC and the percentage of households within wards without car availability, Chandola (2001) found that there were no significant differences in reporting poor health among South Asians compared with the White people.

Hence, among the socio-economic variables identified in the literature as being of central importance to SES and the study of health inequalities, are a person's educational level, social class classifications, and equivalised household income (Chandola, 2001; Galobardes et al., 2006; Grundy and Holt, 2001; Lynch and Kaplan, 2000). Additionally, housing tenure and car availability have also been identified as measures of SES, particularly among British studies (Ellaway and Macintyre, 1998; Grundy and Holt, 2001; Macintyre et al., 2003). As indicated by this thesis' findings, general health and limiting long-standing illness are related to socio-economic status (Acheson, 1998; Bowling, 2004, Galobardes et al., 2006). The framework of this thesis, conceptualising health and ethnicity in later life, underscores the themes elucidated from the reviewed literature on health and the different theoretical approaches. The framework also helps guide the study in terms of the variable selections. For example there has been an on-going debate about whether traditional measures (e.g. education, NS-SEC occupational class, and income) of socio-economic status are appropriate SES measures for older people (Grundy and Holt, 2001; Knesebeck et al., 2003) and ethnic minority groups (Kelaher et al., 2009; Nazroo, 2001). However, as this debate continues, it has been recommended that because of the multi-dimensional aspects of SES in later life, studies should focus on a set of measures rather than a single measure, in particular, measures such as housing tenure or car availability that can be expected to reflect economic accumulative advantages or disadvantages of older people (Grundy and Holt, 2001; Knesebeck et al., 2003; Nazroo, 2001). Hence, this study employed five SES variables (education, NS-SEC occupational classifications, equivalised household income, housing tenure and car availability) for comparability with other studies, in order to assess their appropriateness and validity in assessing health inequalities amongst ethnic minority groups aged 50 and over.

As a result, based on these SES measures, the bivariate analysis showed clear differences based on the different SES measures amongst ethnic elders. The differences among ethnic minority groups in reporting bad/very bad general health were not the same across SES measures, and some ethnic minority groups experienced greater disadvantage. For example, Indian, Black African and Bangladeshi people were more likely to have a degree than Whites (Figure 4.2). The Pakistani and Bangladeshi people include the highest proportions of people who 'never worked', while over two-thirds of Bangladeshis and one-third of Black Africans live in households with 'no income' (Figure 4.4). Also, Bangladeshi and Black African groups were the least likely to be owner-occupiers (Figure 4.5), but there were few differences between White and ethnic minorities in terms of car availability (4.6). Thus, the findings indicated that regardless of the level of educational achievement amongst some ethnic minority groups, it did not protect them against risk of disadvantage (Platt, 2007b). Furthermore, SES disadvantages are more marked for Black African, Bangladeshi and Pakistani ethnic elders. The associations between health and the different SES measures, however, may be more

difficult to measure in later life because ethnic elders may have fewer opportunities to improve their socio-economic circumstances. Ethnic minorities who are more disadvantaged, regardless of their educational qualification (Heath and McMahon, 1997; Platt, 2005a), are more likely to experienced downward mobility in occupation and income (Heath et al., 2000; Platt, 2005a) and are more likely to report bad/very bad health and a LLSI (Bhopal et al., 2004; Harding, 2003; Platt, 2007). Whitehead and colleagues, however, argued that regional differences also contributed to differences in self-assessed health among the lower occupational social classes, and that the unemployed were more likely to report themselves as permanently sick (Whitehead et al., 2005).

7.4 The role of demographic, health-risk behaviour and SES characteristics in explaining health in later life

7.4.1 Introduction

This section discusses the findings of the research in relation to the third research question, which is: ***To what extent do differentials in demographic characteristics, health- risk behaviours and SES explain the relationship between health and ethnicity in later life?*** The key finding of this section is that although older people from most ethnic minorities are less likely than the White population to engage in health-risk behaviours such as smoking and alcohol consumption, their health outcomes tend to be worse than those of the White population. In addition, there exists significant variation within the ethnic minority population, reflecting differences in other factors such as demographic and socio-economic factors.

7.4.2 The role of demographic, health-risk behaviour and SES characteristics in explaining the report of bad/very bad health in later life

This section discusses the key findings of this thesis in relation to the above research question in three steps: firstly, by considering the role of demographic characteristics in explaining bad health in later life; secondly, by considering the role of health-risk behaviour in explaining bad health; and thirdly, by considering the role of SES characteristics in explaining bad health. Each of these groups of explanatory variables is discussed in turn.

One of the key determinants of poor health in life relates to the age structure of the different ethnic minority groups. The demography composition of ethnic elders is changing with an increasing diversity amongst ethnic minority groups as illustrated in Figure 1.2 and Figure 4.1. According to the 1991 Census, approximately 5.5% of the UK population (over 3 million) were from an ethnic minority

background. By the 2001 census, the percentage of the ethnic minority population had grown to 7.9%, an increase of over 53% from the 1991 Census. Furthermore, even though ethnic minority groups are younger than the White population, age differences exist within ethnic minority groups. For example, among the South Asian groups, Bangladeshis are younger than Indians but are similar in age to Pakistanis. Indian people are the oldest subgroup among South Asians, with the highest percentage in the retirement age bracket. The Black Caribbeans represent the highest percentage of ethnic minorities in the labour force and retirement age brackets (Haug et al., 2002; Nazroo, 2001; Nazroo and Williams, 2005). Although, similar heterogeneity can be found among the White groups, for example, the Irish have the oldest age groups, historically they have been treated as a homogeneous ethnic group, and their ethnicity has been left without question (Nazroo, 2001). Consequently, these demographic changes have produced distinct age differences among ethnic minority groups, which in combination with other factors, such as health-risk and socioeconomic position, have a significant impact on ethnic minority groups' health status. In particular, differences in health behaviours such as smoking and alcohol consumption became important markers of ethnic minority groups' health inequalities (Bécares et al., 2009; Bhopal, 2004; Bush et al., 2003; Edwards, 2004).

The analysis of this study on the demographic characteristics of ethnic minority groups aged 50 and over has shown that characteristics such as age, martial status, ethnicity, education, occupation, household income, housing tenure and car availability, are important in explaining the demographics and SES make-up of the British ethnic elders from both the bivariate and multivariate levels of analysis. For example, among ethnic elders, the report of very good health decreased in line with increasing age and the report of bad/very bad health increased in line with increasing age (Table 5.1). However, consistent with the literature, there is significant diversity among older people from ethnic minority groups in terms of their reported general health status (Chandola, 2001; Curtis and Lawson, 2000; Evandrou, 2000b; Erens et al., 1999; ONS, 2001). For example, the Pakistani, Chinese, Bangladeshi and Indian people were the most likely to report bad/very bad health (Figure 5.1). These results are important because they highlighted the differences amongst ethnic minority groups and the effect of the different demographic characteristics in assessing ethnic minorities' health status at older ages. In addition, people who were married were the least likely to report bad/very bad health and were the most likely to report very good health (Table 5.3).

Gender differences were significant and women were less likely than men to report bad/very bad health. It has been suggested that ethnic minority group members, particularly women, may be at a greater risk of developing poor health, as a result of their sex and their membership of an ethnic minority group (Cooper, 2000). It is important to consider the extent to which the health of ethnic men and women are mediated by inequalities of SES (Cooper, 2000; Davey Smith et al., 2000). For

example, ethnic groups may reflect examples of the risky behaviours, such as increased smoking rates (Bush et al., 2003) and alcohol consumption (Bécares et al., 2009). Such results show that health outcomes may be affected by both health-risk behaviours and SES characteristics.

One of they key health-risk behaviours, which has steadily declined in Britain, is cigarette smoking. For example, in the early 1970's, 51% of men and 41% of women over the age of 16 were identified as current cigarette smokers (Evandrou and Falkingham, 2002), but today these percentages have decreased to 25% and 23% respectively (Davy, 2006; Goddard, 2005). However, although smoking prevalence is lowest among men and women aged 60 and over, smoking is still a major contributor to health inequalities and premature death (DOH 1998, Evandrou and Falkingham, 2002; Goddard, 2005). Health-risk behaviours such as smoking and alcohol consumption are often linked to cardiovascular diseases and cancer, with some groups in the population being more likely to experience such diseases related to health-behaviour (Edwards, 2004; Jarvis & Wardle, 2006). Such behaviours, however, are more marked amongst the most disadvantaged groups in the population, and over time the most disadvantaged groups have come to form an increasing proportion of people who smoke and drink (Evandrou and Falkingham, 2002; Lawlor et al., 2003; Jarvis & Wardle, 2006).

One of the key findings of the thesis is that health-risk behaviour varies by demographic characteristics, and this is supported by existing research (Bhopal et al., 2004; Sproston and Mindell, 2006; Nazroo, 2001). For example, the bivariate analysis found that those who were divorced were twice more likely to be current smokers than those who were married or widowed (Table 5.9). Research has suggested that marriage may serve as a source of health-protection by encouraging positive health behaviours, which can over time culminate to desirable health outcomes at older ages (Twigg et al., 2004). However, it was apparent from the analysis that such positive health behaviours do not extend to all ethnic minority group members who smoke. As such, the Irish and Bangladeshi people were the most likely to be current smokers among ethnic minority groups (Table 5.9). However, those who had never smoked were more likely to report very good health than all categories of smokers (Figure 5.3). A possible argument for the higher rates of smoking amongst Bangladeshis people may be attributed to their cultural background, particularly relating to group cohesion and identity (Bush et al., 2003). It has also been postulated that differentials in smoking patterns among South Asians are related to whether they were born in the UK or not (Modood et al., 1997). In addition, smoking prevalence rates also varied by gender, and the regression analysis showed that ex-regular and current smokers were more likely to report bad/very bad health than those who never smoked (Table 6.1). These findings are consistent with earlier findings from the Department of Health, which showed that the estimated proportion of ex-smokers in Britain, with the highest reported rates, are among older men and women (60 and over), even though the number of mortality and morbidity from smoking-attributable diseases has decreased (DOH, 2003).

Equally, this thesis showed that ethnic minorities were less likely to report alcohol consumption, and when they did, such consumption was less frequent than among the White population. For example, more than 9 out of 10 Pakistanis and Bangladeshis consumed no alcohol at all and all ethnic minority groups were less likely than Whites to consume alcohol every day (Table 5.10). There were also differences among gender and men were more likely to consume alcohol every day than women, and women were twice as likely to consume no alcohol at all. Interestingly, in the model, men and women who consumed alcohol were less likely than men and women who never drank to report bad/very bad health (Table 6.2. and 6.3). The finding suggests that although alcohol consumption remains considerably lower among ethnic minority groups, it is still present. However, it has been argued that cultural and religious backgrounds support the marked differences in alcohol consumption among ethnic minority groups (Bhopal et al., 2004; Heim et al., 2004). Thus, given the general patterns of smoking and alcohol consumption, it is questionable that the report of bad/very bad general health of ethnic elders can be explained by differences in health-risk behaviours.

Such findings are consistent with existing research in the UK, which has found significant lower levels of alcohol consumption among ethnic minority groups from the Caribbean and the Indian subcontinent, even though Black Caribbeans are more likely to drink than South Asians in the general population (Goddard, 2005; Hajat et al., 2004; Harrison et al., 1999; Heim et al., 2004). For example, pooling data from GHS (2001 – 2005), findings indicated that over 60% of adults in Britain who reported drinking in the past 2 months, but only 8% were of an ethnic background (ONS, 2007). There were similar results from the FNS regarding alcohol consumption among ethnic minority groups with rates of abstinence ranging from 40% in Chinese people to 60% in Indian and over 90% in Pakistani people compared with 13% in the White population (Nazroo, 1997).

The findings also show that even though it is evident that socio-economic inequalities in health status reflect different social circumstances, it is clear that there is a widening gap in health inequalities between the most advantaged groups in terms of education, occupation and household income, as evidenced by the bivariate analysis of this thesis. For example, those with a degree were more likely to report very good health and least likely to report bad/very bad health (Table 5.7). Furthermore, those from the higher occupational classes were the most likely to report very good health and least likely to report bad/very bad health. Similarly, a higher household income was associated with a higher likelihood of reporting very good health (Table 5.7), although one-quarter of those living in a household with no income reported very good health. A possible explanation for this anomaly is that, those with no income who reported good health, received income support from other sources, including state retirement pension, other state benefits, private pensions, interest and earnings including savings (Balchin and Soule, 1995; Ginn and Arber, 2000). Thus, because of heterogeneity

among different ethnic groups, it should not be assumed that all ethnic elders are disadvantaged in terms of their private income relative to the White majority (Ginn and Arber, 2000).

In this study, housing tenure and car availability were significant factors associated with the report of bad/very bad health amongst ethnic minority groups. As such, those in rented accommodations were the least likely to report very good health and the most likely to report bad/very bad health. Likewise, those who did not have car availability were twice as likely as those with access to report bad/very bad health, and half as likely to report very good health (Table 5.7). Existing literature has consistently drawn links between morbidity rates on the one hand, and markers of SES, including education, income and occupation, housing tenure and car availability (Davey Smith et al., 2003; Grundy and Holt, 2001; Kelaher et al., 2008). Generally, SES in health status takes the form of a social gradient, in which people who are poorer and who have fewer socio-economic advantages are more likely to report a number of diseases (Knesebeck et al., 2007; Read and Gorman, 2006, Nazroo et al., 2002). For example, preliminary analysis of the HSE data (1999 and 2004), suggests that ethnic minority groups who reported bad or very bad health were more marked, particularly among Bangladeshi and Pakistani men and women compared with the general population (Erens, 2001; Natarajan, 2006). Furthermore, the HSE (1999) suggested that people from ethnic minority groups are more disadvantaged in terms of occupation and income. For example, more that 90% of Bangladeshis and over three quarters of Pakistani people, aged 50 and older were in the lowest income tertile compared with just over a third of the White population in the same age groups (Nazroo, 2004; Grewal et al., 2004).

The results of the regression model also present several interesting findings in terms of the use of SES measurements for the study of health amongst ethnic minority groups aged 50 and over. Education, income housing tenure and car availability were most sensitive in the analysis. As expected, and consistent with other studies, respondents with no qualifications were more likely to report bad/very health that those with a degree (Cooper, 2002; Platt, 2007b). Likewise, those living in a household with an income less than £10,000 were more likely to report bad/very bad health than those living in a household with an income over £25,000, and those who rented were more likely than owner-occupiers to report bad/very bad health. Also, those with no car ownership/access were more likely than those with ownership/access to report bad/very bad health (Figure 6.1). Such results appear to be compatible with existing studies, which regard education, occupation and income as the three basic elements of SES advantages and disadvantages in relation to material resources (Bowling, 2004; Galobardes et al., 2007; Grundy and Holt, 2001; Lynch and Kaplan, 2000).

Hence, it is evident that the SES profile and material resources of ethnic elders influence their life chances eventually resulting in bad/very bad health. Evandrou (2000b) emphasised this point in

examining the socio-economic position (e.g. income, housing tenure, and consumer durables) of older people and found significant levels of poverty, with one in five older people socio-economically deprived on three or more measures. As such, over a fifth of White elders, and a quarter of Irish elders, were in the bottom fifth of the income distribution compared with a third of older Black Caribbeans. At the same time, three-fifths of Pakistani and Bangladeshi elders were the most likely to experience very high levels of SES disadvantage. Turning again to the multivariate analysis to examine the question posed in the section, in relation to men and women, it was also evident that for both men and women, bad/very bad health was associated with education, housing tenure and car availability. In particular, men and women with no qualifications were more likely to report bad/very bad health than men and women with a degree (Figure 6.2 and 6.3). Men and women who rented were also more likely than men and women who were owner-occupier to report bad/very bad health. Equally, men and women with no car ownership/access were more likely than men and women with car ownership/access to report bad/very bad health.

In general, the results support the contention that there is a strong relationship between SES and self-reported health among ethnic elders, however, as highlighted elsewhere in the literature, additional factors need to be considered in this relationship (Kelaher et al., 2008; Nazroo and Williams, 2006; Nazroo, 2004). For example, Nazroo and colleague (2006) argued that ethnic inequalities in health arise from a number of causes, including culture, migration, socio-economic differentials, racial harassment and discrimination, and that these factors can impact SES opportunities and rewards that are directly associated with health outcomes. Studies in Britain on harassment and discrimination have found such factors to be associated with poor health (Virdee, 1997), for instance, Karlsen and Nazroo (2002) found that individuals who reported experiences of harassment were approximately 50% more likely than those who did not report such incidents to describe their health as fair, poor or very poor. Furthermore, of the individuals who believed most British employers to be racist, over 40% reported fair, poor or very poor health compared with those who believed that fewer than half of employers were racist (Karlson & Nazroo, 2002). Other factors, such as discrimination in housing provision, may be useful in further exploring such relationships (Harrison, 2003).

7.4.3 The role of demographic, health-risk behaviour and SES characteristics in explaining the report of LLSI in later life

Similarly to the previous section, this section discusses the key findings of this thesis in relation to the third research question in three steps: firstly, by considering the role of demographic characteristics in explaining the report of a LLSI in later life; secondly, by considering the role of health-risk

behaviour in explaining the report of a LLSI; and thirdly, by considering the role of SES characteristics in explaining the report of a LLSI. Each of these groups of explanatory variables is discussed in turn.

Research has highlighted the association between demographic, health-risk behaviour and SES characteristics and the report of a LLSI, and the widespread effects that such ill-health can have on ethnic minority groups in later life (Davey Smith et al., 2000; Manor et al., 2001; Salway et al., 2007). It has been postulated that both health-risk behaviour and SES are associated with significantly reduced chances of employment, income and housing tenure, and as such, these SES characteristics exert their influences independently, cumulatively and interactively (Kud et al., 2003; Shankar et al., 2010). Furthermore, it has been argued that increased morbidity is a predictor of functional decline and people who are poorer and who have fewer socio-economic advantages are more likely to report higher levels of morbidity (Salas, 2002; Salway et al., 2007; Stuck et al., 1999). Stuck and colleagues (1999), in a systematic review on risk factors for functional decline, examined over 78 studies and found that the evidence was most significant for increasing number of chronic diseases reaching a level of four or more, such as cognitive impairments, lower extremity functional limitations (e.g. walking, climbing and stooping), smoking and vision impairments. Hence, the experiences and exposures that influence such health differences between different groups in the population are related to differences in ill-health, SES and behavioural choices.

Other studies have also found significant SES effects and persistent health behaviour and functional limitations amongst ethnic minority groups in the UK. Harding and Balarajan (2000), for example, analysis data from the 1991 Census (ONS Longitudinal study based on 1% sample of the population of England and Wales), observed from logistic regression analyses that ethnic minority groups (Black Caribbeans, Black Africans, Indians, Pakistanis and Bangladeshi) born in the UK, compared with the White reference group, reported a higher risk of a LLSI, which was related to greater morbidity and functional limitations, but the Chinese people were less likely to report a LLSI. Socio-economic status was measured using car availability and housing tenure, and after adjusting for these SES measures, the risk of reporting a LLSI was less attenuated in every group except Indians. The 2001 Census, also indicated that 27% of all people from ethnic minority groups aged 50-64 years reported a limited long-term illness, and other studies indicated that Pakistanis, Bangladeshis and Black Caribbeans are more likely to report a LLSI compared with their White counterparts (ONS, 2001; Salway et al., 2007).

Such findings from existing research appear to be compatible with the findings of this thesis at the bivariate and multivariate levels. For example, the both the bivariate analysis showed that the report of a LLSI increased in line with increasing age and the report of no LI decreased in line with increasing age (Table 5.4). Indeed, studies in this area suggest that LLSI observed in middle adulthood persist into late adulthood, thus contributing to higher rates of reporting a LLSI, result of chronic health

conditions (Ayis et al., 2003; Breeze, Sloggett and Fletcher, 1999; Harding and Balarajan). It was also evident from the findings in this thesis that those who were single were least likely to report a LLSI (Table 5.6), and existing research suggests that the association between reporting a LLSI and marital status may be weaker in older age groups, particularly amongst those who are single (Glaser and Grundy, 1997; Waldron et al., 1995).

At the same time, there is significant heterogeneity in reporting a LLSI amongst ethnic minority groups. This thesis showed that the Pakistani, Chinese, Bangladeshi and Indian people in later life were the most likely to report a LLSI (Figure 5.2). In terms of the age effect, the regression analyses showed the expected relationship between age and the odds of reporting a LLSI, with the likelihood of reporting a LLSI rising with increasing age (Table 6.4). A finding that is concurrent with other studies (Evandrou, 2000a; Harding, 2003; Natarajan, 2006). Furthermore, in the reporting of a LLSI among ethnic minorities, the multivariate analysis found that the Black African and Chinese ethnic groups were less likely than Whites to report a LLSI (Table 6.4).

Furthermore, in the split models by gender, comparable results were found for men and women, for example the analysis at the bivariate level found that women were slightly more likely than men to report a LLSI (Table 5.5). When age was taken into account, there existed more differences within the gender groups, for example, the regression results indicate that younger old men were less likely than older old men to report a LLSI (Table 6.5). Gender was an important factor when comparing different ethnic groups, for example the multivariate analysis showed that Pakistani women were twice as likely and Chinese women were 63% less likely than White women to report a LLSI (Table 6.6).

In terms of the effect of health-risk behaviour on health outcomes, existing literature has emphasised that differences in health-risk behaviours are important contributors to ethnic health inequalities (Bécares et al., 2011; Nazroo, 2001; 2004). In addition, the literature suggests that ethnic minority groups are more likely to be at risk of developing CVD including ischemic heart disease and diabetes than the White population (Chaturvedi, 2003; Bhopal et al., 2003). However, there are substantial differences within and between ethnic minority groups in the patterns of smoking-related diseases and smoking behaviour. For example, the Health Education Authority (HEA) Survey of Health and lifestyles evidenced that smoking incidence among Bangladeshi men (49%) is significantly higher than among Pakistani (29%) and Indian men (15%) and in Britain, than White men (29%) (HEA, 2000). Hence, the relationship between LLSI and smoking is one of both cause and effect among smokers. Smoking is associated with chronic diseases (e.g. CVD, cancer), and premature deaths and even though smokers are at greater risk of developing smoking related diseases such as CVD, cancer and other respiratory diseases, there continue to be smokers (British Medical Association, 2008;

Bhopal et al., 2004; Modood et al., 1997). The results from the thesis indicate that ex-regular smokers were more likely to report a LLSI than current smokers (Figure 5.4). This could partially be explained by the years of smoking, a consequence of developing a LLSI as a smoker (BMA, 2008; White et al., 2006).

However, the findings also include a number of puzzling results. For example, the bivariate analysis showed that those who had never smoked were more likely to report a non-LLSI than all categories of smokers (Figure 5.4), and the regression analyses found that ex-regular smokers were more likely than those who never smoked to report a LLSI (Table 6.4). Similarly, the multivariate analysis showed that ex-regular smokers among men and women were more likely than men and women who never smoked to report a LLSI (Table 6.5 and 6.6). Such results may indicate that the report of an illness (limiting or not) may be the result of, or related to, current or past smoking behaviour. Interestingly, current smokers have a higher likelihood of reporting an LLSI than 'never smokers' in Model 1, however, the statistical significance of this effect disappears once income was added to the model. This reflects the fact that smoking and income are related and that the income effect on health absorbs the smoking effect (see conceptual model on p.200 where SES having a direct impact on behavioural factors). The findings show some similarities with other studies in relation to smoking behaviour in the predominately White population (Lawlor et al., 2003; Manor et al., 2001; Twigg et al., 2004).

Similar to cigarette smoking, alcohol consumption has been linked to a number of health risk behaviours including cirrhosis of the liver, HTN, CVD and cancer (Becker et al., 2006; Davey Smith et al., 1996, NHS, 2009). A key component of our understanding of the relative health risk posed by alcohol consumption is its frequency. In 2007, for example, over 73% of adult men and 57% of women reported they consumed an alcoholic drink at least once every week (ONS, 2009). The General Household Survey (2001 -2005) indicates that of the 67% of British adults who reported drinking in the past week, 9% were from an ethnic minority background (Goddard, 2005; ONS, 2009). It is evident that alcohol consumption is lower among all ethnic minority groups compared to the White majority, except the Irish, although differentials in alcohol intake exist between these groups (BMA, 2008; Goddard, 2005; Harrison et al., 1997; Heim et al., 2004). For example, Black-Caribbean people are more likely to drink than South Asian people, particularly Pakistani and Bangladeshi elders, and the differentials in drinking patterns has been attributed to cultural and religious differences (Bhopal et al., 2004; Heim et al., 2004). It was evident from the multivariate results that there were differences in the relationship between alcohol consumption and the report of a LLSI amongst ethnic elders. For example, those who consumed alcohol were less likely to report a LLSI than those who never drank (Table 6.4), and men and women who consumed alcohol were less likely to report a LLSI than men and women who never drank (Table 6.5 and 6.6).

The final group of explanatory variables to be considered is that of SES characteristics, and their role in explaining the report of a LLSI in later life. The association between the report of a LLSI and SES characteristics is an important consideration amongst ethnic elder's health inequalities. Numerous studies argued that ethnic minority groups in Britain experienced an unequal degree of soci0-economic disadvantage, although there is much heterogeneity within ethnic groups (Achenson, 1998; Evandrou, 2005; Harding, 2003; Nazroo and Williams, 2006). However, ethnic minorities who have lower educational status, come from a lower NS-SEC occupational class and have a lower income are more likely to report a LLSI (Heath et al., 2000; Salway et al., 2007). In Britain, both housing tenure and car availability are often referred to as alternative measures of SES in studies of health (Evandrou, 200a; Grundy and Holt, 2001), and ethnic elders are more likely to experience SES disadvantages on one or several of these measures of SES, in reporting a LLSI, as indicated by this study. For example, those who rented were most likely to report a LLSI (Table 5.8), which may be explained by research showing that poor housing quality and housing conditions, including overcrowding, are markers of higher morbidity (Harrison, 2003). Harrison (2003) examined a number of issues related to housing and the ethnic minority communities in Britain. There were both diversity and constraints in ethnic minority housing tenure and factors such as dilapidated and overcrowded housing exacerbate health problems and chronic illness. Furthermore, the contention was that discrimination and intimidation caused by racism may also influence ethnic minorities' housing choices as to whether they were renters or owner occupiers (Harrison, 2003).

The impact of education on the report of a LLSI is also important to consider in this context, as the thesis' findings indicated that ethnic elders with no qualifications were twice as likely as those with a degree to report a LLSI (Table 5.8). Educational status and educational attainment were key SES measures and have been argued to be fundamental to the success of ethnic minority groups in Britain (Harrison, 2003; Heath and McMahon, 1997; Platt, 2007b). Research has shown that the disadvantages associated with educational attainment underpin ethnic minority SES success and health outcome in later life. For example, Heath and McMahon, (1997) found that even though there were educational differences amongst ethnic minority groups, and some groups have higher educational qualifications that the Whites, educational returns based on income and the chance of employment were not the same for ethnic minorities. They described the gap that emerges between SES (e.g. education) and ethnic minority groups as 'ethnic penalty' (p.91). These authors defined ethnic penalty as disadvantages that are likely to influence ethnic minority's success in attaining higher level employment and or income compared with their White counterparts with similar and or fewer qualifications (Heath and Mahon, 1997).

Other SES measures produced more mixed results. For example, in terms of the household income, the findings from the multivariate analysis showed that ethnic elders living in a household with income less than £10,000 were twice more likely than those living in a household with income over £25,000 to report a LLSI (Table 6.4). This could suggest that the report of a LLSI is related to the household income. In addition, those who rented were more likely to report a LLSI than owner occupiers as well as those with no car availability who were more likely than those with car availability to report a LLSI (Table 6.4).

Finally, the findings from the multivariate analysis show notable differences in the role which SES characteristics play in explaining the report of a LLSI by men and women. For example, men and women living in households with income less than £10,000 were more likely than those living in a household with an income of over £25,000 to report a LLSI (Table 6.5 and 6.6). In addition, men and women who rented were also more likely to report a LLSI than owner-occupiers (Table 6.5 and 6.6), while men with no car availability were more likely that those with car availability to report a LLSI (Table 6.5).

In summary, income, housing tenure and car availability are key discriminators in affecting the probability of an older person reporting an LLSI, after controlling for age, ethnicity and health risk behaviour.

7.4.4 Summary: The role of demographic and health-risk behaviour characteristics in explaining health status in later life.

Demographic characteristics are important measures in explaining health status defined as self-assessed general health and self-reported LLSI, and this has been shown elsewhere in the literature (see also Chapter 4). However, different variables appeared to be significant in the explanations for different health outcomes. For example, in the model explaining the report of bad/very bad health, age and marital status were not significant, whereas in the model explaining the report of a LLSI, it was sex and marital status which were not significant. The variable of marital status was not significant in either of the two models (general health or report of LLSI), and this was also the case when the models were ran separately for women and men. This suggests that either marital status is less important than other factors in explaining poor health among ethnic elders, or that this particular variable has been accounted for by other variables in the model, such as the equivalised household income.

On the other hand, the health-risk behaviour variables behaved similarly as predictors in different models. For example, in both models explaining the report of bad/very bad health and the report of a LLSI, smoking status and the frequency of alcohol consumption were significant parts of the explanation. In addition, the significant role of these variables in explaining poor health and the report of a LLSI remained constant in the separate models for both men and women. These findings provide useful guides for the model-building process in future studies of health in later life.

7.5 The 'sensitivity' of different SES measures in examining health inequalities in later life

Existing studies on health inequalities in later life have used different measures of SES in order to understand differences between different social groups, including ethnic groups (Bhopal et al., 2000; Chandola and Jenkinson, 2000; Curtis and Lawson, 2000; Kelaher et al., 2008). For example, studies examining health inequalities amongst ethnic minority groups were explained by socio-economic status, and individuals who have lower educational attainment, lower income or come from a lower occupational class were more likely to experience health inequalities (Ahmad et al., 2005; Evandrou, 2000a; Grundy and Holt, 2000; Cooper, 2002; Kelaher et al.2009). In addition, analyses of the HSE (1993-96) used educational level, employment status, occupational social class and material deprivation to account for a large proportion of the inequalities in self-reported health among Black Caribbean, Pakistani and Bangladeshi groups (Cooper, 2002). Such studies are important in

emphasising the importance of SES in terms of social mobility, for example Platt (2007b) argued that education is the major route to upward mobility. Platt indicated that ethnic minorities with little or no educational qualifications were more likely to experience ethnic penalty in relation to higher occupational class outcomes and also downward mobility, and that for Pakistanis and Bangladeshis, this penalty persists at all levels of education (Platt, 2007b). Other studies have highlighted other SES measures, for example household income (Nazroo et al 2004), housing (Pandya et al 2005) or employment (Heath et al 2000).

The analysis in this thesis has shown that different SES measures carry different weight when it comes to explaining poor health in later life for ethnic elders. For example, in the model explaining the report of poor health, the variables of education, household income, housing tenure and car availability were significant predictors, while occupational class was not significant. This result raises questions about the usefulness of the latter variable for future analyses of health inequalities using SES measures. By contrast, in the model explaining the report of a LLSI, the variables of education was not significant, while household income, housing tenure and car availability were highly significant. In this model, the variable of occupational class was not significant.

When taking gender into account, there were also significant differences in the strength of difference SES measures as indicators of poor health or the report of a LLSI. For example, in the model explaining the report of poor health, the variables of household income, housing tenure and car availability were strong predictors for men, while the variables of education, household income and housing tenure were the strongest predictors for women. Occupational class was not significant for either of these models. By contrast, the report of a LLSI was explained for men by the variables of household income, housing tenure and car availability, while for women it was the variables of household income and housing tenure which were parts of the explanation. Interestingly, education and occupational class were not significant for the explanation of LLSI among both men and women. These findings point to different pathways to poor health for older men and women from ethnic minorities, and the importance of considering gender differences in our understanding of health inequalities.

7.6 Summary

This Chapter has discussed the key findings of the research in response to the thesis' Research Questions and in relation to the existing literature in this area. The findings show that there are significant differences in the health outcomes experienced by older people from different ethnic minorities, both between different ethnic groups, and between the ethnic minority population and the White majority population. For example, the multivariate analysis has shown that Black African,

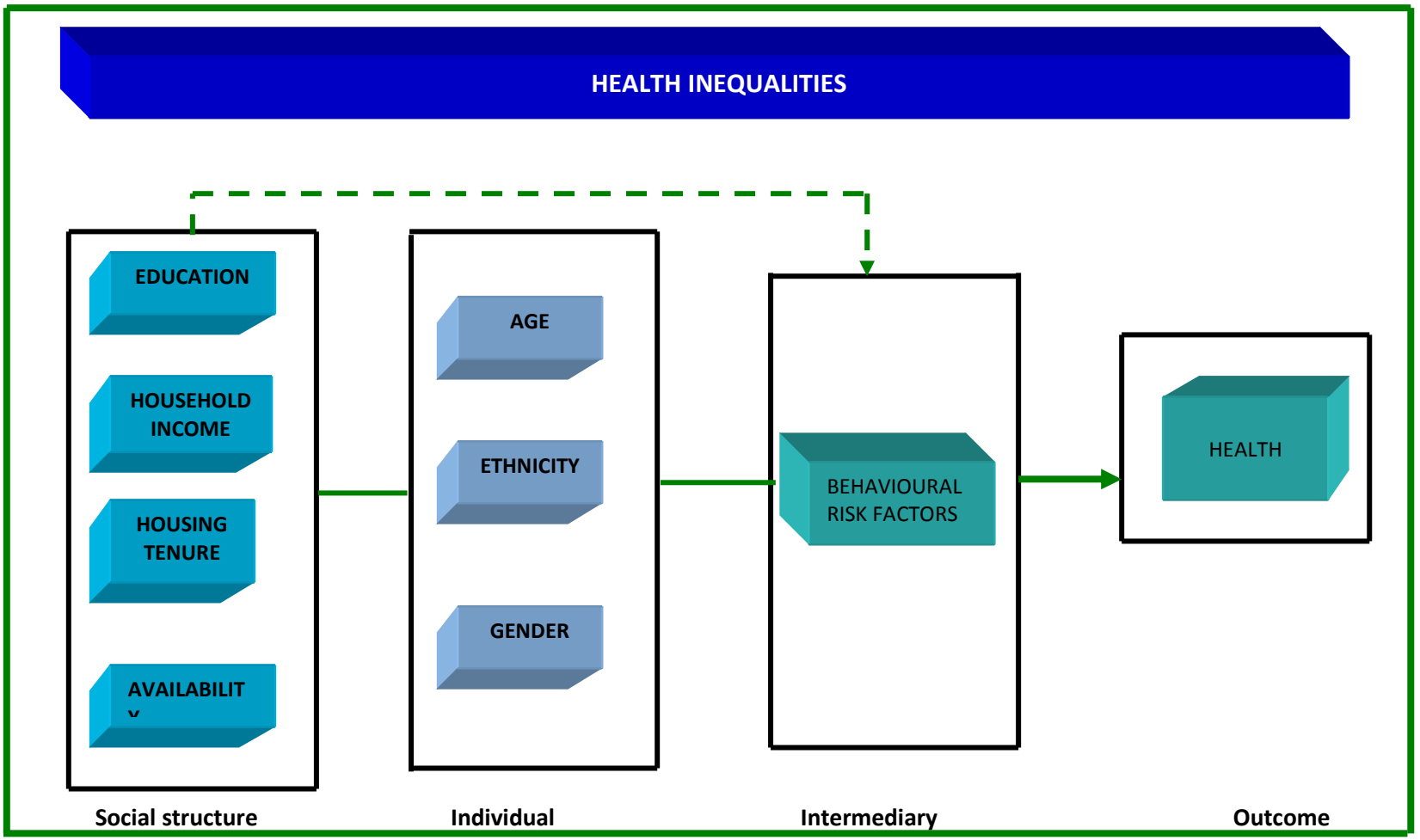
Pakistani, Bangladeshi and Chinese people are more likely than White people to report poor health (Table 6.1). In addition, the findings point to the importance of including a gender perspective to the analysis of health outcomes, as there seem to exist differences both between men and women from the same ethnic group, and between men and women from different ethnic groups. For example, Pakistani women were twice more likely than their White counterparts to report a LLSI (Table 6.6).

In terms of the relative importance of demographic, health-risk behaviour and SES characteristics, the findings are mostly consistent with the literature, and where there are discrepancies, it is possible that additional factors are part of the model-building process in the relationships studied. For example, those who drank alcohol 3 – 6 times a week were shown to be less likely than those who never drank at all to report a LLSI (Table 6.4). Perhaps the most important part of the findings relates to the usefulness of different SES measures for the study of health outcomes among ethnic elders, and further among older men and women from ethnic groups. The thesis has shown that certain SES measures appear to be stronger predictors of poor health or of the report of a LLSI, and that such differentials vary further when we look at men and women separately. For example, car availability was not a stronger predictor of women's report of a LLSI, however this was not the case for men. Such findings can be informative for the model-building process of future studies of health inequalities among ethnic elders.

In conclusion, Figure 7.1 revisits the conceptual framework of the thesis, and reconsiders the relative importance of factors that can help us in understanding and measuring the association between SES and ethnic elders' health inequalities. In general, the analysis found that different measures of SES and demographic factors interact with behaviour to impact health. The figure shows that SES characteristics can have an effect on their own or in combination with other SES characteristics. In addition, SES characteristics can have an independent effect on health-risk behaviour, which in turn can impact on a person's health status (Graham, 2005; Lynch and Kaplan, 2000). However, as discussed throughout the thesis, for ethnic minority groups the relationship between health and different SES characteristics is more complex. Importantly, the separate demographic characteristics which contributed to explaining the reporting of bad/very bad health or a LLSI, have been unpacked in the figure, namely age, ethnicity and gender (marital status was not significant).

Finally, the revised conceptual framework shows the measures of SES which were found to be significant in explaining the reporting of poor health among ethnic elders, and these variables include education, household equivalised income, housing tenure and car availability, however education and occupational social class has been omitted as they were not significant. The figure shows that SES characteristics can combine with intermediary factors, such as health-risk behaviour, in order to impact on the health status of ethnic elders.

Figure 7.1 Determinants of health inequalities among ethnic elders: Outcome of study findings



Chapter 8

8. Conclusion

8.1 Introduction: The relationship between health, ethnicity in later life and the 'sensitivity' of different SES measures

As discussed throughout the literature, socio-economic status consists of multiple dimensions, such as education, occupation and income (Knesebeck et al., 2007; Lynch and Kaplan, 2000; Nazroo and Williams, 2006), as well as housing tenure and car availability (Chandola et al., 2003; Grundy and Sloggett, 2003; Kelaher et al., 2008). These measures are also related to ethnic minority health differences (Chandola, 2001; Nazroo, 2003; Platt, 2007), and socio-economic inequalities may also relate to health inequalities (Drever and Whitehead, 2004; Mackenbach et al., 2005). In previous literature, health inequalities have been explored by a range of health indicators such as self-reported general health and the report of a LLSI (Manor et al., 2001; 1997). Measures of SES such as education, occupation and income, are not without contention, particularly in relation to older age groups (Breeze et al., 2004; Grundy and Holt, 2001), gender groups (Annandale & Hunt 2000; Cooper, 2002; Curtis and Lawson, 2000) and ethnic minority groups (Davey Smith et al., 2000; Nazroo, 2003). As such, education, occupation and income are markers to the life chances and health status of different groups. For example, the income associated with a given level of education and occupation is greater for the White majority than for ethnic minority groups as illustrated in the findings of this thesis and other studies which rely on similar SES measures (Ginn and Arber, 2000; Grundy and Sloggett, 2003; Heath and McMahon, 1997; Nazroo, 2003). Nazroo (2003), for example, argued that education and occupation can provide an indirect indication of the living standards of minority ethnic groups compared with the White population.

The context of studying health inequalities among ethnic minorities is that of an ageing population (see Figure 4.1). Furthermore, it has been estimated that over the next decade, the older population will become more diverse as ethnic minorities who migrated to the UK in the early 1950s and 1960s enter retirement age (Lievesley, 2010; ONS, 2011). For example, according to a recent report published by Runnymede and the Centre for Policy on Ageing, including figures from the ONS, by 2051 the ethnic minority population will make up 36% of the UK population, representing 25 million people. Also, in the same period, the predicted estimate for ethnic elders aged 65 and over will be 3.8 million, and those aged 70 and over are projected to reach 1.9 million (Lievesley, 2010). But in spite of such estimations, the ageing of ethnic minority groups and the implications for health and health care needs have received far less attention in the academic literature. Therefore, given the growing numbers and the anticipated increasing diversity of older ethnic minority groups in the UK,

the ageing of these communities over the next two decades places greater emphasis on the importance of empirical evidence on their health status. Such evidence is likely to be a key resource for researchers, health care practitioners and policymakers. For example, it has been criticised that the recent report commissioned by WHO on *'Social Determinants on Health'* lead by Marmot (2010), paid little attention to inequalities between and within ethnic minority groups, and failed to emphasise the systemic and repeated causes of inequalities, such as poor patient-provider communication, a lack of visible minority presence among health-care staff, and feelings of exclusion and mistrust on the part of minority clients (Salway et al., 2010; Lorant and Bhopal, 2011).

Additionally, part of the literature argued that the effects of SES on health outcomes also influences ethnic minority groups' life experiences, and opportunities and choices related to their living standards (Galobardes et al., 2006; Graham, 2005; Nazroo, 2004). Furthermore, the influences of SES on health were argued to begin in early in life (Barker, 1991; Case et al., 2005), continue to accumulate throughout life (Ben-Shlomo and Kud, 2002; Davey Smith and Heart, 2002) and were being tempered by circumstances in later life (Bajekal et al., 2004; Nazroo, 2004). Individuals with higher SES were more likely to report better health (Davey Smith et al., 2003; Grundy and Holt, 2001), higher social mobility (Harding, 2003; Platt, 2005b) were less likely to engage in health risk behaviour, such as smoking and alcohol consumption (Jarvis and Wardle, 2006). Research on the health of ethnic minority groups suggests that people who were poorer and who have fewer socio-economic advantages were more likely to report higher levels of morbidity (Knesebeck, et al., 2007; Read and Gorman, 2006; Nazroo et al., 2002). For example, Nazroo (2001) shows that amongst diabetic Pakistani and Bangladeshi people, the proportions reporting poor health were over five times higher than among their White counterparts. Several studies also confirm that in terms of SES and health inequalities, Bangladeshis consistently reported poorer health (Chandola, 2001; Kelaher et al., 2009; Nazroo, 2003; 2006).

Given the concern about designing policy initiatives in order to improve the health status of ethnic minority groups, empirical evidence is crucial in order to help disentangle the complex nexuses between SES and health among ethnic elders. Thus, the topic of measurement of health inequalities amongst ethnic minorities using SES indexed by the traditional (e.g. education, occupation, incom*e*) and alternative (e.g. housing tenure and car availability) measures is a key issue which can help strengthening the bridge between research and policy in the area of ethnic elder's health care needs.

Over thirty years ago, the *Black Report*, a major landmark in UK health research, and in the last decade, the *Achenson Independent Inquiry into health inequalities*, widened the debate on the causes of health inequalities (Townsend and Davidson, 1982; Achenson, 1998). These reports helped to shift the focus on the influence of SES by demonstrating how people who were more socio-

economically disadvantaged experience marked health inequalities compared with those in more privileged socio-economic circumstances. Since these reports, there have been extensive developments in the measurement of SES and health inequalities (Craig et al., 2007; DoH, 2006; Graham, 2005; Marmot, 2010). For example, the 1991 Census was the first Census in the UK to include a question on 'ethnicity' and the report of a 'limiting long standing illness', both providing important evidence of the demographic make up and specific health issues of ethnic minorities in the UK. Likewise, in 1993-1994 the Fourth National Survey (FNS) of Ethnic Minorities (Berthoud et al., 1994), was one of the first studies of its kind, focusing only on people from ethnic minority groups. It collected information on a wide range of demographic and socio-economic characteristics including ethnic identity, economic position, education, housing, health status, health risk behaviour and experiences of racial harassment and discrimination (Nazroo, 1997). Even though the FNS has important limitations, for example its sample size, it was considered one of the most authoritative accounts on ethnic minority groups' health status in Britain (Evandrou, 2000a; Nazroo, 2004). Another important source of information that provides valuable data on the health status of ethnic minority groups, used in this thesis, is the HSE Ethnic Boost Sample, which was firstly included in the survey in 1999, and this survey also includes a wide range of questions on ethnicity, SES and health in its core questionnaire.

Whilst in the last ten years the general population in Britain is healthier than it has ever been, the health of the least disadvantaged is improving more slowly and in some cases inequalities are widening (Marmot, 2010; Platt, 2010; Shaw et al., 2000). Several studies, including this study, found that in term of SES (e.g. occupation, income) and morbidity, ethnic minority groups report a more disadvantageous position than the majority White population (Graham, 2005; Platt, 2007; Salway et al., 2007). Over the last decade, the debate on the evidence on determinants of health and health inequalities not only gathered momentum, but for example, reports such as the 2004 Wanless report- *'Securing good health for the whole population*', added impetus in setting out the major determinants of health and health inequalities (e.g. standard of living, housing, education etc), and called for the research agenda to assess issues of inequalities (DoH 2004).

Similarly, programme interventions were targeted to address inequalities of older people, where the government adopted the *Sure Start approach,* initially developed for children, to older people. This latest report was titled 'Sure *Start to Later Life: Ending Inequalities for Older People - a Social Exclusion Unit Final Report'* (DoH, 2006), and was aimed at identifying specific interventions that would help narrow the gap and address issues of independence, dignity and choice of existing services. Additionally, the Sure Start report would inform policy, empower older people and combat social exclusion in later life (DoH, 2006). Although the report identified an array of issues related to ethnic minority elders, including demographic and SES factors, there were no clear targets to

reducing the inequitable experiences in SES circumstances of older ethnic minority groups. In particular, the report indicated that ethnic minority groups were more likely to experience multiple SES disadvantage including low household income, poor housing and multiple deprivation (e.g. absence of central heating, car, phone etc), which could result in poor general health (DoH, 2005). In spite of such evidence, the policy emphasis on this topic was less pronounced. Hence, these reports reiterate not only that there is an urgent need to address the main determinants of health, but that more attention needs to be paid to ethnic elders' health inequalities. The recent *National Equality Panel* (NEP) report is illustrative of how important it is to focus on ethnic and economic inequalities by drawing attention to the fact that inequalities within ethnic minority groups were considerable and even if differences among ethnic groups were accounted for, greater inequalities compared to the whole population still emerge (Hill et al., 2010).

8.2 Revisiting the aim and the research questions of the thesis

The overreaching aim of this thesis investigates how different socio-economic characteristics may be better explanatory factors in assessing the national evidence on health inequalities amongst older people from ethnic minority groups in Britain. In particular, the aim is to determine the 'sensitivity' of the different SES measures and their appropriateness in assessing health inequalities among ethnic elders. The specific research questions for this thesis are:

> **RQ 1.** *What is the association between health and ethnicity in later life?*
>
> **RQ 2.** *How can SES (e.g. education, occupation and income) be measured in later life*?
>
> **RQ 3.** T*o what extent do differentials in demographic characteristics, health risk behaviours and SES explain the relationship between health and ethnicity in later life?*
>
> **RQ 4.** *Does the relationship between ethnicity and health change when alternative measures of SES (e.g. housing tenure and car availability) are used?*

This study shows the gap that exists among ethnic elders, indicating differentials in SES outcomes between the more and less advantaged people between older ethnic minority groups. The findings based on the above questions also provide important insights, attributable to socio-economic circumstances and health inequalities that exist amongst ethnic minority groups compared to their White counterparts. For example, in answering the **RQ1,** it was evident that certain ethnic minority groups were more likely than the majority White population to report 'bad/very bad' health, and that Pakistanis and Bangladeshis were the most likely to report 'bad/very bad' health. Similarly, there were also differences in reporting a LLSI among ethnic minority groups, and Black African and Chinese people were less likely to report a LLSI than other ethnic groups. Even though there is a strong association between health and ethnicity in later life, this relationship is multi-faceted and further confirms the complexity of ethnic inequalities in health. Finally, it is argued that health inequalities take the shape of social gradient and socioeconomic disadvantage has been identified as

a major contributor to health inequalities (Achenson, 1998; DoH, 2004; Evandrou, 2005; Kelaher et al., 2009, Nazroo, 2004).

Thus**, RQ2** helps to unravel the complexity of the relationship between ethnic elders' SES and health, also indicating that the reporting of general health and limiting long-standing illness are related to socio-economic status. For example, the bivariate analysis showed clear differences based on the different SES measures employed. For example, and the differences among ethnic minority groups in reporting bad/very bad health varied when using different measures of SES. Certain ethnic minority group members experienced greater SES disadvantages, for example Indian, Black African and Bangladeshi people were more likely to have a degree than Whites (Figure 4.2). The Pakistani and Bangladeshi people included the highest proportions of people who 'never worked' (Figure 4.4), and over two-thirds of Bangladeshis and one-third of Black Africans lived in households with 'no income' (Figure 4.4). Hence, household income coupled with both alternative measures of housing tenure and car availability were the best predictors of reporting bad/very bad health and a LLSI amongst ethnic elders. However, if ethnic elders are socio-economically more disadvantaged than the population in general, that indicates restriction of opportunities and equality in health in later life (Nandi and Platt, 2010; Platt, 2997b). With this caveats in mind, **RQ3** examined the association between the different demographic characteristics, health risk behaviours as well as SES in explaining the relationship between health and ethnicity in later life.

The third research question (**RQ3**) underlines the persistence of health inequalities, emphasising the importance of demographic characteristics of ethnic minority groups aged 50 and over. Tables 6.1 – 6.6 illustrate the demographic characteristics of ethnic elders and reveal certain key findings, for example, among ethnic elders, the report of very good health decreased in line with increasing age and the report of bad/very bad health increased in line with increasing age (Table 5.1). However, consistently with the literature, there is significant diversity among older people from ethnic minority groups reporting bad/very bad health (Chandola, 2001; Curtis and Lawson, 2000; Evandrou, 2000b). For example, the Pakistani, Chinese, Bangladeshi and Indian people were the most likely to report bad/very bad health (Figure 5.1). Similarly, the multivariate analysis showed that Black African, Indian Pakistani, Bangladeshi and Chinese people were more likely than Whites to report bad/very bad health (Table 6.1). It was also evident that for both men and women, bad/very bad health was associated with low education, renting and no access to a car. In particular, men and women with no qualifications were more likely to report bad/very bad health than men and women with a degree (Figure 6.2). Also, there were significant differences among smokers, and ex-regular smokers were more likely than those who never smoked to report a LLSI (Table 6.4). These results on demographic characteristics, health risk behaviours and SES are important in highlighting the heterogeneity of

ethnic minority groups and the effect of the different measures of SES in assessing ethnic minorities' health status at older ages.

In reference to the final research question (**RQ4**), which addresses the 'sensitivity' of the different SES measures, the findings suggest that equivalised household income coupled with both alternative measures of housing tenure and car availability, were the best predictors of reporting bad/very bad health and a LLSI amongst ethnic elders. There were also differences in SES inequalities among men and women in health status. For example, among men reporting a LLSI, the most sensitive SES predictors were NS-SEC occupational class (only those who never worked), equivalised household income, housing tenure and car availability. By contrast, among women, the traditional measure of household income coupled with the alternative measure of housing tenure were the most sensitive predictors of reporting a LLSI (Figure 6.6). However, even though it as been argued, that in general health in Britain has improved (Graham, 2005; Shaw et al., 2000; Nazroo, 2004), and that the widest gaps in outcomes between groups narrowed in the last decade (Hill, 2010; Marmot, 2010; Nandi and Platt, 2010), significant differences in SES remained among ethnic elders in terms of their health status. Hence, it is of clear concern that ethnic minority groups experience higher health inequalities and poorer socio-economic outcomes in their old age.

8.3 Policy and implications

The findings of this research, both in terms of health inequalities between older people from different ethnic groups, and in terms of measurement of such inequalities using different SES measures, have significant policy implications in a number of areas. This section focuses on the relevance of the findings to the three policy areas of: promoting better health status among older people from ethnic minority groups; accessing and utilising health services among older people; and promoting education regarding health-risk behaviours among ethnic minority groups. The remainder of this section discusses key findings of the research in relation to each of these three areas in turn.

The promotion of better health in later life is a key policy concern, especially as the older population is projected to increase in proportion and in the ethnic diversity. Given existing evidence of health inequalities between different ethnic groups, understanding the determinants of such inequalities is of paramount importance. According to the Dahlgren and Whitehead model of the social determinants of health (Figure2.2), health inequalities needs to be addressed through strengthening individuals, strengthening social and community networks, improving access to the necessary facilities and services, and improving SES circumstances, cultural and environmental conditions. In this respect, policy initiatives and programmes that incorporate elements of the social determinants

of health are key to promoting better health in later life. Hence, over the years, the UK government has introduced a number of policy measures critical to understanding and tackling health inequalities. For example, the 1998 Green Paper, *Our Healthier Nation* (DoH, 1998) and the White Paper, *Saving Lives: Our Healthier Nation* (DoH, 1999), emphasised the government's commitment to multi-sectors and locally based partnerships working together to promote better health of the UK population, and in addition improving the health of the most disadvantaged groups and reducing health inequalities. Particularly, emphasis was placed on morbidity and mortality (e.g. cancer, CHD, stroke, accidents and mental health) affecting the poorest groups in the population (DoH, 1998; 1999).

However, even though the objectives outlined in *Saving Lives: Our Healthier Nation* targeted the improvement of the health of ethnic minority groups, there was no specific targeting of resources for ethnic minority communities or their SES circumstances (DoH, 1999). Thus, due to the complexity of addressing such health inequalities, and the ongoing contention of how to address the health gap among the most disadvantaged groups, more recent policy initiatives, such as *Tackling health inequalities: a programme for action* (DoH, 2003) and the government White paper *Choosing health: Making healthy choices easier* (DoH, 2004) have added to a more comprehensive strategy of health promotion, in which reducing health inequalities was argued to be of central importance for the whole population. Additionally, greater importance was placed on organisations working together in partnerships between the National Health Service (NHS) (e.g. Primary care Trusts/Performance Assessment Framework), local authorities (e.g. neighbourhood renewal programmes) and in alliance with individuals and local communities (e.g. smoking cessation programmes) to better improve health and reduce inequalities (DoH, 2003). However, these initiatives have not escaped criticism. For example, it has been argued that although the NHS Performance Assessment Framework recognised key elements of regional differences, it is inadequate in examining inequalities of treatment outcome as it does not take ethnic minority groups and economic factors into account (Craig et al., 2007; Jacobson, 2000).

This thesis has found that there are significant differences between the White majority and ethnic minority groups, but also between different ethnic minority groups. More specifically, the findings indicated that older people from certain ethnic groups were more likely to report bad/very bad health than the White majority population, except for the Irish (9%) and Black Africans (4%). Similarly, all ethnic groups except the Black Africans (51%) and Chinese people (59%) were less likely than the Whites to report a LLSI. There were also significant differences in the socio-economic circumstances of ethnic elders. For example, Indian, Black African and Bangladeshi people were more likely to have a degree than Whites. The Pakistani and Bangladeshi people include the highest proportions of people who have 'never worked' and over two-thirds of Bangladeshis and one-third of

Black Africans live in households with 'no income information'. Also, Bangladeshi and Black African groups were the least likely to be owner-occupiers, but there were few differences between White and ethnic elders in terms of car availability. At the multivariate level, the effect of different SES measures depended on the type of health indicator used (report of bad/very bad health or report of a LLSI). For example, people with car availability were less likely to report bad/very bad health and a LLSI (see Figures 6.1 and 6.4). Finally, the findings also show differentiated explanations behind the report of bad/very bad health or the report of a LLSI for men and women (see Sections 6.2.8 and 6.4.8).

In addition, the findings show that there are distinct patterns of disadvantage for people from minority ethnic groups, and these raise questions about the need to eradicate the unequal distribution of the major determinants which influence health status (Hill et al., 2010). This thesis has shown that SES circumstances are affected by complex nexuses. For example, while higher educational status can offer people better life chances (Graham, 2005; Heath and McMahon, 1997; Hill et al., 2010), certain ethnic minority groups benefit more than other. For example, Bangladeshis with a degree appear to experience a similar disadvantage in other SES indicators as their White counterparts who have no educational qualification. This points to the importance of policies which can mitigate SES inequalities and improve the position of disadvantaged groups in Britain. Hence, the findings of this thesis are useful in informing national policies and how locally based interventions can be better targeted at men and women from minority ethnic groups. Such policies can be aligning with the current policies to include on-going health promotion campaigns that are suitable for ethnic elders and will help reduce health inequalities.

Prior to the DoH's key developments in policies (DoH, 2003; 2004), the 2001 *National Service Framework (NSF) for Older People (NSF)* defined a high standard of care for older people, warranting fair, high quality and integrated health and social care, and highlighting that older people have equal access to the NHS and social care services regardless of their differences (DoH, 2001). Based on increased ethnic diversity and an ageing population, the Healthcare Commission, the Commission for Social Care Inspection and the Audit Commission came together collaboratively to evaluate the implementations and progress of the different multi-sectors including the NHS, local authorities and other community partners working together to meet the standards set out in the NSF. They also took into account other developments in policy since the NSF and the impact they may have had on the lives of older people and ethnic elders (Commission for Health Care Audit, 2006). The joint approach of these partners allowed for an understanding of the ways in which the services were organised at the different levels, the quality of services provided and the interdependency of one service upon on another service. It was concluded that there were a number of areas in which the NHS and its partners excelled, such as tracking ageism, designing and delivering services around

older people such as smoking cessation programmes, and increasing the number of older people living in their home with support, however there were also a number of caveats highlighted in the report. For example, awareness of diversity issues was in the early stage of development, and more work was needed to ensure that staff receive continuous culturally-sensitive training which includes a positive attitude towards ageing. The report emphasised that the services that ethnic elders receive should be culturally sensitive and responsive to their needs, and that steps should be taken in forming partnerships with local ethnic minority groups representing ethnic elders, in order to guarantee that they were fully engaged in the planning and the development of services (Commission for Health Care Audit, 2006). Thus, as illustrated from the health care audit report, the promotion of good health status among ethnic elders relates not only to the quality of services provided but the extent to which the services are accessible, and sensitive to the needs of ethnic elders.

In addition, there is growing evidence showing inequality in terms of the utilisation of services, and such evidence argues that the experiences of ethnic minority groups are often overlooked by those who deliver and evaluate services aimed at improving health and health care (Commission for Health Care Audit, 2006; 2006; Szczepura, 2005: Salway et al., 2007). Certain policy developments have aimed at tackling such issues. For example, the NHS collaborative programme - *Putting People Firs*t, was introduced by the Government in order to promote partnership across the public sector to improve care services (DoH, 2007). The strategies include maximising access to services, facilitating people to make their own choices, positive contributions towards health and well-being, person-centred approaches, and personalisation of older people services and support. However, as evidence by the findings of the Commission for Health Care Audit (2006) shows, not all mainstream services were sufficiently sensitive to ethnic minority groups, and ethnic minorities could be engaged in the planning and development of such services to a greater extent. Thus, drawing on the document *Putting People First*, it is critical to elicit ethnic elders' input and increase health professional's awareness of services that are culturally sensitive, including diverse strategies to promote their health, and ensuring that they have opportunities and resources to influence health and social care services. Such measures can enable ethnic minority groups to access better services and have better control over their health and well-being in later life.

Addressing health inequalities among older people from ethnic minority groups can be conducted effectively using both prevention and treatment strategies, and promoting education regarding health-risk behaviours among ethnic minority groups is a key element in an ethnically diverse population. However, it is important to keep in mind that knowledge transfer does not happen without awareness of the groups most at risk. For example, this thesis found that among ethnic minority groups, the Irish and Bangladeshi people were the most likely to be current smokers (Table

5.9). However, smoking prevalence rates varied by gender, and the ex-regular and current smokers were more likely to report bad/very bad health than those who never smoked (Table 6.1). Similarly, there were differences amongst ethnic minority groups in reporting alcohol consumption. For example, more than 9 out of 10 Pakistanis and Bangladeshis consumed no alcohol at all, and all ethnic minority groups were less likely than Whites to consume alcohol every day (Table 5.10). There were also differences among gender, and men were more likely to consume alcohol every day than women, while women were twice as likely to consume no alcohol at all. Interestingly, in the model, men and women who consumed alcohol were less likely than men and women who never drank to report bad/very bad health (Table 6.2. and 6.3), which may be related to the amount rather than the frequency of alcohol consumption. There were also differences in health-risk behaviours in reporting a LLSI, and at the bivariate level ex-regular smokers were more likely than those who never smoked to report a LLSI (Figure 5.4). However, ex-regular smokers were more likely than those who never smoked to report a LLSI (Table 6.4), which may relate to the duration and amount of smoking, as well as the time passed since stopping smoking. Smoking differences among men and women were also evident and ex-regular smokers among men and women were more likely than men and women who never smoked to report a LLSI (Table 6.5. and 6.6). The findings indicated that there were differences in alcohol consumption amongst ethnic elders in reporting a LLSI. For example, those who consumed alcohol were less likely to report a LLSI than those who never drank (Table 6.4), and men and women who consumed alcohol were less likely to report a LLSI than men and women who never drank (Table 6.5 and 6.6).

According to a recent report by *Action on Smoking and Health* (ASH) (2008), unhealthy behaviours (e.g. smoking) and poor health cost the NHS over £2 billion per year compared to £1.7 billion a decade ago. The government, however, are working on a number of strategies to reduce smoking including supporting smokers to quit, reducing exposure to second-hand smoke and regulating tobacco products to reduce smoking and its contribution to health inequalities (DoH, 2008). In the recent report evaluating the NHS *Stop Smoking Services*, commissioned in response to the cessation programme implemented as part of the *Smoking Kills: White Paper* (DoH, 1998), analysis of clients showed that equity in access of service was encouraging, although the quitting rates among the more disadvantaged groups in the most deprived neighbourhoods were below average. However, the number of clients from deprived areas outweighed those in the general population who quit smoking (Bauld et al., 2003; Chesterman et al., 2005). Similarly, alcohol initiatives such as *Safe, Sensible, Social* are initiated by the government and demonstrate commitment to multi-sector, locally based partnerships to help tackle alcohol related problems, particularly among binge-drinkers and individuals of any age who drink more than the recommended limits on regular basis (DoH, 2007). A strong evidence base, of these policies, however, with specific targets to reduce health risk

behaviours among minority ethnic elders need to be emphasised as stated in the Commission for Health Care Audit (2006), if we are to reduce health-risk behaviours among ethnic elders in later life.

Interestingly, a number of these policies targeted at the poorest groups in the population are pivoted on education, employment and income, which are considered key to life chances. However, as indicated by the findings of this thesis, educational attainment does not equate to employment success for some ethnic groups, as evidenced by Bangladeshis or Black Africans with a degree who experience the same SES disadvantage as their White counterparts with no qualification. The recent Marmot Report (2010) proposed evidence-based strategies to address the social determinants of health which may start prior to birth and accumulate throughout the life-course leading to health inequalities. The report also draws attention to the fact that people with higher socio-economic circumstances have better life chances and enjoys better health than those with lower socio-economic disadvantages and poorer health (Marmot et al., 2010). The main policy objectives give credence to creating better employment and working environment for all, ensuring healthy standard of living, creating and developing sustainable communities, and strengthening the role and impact of poor health prevention. However, even though these objectives should be praised as important contributions to addressing health inequalities, the report has also been criticised. For example, it has been argued that the report failed to emphasise the systemic factors that continually replicate inequitable experiences and outcomes in healthcare for minority ethnic groups, such as poor patient-provider communication, a lack of visible minority presence among staff, dismissive and disrespectful attitudes and behaviour by staff, feelings of exclusion and a lack of cultural sensitivity in service provision (Salway et al., 2011). Even though from a policy perspective and based on the evidence presented in terms of the ethnic elders' SES and health inequalities, ethnic minority groups clearly face many challenges, and it is critical that policies warrant equitable outcomes in order to diminish inequalities over time.

8.4 Limitations of the study

The gaps and limitations highlighted in this study provide important areas that could be given priority in further research on health inequalities amongst older people from ethnic minority groups in Britain. First, a key area where this study could be taken further is the cross-sectional nature of the data, which limits the analysis to one point in time. Both the outcome and explanatory variables that are used in the analyses were self-reported measures limited to one point in time. Thus, no conclusions about causality can be drawn, even though the outcome measures have been shown to be associated with poor health and the report of a LLSI in a number of studies (Cummins et al., 2010; Hyde and Jones, 2007; Manor et al., 2001; Nazroo, 2001). Also, data limitations, for example on older people, ethnic minority groups, or SES, are often cited as a constraint in the exploration of

ethnic minority groups health inequalities (Cooper et al., 2002; Nazroo and Williams, 2006). It has been argued that the association between SES and health could be due to a statistical artefact, resulting from data limitation and misleading estimates derived from the analysis of such data (Davey Smith et al., 2000). However, the epidemiological literature includes important evidence accounting for the association between ethnicity and health (Davey Smith et al., 2000; Graham 2005; Nazroo, 2004). In the case of ethnic minority groups, such association is determined by the SES circumstances of ethnic minority groups (Graham, 2005; Davey Smith et al., 2002; Lynch and Kaplan, 2000).

A second consideration relates to the part of the findings showing that ethnic minority groups have a higher propensity to report poor health and a LLSI when controlling for similar SES measures as those examined in this study (Arber and Cooper, 1999; Davey Smith et al., 2003; Nazroo, 2001; Sproston and Mindell, 2006). In this thesis, the sample size comprised of 5,086 ethnic minority men and women broken down into sub-samples of ethnic minority groups as indicated in Table 3.1 and the SES measures were operationalised by education, occupation, income, housing tenure and car availability. However, these measures do not present a complete picture. The unexplained differences in health outcome studied in this thesis could be further accounted for by other factors, including neighbourhood effects (Stafford and McCarthy, 2006), early life exposures (Case et al., 2005), migration, discrimination and cultural differences (Nazroo, 2003). These factors are also known to influence health. For example, the literature includes explanations for the initial health advantage of migrants to the UK, referred to as the 'healthy migrant effect' (Harding, 2003; 2004; Nazroo, 2004). However, as indicated in the literature the effect of the healthy migrant may decline over time because migrants are exposed to health risk such as smoking and alcohol resulting in cardiovascular and circulatory diseases before and after leaving their country of origin (Harding 2004; Nazroo, 1997; 2004). For example, in the context of migrants from the Caribbean, one study found that as migrants' behaviour changes their health declines with old age and duration of residence in the UK (Harding, 2004). Some observers also argued that another factor that permeates the experiences of ethnic elders in Britain is racial harassment and discrimination (Karlson and Nazroo, 2002a; 2002b; Nazroo, 2004). However, even though there are no data from which to draw inferences of how the experiences of racism and discrimination vary by age for the non-White, population, the issue was examined for the adult population in some depth in the FNS (Nazroo, 2004; Modood et al., 1997).

Also, it is plausible that some underestimation of health status and health-risk behaviour has undoubtedly occurred, particularly with self reported general health due to various factors such as cultural beliefs and attitudes (Nazroo, 2004). As a consequence of these factors, health perceptions and self-reporting may also differ among and between ethnic minority groups. In sum, it is important to note that the analyses did not address the question of the direction of causality in the

relationship between health and SES amongst ethnic elders. However, the fact that there are different patterns in the associations between the different SES measures and health status, within and amongst ethnic minority groups as well as between the two genders, suggests that the findings of this study are worthy of further investigation.

8.5 Recommendations for further research

While this thesis has explored several aspects of health inequalities amongst older people from ethnic minority groups and ascertained the 'sensitivity' of different SES measures and their appropriateness in assessing health inequalities amongst ethnic minority groups aged 50 and over in Britain, a number of opportunities for further research arise, which could improve our understanding of the 'sensitivity' of SES measures. These opportunities are briefly discussed in this section.

One of the further directions of this research could include studies of a longitudinal nature, which might help provide a more complete picture in order to fully measure the relationship between SES and health inequalities. In particular, such studies will be necessary to help untangle the different factors that lead to the observed ethnic health inequalities. Several commentators echoed that longitudinal studies are needed to test the cumulative effects of lifetime adversities and advantages in predicting functional status among older people and minority groups in particular (Ben-Shlomo and Kud, 2002; Davey Smith et al., 2000; Nazroo, 2006). As such, consideration could be given to the relationships of lifetime exposure to chronic life stresses, migration, access to and utilization of social and formal supports, racial harassment and discrimination (Karlson and Nazroo, 2000a; Nazroo, 2004). The Barker hypothesis (1991) posits that circumstances into which children are born exert an influence on adult health. For example, it is evidenced in the British 1946 birth cohorts study that mortality rates of men and women born into lower occupational class households were double those for men and women living in higher occupational class households, and the increased risk of mortality remained after controlling for SES circumstances during adulthood (Kud et al., 2002). Thus, being born to parents in higher socio-economic circumstances as indexed by education, occupation and income, increases the opportunity of higher SES in adulthood, whereas a poor start in life increases the risk of continuing disadvantages throughout life (Ben-Shlomo and Kud, 2002; Davey Smith et al., 1997). Hence, longitudinal data may be the way forward in better understanding the other structures of inequalities through the life-course (e.g. migration, racial harassment and discrimination) and their impact on ethnic minority SES and health inequalities in later life. In addition, this kind of analysis could further explore the findings of this thesis which could merit further investigation over time, for instance the association between alcohol consumption and the lower likelihood of reporting bad/very bad health or a LLSI.

Furthermore, an examination specifically targeting older ethnic minority women in relation to SES and health is warranted given the gender differences this study has identified. For example, the thesis found that Black African, Bangladeshi and Chinese women were more likely than White women to report bad/very bad health, and that low household income increases women's chances of reporting poor health (Table 6.3). It has been argued that there is a propensity to neglect the SES circumstances of ethnic minority women within both discussions of ethnic inequalities and discussion of gender inequalities (Nandi and Platt, 2010). While SES is the main driver of inequality in health, it has been reported that women face marked inequality in later life based on their gender, ethnicity and age (Cooper, 2002; Nandi and Platt, 2010). Also, women have diverse experiences such as disrupted career paths, reduced lifetime earnings and an increased risk of poverty and poor health in later life (Arber and Cooper, 1999; Graham, 2005; Nandi and Platt, 2010). Therefore, ethnic minority women's experience of SES inequality is relevant to our understanding of health inequalities in the UK. Understanding and addressing the SES and health inequalities of ethnic women could be an essential part of the UK research agenda in order to inform policy aiming at securing equitable outcomes in later life. For example, one recent study found that ethnic minority groups experienced higher poverty rates than the majority White population and women were more likely to be in poverty, but Pakistani and Bangladeshi women were worse off than all other groups based on their individual and household income levels (Nandi and Platt, 2010). Such evidence is important in advancing our understanding and informs policies on women's SES based on their ethnic background.

Finally, a high priority for the future could be analysis which focuses on different life-stages, and which will incorporate life-course trajectories (e.g. early life, mid life and later life), capturing changes in SES measures which could be a powerful tool for understanding and explaining health inequalities amongst older ethnic minority groups. For example, as previously discussed (see Section 2.9) research exploring early life influences on later life outcomes has mainly focused on the impact of conditions at birth and early childhood among the White population (Barker, 1991; Case et al., 2005). For example, studies from the 1958 birth cohorts examined disadvantages at different stages of the life-course including early life, childhood and adulthood in contextualising health inequalities (Ben-Shlomo and Kud, 2002; Berney et al., 2003; Frankel et al., 1999; Power et al., 1999). However, less research has focused on the impact of ethnic minority groups' life-stages throughout the life-course and on outcomes at older ages, a result of the paucity of longitudinal data on ethnic minority groups (Harding, 2004). There are also fewer studies based on prospective and or retrospective data that examine the life histories of older ethnic minority groups, for example the impact of job loss, loss of family to migration, loss of spouse in old age etc. Understanding the role that ethnic minority groups' life-course trajectories play in later life is critical for policy reforms. Two recent reports, one on *Tackling Health Inequalities: 10 year on* (DoH, 2010) and the *National Equality Panel* (Hill et al., 2010) stressed that the foremost responsibility of policies must be to monitor the inequalities

amongst the population and its sub-groups in order to reduce health inequalities. However, it is evident that to reduce inequalities among sub-groups of the population, there should be on-going investment into research and evaluations employing different methodological approaches of quantitative and qualitative research in order to better understand barriers to social mobility, specific health-risk behaviours, and the adaptation of healthier lifestyles amongst different ethnic minority groups in Britain.

Table A. 1: NS-SEC 8 variable classification of Socio-economic status in the UK

Categories	Examples of occupations
Higher managerial and professional occupations	Directors of major organisations; senior officers in national government; clergy; medical practitioners; higher education teaching professionals
Lower managerial and professional occupations	Journalists; newspaper editors; musicians; nurses; paramedics; school teachers
Intermediate occupations	Graphic designers; medical secretaries; travel agents; ambulance staff (excluding paramedics); police officers (sergeants and below)
Small employers and own account workers	Farmers; hotel managers; product designers; roofers; taxi-cab drivers
Lower supervisory and technical occupations	Bakers, electricians; gardeners; road construction operatives; train drivers
Semi-routine occupations	Dental nurses; farm workers; housekeepers; scaffolders; traffic wardens
Routine occupations	Butchers; cleaners; domestics; furniture makers; labourers in building and working trades; waiters; waitresses
Never worked and long-term unemployed	The unemployed, the retired, those looking after a home, the sick and/or older people due to disability

Source: Rose and Pevalin, 2002

Table A.2: Outcome variables, 2004 HSE

Variable name used in the analysis	Variable name in 2004 HSE dataset	Derived	Questions from 2004 HSE
Self-assessed health	GENHELF	No	How is your health in general? Would you say it was 'very good', 'good', 'fair', 'bad' or' very bad'
Limiting long-standing illness	LIMITILL	Yes	Do you have any longstanding illness, disability or infirmity? By long standing, I mean anything that has troubled you over a period of time, or that is likely to affect you over a period of time?' Respondents who answered 'yes' were then asked, 'What is the matter with you?' and 'Does this illness or disability limit your activities in any way?'

Source: Sproston and Mindell, 2006 (p. 2-3)

Table A.3: Study information of explanatory variables, 2004 HSE

Variable name used in the analysis	Variable name in 2004 HSE dataset	Derived from HSE	Questions from 2004 HSE
Ethnic groups	**DMETHN04**	Yes	Does your family have origins which are… 'Black Caribbean', 'Black African', 'Indian', 'Pakistani', 'Bangladeshi', 'Chinese'
Age	**AGE**	No	Age last birthday
Sex	**SEX**	No	Sex (name of respondent's) sex
Marital status	**MARSTATB**	No	Marital status including cohabitates
Education	**TOPQUAL3**	Yes	Classified according to the highest educational qualification: 'NVQ4/NVQ5/ degree or equivalent', 'Higher education below degree', 'NVQ3/GCE: A level equivalent', 'NVQ2/GCE: O level equivalent', 'NVQ1/CSE: other grade equivalent', 'foreign' and 'no qualification'
Occupational social class	**NSE-SEC8**	Yes	Classified according to the NS-SEC social class and based on the individual's current or recent occupation into eight groups by social position: 'I – Professional', 'II – Managerial Technical', 'III – Skilled Non-Manual', 'IV – Semi-Skilled Manual', 'V – Unskilled; Armed Forces', 'All Other Never Worked'.
Equivalised household income	**EQVINC**	Yes	Household income established by means of a show-card on which banded incomes are presented. Thus, the total household income is divided by the sum of scores to provide measure of equivalised household income.
TenureType	**TENUREB**	No	In which of these ways does your household occupy this accommodation. 'Own it outright', 'Buying it with the help of a mortgage or loan', 'Pay part rent and part mortgage (shared ownership)', 'Rent it', 'Live here rent free'.
Car	**CAR**	No	Is there a car or van normally available for use by you or any members of your household?

Source: HSE, 2004

Table A .4: Study information of behavioural risk factor

Health –risk behaviour variables, 2004 HSE

Variable name used in the analysis	Variable name in 2004 HSE dataset	Derived	Questions from 2004 HSE
Alcohol consumption	DNOFT2	Yes	How often have you had an alcoholic drink of any kind during the last 12 months? And was broken down into eight categories (e.g. 'almost every day', 'five or six days a week', 'three to four days a week', 'once or twice a week', 'once or twice a month', 'once every couple of month', 'once or twice per year' and ' not at all in the last 12 months/non-drinker
Smoking	CIGST1	Yes	All informants were asked if they ever smoked a cigarette, and if so, whether they still smoked nowadays. The information was used to classify informants into the following categories: current cigarette smoker, ex-regular cigarette smoker, and never regular cigarette smoker.

Source: Sproston and Mindell, 2004

Table A.5: Underlying data for Figure 4.2

Highest educational qualification of persons aged 50 years and over by ethnicity (%)

Ethnic groups	Educational qualification					Total
	Degree	Diploma/A level	O level	CSE/NVQ 1/Other	No qualification	
Black Caribbean	8.6 (25)	15.8 (62)	12.9 (47)	1.2 (12)	61.6 (252)	**100** (398)
Black African	32.2 (35)	23.6 (29)	3.1 (14)	2.2 (8)	38.9 (55)	**100** (141)
Indian	31.3 (90)	14.5 (50)	10.6 (50)	2.7 (12)	40.9 (196)	**100** (398)
Pakistani	14.3 (22)	3.4 (10)	7.4 (20)	† (0)	74.9 (147)	**100** (199)
Bangladeshi	20.3 (8)	1.6 (5)	9.8 (5)	† (0)	68.3 (124)	**100** (142)
Chinese	19.0 (51)	12.4 (30)	18.2 (18)	† (3)	49.6 (71)	**100** (173)
Irish	11.6 (72)	18.9 (121)	16.4 (91)	6.3 (36)	46.8 (353)	**100** (673)
White	11.4 (321)	17.1 (490)	16.0 (468)	8.8 (256)	46.7 (1396)	**100** (2,931)
Other	† (3)	20.4 (6)	25.2 (7)	† (2)	40..3 (13)	**100** (31)
Total	**12.1** (627)	**17.1** (803)	**15.8** (720)	**8.0** (329)	**47.1** (2,607)	**100** (5,086)

() Sample number unweighted

† Percentages not presented for cell counts below 5

Table A.6: Underlying data for Figure 4.3

NS-SEC occupational class of persons aged 50 years and over by ethnicity (%)

Ethnic groups	NS-SEC Classifications								
	Higher managerial	Lower manager	Intermediate	Small employer	Lower supervisory	Semi routine	Routine	Never work	Total
White	8.4 (237)	22.7 (656)	12.6 (382)	9.7 (269)	9.9 (269)	17.0 (535)	24.0 (491)	9.3 (68)	100 (2,917)
Black Caribbean	4.1(12)	18.2 (60)	6.5 (45)	7.2 (19)	4.2 (28)	24.4 (102)	33.6 (121)	1.7 (8)	100 (395)
Black African	12.0 (14)	23.7 (26)	9.5 (10)	† (4)	10.6 (10)	15.6 (29)	19.8 (27)	7.3 (19)	100 (139)
Indian	9.4 (28)	16.1 (52)	13.3 (36)	6.4 (33)	7.0 (26)	17.9 (86)	14.9 (74)	15 (63)	100 (398)
Pakistani	† (2)	† (2)	1.7 (6)	14.3 (21)	8.3 (8)	16.3 (29)	13.4 (37)	38.3 (81)	100 (198)
Bangladeshi	† (3)	† (3)	† (2)	35.0 (12)	11.4 (50)	6.5 (19)	8.1 (21)	35.0 (66)	100 (139)
Chinese	11.5 (31)	13.1 (31)	16.4 (12)	23.0 (40)	2.5 (8)	16.4 (23)	13.1 (15)	4.1 (11)	100 (171)
Irish	9.9 (49)	17.3 (122)	14.7 (91)	9.2 (62)	7.5 (3)	17.4 (129)	23.1 (158)	1.0 (7)	100 (668)
Other	† (1)	18.0 (5)	† (4)	† (1)	† (3)	17.0 (6)	24.0 (6)	† (3)	100 **(29)**
Total	8.4 (377)	21.7 (972)	12.6 (588)	9.5 (461)	9.4 (422)	17.8 (958)	17.6 (950)	2.9 (326)	100 (5,054)

() Sample numbers unweighted

† Percentages not presented for cell counts below 5

Table A.7: Underlying data for Figure 4.4

Equivalised household income of persons aged 50 years and over by ethnicity (%)

Ethnic groups	Equivalised household income					Total
	No income	Less than £10,000	£10,000 – 15,000	£15,001 – 25,000	> £25,000	
White	**18.9** (557)	**14.1** (414)	**22.6** (687)	**19.2** (554)	**25.3** (718)	**100** (2,930)
Black Caribbean	**29.2** (122)	**28.6** (103)	**18.4** (80)	**14.6** (48)	**9.2** (44)	**100** (397)
Black African	**34.1** (46)	**13.0** (31)	**18.0** (27)	**10.0** (14)	**24.9** (23)	**100** (141)
Indian	**28.1** (109)	**27.5** (112)	**9.5** (52)	**14.1** (54)	**20.9** (71)	**100** (398)
Pakistani	**23.4** (57)	**34.6** (78)	**22.3** (43)	**13.1** (14)	**6.6** (7)	**100** (199)
Bangladeshi	**66.1** (67)	**26.6** (54)	**4.8 (**14)	**2.4** (6)	† (1)	**100** (142)
Chinese	**26.7** (50)	**32.5** (44)	**10.0** (24)	**17.5** (15)	**13.3** (37)	**100** (170)
Irish	**18.7** (124)	1**8.1** (138)	**15.6** (129)	**18.2** (105)	**29.4** (174)	**100** (670)
Other	**25.3** (6)	**19.5** (6)	**23.9** (9)	† (3)	**22.7** (7)	**100** (31)
Total	**19.7** (1,138)	**15.4** (980)	21.4 (1,065)	**18.6** (813)	**24.9** (1,082)	**100** (5,078)

() Sample number unweighted

† Percentages not presented for cell counts below 5

Table A.8: Underlying data for Figure 4.5

Housing tenure of persons aged 50 years and over by ethnicity (%)

Ethnic groups	Housing tenure				Total
	Own	Mortgage	Rent	Other	
White	**56.5** (1,692)	**23.8** (654)	**18.4** (549)	**1.3** (36)	**100** (2,931)
Black Caribbean	**42.0** (113)	3**2.5** (120)	**24.6** (136)	**0.9** (9)	**100** (398)
Black African	**12.5** (20)	**41.6** (40)	**45.7** (80)	† (1)	**100** (141)
Indian	**57.6** (204)	**26.0** (135)	**14.2** (52)	**2.1** (7)	**100** (398)
Pakistani	**49.9** (89)	**36.0** (69)	**15.7** (38)	† (3)	**100** (199)
Bangladeshi	**19.4** (32)	**57.3** (41)	**22.6** (67)	† (2)	**100** (142)
Chinese	**51.6** (86)	**24.6** (62)	**22.1** (20)	**1.6** (5)	**100** (173)
Irish	**47.6** (293)	**28.4** (166)	**21.2** (199)	**2.9** (15)	**100** (673)
Other	**49.9** (16)	† (2)	**34.8** (11)	† (2)	**100** (31)
Total	**54.7** (2,5650	**24.7** (1,289)	**19.1** (1,152)	**1.5** (80)	**100** (5,086)

() Sample number unweighted

† Percentages not presented for cell counts below 5

Table A.9: Underlying data for Figure 4.6

Car availability of persons aged 50 years and over by ethnicity (%)

Ethnic groups	Car availability		
	Availability	Non Availability	Total
White	**78.0** (2,248)	**22.0** (683)	**100** (2,931)
Black Caribbean	**59.9** (212)	**40.1** (186)	**100** (398)
Black African	**61.7** (84)	**38.3** (57)	**100** (141)
Indian	**81.0** (305)	**19.0** (93)	**100 (**398)
Pakistani	**81.4** (144)	**18.6** (55)	**100** (199)
Bangladeshi	**78.9** (75)	**21.1** (67)	**100** (142)
Chinese	**62.3** (146)	**37.7** (27)	**100** (173)
Irish	**73.9** (434)	**26.1** (239)	**100 (**673)
Other	**63.6** (18)	**36.4 (**13)	**100** (31)
Total	**77.0** (3,666)	**23.0** (1,420)	**100** (5086)

() Sample number unweighted

Table A.10: Underlying data for Figure 5.1

Percentage of persons reporting poor general health by ethnicity, aged 50 and over, 2004 HSE

Ethnic groups	General health status			Total
	Very good	Good	Bad/V.bad	
White	**25.8** (743)	**63.3** (1,857)	**11.0** (329)	**100** (2,929)
Black Caribbean	19.8 (55)	**61.1** (256)	**19.1** (85)	**100** (396)
Black African	**18.3** (29)	**77.6** (95)	**4.2** (17)	**100** (141)
Indian	**17.5** (61)	**61.7** (255)	**20.8** (82)	**100** (398)
Pakistani	**3.7** (12)	**69.7** (112)	**26.6** (75)	**100** (199)
Bangladeshi	**1.6** (3) †	**76.4** (72)	**22.0** (67)	**100** (142)
Chinese	**11.5** (31)	**66.4** (124)	**22.1** (18)	**100** (173)
Irish	**30.5** (187)	**60.1** (400)	**9.4** (86)	**100** (673)
Other	† (2)	**77.5** (24)	**16.7** (5)	**100** (31)
Total	**25.3** (1,123)	**63.3** (3,195)	**11.4** (764)	**100** (5,082)

() Sample number unweighted

† Percentages not presented for cell counts below 5

Figure 5.2: Percentage of persons reporting a limiting long-standing illness by ethnicity, aged 50 and over, 2004 HSE

Ethnic groups	Health status (LLSI)			Total
	LLSI	Non-LLSI	No LSI	
Black Caribbean	**46.1** (186)	**23.7** (90)	**30.3** (121)	**100** (397)
Black African	**19.4** (39)	**26.6** (22)	**54.0** (80)	**100** (141)
Indian	**44.4** (174)	**19.6** (66)	**36.1** (158)	**100** (398)
Pakistani	**57.1** (114)	**14.0** (29)	**28.9** (56)	**100** (199)
Bangladeshi	**40.3** (79)	**15.3** (21)	**44.4** (42)	**100** (142)
Chinese	**36.1** (36)	**29.5** (46)	**34.4** (91)	**100** (173)
Irish	**34.7** (246)	**28.9** (175)	**28.9** (251)	**100** (672)
White	**39.5** (1,178)	**25.6** (744)	**25.6** (1,009)	**100** (2,931)
Other	**42.9** (14)	**17.9** (5)	**17.9** (12)	**100** (31)
Total	**39.3** (2,066)	**25.5** (1,198)	**35.2** (1,820)	**100** (5,084)

() Sample number unweighted
† Cell contain less than 5 counts

Table A.12: Underlying data for Figure 5.3

Percentage of persons reporting poor health by smoking, aged 50 and over, 2004 HSE

Smoking status	General health			Total
	Very good	Good	Bad/V.bad	
Current smoker	**18.9** (137)	6**3.3** (526)	**14.3** (142)	**100** (805)
Ex-regularly	**25.4** (390)	**66.8** (993)	**13.1** (251)	**100** (1,634)
Ex-occasionally	**26.1** (65)	**61.5** (181)	**7.5** (28)	**100** (274)
Never smoked	**27.6** (528)	**66.4** (1,488)	**9.3** (341)	**100** (2,357
Total	**25.3** (1,120)	**63.3** (3,188)	**11.4** (762)	**100** (5070)

() Sample number unweighted

Table A.13: Underlying data for Figure 5.4

Percentage of persons reporting a LLSI by smoking, aged 50 and over, 2004 HSE

Smoking status	Health status (LLSI)			Total
	LLSI	Non LLSI	No LSI	
Current smoker	**41.1**(336)	**25.5** (169)	**37.8** (301)	**100** (806)
Ex-regularly	**43.3** (723)	**22.6** (406)	**36.3** (506)	**100** (1,635)
Ex-occasionally	**37.2** (102)	**25.0** (64)	**31.7** (108)	**100** (274)
Never smoked	**35.1** (900)	**27.1** (558)	**36.3** (899)	**100** (2,357)
Total	**39.3** (2,061)	**25.5** (1,197)	**35.2** (1,814)	**100** (5072)

() Sample number unweighted

Table A.14: Self-assessed general health of persons aged 50 years and over, by age and marital status (%)

Marital status and Age Groups	Self-assessed general health			
	Very good	Good/fair	Bad/very bad	TOTAL
Married 50-54	35.3 (227)	58.9 (458)	5.8 (72)	**100** (757)
55-59	32.4 (188)	59.7 (398)	7.9 (61)	**100** (647)
60-64	26.8 (153)	62.0 (404)	11.2 (92)	**100** (649)
65-69	22.6 (94)	65.7 (328)	11.7 (80)	**100** (502)
70+	18.2 (121)	67.1 (477)	14.8 (140)	**100** (738)
Single 50-54	22.4 (22)	58.3 (46)	19.2 (18)	**100** (86)
55-59	32.7 (19)	59.0 (35)	8.2 (8)	**100** (62)
60-64	37.8 (20)	52.9 (28)	9.2 (8)	**100** (56)
65-69	† (3)	80.6 (18)	5.8 (5)	**100** (26)
70+	19.9 (14)	70.3 (52)	9.9 (8)	**100** (74)
Divorced 50-54	21.1 (25)	64.5 (87)	14.4 (18)	**100** (130)
55-59	31.5 (32)	52.4 (63)	16.1 (22)	**100** (117)
60-64	20.1 (17)	62.9 (66)	16.9 (29)	**100** (112)
65-69	20.1 (29)	56.0 (55)	9.8 (19)	**100** (103)
70+	17.8 (15)	67.7 (71)	14.5 (23)	**100** (109)
Widowed 50-54	23.0 (5)	60.8 (27)	16.2 (12)	**100** (44)
55-59	24.3 (10)	55.3 (29)	20.4 (12)	**100** (51)
60-64	19.2 (14)	64.2 (47)	16.6 (18)	**100** (79)
65-69	25.7 (24)	57.1 (57)	17.2 (24)	**100** (123)
70+	16.1 (90)	70.4 (431)	13.5 (95)	**100** (616)
Total	**17.9** (1,123)	**67.6** (3,195)	**14.5** (764)	**100 (**5,082)

X^2 = **married (804.532); single – 128.606; divorced – 102.655; widowed – 95.262** (**df 8, p <0.001**)
(N) = Sample numbers in brackets are unweighted
† Percentages not presented for cell counts below 5
Source: Author's analysis, 2004 HSE

Table A.15: Model VII odds ratios of reporting 'bad/very bad' general health by demographic, health risks and SES characteristics, aged 50 and over, 2004 HSE

Model VII	
Demographics, health-risk and SES characteristics	**% OR (95% CI)**
Sex	
Man **(ref)**	1.00
Woman	0.76 (0.63–0.91) **
Ethnicity	
White	1.00
Black Caribbean	1.14 (0.41 -3.18)
Black African	1.40 (1.06 -2.00) **
Indian	0.75 (0.43 -1.32)
Pakistani	1.66(1.21 -2.29) ***
Bangladeshi	2.21 (1.60 -3.38) ** *
Chinese	2.50 (1.64 -3.78) ***
Irish	0.94 (0.55 -1.60)
Other ethnic group	0.92 (0.70 -1.21)
Smoking status	
Never smoked **(ref)**	1.00
Ex- occasionally	0.91 (0.58 -1.41)
Ex- regular	1.52 (1.22 -1.88) ***
Current smoker	1.30 (1.01 -1.68) *
Alcohol consumption	
Not at all **(ref)**	1.00
Almost every day	0.38 (0.27 -0.53) ***
3 - 6 times a week	0.26 (0.18 -0.38) ***
1 - 2 times a week	0.44 (0.33 -0.58) ***
Once every 2 months	0.53 (0.42 -0.67) ***
Education	
Degree **(ref)**	1.00
Diploma/A-level	1.98 (1.26 -3.07) **
O-level	2.05 (1.29 -3.0) **
CSE/NVQ1	1.52 (0.86 -2.61)
No qualification	2.43 (1.62 -3.65) ***
Equivalised household income	
Over £25,000 **(ref)**	1.00
No income	1.75 (1.21 -2.52) **
Less than £10,000	2.74 (1.90 -3.94) ***
£10,001 –15,000	1.97 (1.37 -2.85) ***
£15,001 – 25,000	1.59 (1.07 -2.35) *
Housing tenure	
Own **(ref)**	1.00
Mortgage	0.88 (0.69 -1.12)
Rent	1.88 (1.53-2.31 ***
Other	1.23 (0.65 -2.32)
Car availability	
Yes **(ref)**	1.00
No	1.56 (1.29-1.89) ***
-2 LLR	**3632.716**
% Change –2 LLR	5.61
R Square	**0.121**

Adjusted by Demographic, health risk and SES characteristics
Significance levels: 95% CI *p <0.01; **p<0.005; ***p<0.001
Source: Authors analysis, 2004 HSE

Table A.16: Model VII odds ratios of reporting 'bad/very bad' general health among men aged 50 and over, 2004 HSE

Model VII	
Demographics, health-risk and SES characteristics	**% OR (95% CI)**
MEN	
Ethnicity	
White	1.00
Black Caribbean	1.12 (0.21–6.04)
Black African	1.34 (0.84–2.40)
Indian	0.33 (0.11–0.96) *
Pakistani	1.70 (1.07–2.71) *
Bangladeshi	1.63 (0.92–2.89)
Chinese	2.42 (1.26–4.63) **
Irish	1.26 (0.62–2.56)
Other ethnic group	1.18(0.80–1.74)
Smoking status	
Never smoked **(ref)**	1.00
Ex- occasionally	0.82 (0.42 -1.62)
Ex- regular	1.52 (1.11 -2.07) *
Current smoker	1.37 (0.95 -1.98)
Alcohol consumption	
Not at all **(ref)**	1.00
Almost every day	0.37 (0.24 -0.62) ***
3 - 6 times a week	0.34(0.21 -0.55) ***
1 - 2 times a week	0.46 (0.31 -0.70) ***
Once every 2 months	0.50 (0.33 -0.76) ***
Education	
Degree **(ref)**	1.00
Diploma/A-level	1.98 (1.26 -3.07) **
O-level	2.05 (1.29 -3.0) **
CSE/NVQ1	1.52 (0.86 -2.61)
No qualification	2.43 (1.62 -3.65) ***
Equivalised household income	
Over £25,000 **(ref)**	1.00
No income	1.84(1.09 -3.06) *
Less than £10,000	2.66 (160 -4.44) ***
£10,001 –15,000	2.55 (1.53 -4.26) ***
£15,001 – 25,000	1.24 (0.70 -2.19)
Housing tenure	
Own **(ref)**	1.00
Mortgage	0.97 (0.69 -1.37)
Rent	1.91 (1.40 -2.63) ***
Other	0.80 (0.26-2.48)
Car availability	
Yes **(ref)**	1.00
No	1.76 (1.32-2.35) ***
-2 LLR	**1614.157**
% Change –2 LLR	**6.05**
R Square	**0.131**

Adjusted by Demographic, health risk and SES characteristics
Significance levels: 95% CI *p <0.01; **p<0.005; ***p<0.001
Source: Authors Analysis

Table A.17: Model VII odds ratios of reporting 'bad/very bad' general health among women aged 50 and over, 2004 HSE

Model VII	
Demographics, health-risk and SES characteristics	**% OR (95% CI)**
WOMEN	
Ethnicity	
White	1.00
Black Caribbean	1.24 (0.34 -4.55)
Black African	1.56 (1.05 -2.30) *
Indian	1.23 (0.62 -2.45)
Pakistani	1.56 (0.99 -2.46)
Bangladeshi	3.31 (1.99 -5.50) ** *
Chinese	2.53 (1.44 -4.44) ***
Irish	0.66 (0.29 -1.51)
Other ethnic group	0.67 (0.44 -1.00)
Smoking status	
Never smoked **(ref)**	1.00
Ex- occasionally	1.01 (0.57 -1.81)
Ex- regular	1.63 (1.19 -2.24) **
Current smoker	1.36 (0.95 -1.97)
Alcohol consumption	
Not at all **(ref)**	1.00
Almost every day	0.36 (0.22 -0.60) ***
3 - 6 times a week	0.11 (0.47 -0.26) ***
1 - 2 times a week	0.39 (0.26 -0.58) ***
Once every 2 months	0.54 (0.40 -0.73) ***
Education	
Degree **(ref)**	1.00
Diploma/A-level	2.09 (1.02 -4.26) *
O-level	1.96 (0.97 -3.99)
CSE/NVQ1	0.60 (0.20 –1.81)
No qualification	2.38 (1.25 -4.51) * *
Equivalised household income	
Over £25,000 **(ref)**	1.00
No income	1.60 (0.94 -2.73)
Less than £10,000	2.76 (1.62 -4.68) ***
£10,001 –15,000	1.60 (0.94 -2.75)
£15,001 – 25,000	1.88 (1.08 -3.28) *
Housing tenure	
Own **(ref)**	1.00
Mortgage	0.82 (0.58–1.15)
Rent	1.82 (1.37–2.40) ***
Other	1.68 (0.76–3.73)
Car availability	
Yes **(ref)**	1.00
No	1.43 (1.10-1.85) ***
-2 LLR	**1971.553**
% Change –2 LLR	5.73
R Square	**0.127**

Adjusted by: Demographic, health risk and SES characteristics
Significance levels: 95% CI *p<0.02; **p<0.005; ***p<0.001
Source: Authors analysis, 2004

Table A.18 Percentage of men aged 50 and over reporting bad/very bad health by SES (%)

SES characteristics	Report of a LLSI			
	Very Good	Good	Bad/very bad	TOTAL
Educational level* **				
Degree	40.0 (135)	55.6 (208)	4.4 (19)	**100** (362)
Diploma/A level	32.5 (126)	60.3 (237)	7.2 (37)	**100** (400)
O level	28.8 (73)	63.1 (191)	8.1 (37)	**100** (301)
CSE/NVQ1/Other	18.9 (29)	68.9 (108)	12.2 (22)	**100** (159)
No qualification	18.8 (163)	63.8 (634)	17.4 (234)	**100** (1,031)
Social class* **				
Higher managerial and professional occupations	36.5(107)	57.6(164)	5.9 (20)	**100** (291)
Lower managerial and professional occupations	33.9 (136)	60.0 (251)	6.1 (33)	**100** (420)
Intermediate occupations	31.1 (28)	59.6 (64)	9.3 (13)	**100** (105)
Small employers and own account workers	28.8 (79)	61.1 (193)	10.0 (34)	**100** (306)
Lower supervisory and technical occupations	23.1 (63)	64.8 (187)	12.1 (45)	**100** (295)
Semi-routine occupations	17.0 (50)	64.1 (219)	18.9 (79)	**100** (348)
Routine occupations	15.8 (59)	66.3 (280)	17.9 (105)	**100** (444)
Never work and long-term unemployed	† (2)	68.8 (15)	21.4 (16)	**100** (33)
Equivalised household income* **				
No household income	28.0 (115)	61.5 (284)	10.5 (76)	**100** (475)
Less than £10,000	12.5 (47)	63.9 (279)	23.6 (124)	**100** (450)
£10,001-15,000	13.6 (53)	67.6 (263)	18.8 (93)	**100** (409)
£15,001-25,000	30.0 (102)	62.5 (251)	7.5 (31)	**100** (384)
Over £25,000	38.5 (208)	57.8 (301)	3.6 (25)	**100** (534)
Housing tenure* **				
Own	26.8 (271)	63.8 (709)	9.4 (134)	**100** (1,117)
Mortgage	31.6 (175)	61.4 (389)	7.0 (67)	**100** (631)
Rent	15.5 (65)	59.1 (258)	25.4 (144)	**100** (467)
Other	37.2 (12)	52.4 (22)	† (4)	**100** (38
Car availability* **				
Yes	28.7 (474)	62.1 (1,097)	9.2 (202)	**100** (1,773)
No	14.7 (52)	62.1 (281)	23.1 (147)	**100** (480
Total	**26.4** (2,066)	**62.1** (1,198)	**11.5** (1,820)	**100** (2,253)

Significance levels ***p **<0.001**
(N) = Sample numbers in brackets are unweighted
† Percentages not presented for cell counts below 5
Source: Author's analysis, 2004 HSE

Table A.19: Percentage of women aged 50 and over reporting bad/very bad health by SES (%)

SES characteristics	Report of a LLSI			
	Very Good	Good	Bad/very bad	TOTAL
Educational level* **				
Degree	38.0 (92)	58.6 (161)	3.4 (12)	**100** (265)
Diploma/A level	35.9 (129)	58.6 (237)	5.5 (37)	**100** (403)
O level	32.0 (122)	60.1 (256)	7.9 (39)	**100** (417)
CSE/NVQ1/Other	30.1 (47)	66.8 (118)	3.1 (5)	**100** (170)
No qualification	15.6 (207)	67.8 (1,045)	16.6 (322)	**100** (1,574)
Social class* **				
Higher managerial and professional occupations	48.3 (38)	48.7 (45)	† (3)	**100** (86)
Lower managerial and professional occupations	32.0 (170)	62.9 (345)	5.1 (37)	**100** (552)
Intermediate occupations	29.4 (133)	63.1 (309)	7.5 (41)	**100** (483)
Small employers and own account workers	31.0 (43)	57.6 (94)	11.4 (17)	**100** (154)
Lower supervisory and technical occupations	15.0 (22)	73.0 (86)	12.0 (19)	**100** (127)
Semi-routine occupations	20.4 (108)	65.6 (409)	14.0 (91)	**100** (608)
Routine occupations	14.6 (66)	67.7 (339)	17.7 (101)	**100** (506)
Never work and long-term unemployed	9.2 (14)	65.3 (176)	25.6 (103)	**100** (293)
Equivalised household income* **				
No household income	24.8 (126)	63.7 (438)	11.6 (98)	**100** (662)
Less than £10,000	12.6 (49)	66.4 (335)	21.0 (114)	**100** (528)
£10,001-15,000	17.4 (107)	67.8 (444)	14.8 (105)	**100** (656)
£15,001-25,000	24.4 (98)	67.7 (284)	7.9 (47)	**100** (429)
Over £25,000	39.6 (215)	56.9 (311)	3.5 (21)	**100** (547)
Housing tenure* **				
Own	26.8 (354)	64.5 (933)	8.9 (161)	**100** (1,448)
Mortgage	29.3 (158)	64.4 (441)	6.3 (58)	**100** (657)
Rent	12.6 (77)	64.0 (419)	23.4 (186)	**100** (682)
Other	29.2 (8)	58.4 (24)	12.4 (10)	**100** (42)
Car availability* **				
Yes	28.5 (488)	63.0 (1,206)	8.5 (197)	**100** (1,891)
No	13.9 (109)	67.4 (611)	11.4 (218)	**100** (938)
Total	**24.3** (2,066)	**64.3** (1,198)	**11.4** (1,820)	**100** (2,829)

Significance levels ***p **<0.001**
(N) = Sample numbers in brackets are unweighted
† Percentages not presented for cell counts below 5
Source: Author's analysis, 2004 HSE

TableA.20: Percentage of men aged 50 and over reporting LLSI, non-LLSI or no LI by SES (%)

SES characteristics	Report of a LLSI			
	Limiting long-standing illness	Non-limiting long-standing	No Long-standing illness	TOTAL
Educational level* **				
Degree	28.2 (94)	33.3 (108)	38.5 (160)	**100** (362)
Diploma/A level	32.9 (123)	25.4 (101)	41.7 (176)	**100** (400)
O level	33.7 (116)	31.1 (80)	35.3 (105)	**100** (301)
CSE/NVQ1/Other	43.7(69)	24.9 (40)	31.4 (50)	**100** (159)
No qualification	44.5 (488)	24.2 (221)	31.3 (323)	**100** (1,032)
Social class* **				
Higher managerial and professional occupations	31.6 (85)	28.8 (81)	39.7 (125)	**100** (291)
Lower managerial and professional occupations	34.8 (136)	31.5 (127)	33.7 (157)	**100** (420)
Intermediate occupations	37.9 (42)	23.8 (24)	38.3 (39)	**100** (105)
Small employers and own account workers	35.2 (109)	27.2 (72)	37.6 (125)	**100** (306)
Lower supervisory and technical occupations	37.1 (120)	31.3 (83)	31.6 (92)	**100** (295)
Semi-routine occupations	49.0 (173)	20.1 (63)	30.9 (113)	**100** (349)
Routine occupations	40.6 (196)	23.9 (97)	35.5(151)	**100** (444)
Never work and long-term unemployed	64.1 (24)	† (3)	34.9 (6)	**100** (33)
Equivalised household income* **				
No household income	39.0 (186)	21.5 (96)	39.6 (193)	**100** (475)
Less than £10,000	54.3 (256)	19.0 (79)	26.7 (116)	**100** (451)
£10,001-15,000	45.7 (185)	26.3 (102)	28.0 (122)	**100** (409)
£15,001-25,000	36.5 (135)	28.0 (101)	35.5 (148)	**100** (384)
Over £25,000	24.5 (128)	34.6 (172)	40.9 (234)	**100** (534)
Housing tenure* **				
Own	36.6 (432)	28.8 (308)	34.6 (377)	**100** (1,117)
Mortgage	31.3 (196)	27.6 (149)	41.2 (286)	**100** (631)
Rent	53.6 (251)	19.9 (81)	26.5(136)	**100** (468)
Other	30.6 (11)	30.9 (12)	38.6 (15)	**100** (38)
Car availability* **				
Yes	35.0 (627)	28.0 (460)	37.0 (686)	**100** (1,773)
No	53.1 (263)	21.8 (90)	25.1 (128)	**100** (481)
Total	**37.9** (2,066)	**27.0** (1,198)	**35.1** (1,820)	**100** (2,254)

Significance levels ***p **<0.001**
(N) = Sample numbers in brackets are unweighted
All calculations use sampling weight for the multistage sampling design
Source: Author's analysis, 2004 HSE

Table A.21: Percentage of women aged 50 and over reporting LLSI, non-LLSI or no LI by SES (%)

SES characteristics	Report of a LLSI			
	Limiting long-standing illness	Non-limiting long-standing	No Long-standing illness	TOTAL
Educational level* **				
Degree	27.8 (75)	27.4 (67)	44.9 (123)	**100** (265)
Diploma/A level	31.8 (135)	26.5 (107)	41.7 (161)	**100** (403)
O level	33.3 (139)	28.4(116)	38.3 (164)	**100** (419)
CSE/NVQ1/Other	34.7 (61)	24.9 (42)	40.5 (67)	**100** (170)
No qualification	48.2 (776)	21.5 (316)	30.3 (491)	**100** (1,573)
Social class* **				
Higher managerial and professional occupations	30.0 (25)	26.2 (21)	43.8 (40)	**100** (86)
Lower managerial and professional occupations	31.1 (174)	25.0 (137)	44.0 (240)	**100** (551)
Intermediate occupations	33.8 (162)	28.3 (135)	37.9 (186)	**100** (483)
Small employers and own account workers	45.8 (65)	23.1 (39)	31.1 (51)	**100** (155)
Lower supervisory and technical occupations	40.3 (50)	29.6 (38)	30.1 (39)	**100** (127)
Semi-routine occupations	46.7 (280)	20.7 (121)	32.6 (208)	**100** (609)
Routine occupations	48.1 (249)	23.5 (111)	28.4 (146)	**100** (506)
Never work and long-term unemployed	53.4 (162)	19.0 (43)	27.6 (88)	**100** (293)
Equivalised household income* **				
No household income	37.5 (259)	24.3 (150)	38.3 (252)	**100** (661)
Less than £10,000	50.8 (270)	19.6 (97)	29.5 (162)	**100** (529)
£10,001-15,000	51.5 (331)	21.9 (143)	26.5 (182)	**100** (656)
£15,001-25,000	37.2 (174)	27.8 (106)	35.0 (149)	**100** (429)
Over £25,000	27.0 (142)	26.7 (150)	46.3 (256)	**100** (548)
Housing tenure* **				
Own	36.9 (543)	25.6 (369)	37.4 (535)	**100** (1,447)
Mortgage	33.9 (235)	24.1 (150)	42.0 (273)	**100** (658)
Rent	57.4 (383)	20.0 (117)	22.6 (183)	**100** (683)
Other	38.3 (15)	27.9 (12)	33.8 (15)	**100** (42)
Car availability* **				
Yes	35.6 (690)	25.0 (453)	39.4 (748)	**100** (1,891)
No	52.9 (486)	22.1 (195)	25.0 (258)	**100** (939)
Total	**40.6** (1,176)	**24.1** (648)	**35.3** (1,006)	**100** (2,2830)

Significance levels ***p **<0.001**
(N) = Sample numbers in brackets are unweighted
Source: Author's analysis, 2004 HSE

TableA.22: Smoking status amongst men aged 50 years and over, by demographics characteristics (%)

Demographic characteristics	Smoking status				
	Never smoked	Ex- occasionally	Ex- regularly	Current smoker	TOTAL
Age group ***					
50-54 years	37.6 (185)	3.5 (22)	34.1 (120)	24.9 (117)	**100** (444)
55-59 years	33.4 (138)	6.1 (27)	42.0 (143)	18.4 (79)	**100** (387)
60-64 years	30.8(140)	3.5 (16)	44.7 (157)	21.0 (88)	**100** (401)
65-69 years	26.4(112)	6.1 (21)	56.0 (169)	11.5 (53)	**100** (355)
70+	29.9 (208)	4.3 (29)	57.2 (355)	8.6 (66)	**100** (658)
Marital status ***					
Married	32.4 (621)	4.6 (89)	49.1 (727)	13.9 (264)	**100** (1,701)
Single	40.9(51)	6.1 (8)	27.7 (39)	25.2 (40)	**100** (138)
Divorced	25.7 (60)	4.1 (10)	38.4 (82)	31.9 (66)	**100** (218)
Widowed	26.5 (51)	3.0 (7)	54.5 (95)	16.1 (33)	**100** (186)
Ethnicity ***					
White	30.9 (377)	4.2 (56)	49.9 (643)	15.0 (182)	**100** (1,258)
Black Caribbean	39.1 (70)	12.6 (17)	42.6 (51)	5.8 (25)	**100** (163)
Black African	73.7 (42)	† (3)	3.0 (8)	22.5 (15)	**100** (68)
Indian	47.9 (102)	7.0 (9)	25.9 (43)	19.2 (41)	**100** (195)
Pakistani	54.8 (54)	† (4)	33.7(22)	10.6 (22)	**100** (102)
Bangladeshi	12.1 (18)	† (2)	40.9 (25)	45.5 (21)	**100** (65)
Chinese	64.7 (49)	5.9 (6)	17.6 (19)	11.8 (13)	**100** (87)
Irish	23.7(64)	6.6 (19)	43.7 (133)	26.0 (79)	**100** (295)
Other	64.7 (7)	† (0)	† (0)	24.1 (5)	**100** (12)
TOTAL	**31.9** (783)	**4.6** (116)	**47.1** (944)	**16.4** (403)	**100** (2246)

Significance levels ***p **<0.001**
(N) = Sample numbers in brackets are unweighted
† Percentages not presented for cell counts below 5
Source: Author's analysis, 2004 HSE

TableA.23: Smoking status amongst women aged 50 years and over, by demographics characteristics (%)

Demographic characteristics	Smoking status				
	Never smoked	Ex- occasionally	Ex- regularly	Current smoker	TOTAL
Age group ***					
50-54 years	45.8 (331)	6.8 (32)	24.5(103)	22.9 (105)	**100** (571)
55-59 years	47.4 (276)	4.2 (21)	27.4 (109)	21.0 (85)	**100** (491)
60-64 years	44.7 (264)	5.0 (21)	32.1 (129)	18.2 (76)	**100** (490)
65-69 years	50.7 (242)	7.1 (23)	29.0 (92)	13.2 (42)	**100** (399)
70+	49.4 (461)	7.7(62)	32.2 (258)	10.7 (96)	**100** (877)
Marital status ***					
Married	48.1 (893)	7.0 (95)	28.9 (383)	16.0 (213)	**100** (1,584)
Single	56.4 (95)	3.4 (8)	28.1 (37)	12.2 (24)	**100** (164)
Divorced	35.5 (166)	4.2 (17)	35.6 (102)	24.7 (69)	**100** (354)
Widowed	50.2 (420)	6.4 (39)	29.6 (169)	16.2 (98)	**100** (726)
Ethnicity ***					
White	45.3 (752)	6.6 (109)	31.2 (524)	16.9 (286)	**100** (1,671)
Black Caribbean	79.9 (175)	18.9 (11)	16.4 (32)	2.4 (15)	**100** (233)
Black African	76.5 (62)	8.9 (6)	† (1)	(1)	**100** (70)
Indian	94.0 (193)	† (3)	† (1)	4.9 (6)	**100** (203)
Pakistani	95.0 (88)	† (3)	† (2)	† (3)	**100** (96)
Bangladeshi	98.2 (71)	† (3)	† (2)	† (3)	**100** (79)
Chinese	94.4 (77)	† (3)	† (4)	† (2)	**100** (86)
Irish	39.6 (143)	6.5 (22)	33.6 (123)	20.3 (86)	**100** (374)
Other	71.2 (13)	† (1)	† (3)	† (2)	**100** (19)
TOTAL	**47.8** (1,574)	**6.4** (161)	**29.6** (692)	**16.2** (404)	**100** (2,831)

Significance levels ***p **<0.001**
(N) = Sample numbers in brackets are unweighted
† Percentages not presented for cell counts below 5
Source: Author's analysis, 2004 HSE

Table A.24: Alcohol consumption amongst men aged 50 years and over by demographics, 2004 HSE

Demographic characteristics	Frequency of alcohol consumption					
	Almost every day	Three to six days per week	Once or twice a week	Once every couple of months	Not at all	TOTAL
Age group* **						
50-54 years	22.3 (67)	29.9 (112)	25.1 (102)	15.7 (77)	7.0 (86)	**100** (444)
55-59 years	23.6 (83)	25.3 (90)	26.9 (101)	18.2 (74)	5.9 (39)	**100** (387)
60-64 years	22.6 (76)	22.0 (73)	25.1 (90)	19.9 (77)	10.4 (83)	**100** (399)
65-69 years	29.3 (77)	18.8 (58)	21.2 (70)	19.4 (58)	11.2 (92)	**100** (355)
70+	29.4 (167)	15.4 (88)	20.9 (132)	22.7 (141)	11.6 (129)	**100** (657)
Marital status * **						
Married	24.9 (346)	22.5 (326)	25.1 (379)	19.0 (317)	8.6 (330)	**100** (1,698)
Single	20.7 (31)	22.5 (32)	28.4 (34)	22.4 (27)	6.1 (14)	**100** (302)
Divorced	24.8 (45)	21.2 (35)	18.4 (42)	20.7 (47)	14.9 (49)	**100** (218)
Widowed	31.0 (48)	18.7 (27)	17.9 (40)	20.1 (35)	12.3 (36)	**100** (186)
Ethnicity * **						
Whites	27.9 (357)	22.5 (276)	23.4 (289)	19.5 (248)	6.7 (87)	**100** (1,257)
Black Caribbean	14.0 (20)	18.6 (28)	29.3 (42)	28.4 (45)	9.8 (28)	**100** (163)
Black African	† (4)	10.4 (6)	21.4 (16)	45.8 (22)	19.9 (20)	**100** (68)
Indian	5.2 (17)	14.4 (27)	22.0 (42)	25.7 (39)	32.7 (70)	**100** (195)
Pakistani	† (**0**)	† (0)	1.4 (5)	† (3)	90.0 (94)	**100** (102)
Bangladeshi	† (0)	† (0)	† (0)	† (1)	100.0 (65)	**100** (65)
Chinese	12.0 (12)	8.0 (9)	20.0 (18)	36.0 (23)	24.0 (25)	**100** (87)
Irish	22.0 (59)	27.0 (75)	27.4 (79)	12.8 (43)	10.8 (38)	**100** (294)
Other	† (1)	† (0)	† (4)	† (4)	† (2)	**100** (11)
Total	**25.6** (796)	**21.9** (738)	**23.7** (967)	**19.5** (1,342)	**9.3** (1,223)	**100** (5,066)

Significance levels ***p **<0.001**
(N) = Sample numbers in brackets are unweighted
† Percentages not presented for cell counts below 5
Source: Author's analysis, 2004 HSE

Table A.25: Alcohol consumption amongst women aged 50 years and over by demographics, 2004 HSE

Demographic characteristics	Frequency of alcohol consumption					
	Almost every day	Three to six days per week	Once or twice a week	Once every couple of months	Not at all	TOTAL
Age group* **						
50-54 years	16.2 (68)	20.7 (86)	22.5 (103)	29.0 (158)	11.6 (156)	**100** (571)
55-59 years	13.8 (51)	15.5 (62)	22.3 (99)	34.7 (152)	13.8 (126)	**100** (490)
60-64 years	13.0 (51)	15.1 (59)	22.0 (93)	33.7 (153)	16.3 (133)	**100** (489)
65-69 years	11.8 (38)	12.5 (42)	20.9 (67)	31.7 (122)	23.1 (130)	**100** (399)
70+	15.7 (118)	8.3 (68)	13.8 (110)	39.8 (330)	22.3 (249)	**100** (875)
Marital status * **						
Married	16.2 (208)	16.3 (219)	20.7 (287)	31.7 (464)	15.1 (404)	**100** (1,582)
Single	11.0 (16)	10.7 (14)	16.7 (29)	41.6 (68)	20.0 (37)	**100** (164)
Divorced	13.9 (38)	13.8 (40)	16.9 (55)	36.6 (129)	18.9 (91)	**100** (353)
Widowed	11.0 (64)	7.3 (44)	16.7 (101)	40.6 (254)	24.4 (262)	**100** (725)
Ethnicity * **						
Whites	15.4 (254)	13.7 (231)	19.5 (326)	35.7 (591)	15.7 (266)	**100** (1,668)
Black Caribbean	4.8 (12)	3.8 (10)	11.3 (31)	46.7 (111)	33.3 (69)	**100** (233)
Black African	(-)	21.5 (6)	21.5 (12)	27.2 (23)	29.1 (28)	**100** (70)
Indian	4.6 (6)	3.5 (5)	6.6 (8)	19.0 (28)	66.4 156)	**100** (203)
Pakistani	† (0)	† (0)	† (0)	† (3)	97.9 (93)	**100** (96)
Bangladeshi	† (0)	† (0)	† (-)	† (1)	98.7 (140)	**100** (141)
Chinese	2.8 (5)	(3)	5.6 (6)	54.9 (34)	35.2 (38)	**100** (86)
Irish	14.6 (45)	17.9 (61)	22.1 (84)	32.9 (118)	12.5 (64)	**100** (373)
Other	† (2)	† (1)	26.5 (5)	31.6 (6)	26.2 (5)	**100** (19)
Total	**14.5** (796)	**13.4** (738)	**19.1** (967)	**34.9** (1,342)	**18.0** (1,223)	**100** (5,066)

Significance levels ***p **<0.001**
(N) = Sample numbers in brackets are unweighted
† Percentages not presented for cell counts below 5
Source: Author's analysis, 2004 H

Summaries: Significance of explanatory variables in multivariate analysis

Table A.26: Summary of reporting 'bad/very bad' health and explanatory variables significance levels at 95% CI, 2004 HSE

Demographics and SES characteristics	Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII
Age groups	✓✓✓	n/s	n/s	n/s	n/s	n/s	n/s
Sex	n/s	✓	✓✓	✓✓	✓	✓	✓
Ethnicity	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Marital status	✓	✓	✓	✓	n/s	n/s	(-)
Smoking status	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Alcohol consumption	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Education		✓✓✓	✓	✓✓	✓✓	✓✓	✓✓✓
NS-SEC Occupation			✓✓	✓	n/s	n/s	(-)
Equivalised household income				✓✓✓	✓✓✓	✓✓✓	✓✓✓
Housing tenure					✓✓✓	✓✓✓	✓✓
Car availability						✓✓✓	✓✓✓

Adjusted by: Demographic and SES characteristics

Significance levels: 95% CI ✓ $p < 0.01$; ✓✓ $p < 0.005$; ✓✓✓ $p < 0.001$

Not significant: n/s

(-) indicated removed from the model

Table A.27: Summary of reporting 'bad/very bad' health and explanatory variables significance levels at 95% CI, men 50 and over, 2004 HSE

Demographics and SES characteristics	Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII
Men (n = 2,225)							
Age groups	✓✓	✓✓	✓✓	n/s	n/s	n/s	n/s
Ethnicity	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	n/s	✓✓
Marital status	✓	✓✓	✓	✓	n/s	**n/s**	**(-)**
Smoking status	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓	✓
Alcohol consumption	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Education		✓✓✓	✓✓	✓	✓✓	✓	✓✓
NS-SEC **Occupation**			✓✓	n/s	n/s	n/s	**(-)**
Equivalised household income				✓✓✓	✓✓✓	✓✓✓	✓✓✓
Housing tenure					✓✓✓	✓✓✓	✓✓
Car availability						✓✓✓	✓✓✓

Adjusted by: Demographic and SES characteristics

Significance levels: 95% CI ✓ p < 0.01; ✓✓ p <0.005; ✓✓✓ p <0.001

Not significant: **n/s**

(-) indicated removed from the model

Table A.28: Summary of reporting 'bad/very bad' health and explanatory variables significance levels at 95% CI, women 50 and over, 2004 HSE

Demographics and SES characteristics	Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII
Women (n = 2,831)							
Age groups	**n/s**	**n/s**	n/s	**n/s**	**n/s**	**n/s**	n/s
Ethnicity	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Marital status	**n/s**	**n/s**	**n/s**	**n/s**	**n/s**	n/s	**(-)**
Smoking status	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓
Alcohol consumption	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓
Education		✓✓	✓	✓	✓	✓✓	✓✓
NS-SEC **Occupation**			✓	n/s	n/s	n/s	**(-)**
Equivalised household income				✓✓✓	✓✓✓	✓✓✓	✓✓✓
Housing tenure					✓✓✓	✓✓✓	✓✓✓
Car availability						✓	✓✓

Adjusted by: Demographic and SES characteristics

Significance levels: 95% CI ✓ $p < 0.01$; ✓✓ $p < 0.005$; ✓✓✓ $p < 0.001$

Not significant: **n/s**

(-) indicated removed from the model

Table A.29: Summary of reporting a LLSI and explanatory variables significance levels at 95% CI, 2004 HSE

Demographics and SES characteristics	Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII
Age groups	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Sex	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Ethnicity	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Marital status	n/s	n/s	n/s	n/s	n/s	n/s	(-)
Smoking status	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓
Alcohol consumption	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Education		✓✓✓	✓	n/s	n/s	n/s	(-)
NS-SEC Occupation			✓✓✓	✓	n/s	n/s	(-)
Equivalised household income				✓✓✓	✓✓✓	✓✓✓	✓✓✓
Housing tenure					✓✓✓	✓✓✓	✓✓✓
Car availability						✓✓	✓✓

Adjusted by: Demographic and SES characteristics

Significance levels: 95% CI ✓ $p < 0.01$; ✓✓ $p < 0.005$; ✓✓✓ $p < 0.001$

Not significant: **n/s**

(-) indicated removed from the model

Table A.30: Summary of reporting a LLSI and explanatory variables levels at 95% CI, men 50 and over, 2004 HSE

Demographics and SES characteristics	Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII
Men (n = 2,225)							
Age groups	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Ethnicity	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
Marital status	n/s	n/s	n/s	n/s	n/s	n/s	(-)
Smoking status	✓✓✓	✓✓	✓✓	✓	✓✓	✓✓	✓✓
Alcohol consumption	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Education		✓✓✓	✓✓	n/s	n/s	n/s	(-)
NS-SEC **Occupation**			✓✓	✓	n/s	n/s	✓✓
Equivalised household income				✓✓✓	✓✓✓	✓✓✓	✓✓✓
Housing tenure					✓✓✓	✓✓	✓✓
Car availability						✓	✓✓

Adjusted by: Demographic and SES characteristics

Significance levels: 95% CI ✓ $p < 0.01$; ✓✓ $p < 0.005$; ✓✓✓ $p < 0.001$

Not significant: **n/s**

(-) indicated removed from the model

Table A.30: Summary of reporting a LLSI and explanatory variables significance levels at 95% CI, women 50 and over, 2004 HSE

Demographics and SES characteristics	Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII
Women (n = 2,831)							
Age groups	✓✓✓	✓✓	✓✓	✓✓	✓	✓	✓✓✓
Ethnicity	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Marital status	✓	✓	✓✓	**n/s**	**n/s**	n/s	**(-)**
Smoking status	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓
Alcohol consumption	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓
Education		n/s	n/s	**n/s**	**n/s**	**n/s**	**(-)**
NS-SEC **Occupation**			✓	n/s	n/s	n/s	**(-)**
Equivalised household income				✓✓✓	✓✓✓	✓✓✓	✓✓✓
Housing tenure					✓✓✓	✓✓✓	✓✓✓
Car availability						✓	**(-)**

Adjusted by: Demographic and SES characteristics

Significance levels: 95% CI ✓ $p < 0.01$; ✓✓ $p < 0.005$; ✓✓✓ $p < 0.001$

Not significant: **n/s**

(-) indicated removed from the model

REFERENCES

Acheson, D. (1998). *Independent inquiry into inequalities in health report*. London: Stationary Office: Available from: http://www.archive.official-documents.co.uk/document/doh/ih/part2g.htm [Access and cited 2nd September, 2008]

Adams, S. (2009). 'No place like home? Housing inequality in later life'. In Unequal ageing: the untold story of exclusion in old age. Cann, P. and Dean, M. (eds.). The Policy Press: Bristol

Adamson, J., Hunt, K. and Ebrahim, S. (2003). 'Association between measures of morbidity and locomotor disability: diagnosis alone is not enough'. Social Science and Medicine **57**: 1355-1360.

Adler, N., and Newman, K. (2002). 'Socioeconomic disparities in health: Pathways and policies'. Health Affairs **21**(2): 60-76.

Age Concern (2007). *Older people in the United Kingdom: Key facts and statistics*. [Online] Available from: http://www.ageconcern.org.uk/AgeConcern/Documents/Key_facts.pdf [Access and cited July, 2008]

Ahmad, K., Java, T. H., and Chaturvedi (2005). Self-rated health in Pakistan: results of a national health survey. BMC Public Health **5** (51): 1-7. [Online] Available from: http://www.biomedcentral.com/1471-2458/5/51 [Access and cited 8 August, 2010]

Allender, S., Balakarishnan, R., Scarborough, P., Webster, P. and Rayner, M. (2009). 'The burden of smoking-related ill health in the United Kingdom'. Tobacco Control **18** (4): 262-267.

Annandale, E. and Hunt, K. (2000). Gender inequalities in health: research at the crossroads. In E. Annandale and K. Hunt (Eds). Gender inequalities in health. Buckingham: Open University Press. [Online] Available from: http://www.mcgraw-hill.co.uk/openup/chapters/0335203647.pdf [Access and cited 10 July, 2010]

Antonovsky, A. (1967). 'Social class, life expectancy and overall mortality'. Milbank Quarterly **45**(2): 31-73.

Arber, S, and Cooper, H. (1999). 'Gender differences in health in later life: a new paradox?' Social Science and Medicine **48**: 61-76.

Arber, S. (1997). 'Comparing inequalities in women's and men's health: Britain in the 1990s'. Social Science and Medicine **44** (6): 773-787.

ASH (Action on Smoking and Health) (2008). *Beyond smoking Kills.* [Online] Available from: http://www.ash.org.uk/files/documents/ASH_691.pdf [Access and cited 29 March, 2011]

Ayis, S., Goobermen-Hill, R. and Ebrahim, S. (2003). 'Longstanding illness in older people: associations with chronic diseases, psychological and environmental factors'. Age and Ageing **32**(2): 265-272.

Backlund, E., Sorlie, P.D. and Johnson, N.J. (1999). 'A comparison of the relationships of education and income with mortality: the national longitudinal mortality study'. Social Science and Medicine **49**(10): 1373-1384.

Baker, D.J.P. (1991). 'The foetal and infant origins of inequality in health in Britain'. Journal of Public Health Medicine**13** (2): 64-68.

Baker, D.J.P. (2004). 'The developmental origins of adult disease'. Journal of the American College of Nutrition **23** (06): 588S-595S.

Balchin, S., and Soule, A. (2005). *Focus on older people: Demographic profile*. [Online] Available from: http://www.statistics.gov.uk/downloads/theme_compendia/foop05/Olderpeople2005.pdf [Access 15 July 2007, cited 18 April, 2011]

Bartley, M., Blane, D. and Davey Smith, G. (1998). 'Introduction: beyond the Black Report'. Sociology of Health and Illness **20** (5): 563-577.

Bartley, M., Martikainen, P., Shipley, M. and Marmot, M. (2004). Gender differences in the relationship of partner's social class to behavioural risk and social support in the Whitehall II study. Social Science and Medicine **59** (9): 1925-1936.

Bajekal, M., Blane, D., Grewal, I., Karlsen, S., and Nazroo, J. (2004). 'Ethnic difference in influencing on quality of life at older ages: a quantitative analysis'. Age and Society **24:** 709-728.

Bassuk, S.S., Berkman, L.F. and Amick lll, B.C. (2002). 'Socio-economic status and mortality among the elderly: findings from four US communities'. American Journal of Epidemiology **155** (6): 520-532.

Battu, H. and Sloane, P.J. (2004). Educational mismatch and ethnic minorities in England and Wales. [Online] Available from: http://www.mpibberlin.mpg.de/de/aktuelles/papers/battu_sloane.pdf [Access and cited September 20, 2010]

Bécares, L., Nazroo, J., and Stafford, M. (2011). 'The ethnic density effect on alcohol use among ethnic minority people in the UK'. Journal of Epidemiology Community Health **65**: 20-25.

Becker, E., Hills, A., and Erens, B. (2006). Alcohol consumption. In K. Sproston and J. Mindell (Eds.). *The Health Survey for England. Vol. 1 and 2: London: HMSO*.

Ben-Shlomo, Y., and Kud, D. (2002). 'A life-course approach to chronic disease epidemiology: conceptual models, empirical challenges and interdisciplinary perspectives.' International Journal of Epidemiology **31**: 285 - 293.

Berney, L., Blane, D., Davey Smith, G., Holland, P. (2003). Life-course influences on health in early age. In Hillary Graham (Ed) Understanding health inequalities. Maidenhead: Open University Press.

Berkman, C. S. and Gurland, B.J. (1998). 'The relationship among income, other socio-economic indicators, and functional level in older persons'. Journal of Ageing and Health **10** (1): 81-98.

Berthoud, R.G., Modood, T., Smith, P., Prior, G. (1994). The Fourth National Survey of Ethnic Minorities. UK Data Archives: University of Essex, Colchester. [Online] Available from: http://www.esds.ac.uk/doc/3685/mrdoc/pdf/a3685uab.pdf [Access and cited 18 May 2009].

Benzeval, M., Judge, M., and Smaje, C. (1995). 'Beyond class, race, and ethnicity: Deprivation and health in Britain'. Health Service Research **30** (1 Pt 2): 163-177.

Bhopal R. (2004). 'Glossary of terms relating to ethnicity and race: for reflection and Debate'. Journal of Epidemiology and Community Health **58:** 441-445.

Bhopal, R., Vettini, A., Hunt, S., Wiebe, S., Hanna, L., and Amos, A. (2004). 'Review of prevalence data in, and evaluation of methods for cross cultural adaptation of, UK surveys on tobacco and alcohol in ethnic minority groups'. British Medicinal Journal **328**: 76-80.

Blane, D., Higgs, P., Hyde, M., and Wiggins, R.D. (2004). 'Life-course influences on quality of life in early old age.' Social Science and Medicine **58**(11): 2171-9.

Blane, D. (2006). 'The life-course, the social gradient, and health'. In The Social Determinants of Health. Marmot, M. and. Wilkinson, R.G (eds.) Oxford: University Press.

Blackburn, R.M. (1998). 'A new system of classes: But what are they and do we need them?'. Work, Employment and Society **12** (4): 1-7.

Blakemore, K. (1999). 'International migration in later-life: social care and policy implications.' Age and Society **19:** 761-774.

Blackady, D.H. Leslie, D.G. Murphy, P.D. and O'Leary, N.C. (2002). 'White /ethnic minority and employment differentials in Britain: Evidence from LFS'. Oxford Economic paper **54:** 270-297.

Blakemore, K. and Boneham, M. (1996). *Age, Race and ethnicity: A comparative approach.* Buckingham: Open University Press.

Bosma, H., van de Mheen, H.D., Borsboom, G.J.J.M., and Mackenbach, J.P. (2001). Neighbourhood socio-economic status and all-cause mortality. American Journal of Epidemiology **153**(4): 363-371.

Bowling, A. (2004). 'Socio-economic differentials in mortality among older people.' Journal of Epidemiology Community Health **58**(6): 438-440.

Breakwell, C., Baker, A.M., Griffiths, C., Jackson, G., Fegan, G., and Marshall, D. (2007). 'Trends and geographical variations in alcohol-related deaths in the United Kingdom, 1991-2004'. Health Statistic Quarterly **33:**6-24.

Breeze, E., Sloggett, A., and Fletcher, A. (1999). Socio-economic transition in status in old age in relation to limiting long term illness measured at the 1991 Census.' European Journal of Public Health **9**: 265-270.

Breeze, E., Jones, D.A., Wilkinson, P., Latif, A.M., Bulpitt, C.J. and Fletcher, A.E. (2004). 'Association of quality of life in old age in Britain with socio-economic position: baseline data from a randomised controlled trial'. Journal Epidemiology Community Health **58:** 667-673.

British Medical Association: Board of Science (2008). Alcohol misuse: tackling the UK epidemic. [Online] Available from: http://www.bma.org.uk/images/Alcoholmisuse_tcm41-147192.pdf [Access and cited 20 May 2010].

Bush, J., White, M., Kai, J., Rankin, J., and Bhopal, R. (2003). 'Understanding influences on smoking in Bangladeshi and Pakistani adults: community based, qualitative study'. British Medical Journal **326** (7396): 962-67.

Case, A., Fertig, A., and Paxson, C. (2005). 'The lasting impact of childhood health and circumstance'. Journal of Health Economics **24** 365-389.

Chondola, T. and Jenkinson, C. (2000). 'Validating self-rated health in different ethnic groups'. Ethnicity and Health **5** (2): 151-159.

Chondola, T. (2000). 'Social class differences in mortality using the new UK National Statistics socio-economic classification'. Social Science and Medicine **50**(5): 641-9.

Chondola, T. (2001). 'Ethnic and class differences in health in relation to British South Asians: using the new UK National Statistics socio-economic classification'. Social Science and Medicine **52** (8): 1285-1296.

Chandola, T., Bartley, M., Wiggins, R., Schofield, P. (2003). 'Social inequalities in health by individual and household measures of social position in a cohort of healthy people'. Journal Epidemiology Community Health **57:** 56-62.

Chandola, T., Ferrie, J., Sacker, A., Marmot, M. (2007). 'Social inequalities in self reported health in early old age: follow-up of prospective cohort study'. British Medical Journal **334** (7601): 987-990.

Chesterman, J., Judge, K., Bauld, L., and Ferguson, J. (2005). 'How effective are the English smoking treatment services in reaching disadvantaged smokers?' Addiction **100** (Suppl. **2**): 36-45.

Cooper, H. (2002). 'Investigating socio-economic explanations for gender and ethnic inequalities in health'. Social Science and Medicine **54**(4): 693-706.

Cooper, H., Arber, S., Daley, T., Samje, C., and Ginn, J. (2000). Ethnicity, health and health behaviour: a study of older age groups. Summary report of main findings. [Online] Available from: http://www.nice.org.uk/niceMedia/documents/ethnicity_studyolder.pdff [Access and cited 30 October, 2007].

Commission for Health Care Audit (2006). *Living well in later life: A review of progress against the National Service Framework for older people.* [Online] Available from: http://www.audit-commission.gov.uk/SiteCollectionDocuments/AuditCommissionReports/NationalStudies/HCC_olderPeopleREP.pdf [Access and cited 23 July, 2011].

Craig, R., Deverill, C., and Pickering, K. (2006). *The Health Survey for England. Methodology and documentation*. Vol. 1 and 2: London: HMSO.

Craig, P., and Forbes, J. (2005). 'Social position and health: are old and new occupational classifications interchangeable?' Journal of Biosocial Sciences **37**: 89-106.

Craig, G., Adamson, S., Ali, N., Ali. S., Atkins, L., Dadze-Arthur, A., Elliott, C., McNamee, S. and Murtuja, B. (2007). *Sure Start and Black and minority populations*. London [Online]
Available from: http://www.ness.bbk.ac.uk/implementation/documents/33.pdf [Access and cited 27 June 2010].

Crimmins, E.M., Kim, K.J., and Solé-Auró, A. (2010). 'Gender differences in health: results from SHARE, ELSA and HRS'. The European Journal of Public Health: pp. 1-11. [Online] Available from: http://eurpub.oxfordjournals.org/cgi/content/abstract [Access and cited 20 April, 2010].

Curtis, S., and Lawson, K. (2000). 'Gender, ethnicity and self-reported health: the case of African-Caribbean population in London.' Social Science and Medicine **50**(3): 365-385.

Curtis, S., Southall, H., Congdon, P., and Dodgeon, B. (2004). 'Area effects on health variation over the life-course: analysis of the longitudinal study sample in England using new data on area of residence in childhood'. Social Science and Medicine **58**(1):57-74

Dahl , E. and Birkelund, E. (1997). 'Health inequalities in later life in a social democratic welfare state'. Social Science and Medicine **44**(6):871-881.

Dale, A., Lindley, J., and Dex, S., (2006). 'A life-course perspective on ethnic differences in women's economic activity in Britain'. European Sociological Review **22**(4): 459-76.

Dahlgren, G. and Whitehead, M. (1991). *Policies and strategies to promote social equity in health Stockholm, Institute of Futures Studies*. [Online] Available from: http://www.framtidsstudier.se/filebank/files/20080109$110739$fil$mZ8UVQv2wQFShMRF6cuT.pdf [Access and cited October, 2008]

Davy M. (2006). 'Time and generational trends in smoking among men and women in Great Britain, 1972–2004/05'. Health Statistic Quarterly **32**: 35-43

Davey Smith, G., Charsley, K., Lambert, H., Paul, S., Fenton, S., and Ahmad, W. (2003). 'Ethnicity, health and the meaning of socio-economic position', in Hilary Graham (ed.) Understanding health inequalities, Maidenhead: Open University Press.

Davey Smith, G. and Hart, C. (2002). 'Life-course socio-economic and behavioural influences on cardiovascular disease mortality: The collaborative study' American Journal of Public Health. **92**(8): 1295-1298.

Davey Smith, G., Gunnell, D., Ben-Shlomo, Y. (2001). 'Life-course approaches to socio-economic differentials in cause-specific adult mortality', in D. Leon and G. Walt. Poverty, Inequality and Health. Oxford: Oxford University Press.

Davey Smith, G. (2000). 'Learning to live with complexity: ethnicity, socio-economic position, and health in Britain and the United States.' American Journal of Public Health **90**(11): 1694-1698.

Davey Smith, G., Chaturvedi, N., Harding, S., Nazroo, J. and Williams. (2000). Ethnic inequalities in health: a review of the UK epidemiological evidence.' Critical Public health **10**: 375-408.

Davey Smith, G., Hart, C., Blane, D., Gillis, C., and Hawthorne, V. (1997). 'Lifetime socio-economic position and mortality: perspective observational study.' British Medical Journal **314**(7086): 547-52.

Davey Smith, G., Hart, C., Blane, D. and Hole, D. (1998). 'Adverse social circumstances and cause-specific mortality: perspective observational study.' British Medical Journal **316**: 631-5.
Davey Smith, G., Wentworth, D., Neaton, J.D., Stampler, R. and Stampler, J. (1996). 'Socio-economic differential in mortality risk among men screened for multiple risk factor intervention trial (MRFIT). American Journal of Public Health **86**: 497-504.

Denton, M., Prus, S., and Walters, V. (2004). 'Gender differences in health: a Canadian study of the psychosocial, structural and behavioural determinants of health'. Social Science and Medicine **58** (1): 2585-2600.

Denton, M. and Walters, V. (1999). 'Gender differences in structural and behavioural determinants of health: an analysis of social production of health'. Social Science and Medicine **48**: 1221-1235.

Department of Health (2001). *The National Service Framework for older people.* [Online] Available from:
http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_4071283.pdf [Access and cited October 3, 2007]

Department of Health (2003). *Ethnicity*. [Online] Available from:
http://www.doh.gov.uk/ethdevlist3.htm [Access and cited November 19, 2007]

Department of Health (1998). *Smoking Kills: A White Paper on Tobacco,* TSO: London. [Online] Available from:
http://www.archive.officialdocuments.co.uk/document/cm41/4177/4177.htm. [Access and cited 5 May, 2010]

Department of Health (2009). *Tackling health inequalities: 10 years on – A review of developments in tackling health inequalities in England over the last 10 years.* [Online]
Available from:
http://www.marmotreview.org/AssetLibrary/resources/new%20external%20reports/DH%20-%2010%20years%20on.pdf [Access and cited 10 June, 2011]

Department of Health (2003). *Tackling health inequalities: A programme for action.* [Online]
Available from:
http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4008268 [Access and cited 20 July, 2011]

Department of Health (1998). Green Paper: *Our healthier nation a contract for health.* [Online]
Available from:
http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4007059 [Access and cited 20 July, 2011]

Department of Health (1999). *Saving Lives: Our healthier nation.* [Online] Available from:
http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_4049329.pdf [Access and cited 20 July, 2011]

Department of Health (2004). *Choosing health: Making healthy choices easier.* [Online] Available at
http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4094559 [Access and cited 21 July, 2011

Department of Health (2007). *Putting people first: A shared vision and commitment to transformation of adult social care.* [Online] Available from
http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_081118 [Access and cited 23 July, 2011]

Department of Health (2007). *Safe, sensible, social: the next steps in the National Alcohol Strategy*. [Online] Available from:
http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_075218 [Access and cited 24 July, 2011]

Diamond, I. and Jefferies, J. (2001). *Beginning statistics: An introduction for Social Scientists.* London: Sage Publication.

Doll R, Peto R, Whateley K. et al (1994) 'Mortality in relation to smoking: 40 years' observation on male British doctors'. British Medical Journal **309**: 901–11.

Dowd, J.J. and Bengtson, V.L. (1978). 'Ageing in minority populations: An examination of the double jeopardy hypothesis'. Journal of Gerontology **33** (3): 427-436.

Drever, F., Doran, T., and Whitehead, M. (2004). 'Exploring the relation between class, gender, and self rated general health using the new socioeconomic classification. A study using data of 2001 Census'. Journal Epidemiology Community Health **58:** 590-596.

Dustmann, C. and Theodoropoulos, N. (2006). *Ethnic minority immigrants and their children in Britain.* CReAM Working Paper: [Online] Available from:
http://www.econ.ucl.ac.uk/cream/pages/CDP/CDP_10_06.pdf [Access and cited 05 August, 2008].

Ebrahim, S. (1996). 'Caring for older people'. British Medical Journal **313**: 610-3.

Ebrahim, S., Papacosta, O., Wannamethee, G., and Adamson, J. (2004). 'Social inequalities and disability in older men: prospective findings from the British regional heart study.' Social Science and Medicine **59**(10): 2109-2120.

Edwards, R. (2004). 'The problem of tobacco smoking'. British Medical Journal **328:** 217-219

Ellaway, A. and Macintyre, S. (1998). 'Does housing tenure predict health in the UK because it exposes people to different levels of housing related hazards in the home or its surroundings?' Health and Place **4**: 2: 141-150.

Engels, F. (1999). *The condition of the working class in England.* Oxford: Oxford University Press.

Erens, B., Primatesta, P., and Prior, G. (2001). 1999 Health Survey for England: The Health of ethnic minority groups. London: HMSO.

Eriksson, M., Wallander, M.A., Krakau, I., Wendel, H. and Svärdsudd, K. (2004). 'Birth weight and cardiovascular risk factors in a cohort followed until 80 years of age: the study of men born in 1913'. Journal of Internal Medicine **255:** 236-246.

Erskine, S., Maheswaran, R., Pearson, T., Gleeson, D. (2010). 'Socioeconomic deprivation, urban-rural location and alcohol-related mortality in England and Wales'. BioMed Central Public Health **10** (99)1471-2458. [Online] Available from: http://www.biomedcentral.com/content/pdf/1471-2458-10-99.pdf [Access and cited 5 May, 2010].

Emslie, C. and Mitchell, R. (2009). 'Are there differences in the geography of alcohol-related mortality in Scotland? An ecological study'. BioMed Central Public Health 9 (58) 1471-2458.

Evandrou, M. (2005). 'Health and well-being amongst older people in Britain at the start of the 21st Century'. 1-27. [Online] Available from: http://www.lse.ac.uk/collections/SAGE/pdf/DP22.pdf [Access and cited 21 September, 2007].

Evandrou, M. (2000a). 'Ethnic inequality in health in later life.' Health Statistics Quarterly **08**(Winter): 20-28.

Evandrou, M. (2000b). 'Social inequalities in later life: the socio-economic position of older people from ethnic minority groups in Britain.' Population Trends **101**(Autumn): 32-39.

Evandrou M. and Falkingham, J. (2002). 'Smoking behaviour and socio-economic status: a cohort analysis, 1974-1998'. Health Statistics Quarterly **14**: 30-39.

Farmer, M. M., and Ferraro, K.F. (2005). 'Are racial disparities in health conditional on socio-economic status?' Social Science and Medicine **60**: 191-204.

Ferrie, J. E., Shipley, M.J., Stansfeld, S.A., Davey Smith, G. and Marmot, M. (2003). 'Future uncertainty and socio-economic inequalities in health: the Whitehall II study.' Social Science and Medicine **57**: 637-646.

Fiscella, K. and Franks, P. (2000). 'Individual income, income inequality, health, and mortality: what are the relationships'? Health Service Research **35** (1 Pt2): 307-18.

Frankel, S., Davey Smith, G. and Gunnell, D. (1999). „Childhood socio-economic position and adult cardiovascular mortality: the Boyd Orr cohort'. American Journal of Epidemiology 150 (10):1081-84.

Frankfort-Nachmias, C. and Nachmias, D. (1996). *Research methods in the social sciences.* Edward Arnold: London.

Galobardes, B., Shaw, M., Lawlor, D.A., Lynch, J.W. and Davey Smith, G. (2006). 'Indicators of socio-economic position (part 1).' Journal of Epidemiology and Community Health **60**: 7-12.

Galobardes, B., Shaw, M., Lawlor, D.A., Lynch, J.W. and Davey Smith, G. (2006). 'Indicators of socio-economic position (part 2).' J. Epidemiology Community Health **60**: 95-101.

Galobardes, B., Lynch, J.W. and Davey Smith, G. (2007). 'Measuring socioeconomic position in health research.' British Medical Bulletin 81**-82** (1): 21-37.

Gerritsen, A.M. and Deville, W.L. (2009). 'Gender differences in health and health care utilisation in various ethnic groups in the Netherlands: a cross-sectional study'. BMC Public Health **9** (109): 1-9. [Online] Available from: http://www.biomedcentral.com/1471-2458/6/155. [Access and cited 2 April, 2010]

Ginn, J., and Arber, S. (2000). 'Ethnic inequality in later life: variation in financial circumstances by gender and ethnic group.' Education and Ageing **15**(1): 65-83.

Ginn, J., and Arber, S. (2001). 'Pension prospects of minority ethnic groups: inequalities by gender and ethnicity.' British Journal of Sociology **52**(3): 519 -539.

Glaser and Grundy (1997). 'Marital status and long-term illness in Great Britain'. Journal of Marriage and the Family **59**: 156-164.

Goddard E. *General Household Survey 2005: Smoking and drinking among adults, 2005.* 2008. London, Office for National Statistics.

Goldman, N., Korenman, S. and Weinstein, R. (1995). 'Marital status and health among the elderly.' Social Science and Medicine **40** (12): 1717-1730.

Gorman, B. K. and Read, J.G. (2006). 'Gender disparities in adult health: An examination of three measures of morbidity'. Journal of Health and Social Behaviour **47** (2): 95-110.

Gooberman-Hill, R., Ayis, S., and Ebrahim, S. (2003). 'Understanding long-standing illness among older people'. Social Science and Medicine **56** (12): 2555-2564.

Graham, H. (2002). 'Building an inter-disciplinary science of health inequalities: the example of life-course research'. Social Science and Medicine **55**: 2005-2016.

Graham, H. (2005). 'Intellectual disabilities and socio-economic inequalities in health: an overview of research.' Journal of Applied Research in Intellectual Disabilities **18**: 101-111

Graham, H. and Kelly, M.P. (2004). Health inequalities: Concepts, frameworks and policy. [Online] Available from: http://www.nice.org.uk/niceMedia/documents/health_inequalities_concepts.pdf [Access and cited 20 June, 2010]

Gravelle, H., and Sutton, M. (2003). 'Income related inequalities in self assessed health in Britain'. J. Epidemiology Community Health **57**: 125- 129.

Grewal, I., Nazroo, J., Bajekal, M., Blane, D., and Lewis, J. (2004). 'Influences on quality of life: A qualitative investigation of ethnic differences among older people in England'. Journal of Ethnic and Migration Studies **30**(4): 737-761.

Grundy, E., and Sloggett, A. (2003). 'Health inequalities in the older population: the role of personal capital, social resources and socio-economic circumstances.' Social Science and Medicine **56**(5): 935-947.

Grundy, E., and Holt, G. (2001). 'The socio-economic status of older adults. how should we measure it in studies of health inequalities?' Journal of Epidemiology and Community Health **55**(12): 895-904.

Grundy, E., and Glazer, K. (2000). 'Demographic differences in the onset and progression of disability in early old age: a longitudinal study'. Age and Ageing **29**: 149-157.

Hajat, S., Haines, A., Bulpitt, C. and Fletcher, A. (2004) 'Patterns and determinants of alcohol consumption in people aged 75 years and older: results from the MRC trial of assessment and management of older people in the community'. Age & Ageing **33**: 170–7.

Harrison, M. (2003). 'Housing black and minority ethnic communities: diversity and constraint', in D. Mason (ed) *Explaining Ethnic Differences: Changing patterns of Disadvantage in Britain.* Bristol: The Policy Press

Harrison, L., and Gardiner, E. (1999). 'Do rich really die young? Alcohol-related mortality and social class in Great Britain, 1988-94'. Addiction **94** (12): 1871-1880.

Harding, S. (2004). 'Mortality of migrants from the Caribbean to England and Wales: effect of duration of residence.' International Journal of Epidemiology **33**(2): 382-386.

Harding, S. and Maxwell, R. (1997). 'Differences in mortality of migrants', in F. Drever and M. Whitehead. *Decennial Supplement*. London: The Stationary Office.

Harding, S. (2003). 'Social mobility and self-reported limiting long-term illness among West Indian and South Asian migrants living in England AND Wales'. Social Science and Medicine **56**: 355-361.

Harman, J., Graham, Hilary, Francis, B., Inskip, H.M., and the SWS Study Group (2006). 'Socioeconomic gradients in smoking among young women: A British survey'. Social Science and Medicine **63**: 2791-2800.

Haug, W., Compton, P.N. and Courbage, Y. (2002) 'The demographic characteristics of immigrant populations'. [Online] Available from: http://www.coe.int/T/E/Social_Cohesion/Population/N%C2%B038_Demo_immig_pop.pdf [Access and cited 30 September, 2007]

Hayward, M.D., Miles, T.P., Crimmins, M. and Yang, Y. (2000). 'The significance of socio-economic status in explaining racial gaps in chronic conditions'. American Sociological Review **65** (6): 910-930.

Heath, A and McMahon, D (1997). 'Education and occupational attainments: The impact of ethnic origins', in V. Karn (ed) *Ethnicity in the 1991 Census:* Volume 4: *Education, Employment and Housing among the Ethnic Minority Populations of Britain.* London: Office for National Statistic.

Heath, A., McMahon, D., and Roberts, J. (2000). 'Ethnic differences in the labour market: a comparison of the samples of anonymized records and Labour Force Survey'. Journal of the Royal Statistical Society (Series A) **163** (3): 341-361.

Heim, D., Hunter, S.C., Ross, A.J., Bakshi, N., Davies, J.B., Flatley, K., and Meer, N. (2004). 'Alcohol consumption, perceptions of community responses and attitudes to service provision: results from a survey of Indians, Chinese and Pakistani young people in greater Glasgow, Scotland, UK. Alcohol & Alcoholism **39** (3): 220-226.

Hills, J., Brewer, M., Jenkins, S., Lister, R., Machin, S., Mills, C., Modood, T., Rees, T., and Riddell, S. (2010). *An anatomy of economic inequality in the UK: Report of the National Equality Panel.* Government Equalities Office: Centre for Analysis of Social Exclusion. Available from: http://eprints.lse.ac.uk/28344/1/CASEreport60.pdf [Access and cited 27 June, 2011].

Hooyman, N.R. and Kiyak, H.A. (2005). *Social gerontology: A multidisciplinary perspective.* Boston: Allyn and Bacon.

House, J.S., Kessler, R.C., Herzog, A.R., Mero, R. P., Kinney, A.M. and Breslow, M.J. (1990). 'Age, socioeconomic status and health'. Milbank Quarterly **68** (3): 383-411.

Howard, G., Anderson, R. T., Russell, G., Howard, V.J. and Burke, G.L. (2000). 'Race, socio-economic status, and cause-specific mortality'. Annals of Epidemiology **10** (4):214-223.

Holland, P., Berney, L., Blane, D., Davey Smith, G., Gunnell, D.J., and Montgomery, S.M. (2000). 'Life-course accumulation of disadvantage: childhood health and hazard exposure during childhood.' Social Science and Medicine **50**(9): 1285-1295.

Huisman, M., Kunst, A., Anderson, O., Bopp, M., Borgan, J.K., Borrell, C., Costa, G., Deboosere, P., Desplanques, G., Donkin, A., Gadeyne, S., Minder, C., Regidor, E., Spadea, T., Valkonen, T. and Mackenbach, J.P. (2004). 'Socio-economic inequalities in mortality among elderly people in 11 European populations'. Journal of Epidemiology Community Health **48**: 468-475.

Huisman, M., Kunst, A., and Mackenbach, J.P. (2003). 'Socio-economic inequalities in morbidity among the elderly: a European overview'. Social Science and Medicine **57** (5): 861-873.

Hyde, M. and Jones, I.R. (2007). 'The long shadow of work? Does time since the labour market exit affect the association between socio-economic position and health in post working population'? Journal of Epidemiology Community Health **61** (6): 532 -538.

Jacobson, B. (2000). 'Tackling inequalities in health and healthcare – the role of the NHS' in D. Gordon, M. Shaw, D. Dorling, and G. Davey Smith (eds) *Inequalities in Health: the evidence presented to the Independent Inquiry into Inequalities in Health, chaired by Sir Donald Acheson*. Bristol: The Policy Press.

Jarvis, M.J. and Wardle, J. (2006). 'Social pattering of individual health behaviours: the case of cigarette smoking'. In The Social Determinants of Health. Marmot, M. and. Wilkinson, R.G (eds.) Oxford: University Press, pp. 224-237.

Jarvis M.J, Wardle J, Waller J, Owen L. (2003). 'Prevalence of hardcore smoking in England, and associated attitudes and beliefs: cross sectional study'. British Medical Journal **326** (7398): 1061.

Kaplan, G. and Baron-Epel, O. (2003). 'What lies behind the subjective evaluation of health status'? Social Science and Medicine **56**: 1669–1676.

Karlsen, S. and Nazroo, J.Y. (2002a). 'Agency and structure: the impact of ethnic identity and racism on the health of ethnic minority people'. Sociology of Health and Illness **24** (1): 1-20.

Karlsen, S. and Nazroo, J.Y. (2002b). 'Relation between racial discrimination, social class, and health among ethnic minority groups'. American Journal of Public Health **29** (4): 624-631.

Kelaher, M., Paul, S., Lambert, H., Ahmad, W. and Davey Smith, G. (2008). The impact of different measures of socioeconomic position on the relationship between ethnicity and health. Annals of Epidemiology **18** (5): 351-356.

Kelaher, M., Paul, S., Lambert, H., Ahmad, W. and Davey Smith, G. (2009). The applicability of measures of socioeconomic position to different ethnic groups within the UK. The International Journal for Equity in Health **8** (4): 01-08.

Kenway, P., and Palmer, G., (2007). Poverty among ethnic groups: How and why does it differ? New Policy Institute. Joseph Roundtree Foundation [Online] Available from: http://www.jrf.org.uk/bookshop/eBooks/2042-ethnicity-relative-poverty.pdf [Access and cited 02 November, 2008].

Kinsella, K. and Suzman. R. (1992). Demographic dimensions of population ageing in developing countries. American Journal of Human Biology **4** (1): 3-8.

Knapp. T.R. (1999). *Quantitative Nursing Research.* Thousand Oaks: London

Knesebeck, O.V.D., Lűschen, G., Cockerham, W.C. and Siegrist, J. (2003). 'Socio-economic status and health among the aged in the United States and Germany: A comparative cross-sectional study'. Social Science and Medicine **57** (9): 1643-1652.

Knesebeck, O.V.D., Wahrendorf, M., Hyde, M., and Siegrist, J. (2007). 'Socio-economic position and quality of life among older people in 10 European countries: results of the SHARE study'. Ageing and Society **27:** 269-284.
Knesebeck, O.V.D., Verde, E. P., and Drangano, N. (2006). 'Education and health in 22 European countries'. Social Science and Medicine **63:** 1344-1351.

Kriger, N. (2000). 'Discrimination and health'. In Berkmen, L. and Kawachi, I. (eds.) Social epidemiology. Oxford; Oxford University Press.

Krieger, N. (2001). 'Theories for social epidemiology in the 21st century: an ecosocial perspective'. International Journal of Epidemiology **30**: 668-677.

Kud, D., Ben-Shlomo, Y., Lynch, J., Hallqvist, J. and Power, C. (2003). 'Life-course epidemiology.' Journal of Epidemiology and Community Health **57**: 778-783.

Kunst, A.E., Geurts, J.J. and van den Berg, J. (1995). 'International variation in socio-economic inequalities in self reported health'. Journal of Epidemiology and Community Health **49**: 117-123.

Kuper, H., Marmot, M. (2003). 'Intimations of mortality: perceived age of leaving middle age as a predicator of future health outcomes within the Whitehall ll study'. Age and Society **32**(2): 178-184.

Laaksonen, M., Rahkonen, O., Martikainen, P. and Lahelma, E. (2005). 'Socioeconomic position and self-rated health: The contribution of childhood socioeconomic circumstances, adult socioeconomic status, and material resources'. American Journal of Public Health. **95**(8): 1403-1409.

Lawlor, A. D., Ebrahim, S. and Davey Smith, G. (2005). 'Adverse socio-economic position across the life-course increases coronary heart disease risk cumulatively: findings from the British Women's Heart and Health Study.' Journal of Epidemiology and Community Health **59**: 785-793.

Lawlor, A. D., Ebrahim, S. and Davey Smith, G. (2004). 'Association between self-reported childhood socio-economic position and adult lung function: findings from the British Women's Heart and Health Study.' Thorax **59** (3): 199-203.

Lawlor, A.D., Frankel, S., Shaw, M.S., Ebrahim, S., and Davey Smith, G. 'Smoking and ill health: Does Lay epidemiology explain the failure of smoking cessation programs among deprived populations?' American Journal of Public Health **93** (2): 266-27

Lawton, J. (2003). 'Lay experience of health and illness: past research and future agendas'. Sociology of health and illness **25**: 23-40

Lehelma, E., Nartikainen, P., Rahkonen, O., Roos, E., and Saastamoinen, P. (2005). 'Occupational class inequalities across key domains of health: Results from the Helsinki Health Study'. European Journal of Public Health **15**(5): 504-510.

Lehelma, E., Arber, S., Kivela, K., Roos, E.(2003). Multiple roles and health among British and Finnish women: The influence of socioeconomic circumstances. In Arber, S. and Khlat, M. (Eds), *Social and Economic Patterning of Health among Women.* Committee for International Research in Demography. Paris: 117-202. [Online] Available from: http://www.cicred.org/Eng/Publications/Books/TunisHealthWomen/TunisLahelma.pdf [Access and cited 02 August, 2010].

Liao, Y., McGee, D.L. Kaufman, J.S., Cao, G., and Cooper, R.S. (1999). 'Socio-economic status and morbidity in the last years of life'. American Journal of Public Health **89**(4): 569-72.

Lievesley, N. (2010). The future ageing of the ethnic minority population of England and Wales. London: Runnymede and Centre for Policy on Ageing. [Online] Available from: http://www.cpa.org.uk/information/reviews/thefutureageingoftheethnicminoritypopulationofenglandandwales.pdf [Access and cited 24 June, 2011].

Lindstrom, M., Hanson, B. S., and Ostergren, P.O. (2001). 'Socioeconomic differences in leisure-time physical activity: the role of social participation and social capital in shaping health related behaviour'. Social Science & Medicine **52**: 441-451.

Lobmayer, P. and Wilkinson, R. (2000). 'Income, inequality and mortality in 14 developed countries'. Sociology of Health and Illness **22** (4): 401-414.

Lorant, V. and Bhopal, R.S. (2011). 'Ethnicity, socio-economic status and health research: insights from and implications of Charles Tilly's theory of Durable Inequality'. Available at: http://jech.bmj.com/content/early/2011/03/03/jech.2010.116418.full.pdf [Access and cited 5 April, 2011].

Lynch, J.W., Harper, S., Kaplan, G., and Davey Smith, G. (2005). 'Associations between income inequality and mortality among US States: the importance of time period and source of income data'. American Journal of Public Health **95** (8): 1424-1430.

Lynch, J. and Kaplan, G. (2000). 'Socio-economic position' in Berkman and Kawachi (eds.) *Social Epidemiology*. (Chap. 2:28) Oxford: University Press.

Lynch, J.W. Kaplan, G.A., and Salonen, J.T. (1997). 'Why do poor people behave poorly? Variation in adult health behaviours and psychological characteristics by stages of the socioeconomic life-course'. Social Science and Medicine **44** (6)**:** 809-1997.

Macintyre, S. (1997). 'The Black Report and beyond what are the issues?' Social Science and Medicine **44**(6): 723-745.

Macintyre, S., Ellaway, A., Der, G., Ford, G., and Hunt, K. (1998). 'Do housing tenure and car access predict health because they are simply markers of income or self esteem?' A Scottish study. Journal of Epidemiology and Community Health **52**:657-664.

Macintyre, S., McKay, L., Der, G., and Hiscock, R. (2003). 'Socio-economic position and health: what you observe depends on how you measure it'. Journal of Public Health Medicine **25**(4): 288-294.

McKeigue P, Kami F. (1993). 'Alcohol consumption and alcoholism-related problems in Afro-Caribbean's and South Asians in the United Kingdom'. Alcohol and Alcoholism **28: 1**-10.

Mackenbach, J. (2005). 'Genetics and health inequalities: hypotheses and controversies'. Journal of Epidemiology and Community Health **59**: 268-73.

Mackenbach, J., and Kunst, A.E. (1997). 'Measuring the magnitude of socio-economic inequalities in health: an overview of available measures illustrated with two examples from Europe'. Social Science and Medicine **44** (6): 757-771.

Macleod, J., Davey Smith, G., Metcalfe, C. and Hart, C. (2005). Is subjective social status a more important determinant of health than objective social status? Evidence from a prospective observational study of Scottish men. Social Science and Medicine **6:** 1916-1929.

Manor, O., Matthews, S., and Power, C. (2001). 'Self-rated health and limiting longstanding illness: inter-relationships with morbidity in early adulthood'. International Journal of Epidemiology **30** (3)**:**600-607.

Manor, O., Matthews, S., and Power, C. (1997). 'Comparing measures of health inequality'. Social Science and Medicine **45** (5): 761-771.

Marmot, M.G., Smith, G.D., Stansfield, S., Patel, C., North, F., Head, J., White, I., Bunner, E., and Feeney, A. (1991) 'Health inequalities among British civil servants: the Whitehall ll study'. The Lancet **337**:1397-93.

Marmot, M.G., Bosma, H., Hemmingway, H., Brunner, E., and Stansfeld, S. (1997). 'Contribution of job control and other risk factors to social variation in coronary heart disease incidence'. The Lancet **350**:235-239.

Marmot, M.G., et al. (2009). Tackling health inequalities 10 years on. [Online] Available from: http://www.marmotreview.org/AssetLibrary/resources/new%20external%20reports/DH%20-%2010%20years%20on.pdf [Access and cited 25 June, 2011]

Marmot, M.G., et al. (2010). Fair Society, Healthy lives: The Marmot Review. [Online] Available from: http://www.marmotreview.org/AssetLibrary/pdfs/Reports/FairSocietyHealthyLivesExecSummary.pdf [Access and cited 25 June, 2011]

Manthorpe, J., and Hettiaratchy, P. (1993). 'Ethnic minority elders in the UK'. International Review of Psychiatry **5** 171-178.

Martikainen, P., and Valkonen, T. (1999). ,Bias related to the exclusion of economically inactive in studies of social class differences in mortality'. International Journal of Epidemiology **28**: 899-904.

Maxim, P.S. (1999). *Quantitative research methods in social sciences.* Oxford: Oxford University Press.

McGrath, A., Crome, P., and Crome, I.B. (2005). 'Substance misuse in the older population'. Postgraduate Medical Journal **81**: 228-231.

McMunn, A., Breeze, E., Goodman, A., Nazroo, J., and Oldfield, Z. (2006). 'Social determination of health in older age'. In The Social Determinants of Health. Marmot, M. and. Wilkinson, R.G (eds.) Oxford: University Press.

Menzoli, L., Villari, P., M Pirone, G., and Boccia, A. (2007). 'Marital Status and Mortality in the Elderly: A Systematic Review and Meta-Analysis.' Social Science & Medicine **65** (1)**:** 77-94.

Modood, T., Berthound, R., Lakey, J., Nazroo, J., Smith, P., Virdee, S., and Beishon, S. (1997). *Ethnic Minorities in Britain: Diversity and Disadvantage.* Fourth National Survey of Ethnic Minorities. London: Policy Studies institute.

Morgan, R. (2005). Focus on older people: Older people and the labour market. [Online] Available from: http://www.statistics.gov.uk/downloads/theme_compendia/foop05/Olderpeople2005.pdf [Access and cited 15 July 2007]

Mouton, C.P. and Esparza, Y.B. (2002). Ethnicity and geriatric assessment. In Gallo, J.J., Fulmer, T., Paveza, G. J., and Reichel, W. Handbook of geriatric assessment (3rd Ed.) Jones and Bartlett: London.

Murphy, M., Glaser, K., and Grundy, E. (1997). 'Marital status and long-term illness in Great Britain'. Journal of Marriage and the Family **59**: 156-164.

Naess, Ø., Claussen, B., Thelle, D.S. and Davey Smith, G. (2004). 'Cumulative deprivation and cause specific mortality. A census based study of life-course influences over three decades'. Journal of Epidemiology and Community Health **58**: 599-603.

Nandi, A., and Platt, L. (2010) Ethnic minority women's poverty and economic well being. Institute for Social and Economic Research, University of Essex. [Online] Available from: http://www.equalities.gov.uk/pdf/14328%20GEO%20EM%20Womens%20Poverty%204th.pdf [Access and cited 27 June 2011]

Natarajan, L. (2006). Self-reported health and psychosocial wellbeing. In: K. Sproston and J. Mindell (Eds.). *Health Survey for England 2004. Volume 1.* London: HMSO.

National Health Services (2008). *Stop Smoking Services.* . [Online] Available from: http://www.ic.nhs.uk/statistics-and-data-collections/supporting-information/health-and-lifestyles-supporting-information/nhs-stop-smoking-services/stop-smoking-services-quarterly-monitoring-return-2008-09 [Access and cited 23 July, 2011]

Nazroo, J.Y. (1997). *Health of Britain's ethnic minorities: Finding from a National Survey.* London: Policy Studies Institute.

Nazroo, J.Y. (2001). *Ethnicity, class and health*. London: Policy Studies Institute.

Nazroo, J. Y. (2003). 'The structuring of ethnic inequalities in health: economic position, racial discrimination, and racism.' American Journal of Public Health **93**(2): 277-284.

Nazroo, J.Y. (2004). 'Ethnic disparities in ageing health: what can we learn from the United Kingdom?' in N. Anderson, R. Bulatao and B. Cohen (eds.) *Critical perspective on racial and ethnic differentials in health in late life*. Washington DC: National Academy Press.

Nazroo, J. Y., and Williams, D.R. (2006). 'The social determination of ethnic/racial inequalities in health'. In The Social Determinants of Health. Marmot, M. and. Wilkinson, R.G (eds.) Oxford: University Press.

Nazroo, J.Y. (2006). 'Ethnicity and Old age'. In The Futures of Old Age. Vincent, J.; Phillipson, C. and Downs, M. (eds.), London: Sage Publications Ltd.

Nazroo, J., Jackson, J., Karlson, S., and Torres, M. (2007). 'The Black diaspora and health inequalities in the US and England: does where you go and how you get there make a difference'? Sociology of Health and Illness **29**(6): 811-830.

Oakes, J. M. and Rossi, P.H. (2003). 'The measurement of SES in health research: current practice and steps toward a new approach'. Social Science and Medicine **56:** 769-784.

Office for National Statistics (ONS) (2010) Alcohol-related deaths in the United Kingdom. [Online] Available at: http://www.statistics.gov.uk/pdfdir/alc0110.pdf [Access and cited 14 May, 2010]

Office for National Statistics (ONS) (2010) Focus on older people. [Online] Available at: http://www.statistics.gov.uk/focuson/olderpeople [Access and cited 2 March, 2010]

Office for National Statistics (ONS) (2008) Health: Life expectancy continues to rise. [Online] Available at: http://www.statistics.gov.uk/cci/nugget.asp?ID=168 [Access and cited 19 February, 2009]

Office for National Statistics (ONS) (2001) Focus on older people and ethnic minorities. [Online] Available at: http://www.statistics.gov.uk/focuson/ethnicity [Access and cited 20 July, 2008]

Offices for National Statistics (ONS) (2007) Variations persist in life expectancy by social class. [Online] Available at: http://www.statistics.gov.uk/pdfdir/le1007.pdf [Access and cited 20 September, 2009]

Office for National Statistics (ONS) (2007). Statistics on Alcohol: England 2007. [Online] *The National Health Services Information Centre for Health and Social Care*. Available at: http://www.ic.nhs.uk/webfiles/publications/alcoholeng2007/Statistics%20on%20Alcohol-England%202007v6.pdf [Access and cited 4 April, 2011]

Office for National Statistics (ONS) (2009). Statistics on Alcohol: England 2009. [Online] *The National Health Services Information Centre for Health and Social Care*. Available at: http://www.ic.nhs.uk/webfiles/publications/alcoholeng2009/Final%20Format%20draft%202009%20v7.pdf [Access and cited 4 April, 2011]

Office for National Statistics (2005). 'Sex differences in mortality, a comparison of the UK and other developed countries.' Health Statistics Quarterly. Summer 2005

Office of National Statistics (2011). Population estimates by ethnic group for England and Wales for 2002 – 2009. [Online] Available from: http://www.statistics.gov.uk/pdfdir/eth0511.pdf [Access and cited 25 June, 2011]

Olshansky, S. J., and Ault, A. B. (1986). 'The Fourth Stage of the Epidemiologic Transition: The Age of Delayed Degenerative Diseases'. Milbank Quarterly **64**: 355–391.

Omran, A.R. (2005). 'The epidemiologic transition: a theory of the epidemiology of population change'. The Milbank Quarterly **49** (4): 731-757.

O'Reilly, D. (2002). 'Standard indicators of deprivation: do they disadvantage older people? Age and Society **31**(3):197-202.

Orford, J., Johnson, M., and Purser, B. (2004). 'Drinking in second generation Black and Asian communities in the English Midlands'. Addiction Research and Theory. **12**(1): 11-30.
Pandya, H., Chan, M., and Mill, N. (2005). Focus on older people: Housing [Online] Available from: http://www.statistics.gov.uk/downloads/theme_compendia/foop05/Olderpeople2005.pdf [Access and cited 15 July 2007]

Pfeffermann, D., Skinner, C.J., Holmes, D.J., Goldstein, H., and Rasbash, J. (1998). 'Weighting for unequal probabilities in multilevel models'. Journal of the Royal Statistical Society **60** (1): 23-40.

Platt, L. (2007a). Poverty and ethnicity in the UK. Joseph Roundtree Foundation [Online] Available from: http://www.jrf.org.uk/bookshop/eBooks/2006-ethnicity-poverty-UK.pdf [Access and cited 02 November, 2008].

Platt, l. (2007b). 'Making education count: the effects of ethnicity and qualifications on intergenerational social class mobility'. The Sociological Review **55** (3): 485-508.

Platt, L. (2005a). 'The intergenerational social mobility of minority ethnic groups'. Sociology **39:** (3)**:** 445-461.

Platt, L. (2005b). *Migration and social mobility: The life chances of Britain's minority ethnic communities*. Bristol: The Policy Press

Power, C., Matthews, S., and Manor, O. (1998). 'Inequalities in self-rated health: explanations from different stages of life'. The Lancet **351:** 1009-1013.

Prandy, K. (1998). 'Deconstructing classes: critical comments on the revised social classification'. Work, Employment and Society **12**: 743-753.

Read, J.G., and Gorman, B.K. (2006). 'Gender inequalities in US adult health: The interplay of race and ethnicity'. Social Science and Medicine **62** (12): 1045-1065.

Roos, N.P. and Havens, B., (1991). 'Predicators of successful: a twelve-year study of Manitoba elderly'. American Journal of Public Health **81**(1): 63-68.

Rose, D., and Pevalin, D.J. (2000). Social class differences in mortality using the National Statistics Socio-economic Classification – too little, too soon: a reply to Chandola. Social Science and Medicine **51** (7): 1121-1127.

Rose, D., and Pevalin, D.J. (with O'Reilly, K) (2005). The National Statistics Socio-economic Classification: Origins, development and use. [Online] Available from: http://www.statistics.gov.uk/methods_quality/ns_sec/downloads/NS-SEC_Origins.pdf [Access and cited 2 October, 2009]

Rose, D., and O'Reiley, K. (1998). The ESRC review of Government Social Classifications. London and Swindon: ONS and ESRC. [Online] Available from: http://www.statistics.gov.uk/downloads/theme_compendia/ESRC_Review.pdf [Access and cited 30 October, 2009]

Rueda, S. and Artazcoz, L. (2009). 'Gender inequality in health among elderly people in a combined framework of socioeconomic position, family characteristics and social support'. Ageing and Society **29**: 625-647.

Sacker, A., Clarke, P., Wiggins, R.D., and Bartley, M. (2005). 'Social dynamics of health inequalities: a growth curve analysis of ageing and self-assessed health in the British household panel survey 1991-2001'. Journal Epidemiology Community Health **59:** 495-501.

Salas, C. (2002). 'On the empirical association between poor health and low socioeconomic status at old age'. Health Economics **11:** 207-220.

Salway, S., Platt, L., Chowbey, P., Harriss, K., and Bayliss E. (2007). Long-term ill health, poverty and ethnicity. Joseph Roundtree Foundation [Online] Available from: http://www.jrf.org.uk/publications/long-term-ill-health-poverty-and-ethnicity [Access and cited 02 November, 2008].

Salway, S., Nazroo, J., Mir, G., Craig, G., Johnson, M., and Gerrish, K. (2010). Fair Society, healthy lives: a missed opportunity to address ethnic inequalities in health. [Online] Available from: http://www.bmj.com/content/340/bmj.c684/reply#234369 [Access and cited 27 June, 2011].

Schoenborn, C.A. (2004). Marital status and health: United States, 1999-2002. [Online] Available from: http://www.cdc.gov/nchs/data/ad/ad351.pdf [Access and cited 15 July, 2010].

Shavers, V. L. (2007). 'Measurement of socioeconomic status in health disparities research'. Journal of the National Medical Association **99**(9): 1013-1023.

Shaw, M., Dorling, D., Gordon, D., and Davey Smith, G. (2000). *The widening gap: health inequalities and policy in Britain.* Bristol: The Policy Press.

Shaw, M., Dorling, D., Gordon, D., and Davey Smith, G. (2003). 'Poverty, social exclusion, and minorities' in M. Marmot and R.G. Wilkinson (eds.) *The Social Determinants of Health*. Oxford: University Press.

Singh-Manoux, A., Ferrie, J.E., Chandola, T. and Marmot, M. (2004). 'Socio-economic trajectories across the life-course and health outcomes in midlife: evidence for the accumulation hypothesis?' International Journal of Epidemiology **33**(5): 1072-1079.

Smaje, C. (1995). Health, race and ethnicity. London: King's Fund Institute.

Smith, J. P., and Kingston, R. (2004). 'Race, socio-economic status, and health in late life.' [Online] Available from: http://129.3.20.41/eps/hew/papers/0403/0403001.pdf [Access and cited 15 June 2007]

Smith, J. P. (1997). 'Demographic and economic correlates of health in old age.' Demography **34**(1): 159-170.

Smith, N. and Middleton, S. (2007). 'A review of poverty dynamics research in the UK. Joseph Roundtree Foundation [Online] Available from:
http://www.crsp.ac.uk/downloads/publications/poverty_dynamics.pdf
[Access and cited 02 November, 2008].

Sorensen, H.T., Sabroe, S. and Olsen, J. (1996). 'A framework for evaluation of secondary data source for epidemiological research'. International Journal of Epidemiology **125**(2): 435-442.

Sproston, K. and Mindell, J. (2006). 'The Health Survey for England'. *The health of minority ethnic groups*. Vol. 1 and 2: London: HMSO.

Stafford, M. and McCarthy, M. (2006). 'Neighbourhoods, housing, and health' in M. Marmot and R.G. Wilkinson (eds.) *The Social Determinants of Health*. Oxford: University Press.

Stuck, A.E., Walthert, J.M., Nikolaus, T., Bula, C.J., Hohmann, C. and Beck, J.C. (1999). 'Risk factors for functional status decline in community-living elderly people: a systematic review'. Social Science and Medicine **48**: 445-469.

Sundquist, J. (1995). ' Ethnicity, social class and health: A population-based study on the influence of social factors on self-reported illness in 223 Latin American refugees, 333 Finnish and 126 South European labour migrants and 181 Swedish controls'. Social Science and Medicine **40** (6): 777-789.

Szczepura, A. (2005). 'Access to healthcare for ethnic minority populations'. Postgraduate Medical Journal **81**: 141-147.

Tomassini, C. (2005). Focus on older people: Demographic profile. [Online] Available from: http://www.statistics.gov.uk/downloads/theme_compendia/foop05/Olderpeople2005.pdf [Access and cited 15 July 2007]

Townsend, P., Davidson, N. and Whitehead, M. (1988). *Inequalities in health: The Black Report*. Harmonsworth: Penguin.

Townsend, P. and Gordon, D. (1991). 'What is enough? New evidence on poverty allowing the definition of a minimum benefit' in M. Adler, C. Bell, J. Clasen and C. Sinfield (eds). *The Sociology of Social Security.* Edinburgh: Edinburgh University Press.

Twigg, L., Moon, G., and Walker, S. (2004). *The smoking epidemic in England. The Health Development Agency*: [Online] Available at: http://www.ealingpct.nhs.uk/Library/JSNA/JSNA_June_2008_Data/023_Smoking_epidemic_HDA_2004.pdf [Access and cited 14 September, 2010].

UK Poverty Site (2008). *Numbers in low income.* [Online] Available from: http://www.poverty.org.uk/01/index.shtml [Access and cited 15 June, 2009]

Vågerö, D., and Illsley, R. (1995). 'Explaining health inequalities: Beyond Black and Barker.' European Sociological Review **11**(3): 219-40

Van Rossum, C.T.M., Van De Mheen, H., Mackenbach, J., and Grobbee, D. (2000). 'Socio-economic status and mortality in Dutch Elderly people'. European Journal of Public Health **10** (4):255-61.

Virdee, S. (1997). Racial harassment. In T.Modood, R. Berthoud, J. Lakey, P. Smith, S. Virdee, & S. Beishon (Eds.), *Ethnic Minorities in Britain: Diversity and Disadvantage.* (pp. 259-289). London: Policy Studies Institute.

Waldron, I., Hughes, M.E. and Brooks, T.L. (1996). 'Marriage protection and marriage selection–prospective evidence for reciprocal effects of marital status and health'. Social Science and Medicine **43**: 113-123.

Waldron, I., Weiss, C., Hughes, M.E. (1997). 'Marital status effects on health: are there differences between never married women and divorced and separated women?' Social Science and Medicine **45** (9): 1387-1397.

Walker, R.B. and Luszcz, M.A. (2009). 'The health and relationship dynamics of late-life couples: a systemic review of the literature'. Ageing and Society **29**: 455-480.

Wamala, S., Ahnquist, J. and Månsdotter, A. (2009). 'How do gender, class and ethnicity interact to determine health status'? Journal of Gender Studies **18** (2): `115-129.

Wannamethee, S.G. and Shaper, A.G. (1997). 'Socio-economic status within social class mortality: a prospective study in middle-aged British men'. International Journal of Epidemiology **26** (3): 532-541.

Wanless, D. et al., (2004). *Securing good health for the whole population.* HMSO, London: [Online] Available from: http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_4076134.pdf [Access and cited 27 June, 2010]

Wanless, D., Forder, J., Ferna`ndez, J-L., Poole, T., Beesley, L., Henwood, M. and Moscone, F. (2006). *The Wanless social care review: securing good care for older people – taking a long-term view*. [Online] Available from: http://www.kingsfund.org.uk/publications/securing_good.html [Access and cited 24 July, 2011].

Wardle, H. (2006). *The Health Survey for England.* The use of tobacco products. Vol. 1 and 2: London: HMSO.

Wandsworth, M. E. J. (1997). 'Health inequalities in the life-course perspective.' Social Science and Medicine **44** (6): 859-869.

Warnes, A.M. and Williams, A. (2006). Older migrant in Europe: A new focus for migration studies. Journal of Ethnic and Migration Studies **32** (8): 1257-1281.

Warnes, A.M., Friedrich, K., Kellaher, L., and Torres, S. (2004). 'The diversity and welfare of older migrants in Europe.' Ageing and Society **24**: 307-326.

Weich, S., Nazroo, J., Sproston, K., McManus, S., Blanchard, M., Erens, B., Karlsen, S., King, M., Lloyd, K. L., Stansfeld, S and Tyrer, P. (2004). 'Common mental disorders and ethnicity in England: the EMPIRIC Study'. Psychological Medicine **34**: 1543–1551.

Weich, S., Lewis, S.P., and Jenkins, S.P. (2003). 'Income inequality and self rated health in Britain'. J. Epidemiology Community Health **56**: 436-441.

White, M., Bush, J., Kai, J., Bhopal, R and Rankin, J. (2006). 'Quitting smoking and experience of smoking cessation interventions amongst Bangladeshi and Pakistani adults: the views of community members and health professionals'. J. Epidemiology Community Health **60**: 405-411.

Whitehead, M., Drever, F., and Doran, T. (2005). 'Is the health of the long-term unemployed better or worse in high unemployed areas?' Health Statistic Quarterly **25:** 12-7.

Williams, R., Wright, W., and Hunt, K. (1998). 'Social class and health: The puzzling counter-example of British South Asians'. Social Science and Medicine **47** (9): 1277-1288.

Wilking, E., Johansson, S-E and Sundquist, J. (2004). 'Ethnicity, acculturation, and self-reported health. A population based study among immigrants from Poland, Turkey, and Iran in Sweden'. J. Epidemiology Community Health **58**: 574-582.

Windle, G., Burholt, V., and Edwards, R.T. (2006). 'Housing related difficulties, housing tenure and variations in health status: evidence from older people in Whales'. Health & Place **12**:267-278.

World Health Organisation: Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948. [Online] Available from: http://www.who.int/about/definition/en/print.html [Access and cited 15 May, 2008]

Zimmer, Z., Chayovan, N., Lin, H.S., and Natividad, J. (2003). 'How indicators of socio-economic status relate to physical functioning of older people in three Asian societies'. Research on Ageing **26**(2): 224-258.