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Understanding the risks of social exclusion across the life course: Older age

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Acknowledgements

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CONTENTS

List of figures

List of tables

EXECUTIVE SUMMARY

Social exclusion means being unable to access the things in life that most of society takes for granted. It's not just about having enough money. It is a build-up of problems across several aspects of people's lives (Age Concern 2009). Older people can face a range of problems which can be thought of as risk markers of social exclusion, for example low income, limited contact with other people, and poor health.

Previous studies have focused on singular risk markers of social exclusion. This study focused older people aged 60 and over, who experienced *multiple* risk markers, as evidence suggests that experiencing two or more risk markers of social exclusion can have severe negative implications and consequences for quality of life (Barnes *et al* 2006). The need to understand the experience of multiple risk markers in older age is very important, especially as Britain has a rapidly growing older population, with more pensioners than children recorded living in the UK in 2008.

This study was funded by the Social Exclusion Task Force, and was carried out by Elizabeth Becker and Richard Boreham of the National Centre for Social Research (NatCen). The main report presents the findings of this study. Key results are presented in this summary.

How is social exclusion measured?

The study uses 2004-05 data from the English Longitudinal Study of Ageing (ELSA), a survey broad in topic area, which can be used to measure patterns of multiple risk markers of social exclusion in depth. Nine years of the British Household Panel Survey (BHPS) were used in exploring the dynamics of social exclusion risk markers. The BHPS is less detailed when considering the measurement of social exclusion risk markers, but is rich in its longitudinal nature. In both data sources, social exclusion was measured using the risk markers outlined in the Bristol Social Exclusion Matrix (Levitas *et al*. 2007).

Who experiences risk markers of social exclusion?

Findings from this study showed that 50 per cent of all those aged 60 and older experienced multiple risk markers of social exclusion.[1] The older old (aged 80 years and over) were more likely to experience multiple risk markers than their younger counterparts (72% of those aged 80 and over, compared with 52% of those aged 70-79, and 41% of those aged 60-69 experienced multiple risk markers).

What are the combinations of multiple risk markers of social exclusion?

Older people who experienced multiple risk markers were not a homogenous group in terms of the problems they faced. Latent Class Analysis, a technique which sought to understand how risk

[1] Experiencing multiple risk markers of social exclusion was defined as having two or more of 16 measures created in the ELSA data. These 16 risk markers were based on those presented in the Bristol Social Exclusion Matrix (Levitas *et al* 2007).

markers grouped together, was used to identify different combinations of risk markers experienced by older people. [2]

Findings from this research suggest that:

- On average, 5% of older people experienced 5.1 risk markers of social exclusion out of 16, more than any other group.
  - Older people in this group were very likely to have poor access to services and to transport, were physically inactive, had a fear of their local area after dark, had low social support, and had poor general and emotional health.
  - Older people in this group were likely to be aged 80 and older, had no qualifications, and lived alone.
- 7% of older people experienced 3.7 risk markers of social exclusion on average.
  - Older people in this group were likely to experience poor general and emotional health, low social support, and had a fear of their local area after dark.
  - Older people in this group had no qualifications, and had a longstanding and limiting illness.
- 16% of older people experienced 3.2 risk markers of social exclusion on average.
  - Older people in this group experienced low relative income, had a fear of their local area after dark, and had low social support.
  - Older people in this group were likely to be female, aged 80 and older, lived alone, were unmarried, lived in a deprived area, and rented their home.
- 12% of older people experienced 2.7 risk markers of social exclusion on average.
  - Older people in this group had a fear of their local area after dark, and had poor literacy and numeracy skills.
  - Older people in this group were likely to live in a deprived area, and rented their home.
- 10% of older people experienced 2.5 risk markers of social exclusion on average.
  - Older people in this group had limited contact with others, and had low social support.
  - Older people in this group were likely to be unmarried.

How does social exclusion behave over time?

Nine years of BHPS data was used to explore the dynamics of multiple risk markers of social exclusion. Three combinations, in other words clusters, of multiple risk markers were studied over time[3]:

- a combination of low income and transport access risk markers,
- a combination of poor health and loneliness risk markers,
- a combination of low social support and loneliness risk markers.

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[2] Latent Class Analysis was used to identify clusters of multiple risk markers. Technical details of this analysis are presented in Annex B. A caveat to the Latent Class Analysis that should be borne in mind, is that it is driven by the 16 risk markers available in the ELSA data, and this to some extent determines the combinations of risk markers identified.

[3] These groups were identified through a Latent Class Analysis of BHPS data. The three clusters of multiple risk markers classified by the analysis were a somewhat compressed translation of those identified in the earlier analysis of ELSA data.

Analysis looked at how long older people experienced these combinations of multiple markers of risk. Over the nine years analysed, around two thirds (65%) of older people experienced a combination of multiple risk markers related to health and loneliness on at least one occasion, and around two thirds (64%) of older people experienced a combination of multiple risk markers associated with low income and poor transport access on at least one occasion. A larger proportion of older people (83%) experienced a combination of multiple risk markers associated with low social support and loneliness on at least one occasion.

The study focussed on older people that persistently had multiple risk markers, as these people were likely to have the lowest living standards. Older people who had a combination of low income and transport risk markers experienced this set of problems the longest. 28% of older people who faced this combination of risk markers, did so for at least seven years. 10% experienced this combination of risk markers for all nine years. Older people experiencing health and loneliness problems, or social support and loneliness problems experienced these combinations of multiple risk markers for a shorter duration [4].

The research also looked at whether older people moved from one combination of multiple risk markers to another. Older people who stopped experiencing a combination of health and loneliness risk markers, were likely to move out of this situation completely, rather than to a different combination of risk markers. Conversely, older people who moved from a combination of low income and transport risk markers, or a combination of low social support and loneliness risk markers, were more likely to move to a different situation of multiple risk markers, than to escape a situation of multiple risk altogether.

What triggers the experience of multiple risk markers of social exclusion?

In addition to exploring the behaviour of multiple risk markers over time, this study looked at the impact of life events between one year and the next, such as becoming retired. Getting divorced between one year and the next, or becoming widowed, were the only events that were significantly related to a change in situation from experiencing none or one risk marker of social exclusion to experiencing multiple risk markers. No life event triggered a change in situation from one combination of multiple risk markers to a different combination of multiple risk markers.

[4] The persistence of experiencing these forms of multiple risk markers is probably due to the persistence of these markers as individual measures of disadvantage, rather than of multiple risk markers per se.

1 Introduction

1.1 Conceptualising social exclusion

The concept of social exclusion arose from a concern that poverty was too one-dimensional as a measurement of disadvantage, and that there were other factors that should be taken into account when creating policy to improve the situation for those who are worse off in society. Poverty measurements cover the financial or economic dimension of exclusion, and broadening the definition from poverty to social exclusion has led people to consider the social, political and cultural aspects of disadvantage. The problem with defining and measuring social exclusion is determining which factors can be considered as risk markers of social exclusion and how they can be grouped meaningfully together into dimensions or domains. There are a number of different approaches to conceptualising social exclusion (Barnes, 2005; Berthoud, 2003; Barnes *et al*, 2002; Burchardt *et al*, 1999; Lessof and Jowell, 1999 are some of the more recent studies) and it is difficult to assess which methods of conceptualising social exclusion are more valid than others.

Levitas *et al* (2007) extended the discussion about definitions of exclusion to define an additional concept of deep exclusion, which essentially is experiencing a risk marker of social exclusion across more than one dimension or domain. The study examined the patterns of deep exclusion through an exploration of the combinations of the multiple risk markers of exclusion experienced by older people.

In addition to the problem of theoretically defining social exclusion, there are problems with its measurement. The choice of which risk markers of social exclusion to use is primarily driven by the data that is already available, whether survey data or from administrative records.

1.2 Measuring social exclusion

Social exclusion has been defined successfully elsewhere and a number of studies have attempted to measure and describe this important but complex concept (Levitas *et al*, 2007; Nolan and Whelan, 1996; Room, 1998). Helpfully, Levitas *et al* (2007) have created the Bristol Social Exclusion Matrix (B-SEM) which identifies ten domains of social exclusion, falling into three main themes: lack of resources, lack of participation in economic, social, cultural and political life and quality of life. This method of operationalising social exclusion, as with all other methods of this kind, makes certain assumptions about what can be considered to be the components of social exclusion as opposed to what are the risk markers and outcomes of social exclusion. For example, it could be argued that some of the subcomponents of social exclusion identified by Levitas *et al*, such as having a reduced income, being unemployed and having health problems (e.g. a stroke or a fall) can be considered to be drivers of social exclusion rather than components of it. Furthermore, other subcomponents, such as imprisonment, poor life satisfaction, and again health problems (e.g. asthma, depression), could be thought of as potential outcomes of being socially excluded.

The B-SEM is a hierarchical categorisation of exclusion consisting of three domains, 10 sub-domains, and 56 themes of which there are risk markers of social exclusion. The choice of risk markers in this analysis is limited by two factors, the coverage of risk markers in ELSA and the relevance of markers to older people (for example being employed is not as relevant for a population largely above retirement age).

Previously studies of social exclusion have been more difficult to compare. Levitas *et al* (2007, page 81) said of Barnes *et al* (2006) "Comparing these findings to other studies of social exclusion such as the Poverty and Social Exclusion Survey (Gordon *et al*, 2000; Pantazis *et al*, 2006) and SQOL OA (Survey of Quality of Life in Old Age) (Scharf *et al*, 2002) is problematic because the scoring mechanisms and cut-off thresholds employed in each study are different". All studies in this series have used the B-SEM in defining markers of risk. This means that findings in the older life stage can more easily be compared with other studies that use this framework.

This analysis covers 21 risk markers of social exclusion and 9 of the B-SEM sub-domains.

Table 1-1 Bristol Social Exclusion Matrix (B-SEM): risk markers of social exclusion covered in ELSA

Domain	Sub-domain	Risk marker of social exclusion	Covered
Resources	Material and economic resources	Relative low income	●
		Receipt of out of work benefits	
		Material deprivation	●
		Fuel Poverty	
		Not owning own home	●
		No pension wealth	●
		No wealth and savings	
		Debt	
		Subjective poverty	
	Access to public and private services	Poor access to services	●
		Poor access to transport	●
		No financial services	●
		No private services	
		Poor utilities	
	Social resources	Institutionalisation	
		Low social support	●
		Low contact with others	●
Participation	Economic participation	Cares for another person	●
		In employment	
		Living in a workless household	
		Undertaking unpaid work	
		Poor quality of working life	
	Social Participation	No participation in positive activities	
	Culture, education and skills	Poor functional literacy and numeracy	●
		School absences and exclusions	
		Not doing cultural, leisure activities	
		Not participating in cultural and sporting activities	
		No internet access	
		No qualifications	●
	Political and civic participation	Not voted in the last general election	●
Quality of life	Health and well-being	Poor self-reported general health	●
		Low participation in physical exercise	●

Domain	Sub-domain	Risk marker	Covered
	Health and well-being	Obesity	
		Limiting longstanding illness	●
		Poor emotional health	●
		Low well being	●
		Low personal efficacy	
		Long periods on benefits	
		Smoking	
		Drug use	
	Living environment	Bad housing	●
		Homelessness	
		Poor neighbourhood safety	
		Low area satisfaction	
		No sense of belonging	●
		Limited access to space	
	Crime, harm and criminalisation	Fear of area after dark	●
		Experience of crime	
		Hospital admissions	
		Domestic violence	
		Fear of crime	
		Bullying	
		Discrimination	
		Committed a crime	
		Imprisonment	
		Has an ASBO	

1.3 Using the English Longitudinal Study of Ageing to measure social exclusion

ELSA is funded by the National Institute on Ageing and a consortium of UK government funders led by the Office for National Statistics. It is designed and carried out through collaboration between University College London, the Institute for Fiscal Studies and the National Centre for Social Research.

The ELSA sample was originally drawn from households who responded to the Health Survey for England (HSE) in 1998, 1999 or 2001. Individuals were considered eligible to be core members of ELSA if they had been living in an HSE household, were 50 or over and were still living in a private residential address in England.

The first ELSA survey was carried out in 2002-3. ELSA is a longitudinal study and the design strategy is to collect data every two years – wave 2 was carried out in 2004-5, and wave 3 in 2006-7. This longitudinal design means that ELSA will aid understanding of how and why people's lives change as they grow older and in future, there will be many opportunities to look at the experiences of social exclusion over time. At the time of analysis for this study, the most recent and available wave of ELSA (wave 2) was used for cross-sectional analysis.

It is important to remember that ELSA was not designed specifically to measure social exclusion, although because of its multi-disciplinary nature, a number of questions that relate to social exclusion were included in the questionnaire including individual and household characteristics; physical, cognitive, mental and psychological health; housing, work, pensions, income and assets; expectations for the future; social participation and social support.

The main drawback of using ELSA is the coverage of the population of older people. Most surveys exclude people in institutions such as prisons and people who are homeless and even those that attempt to address it struggle to achieve representative samples of these populations. This is also true of ELSA, but for the population of older people, the bigger problem is to include older people who are in care homes. ELSA's original sample was drawn from a household sample, and although older people are followed if they move into a care home, response tends to be lower among this group, mainly due to respondents' abilities to take part in an interview. People in care homes are clearly a group marked by risk of social exclusion, and under-represented in this analysis, although it is arguable that policies and interventions aimed at this group would be different to those aimed at the older population living in households, and that therefore the care home population should be considered separately.

In summary, although there are some issues with the sample and topic coverage of ELSA, it is a rich data source and offers opportunities to explore and understand aspects of risk markers and social exclusion that would not be possible otherwise.

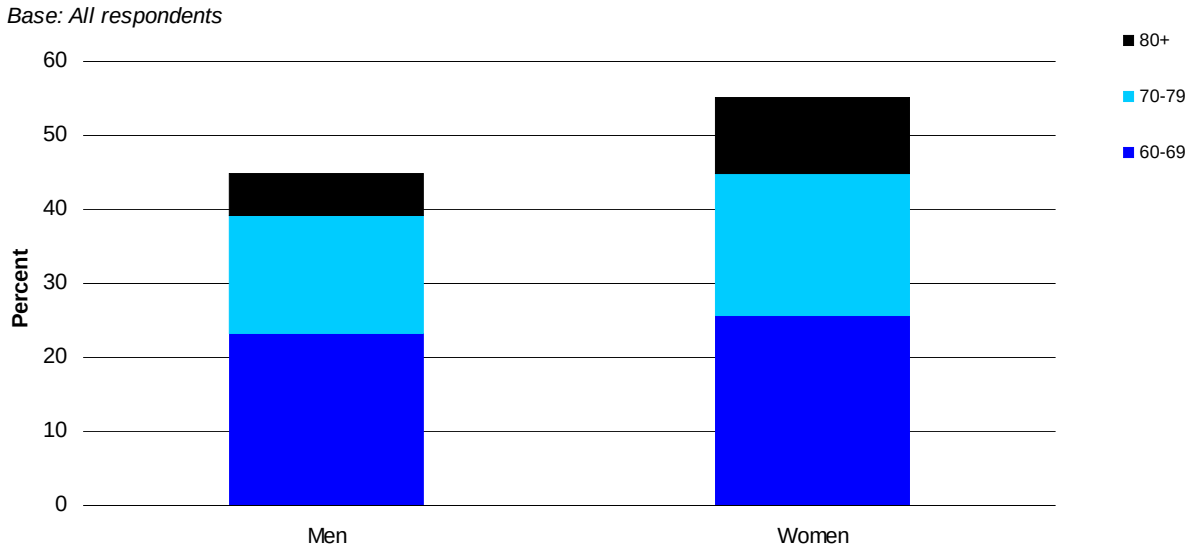
1.4 A profile of older people

This section describes some of the basic social, demographic, and economic characteristics of older people (defined in this report as people aged 60 years and over[5]). It is important to recognise that older people are a diverse population, and understanding this diversity matters when deciding how to prioritise policies that might affect different groups of older people.[6]

In total, 55% of older people were women and 45% men. Although the population is all those aged 60 and over, the sample was biased towards the younger old – 49% were aged 60-69, 35% were aged 70-79 and 16% were aged 80 and older. Women were more likely to be older than men (18% of women were aged 80+ compared with 13% of men), and this age differential may be a factor in some of the other differences in characteristics between men and women.

[5] Those aged 59 or less are explored in the associated report by Gordon, D., Fahmy,E., (2009) *Understanding social exclusion across the life course: Working age*, Cabinet Office.
[6] A full profile of the older population can be found in Banks, J., Breeze, E., Lessof, C., Nazroo, N., (eds) (2006) Retirement, health and relationships of the older population in England: The 2004 English Longitudinal Study of Ageing. Institute of Fiscal Studies, London.

Figure 1-1 Sex and age profile of the sample



Having significant relationships with partners or siblings are likely to be important to older people because of their effects on mortality and well-being (*Barnes et al 2006*). In total, 26% of older people lived alone, 22% were widowed and 26% had no living siblings, and there will obviously be some overlap between these groups.

Looking at differences within the sample of older people by sex, women are more likely than men to live alone (35% compared with 15%), to be widowed (66% compared with 27%), to have a low income[7] (39% compared with 26%) and for their main activity to be looking after the home (60% compared with 32%). Thus among older people, women's lives are different to men's lives and this may be reflected in their experience of risk markers of social exclusion.

The other important factor to consider is age, particularly comparing the situation and experiences of the younger old (60-69) to the older old (80+). Comparing these two groups, the older old were more likely to be living alone (54% compared with 16%), were more likely to be widowed (58% compared with 8%) and more likely to have no living siblings (45% compared with 20%), and more likely to have a low income (36% compared with 13%).

Looking at how the diverse groups within older people experience different types of markers of risk is important in terms of being able to target interventions and policies at those who would most benefit from them, and this will be explored in section 1.6.

[7] Low income was defined as being in the lowest quintile of income.

1.5 Creating risk markers of social exclusion in ELSA

In order to understand social exclusion and how it affects older people, we have used the framework of Levitas *et al*'s (2007) B-SEM, and have identified markers of risk that fit into the sub-domains and domains of the B-SEM, and that were considered relevant and appropriate to older people. The definition of risk markers of social exclusion is obviously restricted by the questions contained within ELSA.

It should be noted that reported prevalence of risk markers of social exclusion are to some extent determined by the definitions of these markers as well as the number of markers used. Clearly the lower the threshold of risk, then the more people become defined as marked by risk. Similarly, the more risk markers used in the analysis, the more likely people will be defined as experiencing *multiple* markers of risk.

Risk markers of social exclusion were defined as binary variables (marked by risk or not marked by risk) as this type of variable was required for the Latent Class Analysis, detailed later in this report. Where possible, risk markers were derived in line with government indicators.

Where there were no government indicators, decisions about where to set a threshold were to some extent arbitrary. If there was a natural place to define marker of risk (such as having or not having something), then this was taken as the definition. Where there were a number of answer categories on a question, or multiple questions used to create a scale then where possible thresholds were defined such that prevalence of risk markers was in the range 15%-20%, as this was the approximate range covered by government indicators.

Table 1-2 Risk markers

Material and economic resources

Risk Marker	Prevalence	Govt Indicator	Definition
Relative low income	23%	PSA17	Household income is less than 60 percent of contemporary median income, before housing costs are deducted, and equivalised using the Modified OECD scale.
Material deprivation	5%	OA3	Possess three or fewer of the following: central heating, freezer or fridge freezer, washing machine, microwave oven, telephone, home computer, access to internet at home.
Not owning own home	28%		Living in accommodation which is shared ownership, rented, rent-free, or squatting, or buying with the help of a mortgage.
No pension wealth	5%	OA22	Based on the IFS model-based estimates of pension wealth, which are broken down into state pension and private pension. A person is deemed marked by risk if their total pension wealth is zero.

Access to public and private services

Risk Marker	Prevalence	Govt Indicator	Definition
Poor access to services	13%	OA7	Difficult or very difficult to access at least two of the following services: bank or cash point, chiropodist, dentist, GP, hospital, local shops, optician, post office, shopping centre, supermarket
Poor access to transport	6%	OA8	No access to a car and who never or rarely use public transport.
No financial services	3%		None of: Current account Savings account Tessa Isa Premium bonds National savings account, PEP, Stocks and/or shares, Share Options/Employee share ownership, Share club, Unit or investment trusts, 'Bonds and Gilts, Other savings and investments.

Social resources

Risk Marker	Prevalence	Govt Indicator	Definition
Low social support	17%		Scored less than six on the derived social support scale
Low contact with others	9%	OA6	Face-to-face, phone, or written contact two times a year or less with children, family, or friends.

Economic participation

Risk Marker	Prevalence	Govt Indicator	Definition
Cares for another person	13%		Caring for another person, including partner or other person in or out of the household.

Culture, education and skills

Risk Marker	Prevalence	Govt Indicator	Definition
Poor functional literacy and numeracy	17%		Performed poorly on both wave 2 literacy and wave 1 numeracy tests
No qualifications	45%		

Political and civic participation

Risk Marker	Prevalence	Govt Indicator	Definition
Not voted in the last general election	14%		

Health and well-being

Risk Marker	Prevalence	Govt Indicator	Definition
Poor self-reported general health	7%		Self-reported general health is 'Poor'
Low participation in physical exercise	6%	OA16	Do mildly energetic sports and activities rarely or never.
Limiting longstanding illness	36%		
Poor emotional health	11%		Score at least 4 of the Center for Epidemiologic Studies Depression Scale (CES-D) symptoms
Low well being	20%		Score low on the CASP-19 scale, which measures the following four elements of well-being: Control; Autonomy; Self-realisation; Pleasure

Living environment

Risk Marker	Prevalence	Govt Indicator	Definition
Bad housing	16%		Have at least 1 of the following housing problems: Shortage of space; Too dark; Rising damp; Water from roof etc.; Condensation; Electrical problems; General rot and decay; Insects, mice or rats; Too cold in winter.
No sense of belonging	7%		Feel to some extent that they do not belong in the area they live.

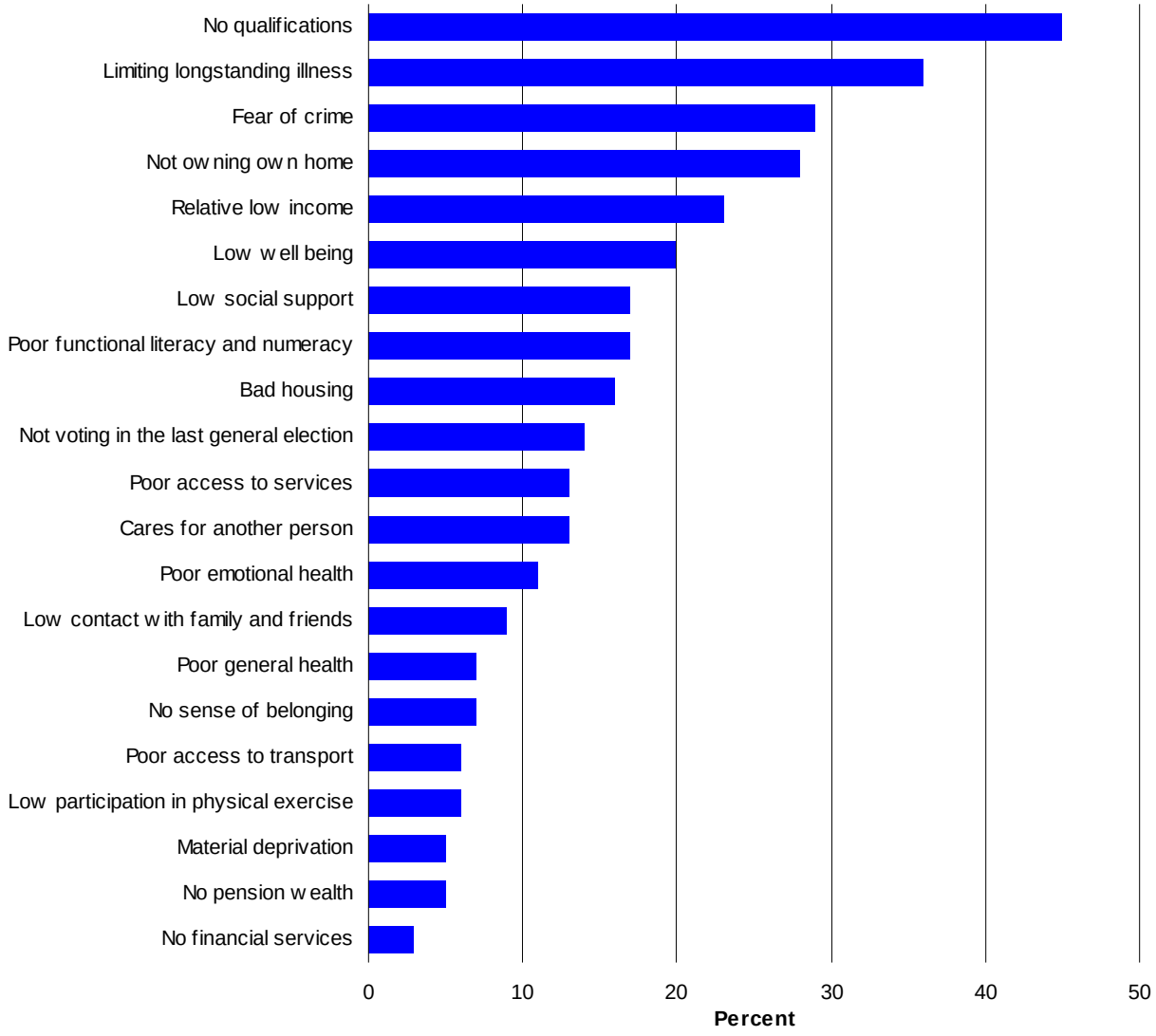
Crime, harm and criminalisation

Risk Marker	Prevalence	Govt Indicator	Definition
Fear of area after dark	29%		Think to some extent that people would be afraid to walk alone in their area after dark.

Lack of qualifications was the most prevalent risk marker (45%), followed by having a longstanding limiting illness (36%), fear of area after dark (29%) and not owning a home (28%). The least prevalent risk markers were all linked to money, namely access to financial services (3%), lack of pension wealth (5%) and material deprivation (5%).

Figure 1-2 Prevalence of risk markers of social exclusion

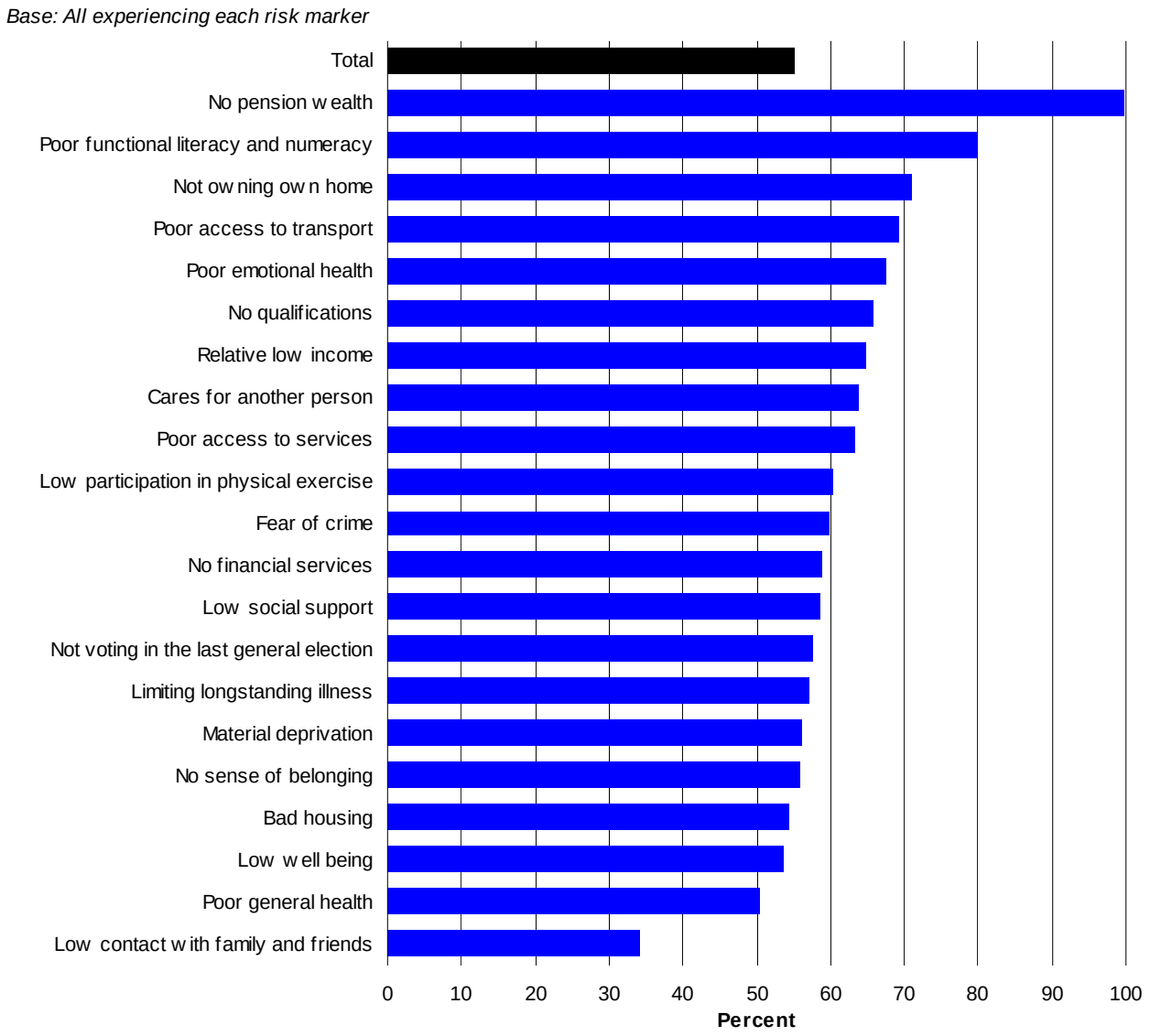
Base: All respondents



1.6 Segmenting older people according to singular markers of risk

As there were different characteristics of women and the older old within the group of older people, this section on segmentation focuses on these two groups. The age and sex profile of those experiencing each risk marker of social exclusion can be compared to that of the whole sample. The greatest disparity between men and women was with regards to pension wealth, where virtually all those who were marked by risk on pension wealth were women. In contrast men were more likely to be marked by risk in terms of contact with family or friends. Overall women experienced more risk markers than men, but there weren't necessarily consistent patterns within domains – for example women were more likely to have poor emotional health, but were less likely to have poor general health.

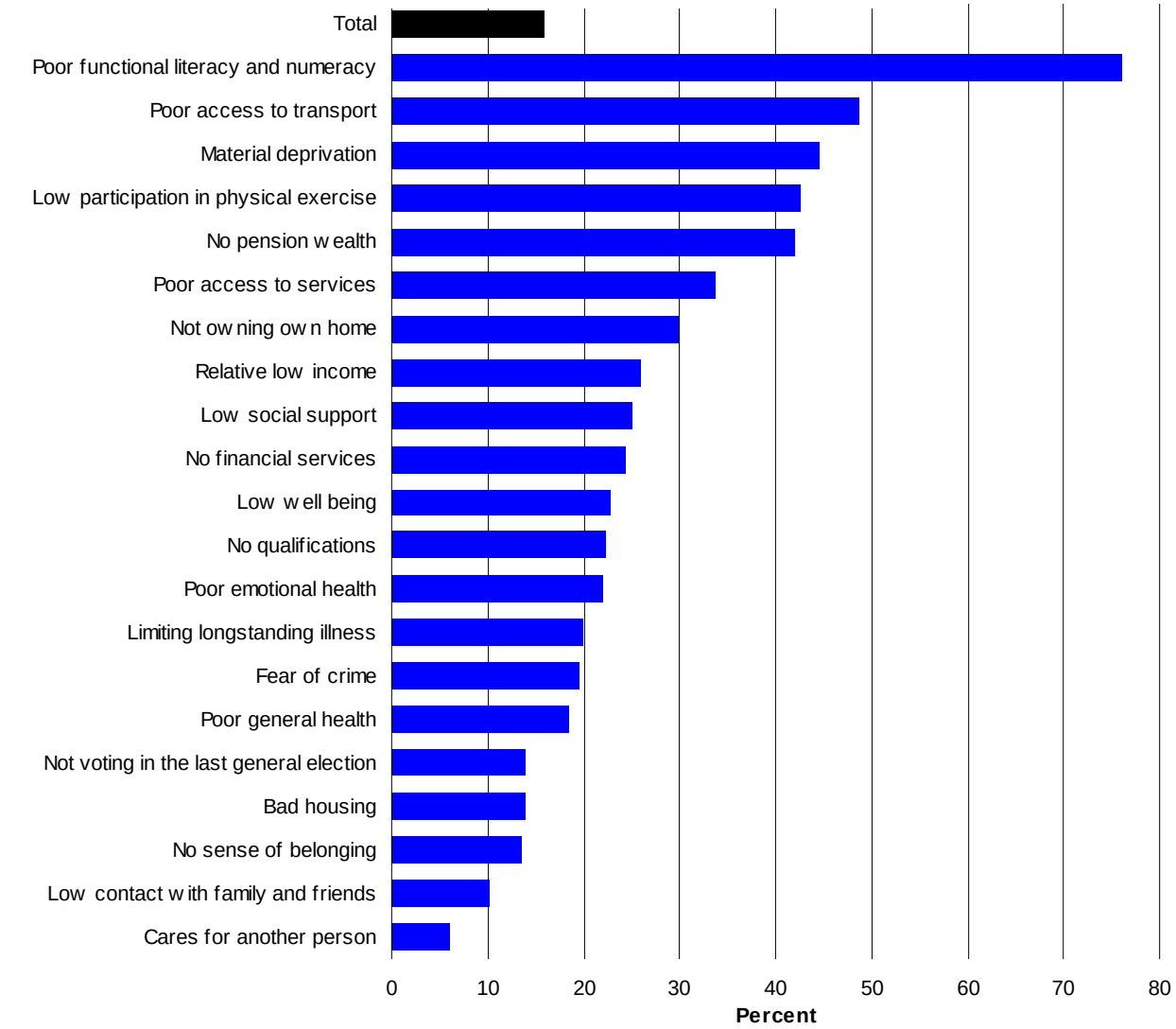
Figure 1-3 Proportion of those experiencing each risk marker who were women



There was a stronger relationship between age and risk markers of social exclusion than there was for sex and risk markers. The older old (those aged 80+) were much more likely to be marked by risk than their younger counterparts on a wide range of measures. Over 40% of those marked by risk in terms of poor access to transport, material deprivation, lack of physical exercise and no pension wealth were aged 80 and over, compared with 16% of all older people who were aged 80 and over. There were a further seven markers of risk where the proportion of those aged 80 and over was 20% or more.

Figure 1-4 Proportion of those experiencing each risk marker who were aged 80+

Base: all those experiencing each risk marker of social exclusion



2 Multiple and multidimensional risk markers of social exclusion

This section focuses on the extent to which older people may be affected by more than one of marker of risk, more than one domain of exclusion, and by particular combinations of risk markers of social exclusion.

2.1 The multidimensional nature social exclusion

The experience of multiple markers of risk, classed as having two or more risk markers, can have severe negative implications and consequences for quality of life, well-being and future life chances.

When using ELSA to explore multidimensional social exclusion, we have focused on 16 of the 21 risk markers discussed in the previous chapter. One reason for this was to balance out coverage of the sub-domains of the B-SEM, so that no sub-domain was over represented by risk markers of social exclusion in the Latent Class Analysis. The five risk markers removed from the multidimensional analysis (housing tenure, carer, qualifications, limiting illness, and well being), are useful as explanatory characteristic variables in their own right.

Table 2-1 Risk markers used in multidimensional social exclusion analysis

Domain	Subdomain	Risk marker of social exclusion
Resources	Material and economic resources	Relative low income Material deprivation No pension wealth
	Access to public and private services	Poor access to services Poor access to transport No financial services
	Social resources	Low social support Low contact with others
Participation	Culture, education and skills	Poor functional literacy and numeracy skills
	Political and civic participation	Not voted in the last general election
Quality of life	Health and well-being	Poor self-reported general health Low participation in physical exercise Poor emotional health
	Living environment	Bad housing No sense of belonging
	Crime, harm and criminalisation	Fear of area after dark

In order to look at multiple markers of risk, a simple additive scale was created to measure the number of risk markers experienced by older people. Each of the 16 risk markers of social exclusion were coded as a binary 0,1 variable, and added together to get a score out of 16. When considering the additive scale, it is important to remember that the threshold of risk for each individual marker is relative and/or arbitrary.

A reliability analysis was run on the 16 risk markers, to see whether the items measured a common underlying concept (please see Annex B for further details of the analysis). A Cronbach's alpha score of 0.5 was calculated which suggests that the 16 risk markers were tentatively measuring an

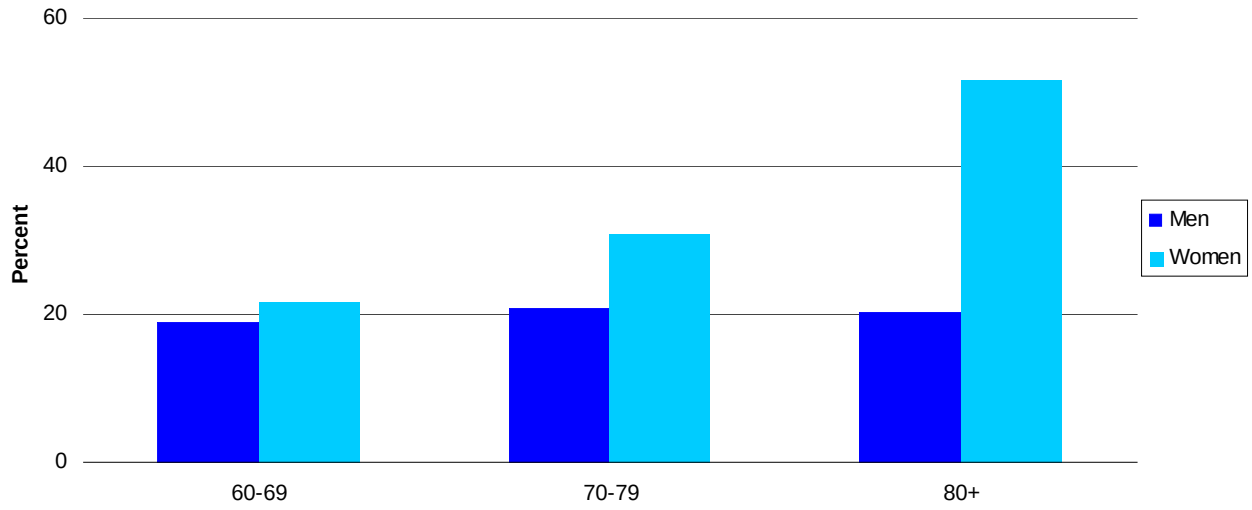
underlying concept[8]. The lack of a particularly high score suggests that the risk markers under investigation are also distinctly different.

The result of the reliability analysis suggests that risk of social exclusion cannot be measured in a single variable, however the additive scale does allow us to look at single versus multiple risk markers. It is in this context that we will be using the scale.

In total, 50% of older people experienced two or more of the 16 risk markers, and this experience was more prevalent among women and the older old. Women were more likely than men to experience multiple risk markers (54% compared with 44%). Older old people were much more likely than younger old to experience multiple risk markers (72% of those aged 80 and over, compared with 52% of those aged 70-79, and 41% of those aged 60-69%).

Figure 2-1 Sex and age profile of those experiencing multiple risk markers

Base: all respondents experiencing multiple risk markers of social exclusion



Looking at family situation, 78% of those who were single, 62% of those who were widowed, and 71% of those who were divorced or separated experienced multiple risk markers. Of these non-married older people, those who lived alone were more likely than those who lived with other people, to experience two or more risk markers (72% compared with 62%). Having living siblings or children did not influence chances of experiencing two or more risk markers. 52% of city dwellers suffered multiple risk markers - those living in a city were more likely than those living in a town, village, or hamlet to be marked by risk on two or more measures.

It is not just typically those in the 'lowest' groups who experience multiple markers of risk. 39% of those who had at least one qualification also experienced two or more risk markers, as did 26% of those on a high income, and 44% of those who owned their own home. 38% of those who were married and 46% of those who were remarried, were also likely to experience risk on at least two of the 16 risk markers.

[8] A Cronbach's alpha score of 0.7 or above would suggest that there was a distinct underlying concept.

When considering other socio-demographic characteristics, such as income, it is difficult to examine multiple risk markers of the least well off groups with simple crosstabular analysis as by definition these groups are experiencing one marker of risk.

The next step is to unpick these confounders and to investigate how these multiple risk markers overlap with each other, exploring whether some markers are particularly associated with other markers.

2.2 Which risk markers do older people experience?

This section considers whether the experience of multiple risk markers is multidimensional. For example is an older person likely to experience interrelated risk markers such as health problems only, or are they just as likely to have a combination of risk markers linked to different dimensions of exclusion, for example health as well as financial problems.

The analysis begins by exploring the interrelationships between markers of risk using tetrachoric correlation analysis[9]. Findings indicate that some of the 16 markers of risk correlate particularly highly with each other, while others do not. The highest correlation is between poor self-reported general health and not being physically active at 0.61[10].

The results of the tetrachoric correlation analysis, presented in Annex B, show the potential for some interesting overlapping risk markers, as some of the 16 markers from different sub-domains in the B-SEM correlate together, for example low social support and material deprivation correlate together at 0.41, and poor self-reported general health and poor access to services are correlated at 0.45.

This analysis illustrates that the relationship between any two markers is seldom a strong one, suggesting that risk markers experienced by older people across the 16 markers is multidimensional, and the experience is different for different people. (Correlation matrix is in section 5.1, correlations higher than or equal to 0.20 have been highlighted).

To understand further the relationships between overlapping markers of risk, we looked at those who had two or more out of a total of 16 risk markers (2156 respondents), and used Latent Class Analysis to identify particular clusters of older people. Section 2.2.1 will consider each cluster identified by the Latent Class Analysis. Older people not experiencing multiple risk markers and therefore not part of the Latent Class Analysis, are explored in part 2.3.

Latent Class Analysis is a multivariate technique that is useful in exploring whether social exclusion is multidimensional. It is analogous to cluster analysis in that it is a means of identifying clusters of similar individuals who share an underlying or ‘latent’ characteristic.

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[9] Tetrachoric correlation analysis is suitable for pairs of dichotomous variables that assume an underlying continuous variable.

[10] A correlation of 0.7 is considered high.

In each latent class identified by the analysis, a set of probabilities[11] is produced for the 16 risk markers. These probabilities show for each marker, the likelihood of a person being marked by risk. These probabilities are useful when defining the latent classes identified by the analysis. (See chapter 6.2 in Annex B for a technical description of the Latent Class Analysis).

2.2.1 Latent Class Analysis findings

Findings of the Latent Class Analysis suggest that among those experiencing at least two risk markers, there are five different clusters, or combinations, of risk markers experienced by older people[12]. The clusters were re-classified in order of mean number of risk markers experienced by those in each cluster group. Clusters were labelled according to the most prominent markers of risk, in other words when the likelihood of experiencing a risk marker was greater than 0.20.

As part of this labelling process it became evident that some risk markers experienced were common among older people, and appeared in all clusters (fear of local area, bad housing, low social support, poor functional literacy and numeracy skills, and low political efficacy). As such, commonly experienced risk markers were generally not used to label clusters. Commonality of risk markers is discussed in detail in section 2.2.2.

Cluster One: Mostly lonely and unsupported

20% of older people formed a cluster that were fundamentally lonely, in that they were likely to have very infrequent contact with others, had low social support, and felt that they didn't belong in the area that they live. Older people in this group were likely to be marked by risk to some extent in terms of access to services, as well as likely to experience some of the risk markers common to all those suffering from multiple exclusion (bad housing, poor functional literacy and numeracy skills, and low political efficacy).

Unlike other clusters, individuals in this cluster of individuals were not afraid of their local area after dark. Older people assigned to this group, were very unlikely to have access problems in terms of transport or financial services. They were not physically inactive, or experienced poor general health.

On average, older people in this group experienced two or three risk markers out of 16. Those in this group were primarily marked by risk on the participation domain and living environment sub-domain, in addition to being marked by risk with respect to service access.

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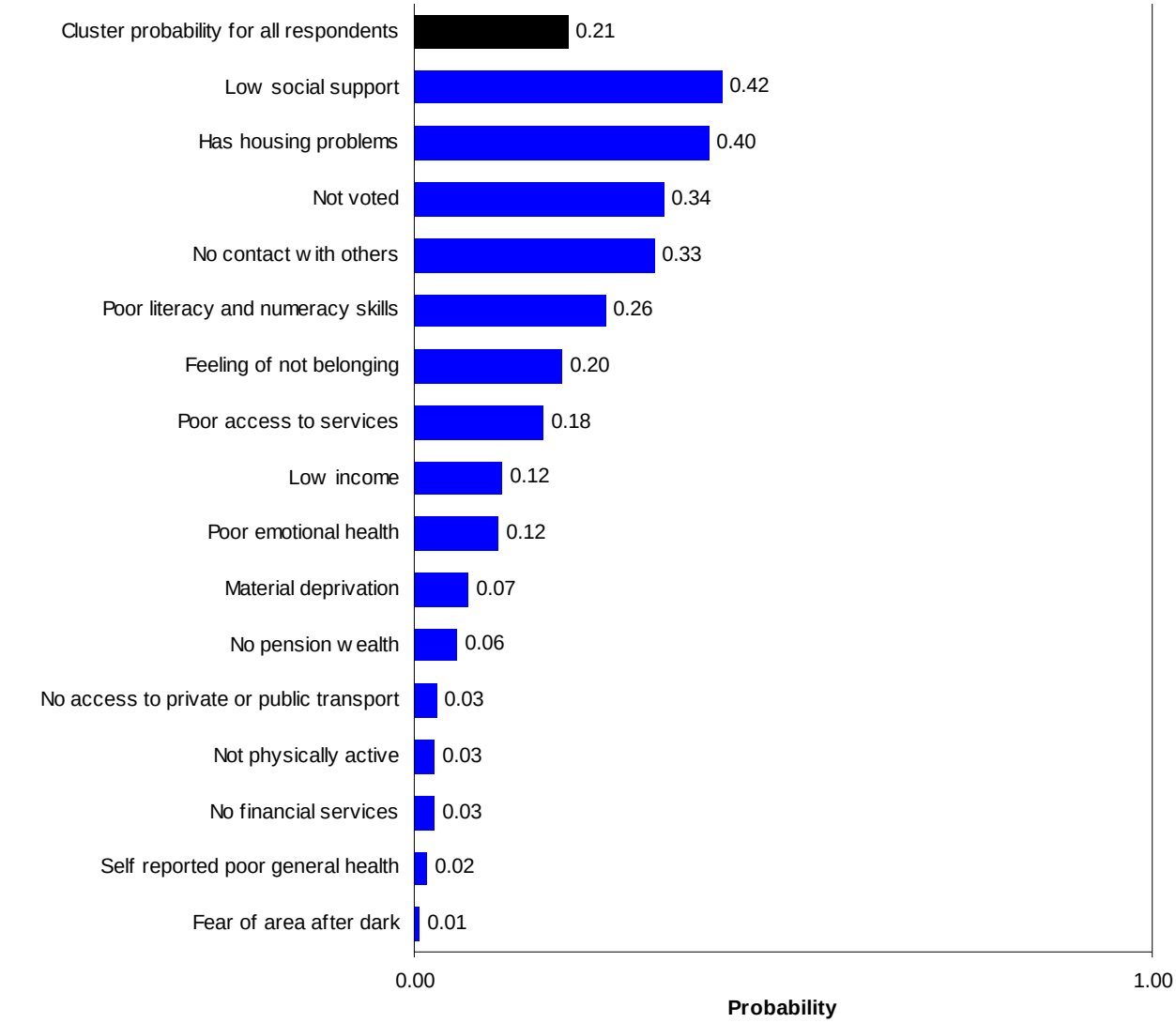
[11] Latent Class Analysis produces recruitment probabilities for each cluster. This is the probability that, for a randomly selected member of a given latent class, a given response pattern will be observed. From the recruitment probabilities, one easily calculates the a posteriori probability of an individual's membership in each class. One may then assign the individual to the latent class with the highest a posteriori probability (modal assignment).

[12] To verify findings of the Latent Class Analysis and the identification of five clusters, the analysis was repeated on wave 1 ELSA data and a similar latent class model was produced.

Figure 2-2 Cluster One: Lonely - probabilities of risk markers

Base: 429 respondents (20%) of those experiencing multiple risk markers of social exclusion



Cluster Two: Fear of local area

Older people experiencing multiple markers of risk had a 23% chance of being in this group. Unlike cluster one, older people in this cluster were defined distinctively by one characteristic - fear of their local area after dark.

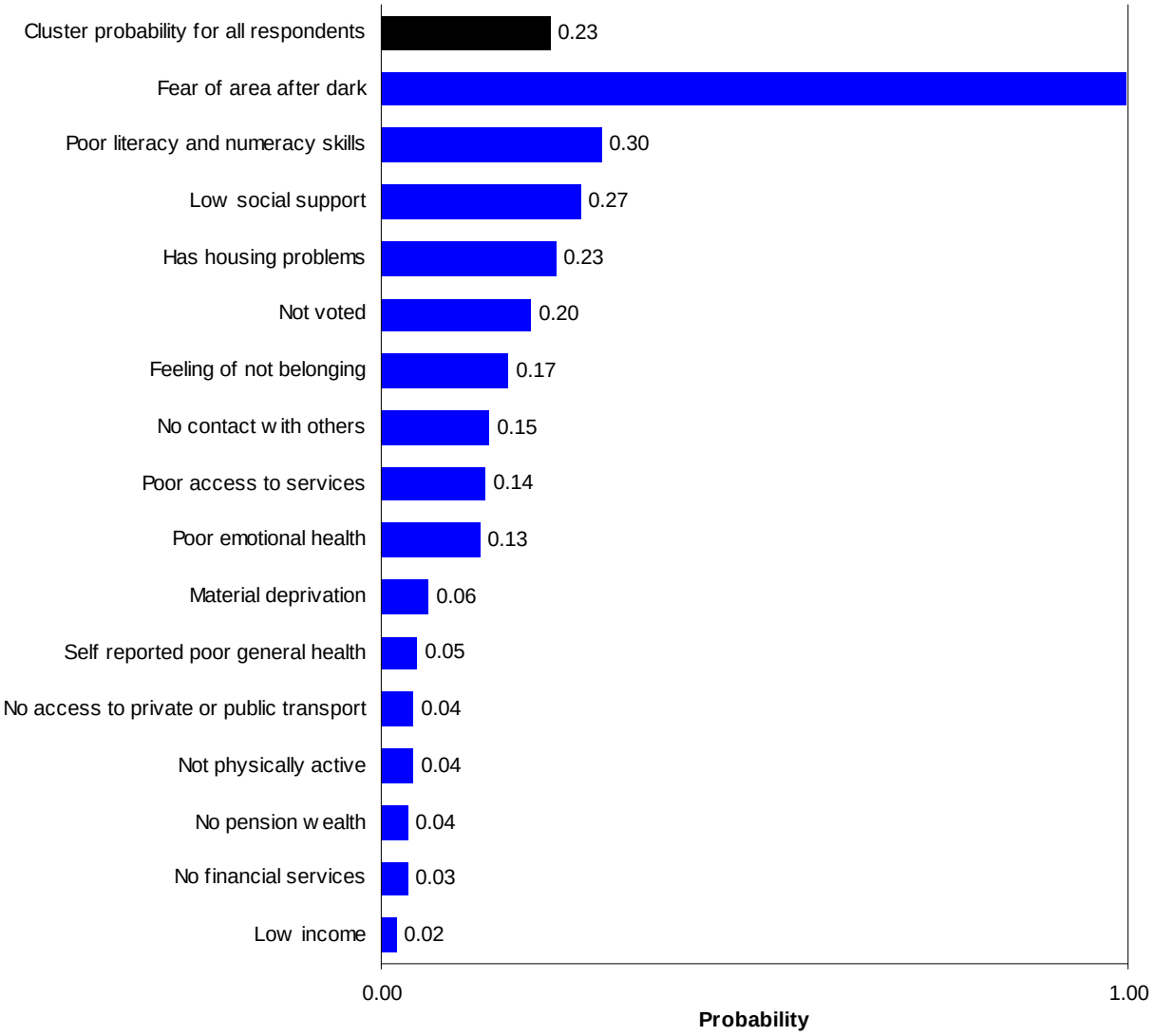
Older people in this cluster were also particularly affected on other common[13] risk markers (bad housing, low social support, poor functional literacy and numeracy skills, and low political efficacy). On average, older people in this cluster were likely to experience around three risk markers out of 16.

This group were extremely unlikely to have a relative low income, with a probability of 0.02. Similarly those assigned to this group were very *unlikely* to be lonely, have poor transport access, be physically inactive, have no pension wealth or financial services, be materially deprived, or have poor self-reported general health.

[13] See section 2.2.2 for a discussion of endemic risk markers.

Figure 2-3 Cluster Two: Fear of local area - probabilities of risk markers

Base: 527 respondents (24%) of those experiencing multiple risk markers of social exclusion



Cluster Three: Low income

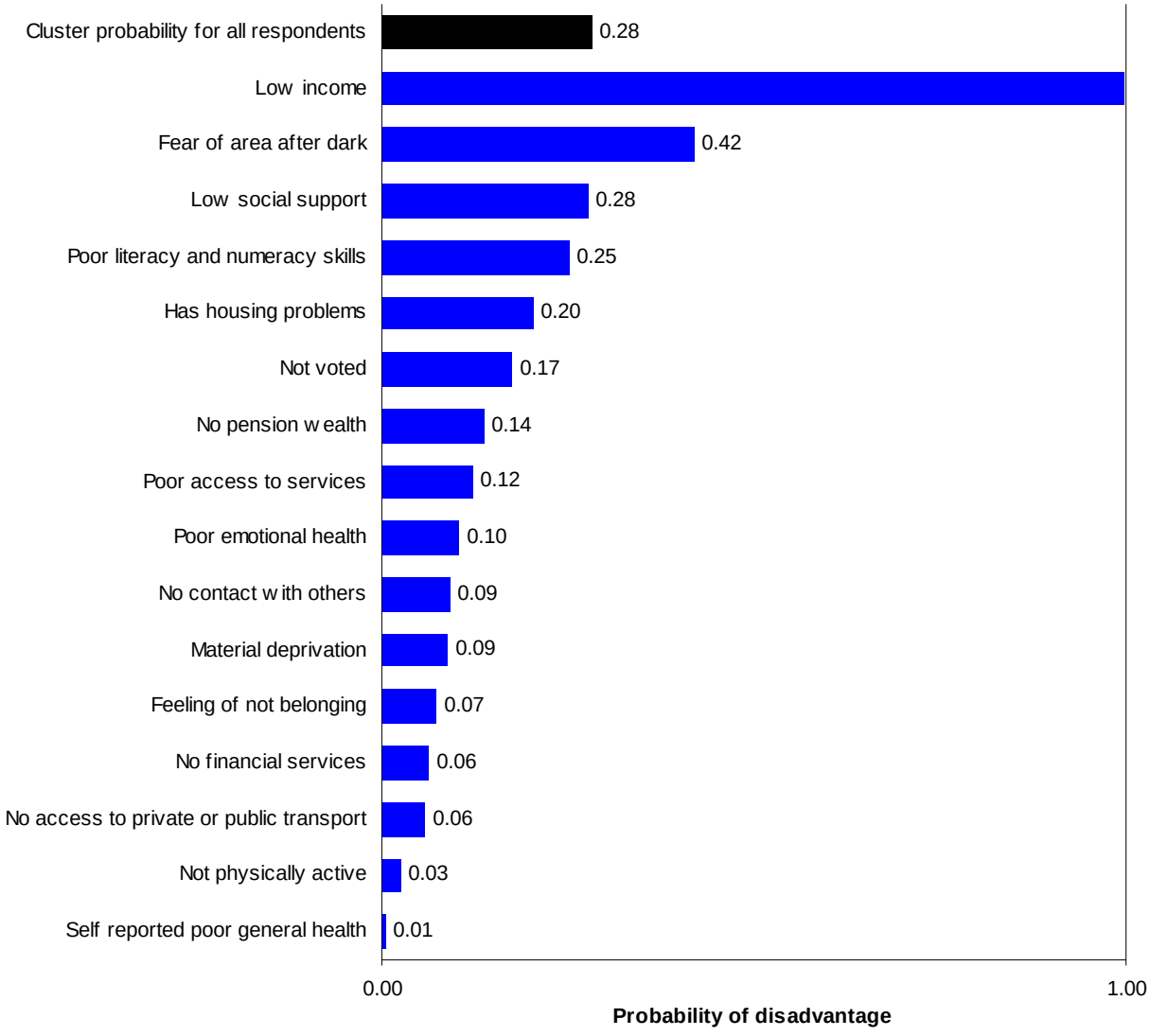
This cluster was the largest group identified by the Latent Class Analysis, with 32% of older people assigned to this cluster.

This cluster consists entirely of people who were in the lowest income group (although there were some people in the lowest income group who were not in this cluster), the other characteristics of older people in this group were that they were likely to be afraid of their local area after dark, were likely to have low social support, had poor literacy and numeracy skills as well as housing problems.

Conversely, this group were very unlikely to report poor health, or be physically inactive. They were also unlikely to have poor access to transport or poor access to financial services.
Older people experiencing risk markers on two or more of the 16 ELSA markers of risk had a 28% chance of belonging to the low income cluster, as the cluster probability for all older people is 0.28. Those in this group typically experienced three out of 16 risk markers.

Figure 2-4 Cluster Three: Low income - probabilities of risk markers

Base: 701 respondents (32%) of those experiencing multiple risk markers of social exclusion



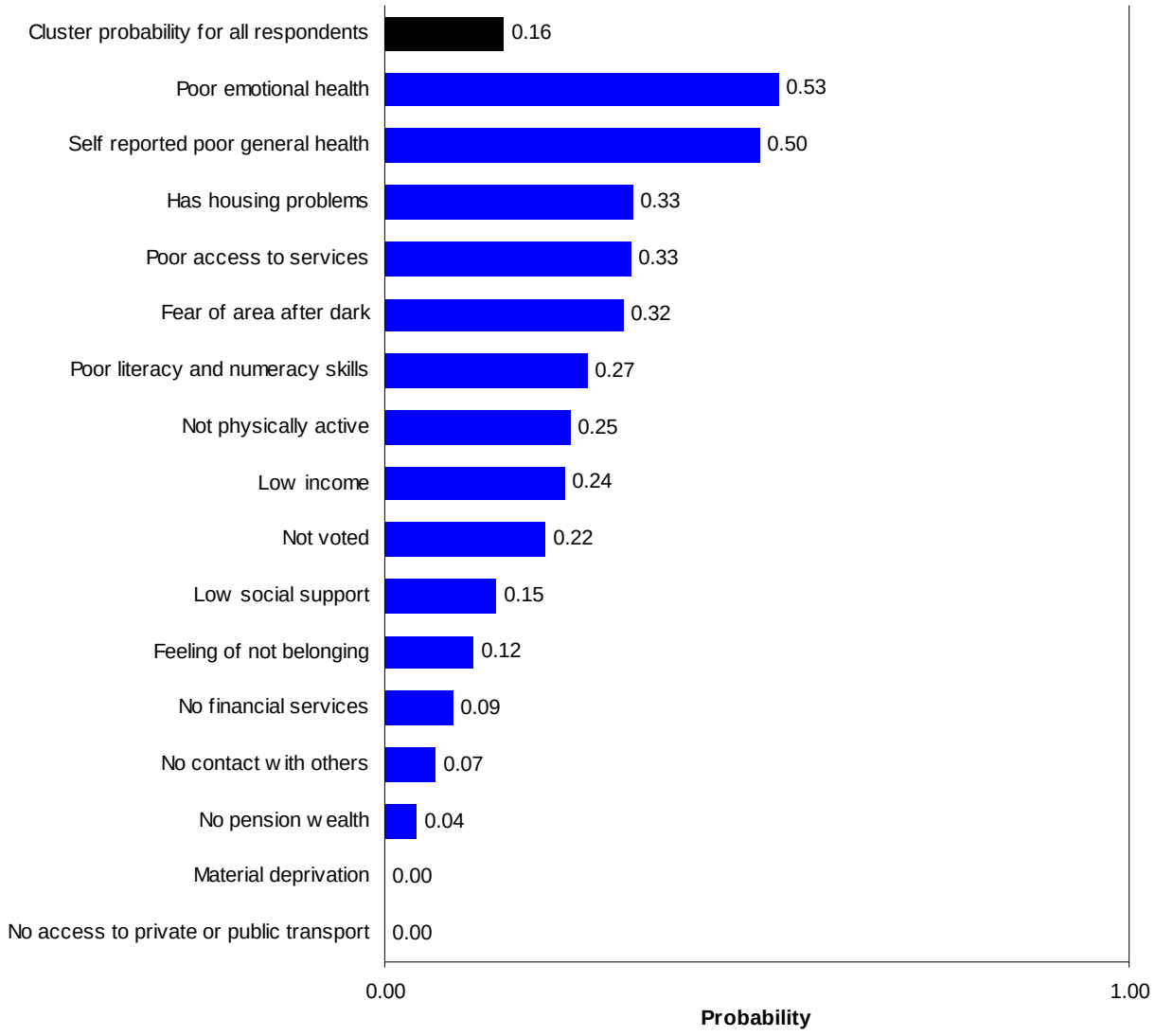
Cluster Four: Mostly poor health

14% of older people affected by multiple risk markers were likely to suffer multidimensional problems that spanned all three domains of the B-SEM. Older people in this group were likely to suffer health related problems in the main, and had a 50% chance of poor general health and poor emotional health. On average, older people in this cluster experienced around four of 16 risk markers.

Low relative income and service access were also issues for those who were classified in this cluster, as were the endemic problems faced by the wider older population affected by multiple risk markers (bad housing, poor functional and literacy skills, fear of area after dark, low political efficacy demonstrated through not voting in the last general election, and low social support).

Figure 2-5 Cluster Four: Mostly poor health - probabilities of risk markers

Base: 304 (14%) of those with multiple risk markers of social exclusion

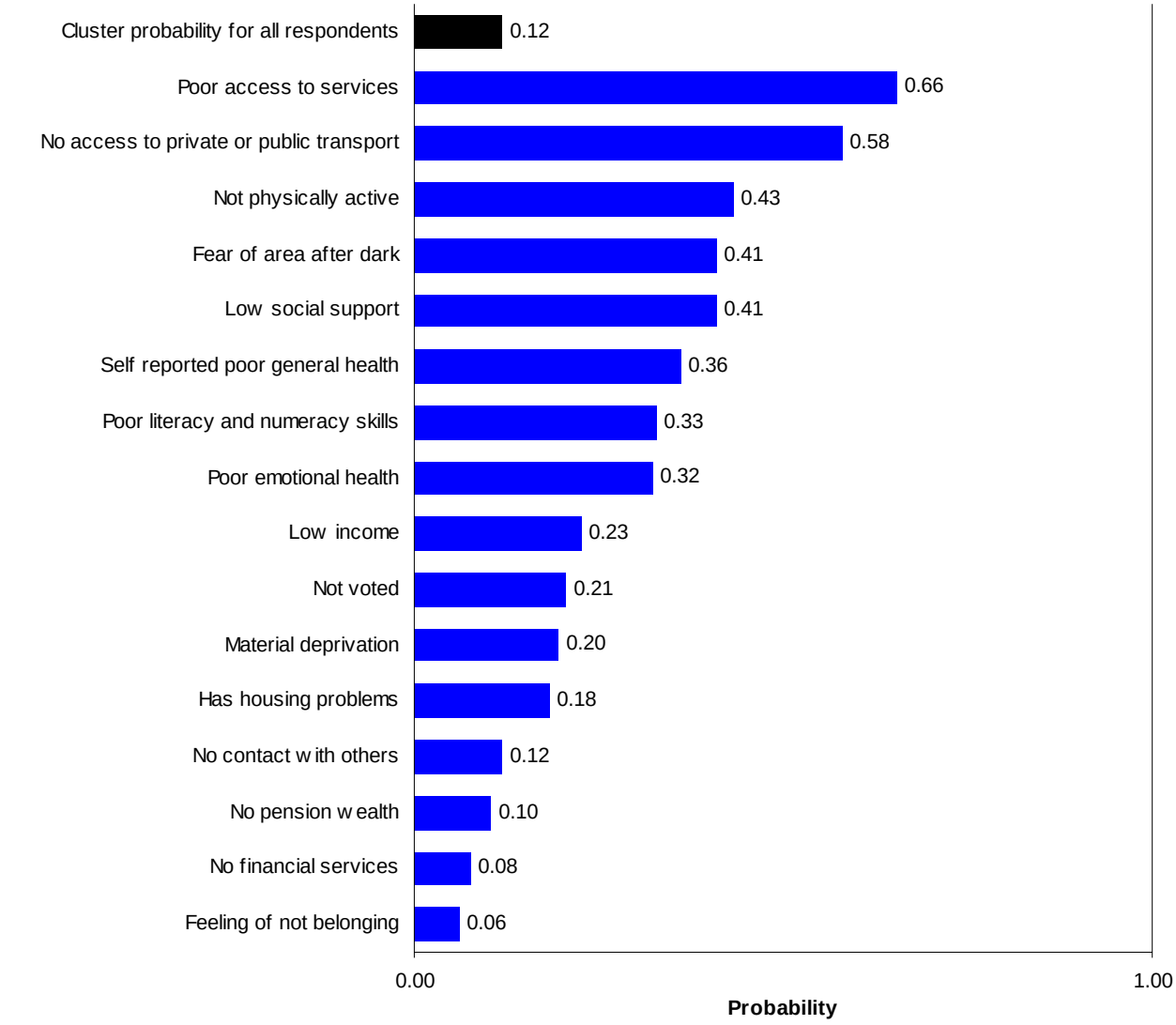


Cluster Five: Mostly poor access

The smallest cluster identified by the Latent Class Analysis contained 10% of older people who experienced multiple risk markers. Older people in this cluster were primarily defined by their lack of access to services and lack of access to transport. Those in this group were also likely to be physically inactive, had poor self-reported general health and emotional health, and were also likely to experience the risk markers endemic to this population. This cluster experienced more risk markers on average than any other cluster, with older people in this group likely to suffer five out of 16 risk markers.

Figure 2-6 Cluster Five: Mostly poor access - probabilities of risk markers

Base: 205 (10%) of those experiencing multiple risk markers of social exclusion



2.2.2 Comparing clusters of multiple risk markers of social exclusion

Five clusters were identified when looking at the forms of multiple risk markers experienced by older people.

- Mostly poor access (most marked by risk) - mean number of risk markers in this cluster was 5.1.
- Mostly poor health - mean number of risk markers was 3.7.
- Low income - mean number of risk markers was 3.2.
- Mostly lonely & unsupported - mean number of risk markers was 2.5.
- Fear of local area (least marked by risk) - mean number of risk markers was 2.8.

Those in the mostly poor health cluster and mostly poor access cluster were most vulnerable to multiple risk markers. The poor health subgroup had at least a 20% chance of experiencing a risk marker of social exclusion on nine of 16 risk markers, and was therefore more likely than the low income, lonely and fear of local area clusters to experience severe multidimensional exclusion. Older people in the poor access cluster can be thought of as the most at risk of severe multiple risk markers and were likely to experience all markers to some degree.

Although we have labelled clusters in terms of the markers of risk most likely to be experienced, the clusters produced by the Latent Class Analysis were by no means mutually exclusive or distinct from each other in terms of risk markers experienced in each group.

Considering each of the five clusters identified by the Latent Class Analysis, those in the fear of local area cluster predominantly experienced risk markers that were common to all clusters. This cluster can be thought of as including individuals who were the least vulnerable to severe multidimensional exclusion, as the other clusters suffered further problems in addition to these common risk markers.

Further analysis into the prevalence of markers of risk by cluster, demonstrates further the presence of common or “endemic” risk markers experienced by older people.

Table 2-2 Prevalence of each risk marker of social exclusion by cluster

			Multiple risk marker cluster					
Domain	Sub-domain	Risk marker	Low Income	Fear of local area	Lonely	Poor Health	Poor Access	Total
			%	%	%	%	%	%
Resources	Material and economic resources	Low income	100	-	3	21	20	22
		Material deprivation	9	6	7	-	23	4
		No pension wealth	13	4	6	5	11	4
	Access to public and private services	Poor access to services	13	15	19	36	73	12
		No access to private or public transport	5	4	2	-	76	5
		No financial services	6	3	4	10	7	3
	Social resources	Low social support	28	26	43	13	45	17
		No contact with others	10	13	34	6	14	9
Participation	Culture, education and skills	Poor literacy and numeracy skills	25	29	26	28	36	16
	Political and civic participation	Not voted	18	20	34	23	21	14
Quality of life	Health and well-being	Self reported poor general health	-	5	0	67	38	7
		Poor emotional health	12	14	9	63	30	11
		Not physically active	3	4	2	32	51	6
	Living environment	Has housing problems	22	23	40	33	17	16
		Feeling of not belonging	8	16	22	12	5	7
	Crime, harm and criminalisation	Fear of area after dark	40	100	-	25	42	28
		Base	*701*	*527*	*429*	*304*	*205*	*2166*

Having poor functional and literacy skills is one risk marker that was consistently present across all five clusters with a similar proportion of older people experiencing risk markers. Bad housing, fear of local area after dark, low social support, and low political efficacy as demonstrated by not voting in the last general election, were common in at least four out of five of the clusters.

The presence of these endemic risk markers is an important caveat to the multidimensional analysis that needs to be kept in mind when interpreting the findings of the multidimensional analysis.

These common or endemic risk markers originate from different domains and sub-domains of the B-SEM. This means that older people who experience two or more markers of risk, are by definition, experiencing a form of multidimensional exclusion.

Despite some commonality between clusters, there is also a clear distinction between other clusters. For example, 100% of older people in the low income cluster had a relative low income,

whereas no older people assigned to the fear of local area cluster were income poor. 76% of older people in the poor access cluster were marked by risk in terms of access to transport and 73% were marked by risk with respect to accessing services – a proportion much higher than in other clusters. In the poor health cluster, roughly twice as many older people reported poor general health (67%) and poor emotional health (63%) than in the other clusters.

To further investigate the different forms of risk markers experienced, this section will now focus on each of the five clusters identified in the Latent Class Analysis, considering the markers of risk that define the individuals in these groups, and the socio-demographic characteristics that explain them.

2.3 How do clusters of multiple risk markers of social exclusion vary?

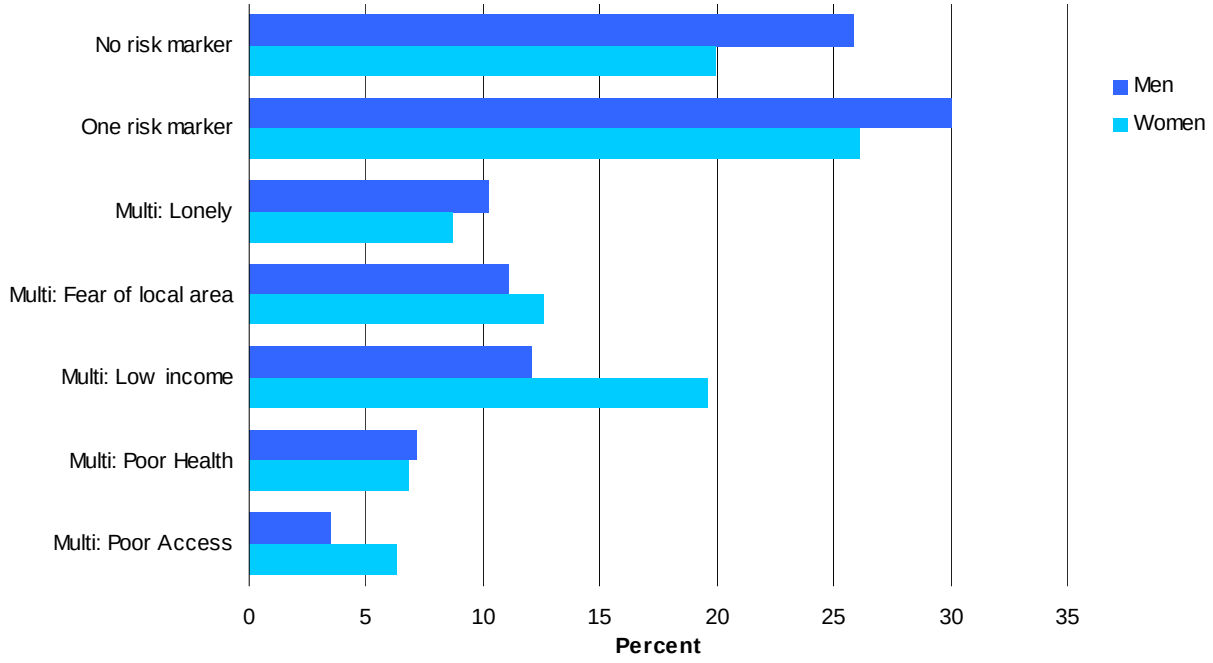
Those who experience multiple risk markers of social exclusion form an especially deprived group. The five clusters identified by the Latent Class Analysis go some way to explaining the different types of multidimensional exclusion experienced by older people. The remainder of this section examines multidimensional social exclusion as defined by the five cluster groups, in the context of a lack of risk markers and the experience of singular markers of risk.[14]

Demographic characteristics

Men were more likely than women to experience no risk markers (26% compared with 20%) and also less likely to experience singular markers of risk (30% compared with 26%). Thus women were more likely than men to experience multidimensional social exclusion, and this difference was most pronounced in clusters related to low income (20% compared with 12%) and access to services (6% compared with 4%).

Figure 2-7 Multidimensional social exclusion clusters by sex

Base: All respondents



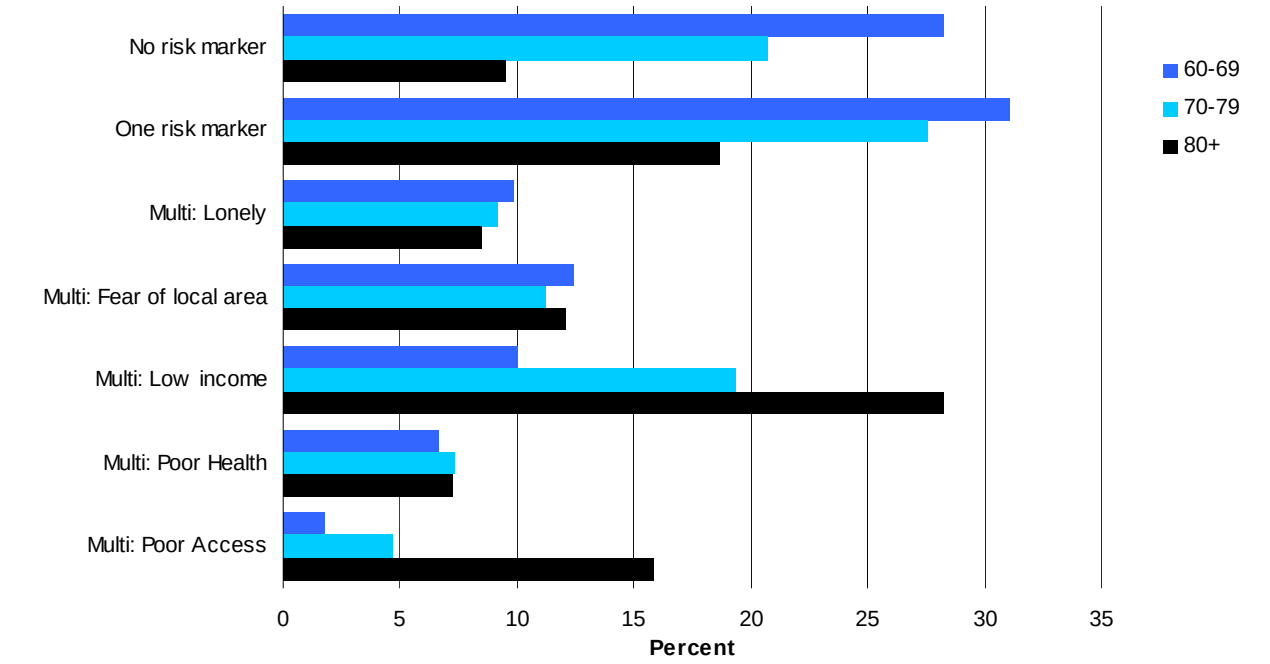
Age showed a stronger relationship with risk markers than sex, with the older old being more likely to experience multidimensional social exclusion – 72% of those aged 80 and over experienced multidimensional social exclusion compared with 41% of 60-69 year olds. As with the difference between men and women, the difference in any experience of multidimensional social exclusion

[14] Ethnicity is not used in this section as an explanatory variable, due to the small sample of non-white older people in the sample. Other explanatory variables that did not have a significant effect, have been omitted from this section. However tables for these are included in chapter 5.2.

experienced by the older old was explained by greater prevalence of the multidimensional clusters of low income (28% 80+; 10% 60-69s) and poor access (16% 80+; 2% 60-69s).

Figure 2-8 Multidimensional social exclusion by age

Base: All respondents

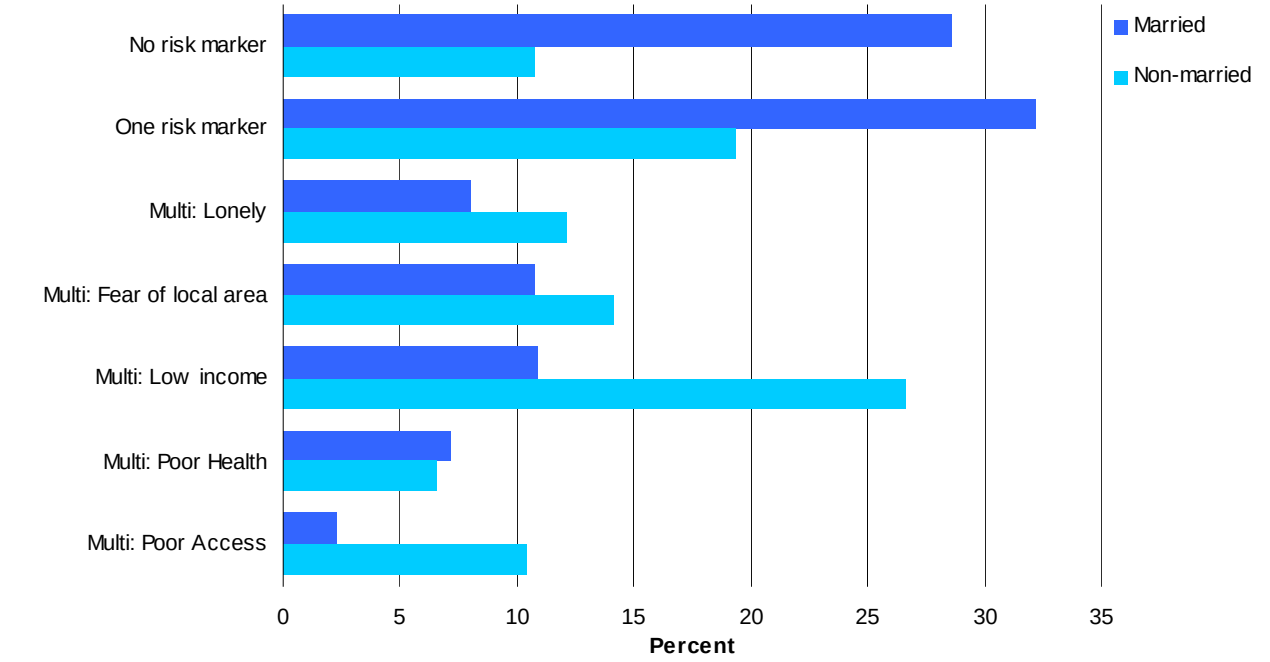


Generally, those who were married were less likely to experience multidimensional social exclusion (39%) than those who were not married (70%). Those who were not married were more likely to be classified in most multidimensional clusters apart from poor health, and in particular were more likely to be in the low income cluster (28% compared with 11%).

As marital status is related to age, it may be that age confounds this analysis, but the same patterns of differences were seen between married and non-married older people when the analysis was restricted to 60-69 year olds.

Figure 2-9 Multidimensional social exclusion by martial status

Base: All respondents

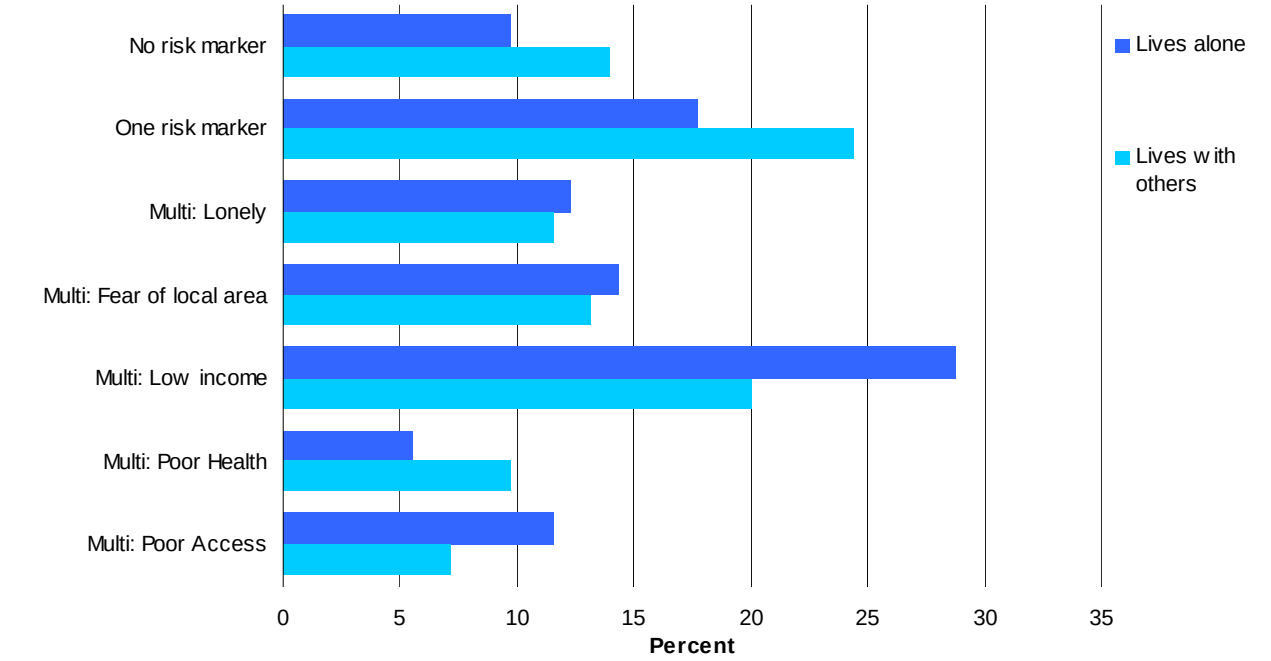


Another factor that may affect the experience of multiple markers of risk is whether older people live alone or with someone else. As living arrangements would be confounded by whether people are married or not, this analysis was restricted to those who were not married.

Among unmarried older people those living alone were more likely to experience multidimensional social exclusion (73% compared to 62%), and the greatest difference was in being in the low income (29% compared to 20%) and poor access clusters (12% compared to 7%).

Figure 2-10 Multidimensional social exclusion by living arrangements (not married)

Base: All non-married respondents



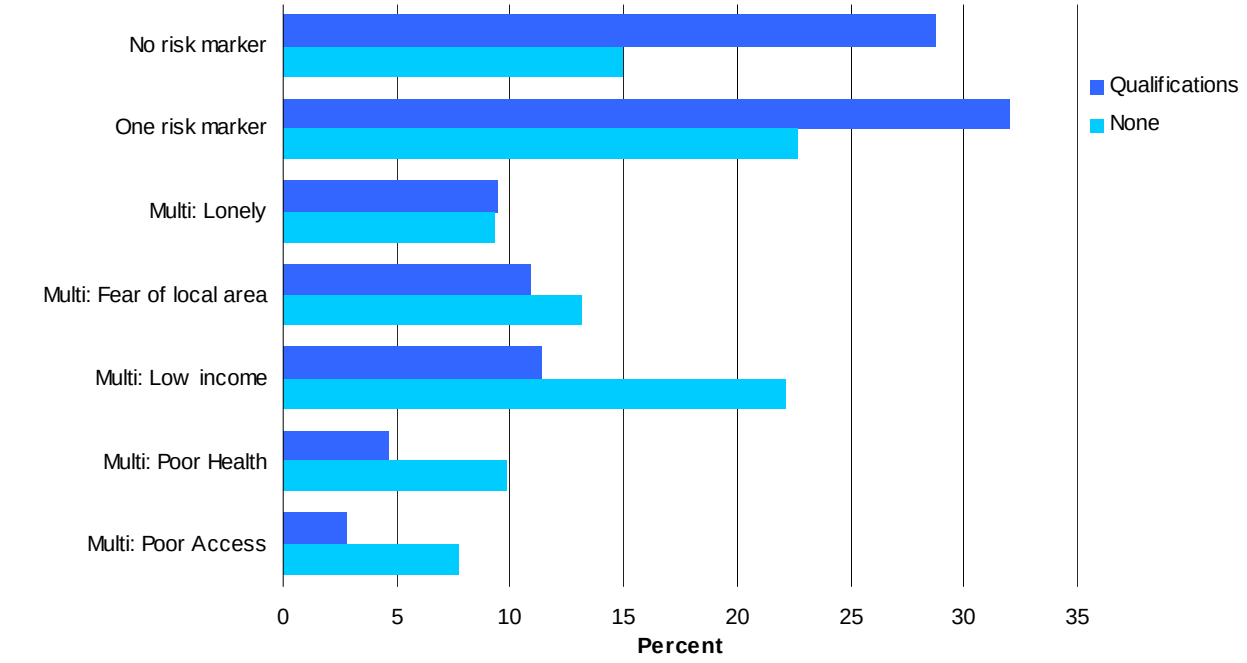
There was no relationship between multidimensional social exclusion and whether older people had living siblings.

Older people without qualifications were more likely than those with qualifications to experience multidimensional exclusion (62% compared with 39%). Those without qualifications were more likely to be in clusters related to low income, poor health and poor access to services, but were no more likely to belong to loneliness or fear of the local area clusters.

Although age was related to whether people had qualifications (the older old were less likely to possess them), this did not confound the analysis and similar patterns were seen when the analysis was restricted to just 60-69 year olds.

Figure 2-11 Multidimensional social exclusion by whether has qualifications

Base: All respondents

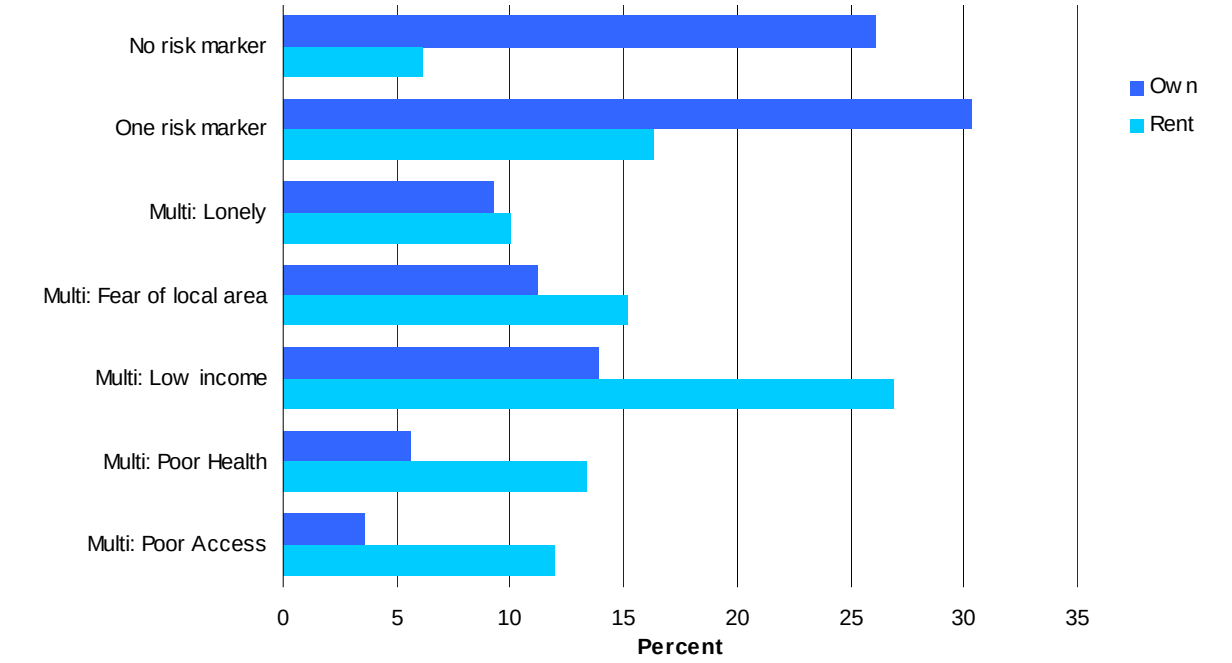


Home and area characteristics

Home ownership was strongly related to being marked by risk, with those who rented being much more likely to experience multidimensional social exclusion (78%) than those who owned their home (44%). Those who rented were more likely to be in every cluster of multiple risk markers apart from the loneliness one.

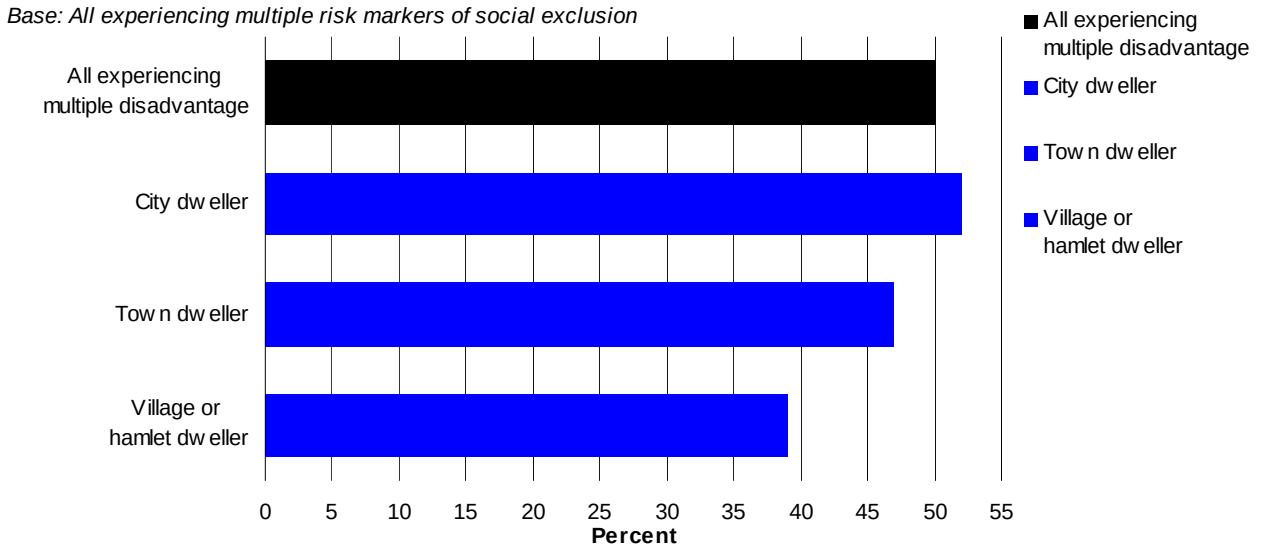
Figure 2-12 Multidimensional social exclusion by whether owns own home

Base: All respondents



Being marked by risk was related to population density with those in cities (52%) more likely to experience multidimensional social exclusion than those in towns (47%) and villages (39%). However, when considering the relationship between cluster membership and population density there was no significant relationship[15].

Figure 2-13 Multiple markers of risk by locality



[15] Crosstabulation analysis of population density by multiple risk marker cluster membership in the context of singular risk markers and lack of risk marker is presented in Annex A, Section 5.3 at the end of this chapter.

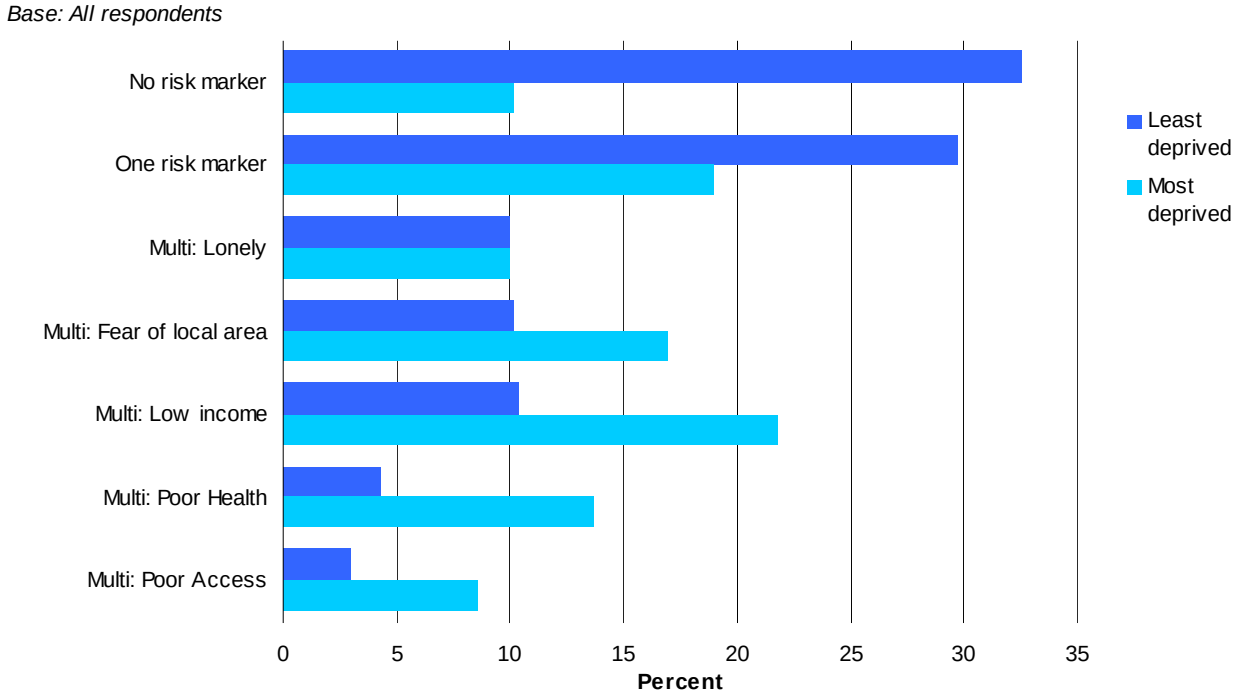
Given that all older people in one of the multidimensional social exclusion clusters had a low income, this confounds further analysis by personal income. However it is still possible to look at the relationship between income and risk markers, by using the Index of Multiple Deprivation (IMD) quintiles which measure the deprivation of an area (defined at the ward level). Personal income is highly correlated with IMD index of an area.

It should be noted that by definition we would expect people living in an area with a high IMD index to be more likely to experience multidimensional social exclusion themselves, as IMD is itself a measure of multiple risk markers.

The deprivation level of an area was related to whether people experience multidimensional social exclusion, with the exception of the loneliness cluster where there was no difference in membership of the cluster between those in highest and lowest area quintiles of IMD. However, this lack of a relationship is partly explained by the fact that the IMD does not use any indicators of social support in its definition.

Figure 2-14 Multidimensional social exclusion by Index of Multiple Deprivation Quintile

Base: All respondents



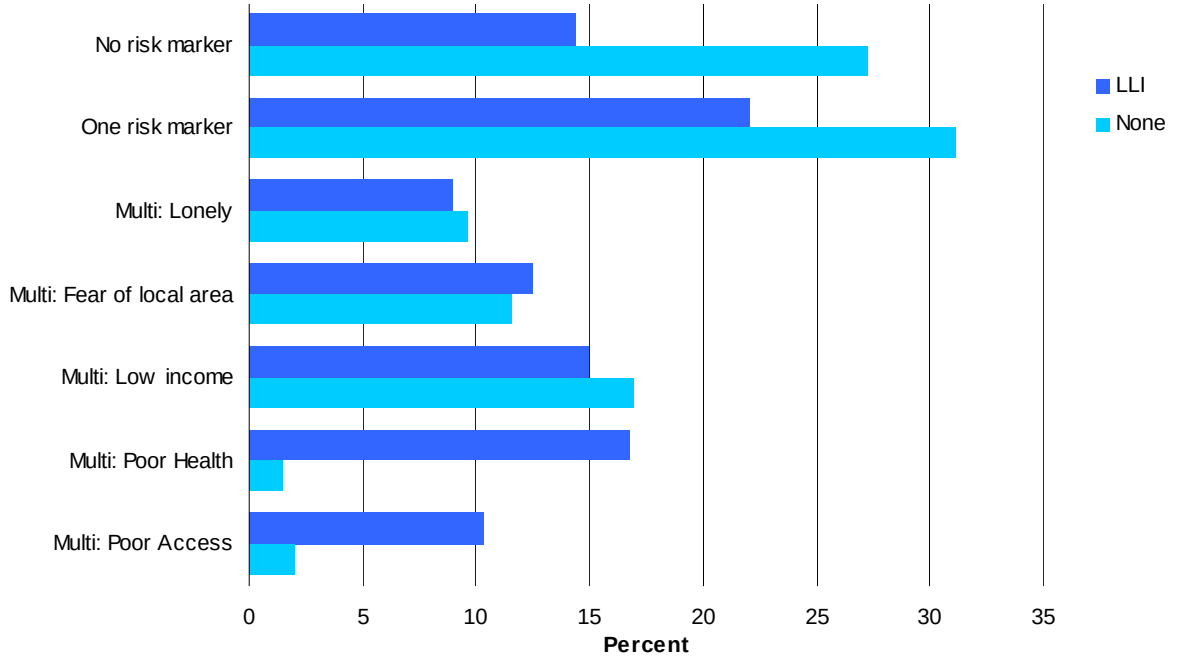
Health factors

Limiting longstanding illness and low well-being are to some extent confounded in this analysis as one of the clusters is mainly about poor health. Nevertheless, it is still useful to consider these as explanatory variables of social exclusion for the older population.

Older people with a limiting longstanding illness were more likely to experience multiple risk markers than those who did not have such an illness (64% compared with 42% respectively). Those with a limiting longstanding illness were more likely to be in clusters related to poor access to services, poor health and fear of the local area, but were no more likely to belong to loneliness or poor access to services clusters.

Figure 2-15 Multidimensional social exclusion by whether have limiting longstanding illness

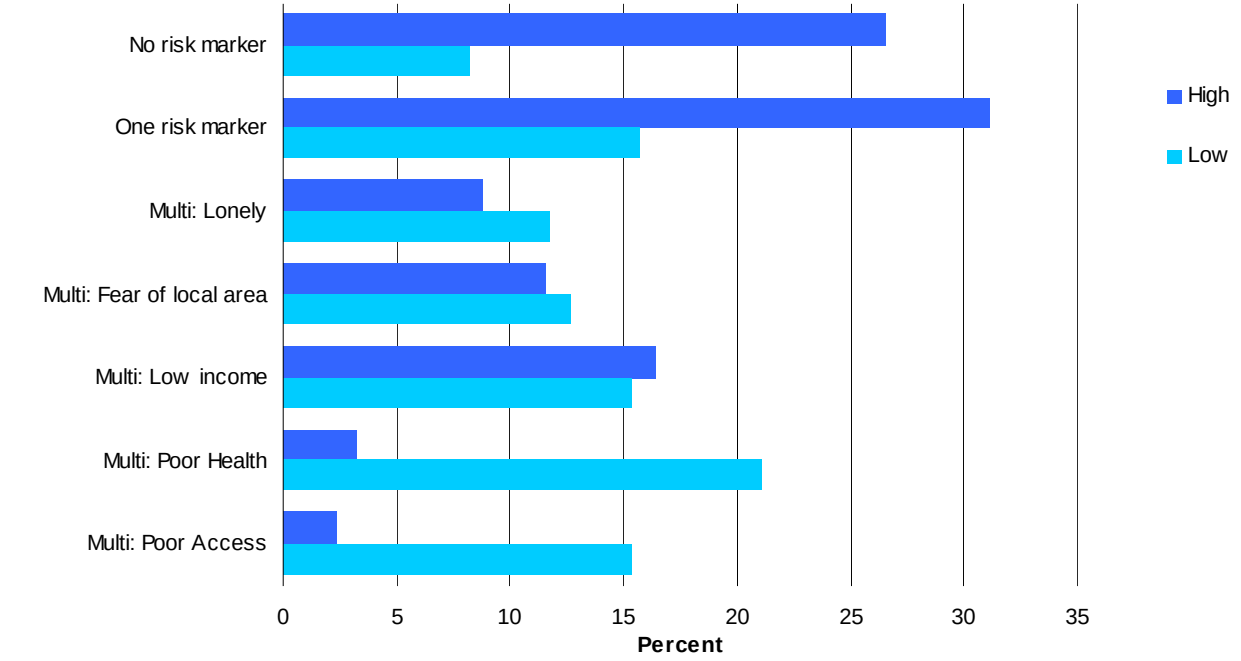
Base: All respondents



76% of older people experiencing low well-being experience multiple risk markers. Low well being is to some extent associated with all clusters, with those in the poor health, poor access and low income clusters most likely to have a low well being.

Figure 2-16 Multidimensional social exclusion by wellbeing

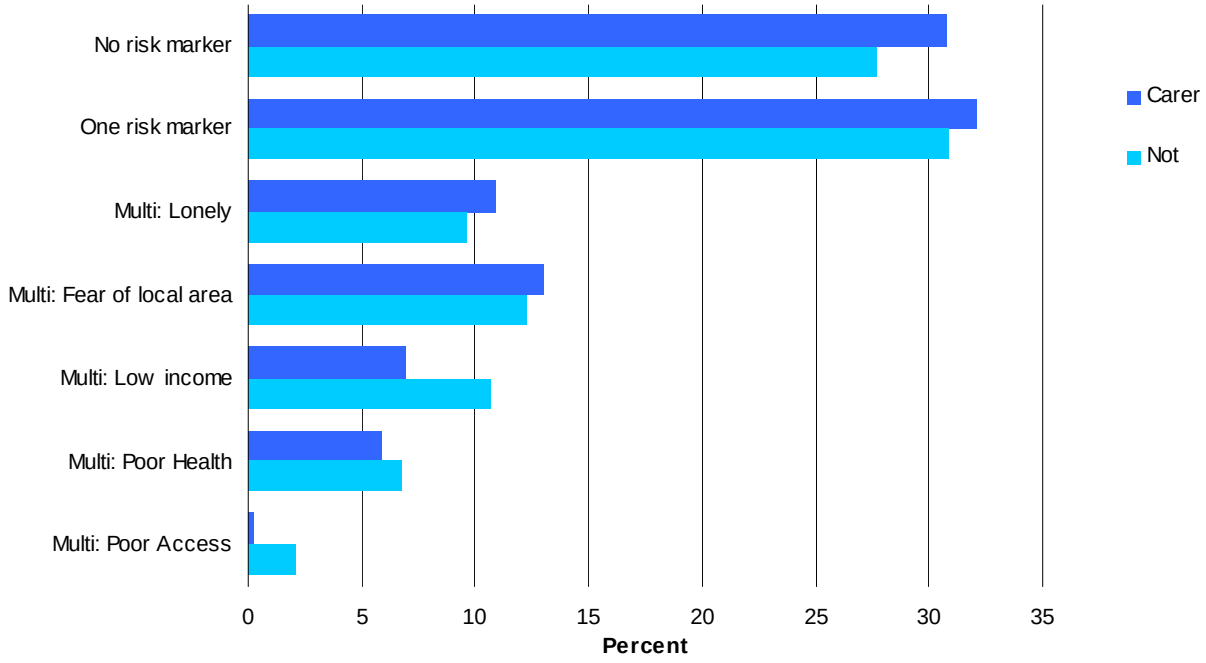
Base: All respondents



Whether older people care for someone is strongly related to age and this would potentially confound the relationship between caring and multidimensional social exclusion - therefore the analysis was restricted to those aged 60-69. When restricted to this age group there was no relationship between caring and multidimensional social exclusion.

Figure 2-17 Multidimensional social exclusion by caring

Base: All respondents aged 60-69



Summary

To summarise these findings, those who were in the cluster most marked by risk, defined as those experiencing mostly poor access problems, were likely to be aged 80 and older, had no qualifications, were living alone, and had a low well-being.

Having no qualifications and a low wellbeing, was also associated with membership in the mostly poor health cluster, as was having a limiting longstanding illness,

The low income cluster also included older people who had no qualifications and a low well-being. Older people in this cluster were also likely to live alone, and were particularly likely to be unmarried when compared with other clusters.

Renting accommodation as opposed to owning or buying a home, and being in the lowest quintile of the Index of Multiple Deprivation, was associated with older people in all clusters, with the exception of those who were mostly experiencing loneliness and low social support.

Being a carer was not a risk marker of any of the five forms of multidimensional social exclusion identified in the analysis. Nor was population density when considering the relationship between an older person living in a city, town, or village/hamlet, with multidimensional social exclusion.

3 Social exclusion risk marker dynamics

3.1 Measuring the dynamics of social exclusion

Multidimensional social exclusion is a process that can affect people over a period of many years, where they may get into a vicious circle of risk markers and find it hard to escape their circumstances. Levitas *et al* (2007) called this process deep exclusion.

Chapters 1 and 2 examined a snapshot of exclusion in one particular year using ELSA data. This chapter will explore the dynamics of multiple exclusion, considering duration and recurrence of exclusion, as well as the events or 'triggers' that cause it.

In order to be able to look at exclusion over a number of years, we needed to use BHPS data rather than ELSA (which had 3 waves of data at the time of this analysis). The BHPS risk markers used in the investigation of social exclusion dynamics, were similar in terms of their derivation to the ELSA risk markers used in the study of multidimensional social exclusion.

As with ELSA, the BHPS was not designed to measure social exclusion, and its longitudinal nature means that tracking trends over time is restricted to those questions asked in every wave. Thus, the risk markers derived in the BHPS data are fewer than in the ELSA data as shown in the table below.

Table 3-1 B-SEM risk markers of social exclusion

Domain	Sub-domain	Risk marker of social exclusion	ELSA	BHPS
Resources	Material and economic resources	Relative low income	●	●
		Receipt of out of work benefits		
		Material deprivation	●	●
		Fuel Poverty		
		Not owning own home	●	●
		No pension wealth	●	
		No wealth and savings		
		Debt		
		Subjective poverty		
	Access to public and private services	Poor access to services	●	
		Poor access to transport	●	●
		No financial services	●	
		No private services		
		Poor utilities		
	Social resources	Institutionalisation		
		Low social support	●	●
		Low contact with others	●	●

Domain	Sub-domain	Risk marker of social exclusion	ELSA	BHPS
Participation	Economic participation	Cares for another person	●	
		In employment		
		Living in a workless household		●
		Undertaking unpaid work		
		Poor quality of working life		
	Social Participation	No participation in positive activities		
	Culture, education and skills	Poor functional literacy and numeracy	●	
		School absences and exclusions		
		Not doing cultural, leisure activities		
		Not participating in cultural and Sporting activities		
		No internet access		
		No qualifications	●	●
	Political and civic participation	Not voted in the last general election	●	
Quality of life	Health and well-being	Poor self-reported general health	●	●
		Low participation in physical exercise	●	
		Obesity		
		Limiting longstanding illness	●	
		Poor emotional health	●	●
		Low well being	●	
		Low personal efficacy		
		Long periods on benefits		
		Smoking		
		Drug use		
	Living environment	Bad housing	●	●
		Homelessness		
		Poor neighbourhood safety		
		Low area satisfaction		●
		No sense of belonging	●	
		Limited access to space		
	Crime, harm and criminalisation	Fear of area after dark	●	
		Experience of crime		
		Hospital admissions		
		Domestic violence		
		Fear of crime		
		Bullying		
		Discrimination		
		Committed a crime		
		Imprisonment		
		Has an Anti Social Behaviour Order		

The BHPS risk markers selected for analysis cover eight of the ten themes of the B-SEM. As with previous analyses, some of these markers were used as characteristic variables and were used in the formulation of the Latent Class model.

In investigating the dynamics of social exclusion, we have repeated the analysis techniques that were used when exploring the multidimensional exclusion in the previous chapter. Latent Class Analysis was used to identify different combinations of multiple risk markers. The movement of these subgroups of older people was explored over time.

The difficulty in analysing different markers of risk from several consecutive survey years, is that questionnaire structure is not always the same year after year. A balance needs to be found between selecting the optimal number of risk markers for the analysis and the availability of these markers over time. Table 3-2 illustrates the risk markers chosen for the Latent Class Analysis stage of the longitudinal analysis. These cover eight of the ten themes of the B-SEM.

Table 3-2 Risk markers used in longitudinal multidimensional analysis

Wave	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Year	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05
Low relative income	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Material deprivation	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
No transport access	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Low social support	●	M	●	M	●	M	●	M	●	M	●	M	●	M	●
Low contact with others	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
No qualifications	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Poor general health	●	●	●	●	●	●	●	●	M	●	●	●	●	●	●
Poor emotional health	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Bad housing	M	M	M	M	M	●	●	●	●	●	●	●	●	●	●
Area satisfaction	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

● indicates availability of risk marker in a wave.
M indicates missing risk marker in a wave.

Due to the changing nature of the questionnaire content wave on wave, the social support risk marker of social exclusion was not available in every survey year. Self-reported general health was also not measured in one wave.

Because of this, social support and general poor health were derived for those waves in which these questions were not asked[16]. It could be argued that more markers of risk could have been derived using a similar methodology. However, it did not seem sensible to derive risk markers when there was substantial missing data due to changing questionnaire structure between survey years. In longitudinal analysis of this type, there needs to be a balance between guessing what a person might have said in a year, for which a question was missing, and excluding this risk marker altogether.

3.2 Profile of the balanced panel sample

Our analysis focuses on a panel sample of 987 individuals who were aged 60 and over in 1997, and were interviewed annually from this year until 2005.

In the first wave of the analysis (1997) 42% of the balanced panel sample were men and 58% women. 59% of older people were aged 60-69, compared with 36% aged 70-79, and 8% aged 80 and older. The sex and age profile of the balanced panel sample is markedly different from that seen in the ELSA population which reflected that of the general older population. Age distribution

[16] Imputed risk markers were derived from complete data at preceding and following waves. Prevalence of risk on derived markers was therefore in line with the prevalence of risk markers in the preceding and following wave.

among older people in the balanced panel is particularly different, and this may be a result of attrition of older old people aged 70 and over the course of the survey which started in 1991[17].

Further analysis of the socio-demographic characteristics of the panel sample is presented in section 5.4 of Annex A.

Table 3-3 Prevalence of risk markers experienced by panel sample in 1997

Material and economic resources

Risk Marker	Prevalence	Govt Indicator	Definition
Relative low income	26%	PSA17	Household income is less than 60 percent of contemporary median household income as measured by BHPS, before housing costs are deducted, and equivalised using the McClements Scale.
Material deprivation	9%	OA3	Possess three or fewer of the following: central heating, freezer or fridge freezer, washing machine, microwave oven, telephone, home computer.
Not owning own home	24%		Living in accommodation which is shared ownership, rented, or something other than owned or buying with the help of a mortgage.

Access to public and private services

Risk Marker	Prevalence	Govt Indicator	Definition
Poor access to transport	30%	OA8	No access to a car and or van for private use.

Social resources

Risk Marker	Prevalence	Govt Indicator	Definition
Low social support	38%		Scored one or more on the derived 5 point social support scale
Low contact with others	51%	OA6	Don't meet or talk to people at least once in a week

Economic participation

Risk Marker	Prevalence	Govt Indicator	Definition
Living in a workless household	70%		Living in household where no-one works

Culture, education and skills

Risk Marker	Prevalence	Govt Indicator	Definition
No qualifications	48%		Having no qualifications

Health and well-being

Risk Marker	Prevalence	Govt Indicator	Definition
Poor self-reported general health	9%		Self-reported general health is 'Poor'

[17] As the profile of the panel sample used in this study is not representative of older people in the general population, findings presented in this chapter reflect societal change rather than a change in the general population of older people between 1997 and 2005.

Poor emotional health	13%		Score at least 4 on the GHQ12 scale

Living environment

Risk Marker	Prevalence	Govt Indicator	Definition
Bad housing	26%		Have at least 1 of the following housing problems: Shortage of space; Too dark; Rising damp; Water from roof etc.; Condensation; General rot and decay; Too cold in winter.
Low area satisfaction	6%		Dislikes neighbourhood

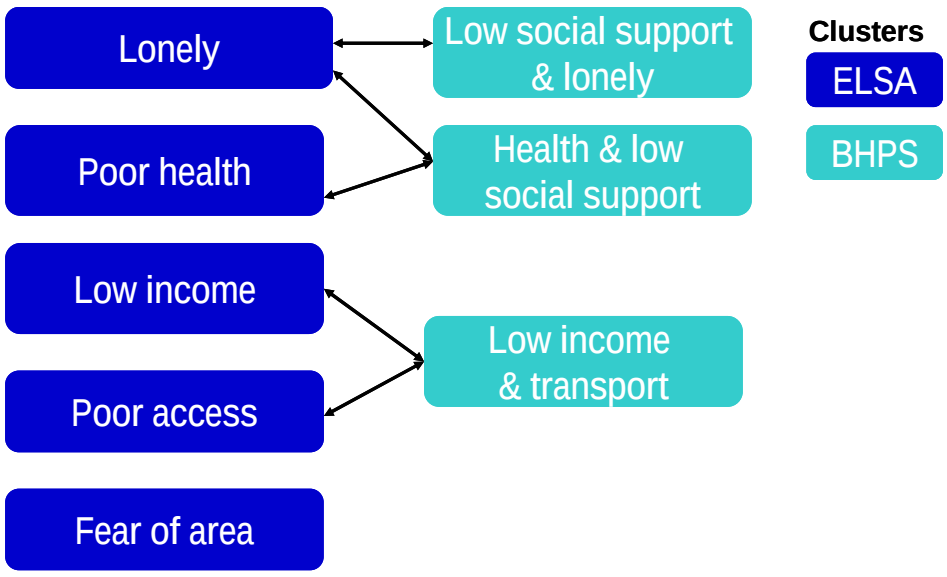
Note prevalence of risk marker , for years 1997 to 2005, is presented in section 5.5 of Annex A.

3.3 The behaviour of multidimensional social exclusion over time

As with the cross-sectional ELSA analysis, a Latent Class Analysis was run on BHPS data for all those experiencing multiple markers of risk, to form clusters of multidimensional social exclusion.[18] Then additional groups of those experiencing no risk markers or one risk marker were added after the Latent Class Analysis.

It is difficult to compare the BHPS clusters to the ELSA clusters because different variables were used in the different latent class analyses, and because there were 3 BHPS clusters and 5 ELSA clusters. However, looking at the common variables used in each analysis suggests that the ELSA and BHPS clusters map onto each other as shown in Figure 3-1.

Figure 3-1 Relationship between ELSA and BHPS multidimensional clusters



[18] Different Latent Class Analyses were run on data from 1997, 2001, 2003 and 2004 to check whether the cluster solutions were stable over time. These years were the four survey waves for which all indicators were available.

The same endemic risk markers were identified in all clusters produced by the model (low educational attainment, low social support, bad housing) and the cluster definitions themselves were similar, although the BHPS model suggested a three cluster model was the most appropriate fit for the data, compared to a five-cluster model identified in the ELSA data.

The three clusters of older people identified, can be thought of as a somewhat compressed translation of the clusters identified in the ELSA data. The three BHPS clusters followed a somewhat hierarchical nature, in that cluster one could be thought of as the subgroup least marked by risk; cluster three could be thought of as the most vulnerable to multiple exclusion; and cluster two was somewhere in the middle. Each cluster, reflects by nature, multidimensional social exclusion, in the sense that risk markers experienced in each of the three spans more than one domain of the B-SEM.

In chapter two, we explored the multidimensional social exclusion experienced by older people. Using the BHPS we are able to look at the length of time that older people experience exclusion, and whether or not their experience of exclusion is recurrent.

A useful output of Latent Class Analyses is the probability scores discussed in detail in chapter 4.2 of the technical annex. New members of a sample can be assigned to an already defined cluster structure using probability scores, or can be used to impose the cluster structure on a new wave of panel data. It is possible therefore, to explore the behaviour of different clusters of individuals longitudinally.

In this analysis, the duration of particular forms of social exclusion and its recurrence, were explored longitudinally between 1997 and 2005, through the application of assigning a defined cluster structure identified in wave 1997 of the panel data, to the following consecutive eight waves.[19]

The rest of this chapter examines each multidimensional cluster in turn[20].

[19] The cluster structure applied to all waves was checked for consistency against other survey years, and full details of this modelling approach can be found in Annex B.

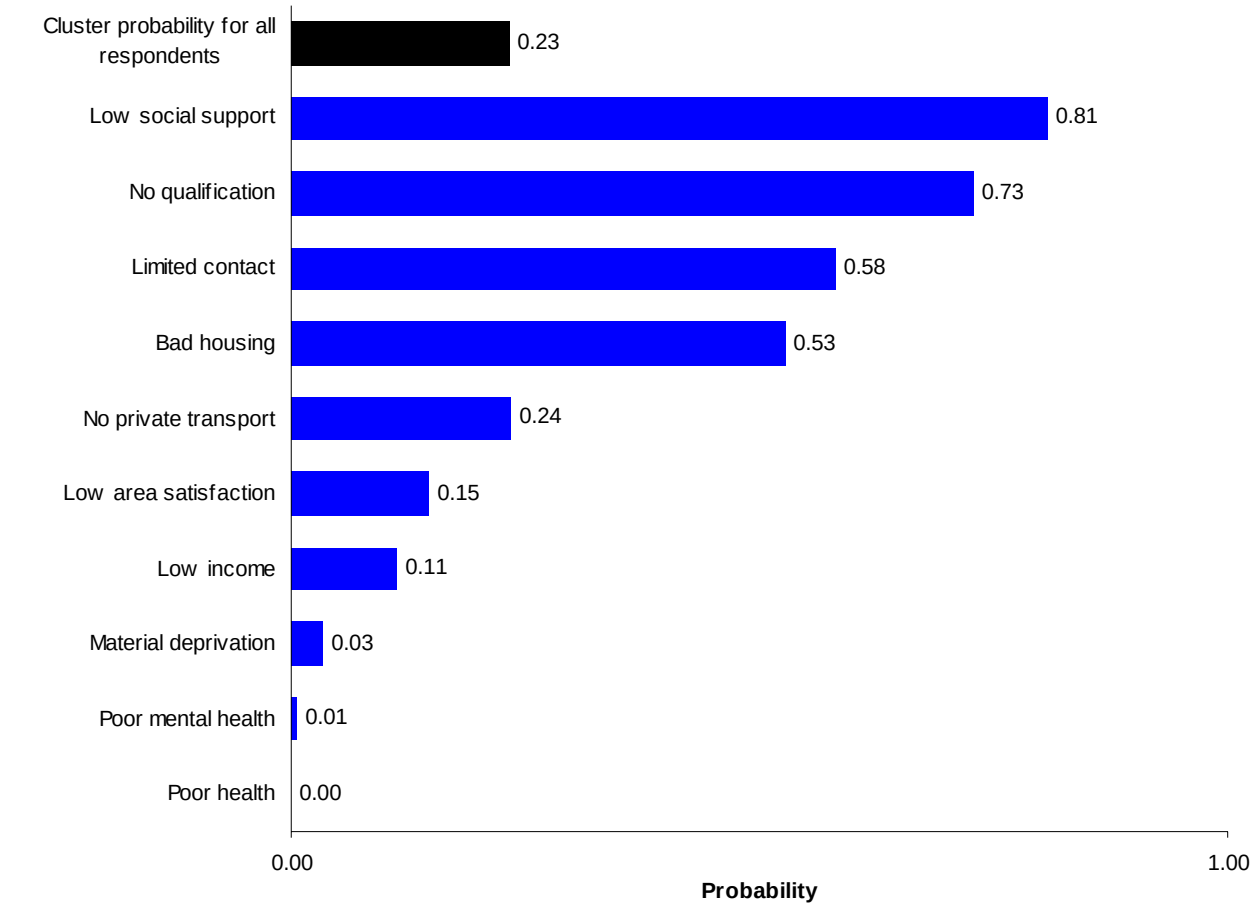
[20] Annex A, sections 5.5, 5.6, 5.7, 5.8, and 5.9 present analysis on multiple risk markers and cluster dynamics.

Low social support and loneliness cluster

This cluster consisted of 40% of those experiencing multiple social exclusion in 1997, and the mean number of risk markers experienced by this cluster was 2.6.[21] Over the nine waves, men were more likely than women to be in this group (20% compared with 17%) unlike the other two clusters where women were predominant.

Figure 3-2 Cluster One: Low social support and loneliness cluster - probabilities of risk markers

Base: 261 (46%) of those experiencing multiple risk markers of social exclusion at wave 1997



Over the 9 waves of BHPS, 83% were in the low social support and loneliness cluster on at least one occasion. Among those who were in the cluster at least once, the mean number of occurrences in the cluster was 4.2. No-one was in this cluster for all 9 waves, but 18% were in the cluster on more than two-thirds of occasions (at least 7 out of 9 years).

[21] Note that the mean number of risk markers for BHPS multidimensional clusters was lower than for ELSA clusters because there were more risk markers of social exclusion in the ELSA analysis.

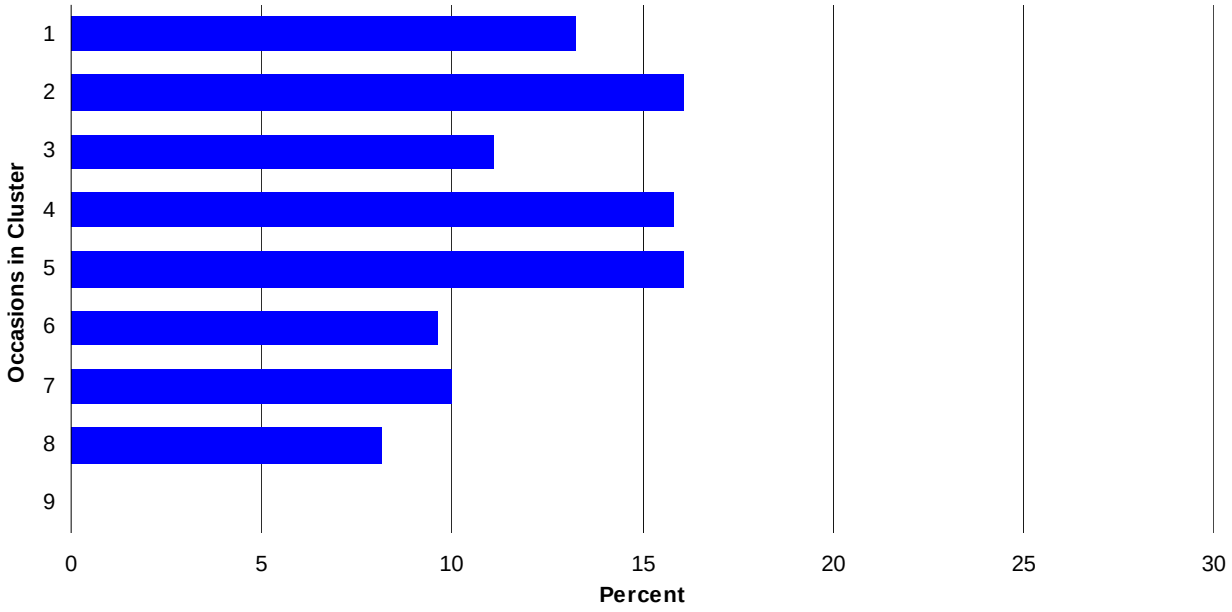
Table 3-4 Duration in low social support & loneliness cluster

Base: All in low social support and lonely cluster on at least one occasion

Years	BHPS Total %
1-3	40
4-6	41
7-9	18
Base	*822*

Figure 3-3 Duration in low social support and loneliness cluster

Base: All in low social support and lonely cluster on at least one occasion



In terms of moving between clusters between waves of BHPS, of the people who were in the low social support and loneliness cluster at a wave, 44% were likely to still be in the same cluster at the subsequent wave, 39% were likely to move to one of the other multi-risk marker clusters and 17% were likely to move out of multidimensional social exclusion (15% to singular risk marker and 1% to no risk marker[22]).

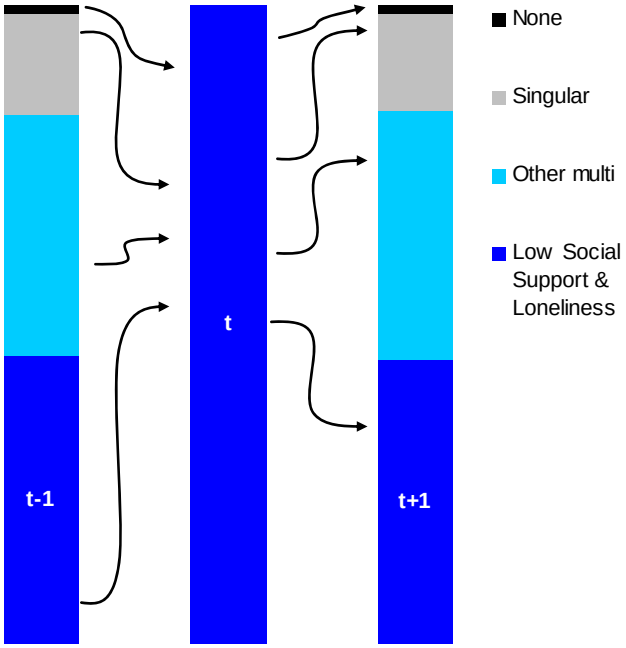
There was a similar pattern of movement seen in the low social support and loneliness group between one year and the next – 46% had been in the same cluster, 38% had been in another multi-risk marker cluster and 17% had not been in a multi-risk marker cluster.

There is clearly some churn in membership of the cluster over time, although on balance people in this cluster who move out of it were more likely to move to a different situation of multiple risk

[22] Figures do not add up to 17 due to rounding.

markers than to move out of situation of multiple risk. Given that this cluster has the lowest mean number of risk markers out of all the multi-risk marker clusters, then people in this cluster at one wave were more likely to see their situation worsening rather than improving at the next wave.

Figure 3-4 Persistence in low social support and loneliness cluster

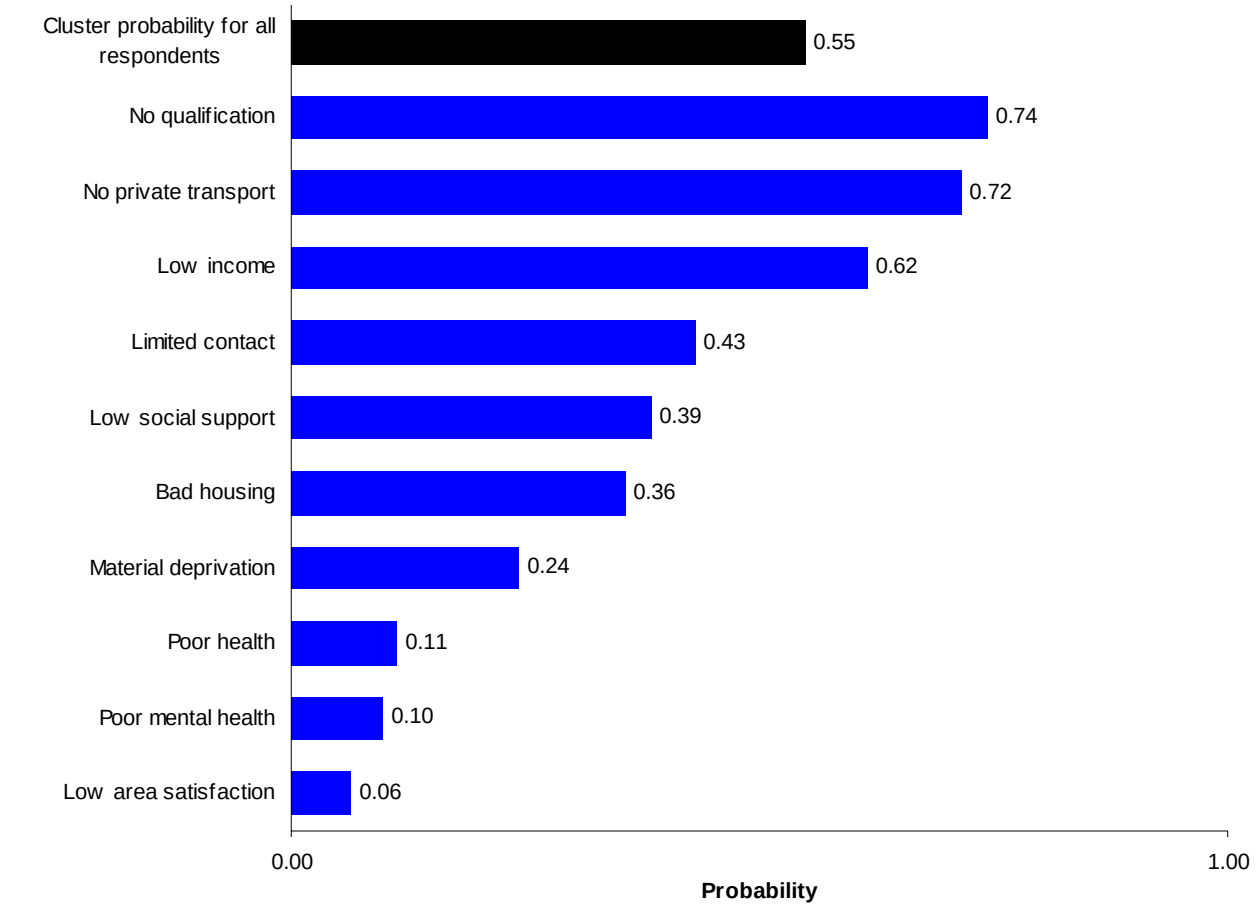


Low income and transport cluster

This cluster consisted of 40% of the multi-risk marker sample in 1997, and the overall mean number of risk markers in the cluster was 3.3.[23] Older people in this cluster were likely to be women (31% women, compared with 21% men). This cluster was most likely to apply to older old people than the other clusters (40% aged 80+ compared with 30% aged 70-79, and 18% aged 60-69).

Figure 3-5 Cluster Two: Low income and transport cluster - probabilities of risk markers

Base: 183 (32%) of those experiencing multiple risk markers of social exclusion at wave 1997



Over the 9 waves of BHPS, 64% were in the low income and transport cluster on at least one occasion. Among those who were in the cluster at least once, the mean number of occurrences in the cluster was 4.5. 10% of those who were in the cluster at least once were in this cluster for all 9 waves, and 28% were in the cluster on more than two-thirds of occasions (at least 7 out of 9 years).

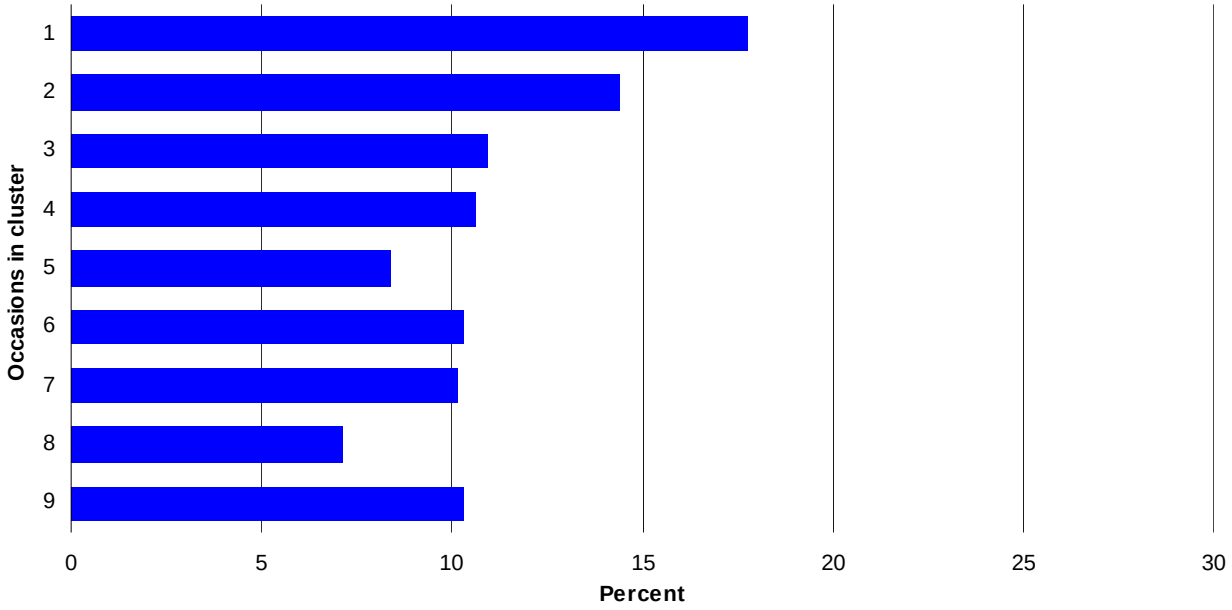
[23] Note that the mean number of risk markers for BHPS multidimensional clusters was lower than for ELSA clusters because there were more risk markers of social exclusion in the ELSA analysis.

Table 3-5 Duration in low income and transport cluster

Base: All in low income and transport cluster on at least one occasion	*BHPS*
Years	Total %
1-3	43
4-6	29
7-9	28
Base	*631*

Figure 3-6 Duration in low income and transport cluster

Base: All in low income and transport cluster on at least one occasion

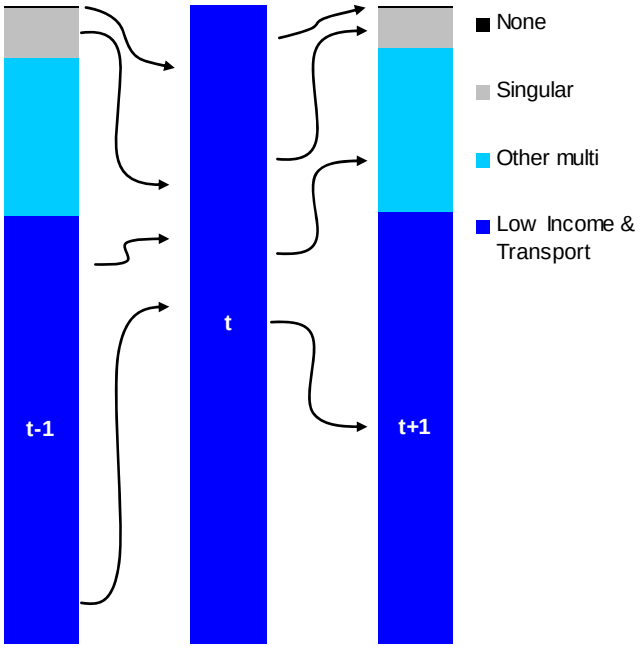


In terms of moving between clusters between waves of BHPS, of the people who were in the low income and transport cluster at a wave, 68% were likely to still be in the same cluster at the subsequent wave, 26% were likely to move to one of the other multi-risk marker clusters and 7% were likely to move out of multidimensional social exclusion (almost all of these to singular risk marker).

There was a similar pattern of movement looking back at which clusters people in the low income and transport cluster were in at the previous wave – 67% had been in the same cluster, 33% had been in another multi-risk marker cluster and 8% had not been in a multi-risk marker cluster.

There was less movement in and out of this cluster over time than there was for the other clusters. Again on balance people in this cluster who move out of it were more likely to move to a different combination of multiple markers of risk than to move out of an experience of multiple markers.

Figure 3-7 Persistence in low income and transport cluster

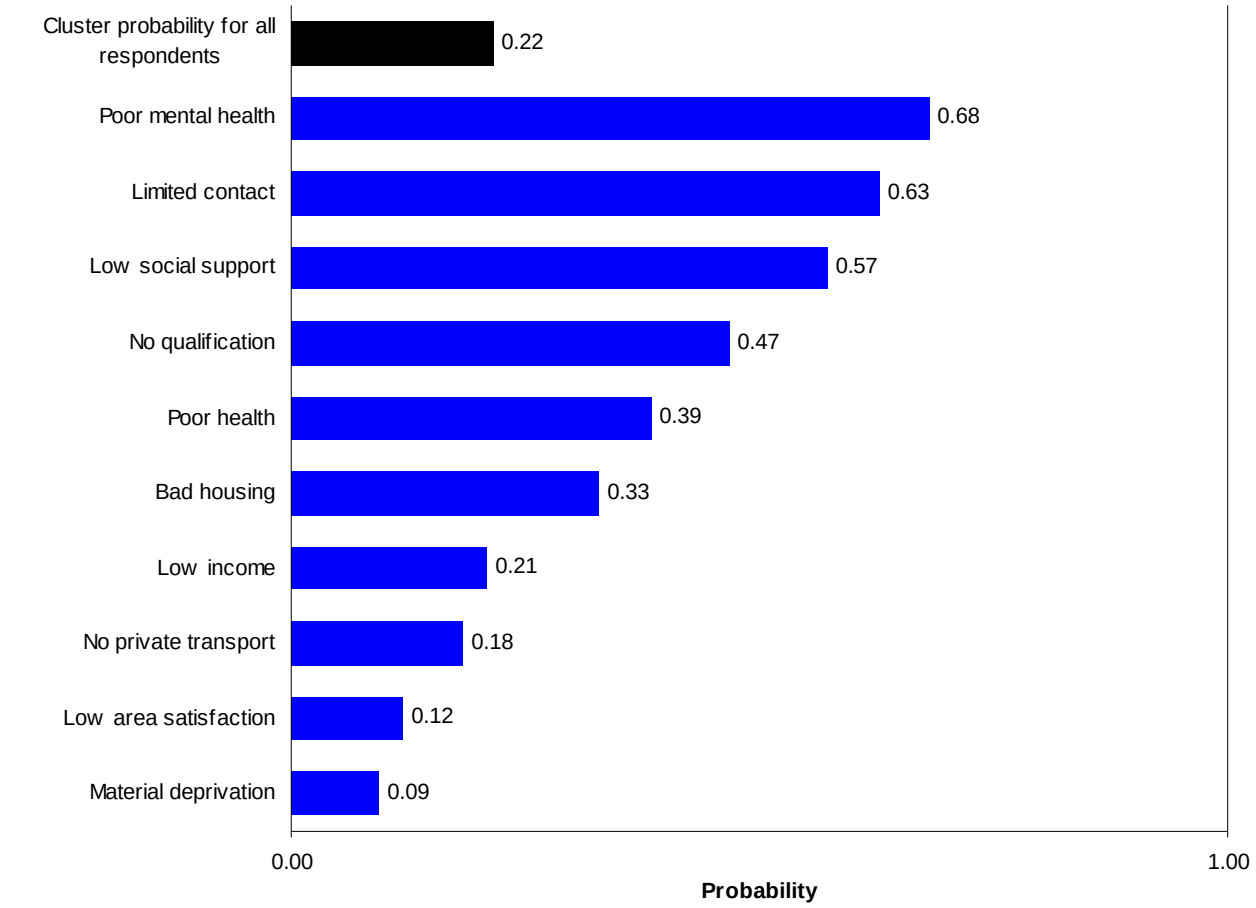


Health and loneliness cluster

This cluster consisted of 20% of the multi-risk marker sample in 1997, and the overall mean number of risk markers in the cluster was 3.4.[24] On average, women were more predominant than men in this cluster (18% compared with 13%). People in this group were no more likely to be older old than to be younger old.

Figure 3-8 Cluster Three: Health and loneliness cluster - probabilities of risk markers

Base: 129 (22%) of those experiencing multiple risk markers of social exclusion at wave 1997



Over the 9 waves of BHPS, 65% were in the health and loneliness cluster on at least one occasion. Among those who were in the cluster at least once, the mean number of occurrences in the cluster was 3.0. No-one was in this cluster for all 9 waves, but 7% of those who were in the cluster on at least one occasion were in the cluster on more than two-thirds of occasions (at least 7 out of 9 years).

[24] Note that the mean number of risk markers for BHPS multidimensional clusters was lower than for ELSA clusters because there were more risk markers of social exclusion in the ELSA analysis.

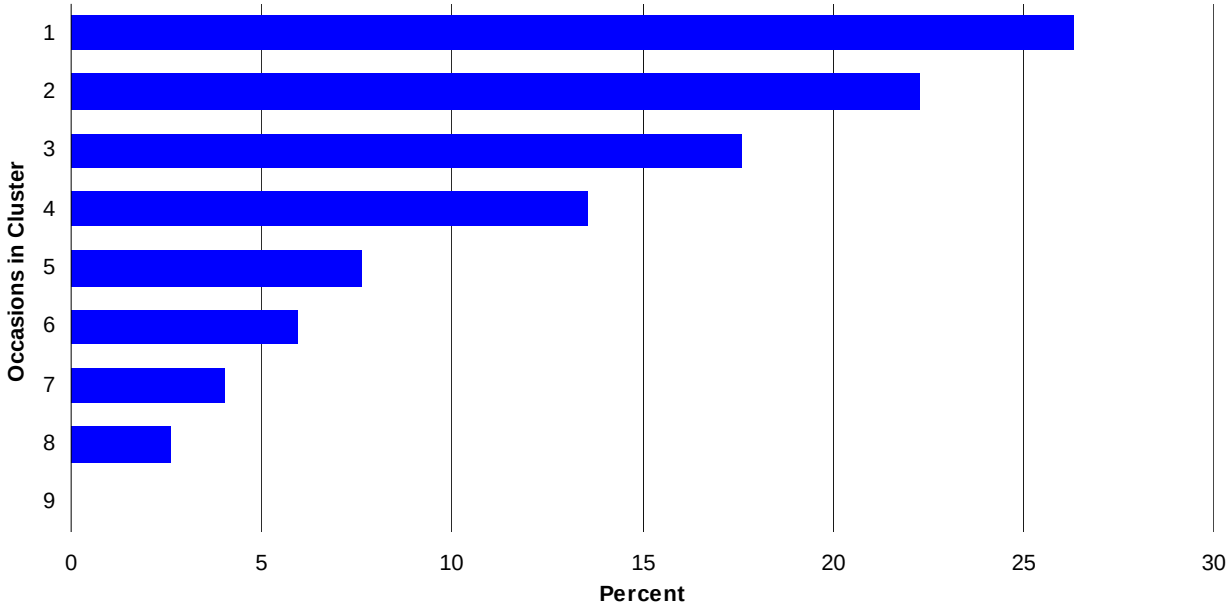
Table 3-6 Duration in health and loneliness cluster

Base: All in health and loneliness cluster on at least one occasion

Years	BHPS Total %
1-3	66
4-6	27
7-9	7
Base	*642*

Figure 3-9 Duration in health and loneliness cluster

Base: All in low social support and lonely cluster on at least one occasion

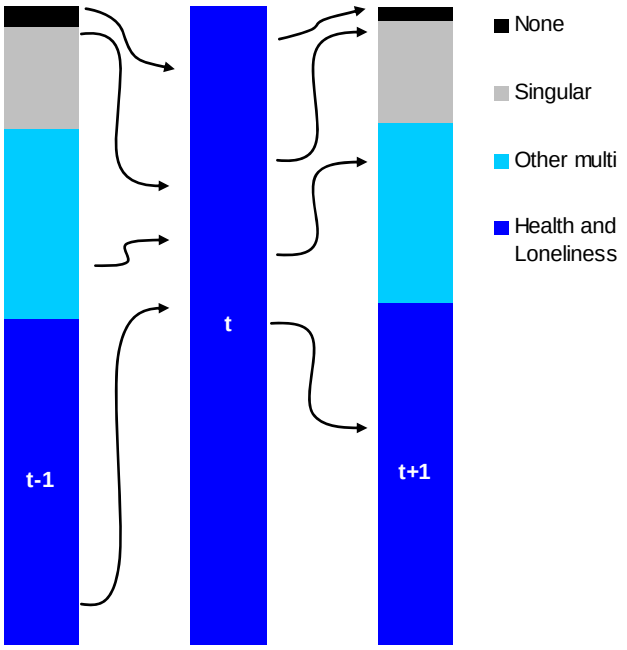


In terms of moving between clusters between waves of BHPS, of the people who were in the health and loneliness cluster at a wave, 54% were likely to still be in the same cluster at the subsequent wave, 28% were likely to move to one of the other multi-risk marker clusters and 18% were likely to move out of multidimensional social exclusion (16% to singular risk marker and 2% to no risk markers).

Looking back at which clusters people in the health and loneliness cluster were in at the previous wave – 51% had been in the same cluster, 30% had been in another multi-risk marker cluster and 19% had not been in a multi-risk marker cluster.

Although this was the cluster with the highest mean number of risk markers, people who moved out of the cluster were more likely to move out of the experience of multiple risk markers than to move to a different combination of multiple risk markers when compared to other clusters.

Figure 3-10 Persistence in health and loneliness cluster



3.4 Comparing combinations of multiple risk markers of social exclusion over time

One of the problems with using BHPS data to segment those experiencing multiple risk markers is that there were fewer clusters than the ELSA segmentation (3 compared with 5), which will be driven by the fact that there were 16 risk markers used in the ELSA Latent Class analysis compared with 10 in the BHPS analysis. It should also be noted that low social support and lack of contact with others, were drivers of both the low social support and loneliness cluster and the health and loneliness cluster, which reduces the difference between these two clusters.

The 3 BHPS clusters were also less distinct than the ELSA clusters – in terms of mean number of markers of risk the BHPS clusters ranged from 2.6-3.4 mean markers of risk, whereas the range for ELSA clusters was twice as large 1.6-3.2.[25] Thus it should be borne in mind that the BHPS analysis examining duration in clusters and movement between clusters may simplify some of the relationships which could be drawn out if there were more waves of ELSA to be able to carry out an equivalent analysis.

The severity of the risk of social exclusion in each of the BHPS clusters was inversely related to their size. The largest cluster was low social support and loneliness which comprised 46% of those experiencing multiple risk markers at a wave and older people in this cluster experienced a mean of 2.6 markers of risk. The equivalent figures for the low income and transport were 32% of the

[25] Note that the ELSA range has been scaled to be comparable. The actual range based on 16 indicators was 2.5-5.1.

multi-risk marker population and mean of 3.2 markers of risk, and for the health and loneliness cluster were 22% and 3.4 markers of risk.

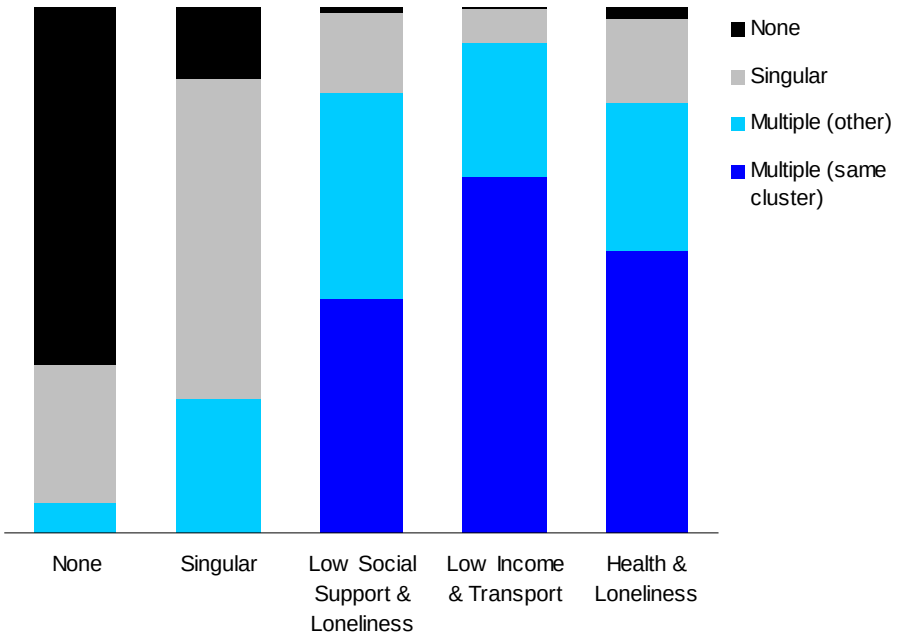
Although at any one wave the low income and transport cluster was larger than the health and loneliness cluster, over all 9 waves used in the analysis, there were similar proportions of the total sample who were members of each of clusters on at least one occasion (64% and 65% respectively). In comparison, 83% of the population of older people was in the low social support and loneliness cluster on at least one of the 9 waves.

In terms of long-term cluster membership, of those who had at least one occasion in a cluster, 28% of those in the income and transport cluster were in this cluster on at least 7 of the 9 waves. Equivalent figures for the other clusters were 18% for low social support and loneliness and 7% for health and loneliness.

These apparent anomalies can be explained by the transition between clusters. Of those in the low income and transport cluster at one wave, 68% were likely to remain in that cluster at the subsequent wave, whereas the equivalent likelihood for the health and loneliness cluster was 54% and for the low social support and loneliness it was 44%.

Those in the low income and transport cluster were less likely to move out of a multi-risk marker situation (7%) than those in the health and loneliness or low social support and loneliness clusters (18% and 17% respectively).

Figure 3-11 Movement to different clusters at t+1



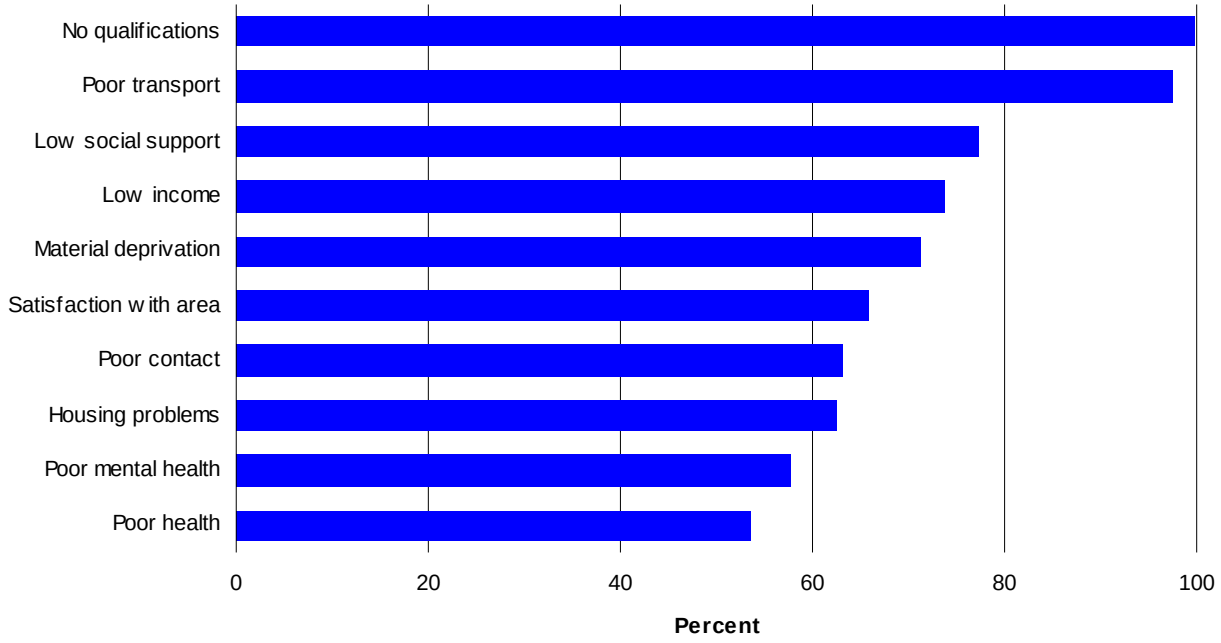
We would expect people in the cluster with the highest mean number of markers of risk to be the least likely to move out of multiple risk markers, simply as a result of having to come out of more situations of risk markers. This appears not to be the case with this analysis. However, this may be

an artefact of the extent that the BHPS analysis managed to discriminate between clusters, as we have seen that the ELSA analysis produced clusters with a wider range of mean marker of risk. The mean number of risk markers experienced by the low income and transport cluster and the health and loneliness cluster were in fact very similar (3.2 compared with 3.4), so there must be another explanation for why people are less likely to escape from the low income and transport cluster.

Rather than looking at whether people remain in the same cluster in the next wave, it is possible to look at movement for each individual risk marker, to see the extent of movement. The no qualifications and poor transport risk markers were the most persistent (and low income was also relatively persistent), and the health and mental health risk markers were the least persistent. This explains why there was more movement out of the health and loneliness cluster than out of the income and transport cluster.

Figure 3-12 Persistence of individual risk markers at t+1

Base: all experiencing individual risk markers of social exclusion



It should be noted that some of the movement in these risk markers (and hence between clusters) may be due to the underlying reliability of the markers used (ie would people give the same answer at different points in time if nothing had changed). The measurement of lack of qualifications is completely factual, unlikely to change much with this cohort of older people and depending on the complexity of the question, the measurement should be reasonably reliable. In contrast measurements of health status (particularly just using one question about general health) are much more likely to be affected by short term situations and people's mood, and hence may be intrinsically less stable than other measurements.

This needs to be taken into account when interpreting the results and drawing up policy recommendations. It may not be the case that in reality people are more likely to move in and out of a poor health and loneliness cluster, it may instead be an artefact of the reliability of the risk markers used.

3.5 Triggers of becoming marked by risk

There are a number of event triggers which may cause people to become marked by risk. As we have longitudinal data, we can define changes in status such as becoming retired since the previous wave and look at their relationship with a change in risk marker and a change in cluster membership. This analysis is therefore based on events, which gives us a much larger total sample size (8883) as each transition of a sample member from one wave to the next is an event.

There were 7 different triggers that could be defined using BHPS data. Note that for most people each event would usually only happen once during the transition between the 9 waves of BHPS used. The triggers defined were:

- becoming retired (4% of events);
- starting to draw a pension (3% of events);
- moving house (3% of events);
- having an accident (8% of events);
- becoming widowed (2% of events);
- getting divorced (<0.5% of events);
- getting married (<0.5% of events).

It should be borne in mind that even with a large sample of events, getting divorced or married were still extremely rare occurrences and therefore it is difficult for these events to show a significant relationship with changes in risk marker.

Before examining the potential impact of these triggers on cluster membership, we first need to look at whether they are related to any changes in risk marker. Thus, for example, becoming retired was related to becoming marked by risk on the low income and poor mental health risk markers.

Table 3-7 Becoming marked by risk by trigger event

	Trigger event						
Change in risk markers	Retired	Pension	Move house	Accident	Widowed	Divorced	Married
Low social support					●		
Low income	●				●		
Material deprivation						●	
Poor transport			●	●	●		
Housing problems		●				●	
Poor contact			●				
No qualifications							
Poor health				●			●
Poor mental health	●			●	●		
Satisfaction with area							

● significant relationship

The next step is to examine whether any of these triggers are related to a change from a non-multiple risk marker situation to a multi-risk marker one. Getting divorced between one year and the next, or becoming widowed, were the only events that were significantly related to a change in situation from experiencing none or one risk marker of social exclusion to experiencing multiple risk markers.

Becoming widowed was related to becoming marked by risk on 4 measures (low social support, low income, poor transport and poor mental health), all of which were strong drivers of the membership of each of the cluster groups and the end result was that becoming widowed was related to a net move into the health and loneliness cluster. The health and loneliness cluster was the one with the highest mean number of markers of risk, so perhaps in this instance it is the number of risk markers experienced that is driving the relationship between becoming widowed and membership of this cluster.

Getting divorced was related to becoming marked by risk on two measures (material deprivation and housing problems), neither of which were strong drivers of cluster membership. This probably explains why although getting divorced was related to becoming at risk of multiple markers, there was no relationship between getting divorced and becoming a member of any particular multi-risk marker cluster group.

Although having an accident was related to becoming marked by risk on 3 measures (poor transport, poor health and poor mental health), it was not related to becoming at risk of multiple markers. This may be due to the fact that older people who were already in the poor health and loneliness cluster were more likely to have had an accident.

4 Policy directions

This study has identified new information about the different types of social exclusion older people face. The obvious policy direction recommended by this report is a focus on the 50% of individuals aged 60 and over who experience multiple risk markers of social exclusion. At a basic population level, women and the oldest old were identified as most at risk of experiencing multiple risk markers. A policy focus on social exclusion should consider these two groups, particularly as the fastest growing age group in the UK is those aged 80 and over (of which there are currently 2.7 million in the population), and the next few years will see women born in the immediate World War Two baby boom reaching pensionable age. However, a general issue for policy makers is the sheer number of older people in these two 'at risk' groups.

The size and representativeness of the 2004-5 ELSA data used in the cross-sectional analysis in this research led to the identification of five different combinations of multiple risk markers. Individuals facing one of these combinations of multiple risk markers were categorised by the most predominant problem they experienced – access problems in terms of services and transport, health problems, low income problems, loneliness and support problems, or fear of local area problems. While using these typologies may be useful in developing focused and singular strands of policy, it is important to note that older people in these groups experienced *multiple* problems that were not necessarily restricted to the somewhat singular definition given above.

A key finding of this study was that all those experiencing multiple risk markers shared common problems. Having poor functional and literacy skills, living in bad housing, having low social support, and having a low political efficacy were endemic among *all* older people marked by risk, and as such must be considered in policy.

Considering the experience of multiple risk markers over time can inform social exclusion policy. Evidence in this study suggests that older people who have a combination of low income and transport problems are likely to experience multiple risk markers for the longest period of time. Older people experiencing a combination of loneliness and health problems, or low social support problems, experience multiple risk markers for a shorter duration. However, this does not mean that these groups should be seen as less important in the eyes of policy makers.

Above all else, the research has shown that the combinations of multiple risk markers experienced by older people are complex and interrelated. Key targets for action suggested by the work include improving access to services and transport, poor general and mental health, low income, loneliness and low social support. In developing a comprehensive strategy to tackle exclusion, an understanding of the socio-characteristics of people experiencing multiple risk markers must be considered alongside the types of exclusion identified. Typically those at risk of experiencing any of the five combinations of multiple risk markers are older people, who live alone, are single, physically inactive, have a limiting illness, have poor health in general, and have a low well-being.

This research highlights the need for policy makers to take a 'joined up' approach in tackling the issue of older people experiencing multiple risk markers of social exclusion. Close co-ordination is needed between Departments, Local Authorities and third sector organisations in delivering strategies to keep older people in touch with services and society more generally.

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5 Annex A: Tables

5.1 Markers of risk by age and sex

Table 5-1 Low income, by age and sex

Base: All respondents *ELSA*

	Age			
Marked by risk	60-69 %	70-79 %	80+ %	Total %
Men				
No	87	78	74	82
Yes	13	22	26	18
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
No	83	69	55	73
Yes	17	31	45	27
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-2 Material deprivation, by age and sex

Base: All respondents *ELSA*

	Age			
Marked by risk	60-69 %	70-79 %	80+ %	Total %
Men				
No	97	95	90	95
Yes	3	5	10	5
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
No	99	96	85	95
Yes	1	4	15	5
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-3 Pension wealth, by age and sex

Base: All respondents *ELSA*

	Age			
Marked by risk	60-69 %	70-79 %	80+ %	Total %
Men				
No	100	100	100	100
Yes			0	0
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
No	96	91	81	91
Yes	4	9	19	9
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-4 Access to services, by age and sex

Base: All respondents *ELSA*

Marked by risk	Age 60-69 %	70-79 %	80+ %	Total %
Men				
No	92	90	79	89
Yes	8	10	21	11
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
No	91	85	68	85
Yes	9	15	32	15
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-5 Transport access, by age and sex

Base: All respondents *ELSA*

Marked by risk	Age 60-69 %	70-79 %	80+ %	Total %
Men				
No	98	96	90	96
Yes	2	4	10	4
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
No	98	94	79	93
Yes	2	6	21	7
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-6 Financial services, by age and sex

Base: All respondents *ELSA*

Marked by risk	Age 60-69 %	70-79 %	80+ %	Total %
Men				
No	97	97	97	97
Yes	3	3	3	3
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
No	97	97	94	97
Yes	3	3	6	3
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-7 Social support, by age and sex

Base: All respondents *ELSA*

	Age			
Marked by risk	60-69 %	70-79 %	80+ %	Total %
Men				
No	85	84	82	84
Yes	15	16	18	16
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
No	89	79	67	81
Yes	11	21	33	19
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-8 Contact with other people, by age and sex

Base: All respondents *ELSA*

	Age			
Marked by risk	60-69 %	70-79 %	80+ %	Total %
Men				
No	85	87	92	87
Yes	15	13	8	13
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
No	94	94	95	94
Yes	6	6	5	6
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-9 Literacy and numeracy skills, by age and sex

Base: All respondents *ELSA*

	Age			
Marked by risk	60-69 %	70-79 %	80+ %	Total %
Men				
No	91	84	83	87
Yes	9	16	17	13
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
No	83	79	73	80
Yes	17	21	27	20
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-10 Political efficacy (not voted), by age and sex

Base: All respondents *ELSA*

	Age			
Marked by risk	60-69 %	70-79 %	80+ %	Total %
Men				
No	83	90	92	87
Yes	17	10	8	13
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
No	85	86	85	86
Yes	15	14	15	14
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-11 Poor general health, by age and sex

Base: All respondents *ELSA*

	Age			
Marked by risk	60-69 %	70-79 %	80+ %	Total %
Men				
No	91	92	92	92
Yes	9	8	8	8
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
No	95	91	91	93
Yes	5	9	9	7
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-12 Poor emotional health, by age and sex

Base: All respondents *ELSA*

	Age			
Marked by risk	60-69 %	70-79 %	80+ %	Total %
Men				
No	92	92	89	92
Yes	8	8	11	8
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
No	89	84	81	86
Yes	11	16	19	14
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-13 Low physical activity, by age and sex

Base: All respondents *ELSA*

	Age			
Marked by risk	60-69 %	70-79 %	80+ %	Total %
Men				
No	95	96	88	94
Yes	5	4	12	6
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
No	97	94	80	93
Yes	3	6	20	7
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-14 Bad housing, by age and sex

Base: All respondents *ELSA*

	Age			
Marked by risk	60-69 %	70-79 %	80+ %	Total %
Men				
No	82	84	87	83
Yes	18	16	13	17
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
No	84	83	85	84
Yes	16	17	15	16
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-15 Sense of belonging in local area, by age and sex

Base: All respondents *ELSA*

	Age			
Marked by risk	60-69 %	70-79 %	80+ %	Total %
Men				
No	91	94	95	93
Yes	9	6	5	7
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
No	92	93	93	93
Yes	8	7	7	7
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-16 Fear of local area after dark, by age and sex

Base: All respondents *ELSA*

	Age			
Marked by risk	60-69 %	70-79 %	80+ %	Total %
Men				
No	75	74	72	74
Yes	25	26	28	26
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
No	72	68	60	69
Yes	28	32	40	31
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

5.2 Socio-demographic characteristics of ELSA sample

Table 5-17 Marital status, by age and sex

Base: All respondents *ELSA*

	Age			
Family type	60-69 %	70-79 %	80+ %	Total %
Men				
Single, never married	6	5	2	5
Married	68	70	56	67
Remarried	14	10	8	12
Legally separated or divorced	8	4	1	6
Widowed	4	11	33	10
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
Single, never married	3	5	6	4
Married	60	48	17	48
Remarried	13	4	3	8
Legally separated or divorced	12	7	1	8
Widowed	12	36	72	32
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-18 Lives alone, by age and sex

Base: All respondents *ELSA*

	Age			
Lives alone	60-69 %	70-79 %	80+ %	Total %
Men				
Yes	12	16	27	15
No	88	84	73	85
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
Yes	18	38	69	34
No	82	62	31	66
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-19 Number of children, by age and sex

Base: All respondents *ELSA*

	Age			
Children	60-69 %	70-79 %	80+ %	Total %
Men				
Yes	87	91	90	89
No	13	9	10	11
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
Yes	91	88	85	89
No	9	12	15	11
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-20 Number of siblings, by age and sex

Base: All respondents *ELSA*

	Age			
Siblings	60-69 %	70-79 %	80+ %	Total %
Men				
Yes	79	73	61	75
No	21	27	39	25
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
Yes	80	76	52	73
No	20	24	48	27
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-21 Qualifications, by age and sex

Base: All respondents *ELSA*

	Age			
Qualifications	60-69 %	70-79 %	80+ %	Total %
Men				
Yes	79	73	61	75
No	21	27	39	25
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
Yes	80	76	52	73
No	20	24	48	27
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-22 Housing tenure, by age and sex

Base: All respondents *ELSA*

	Age			
Housing tenure	60-69 %	70-79 %	80+ %	Total %
Men				
Owner	66	79	78	72
Buyer	20	5	3	12
Private renter	11	13	16	12
Social renter or rent free	3	3	3	3
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
Owner	72	72	67	71
Buyer	15	5	2	9
Private renter	10	19	25	16
Social renter or rent free	3	4	6	4
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-23 Limiting longstanding illness, by age and sex

Base: All respondents *ELSA*

	Age			
Limiting longstanding illness	60-69 %	70-79 %	80+ %	Total %
Men				
Yes	30	38	44	34
No	70	62	56	66
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
Yes	31	41	47	38
No	69	59	53	62
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-24 Housing tenure, by age and sex

Base: All respondents *ELSA*

	Age			
Housing tenure	60-69 %	70-79 %	80+ %	Total %
Men				
Owner	66	79	78	72
Buyer	20	5	3	12
Private renter	11	13	16	12
Social renter or rent free	3	3	3	3
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
Owner	72	72	67	71
Buyer	15	5	2	9
Private renter	10	19	25	16
Social renter or rent free	3	4	6	4
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-25 Index of Multiple Deprivation Quintile, by age and sex

Base: All respondents *ELSA*

	Age			
IMD Quintile	60-69 %	70-79 %	80+ %	Total %
Men				
Least deprived quintile	24	25	28	25
Second quintile	25	23	28	25
Third quintile	19	23	19	20
Fourth quintile	19	17	16	18
Most deprived quintile	14	11	9	12
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
Least deprived quintile	25	23	21	23
Second quintile	25	24	27	25
Third quintile	21	21	18	20
Fourth quintile	18	18	20	18
Most deprived quintile	12	14	15	13
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-26 Well-being, by age and sex

Base: All respondents *ELSA*

	Age			
Well-being	60-69 %	70-79 %	80+ %	Total %
Men				
High	80	80	72	79
Low	20	20	28	21
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
High	84	80	70	80
Low	16	20	30	20
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-27 Carer, by age and sex

Base: All respondents *ELSA*

	Age			
Carer	60-69 %	70-79 %	80+ %	Total %
Men				
Yes	88	89	94	89
No	12	11	6	11
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
Yes	79	86	95	84
No	21	14	5	16
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-28 Population density, by age and sex

Base: All respondents *ELSA*

	Age			
Population density	60-69 %	70-79 %	80+ %	Total %
Men				
City	74	72	75	73
Town	12	12	12	12
Village or hamlet	15	16	13	15
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
City	75	75	76	75
Town	11	13	13	12
Village or hamlet	14	12	11	13
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

Table 5-29 Ethnicity, by age and sex

Base: All respondents *ELSA*

	Age			
Ethnicity	60-69 %	70-79 %	80+ %	Total %
Men				
White	98	99	99	98
Non-white	2	1	1	2
Weighted bases	*1007*	*701*	*248*	*1956*
Unweighted bases	*1026*	*747*	*252*	*2025*
Women				
White	98	99	100	99
Non-white	2	1		1
Weighted bases	*1114*	*837*	*441*	*2392*
Unweighted bases	*1230*	*874*	*394*	*2498*

5.3 Exploring multidimensional social exclusion

Table 5-30 Multidimensional social exclusion, by sex

Base: All respondents *ELSA*

	Sex		
Risk marker Clusters	Men %	Women %	Total %
No risk markers	26	20	23
1 risk marker	30	26	28
Multi: Lonely	10	9	9
Multi: Fear of local area	11	13	12
Multi: Low income	12	20	16
Multi: Poor Health	7	7	7
Multi: Poor Access	4	6	5
Weighted bases	*1956*	*2392*	*4348*
Unweighted bases	*2025*	*2498*	*4523*

Table 5-31 Multidimensional social exclusion, by age

Base: All respondents *ELSA*

	Age			
Risk marker clusters	60-69 %	70-79 %	80+ %	Total %
No risk markers	28	21	9	23
1 risk marker	31	28	19	28
Multi: Lonely	10	9	8	9
Multi: Fear of local area	12	11	12	12
Multi: Low income	10	19	28	16
Multi: Poor Health	7	7	7	7
Multi: Poor Access	2	5	16	5
Weighted bases	*2121*	*1538*	*690*	*4348*
Unweighted bases	*2256*	*1621*	*646*	*4523*

Table 5-32 Multidimensional social exclusion, by marital status

Base: All respondents *ELSA*

	Married		Non-married					Total
	Married	Remarried	Total	Single	Divorced/ Separated	Widowed	Total	
Risk maker clusters	%	%	%	%	%	%	%	%
No risk markers	29	25	29	2	11	16	11	23
1 risk marker	33	29	32	20	19	22	18	28
Multi: Lonely	7	13	8	22	12	13	10	9
Multi: Fear of local area	11	12	11	17	14	14	13	12
Multi: Low income	11	9	11	27	27	21	28	16
Multi: Poor Health	7	11	7	3	7	8	7	7
Multi: Poor Access	2	1	2	10	10	6	12	5
Weighted bases	*2463*	*418*	*2881*	*197*	*1465*	*309*	*960*	*4348*
Unweighted bases	*2559*	*446*	*3005*	*196*	*1517*	*343*	*978*	*4523*

Table 5-33 Multidimensional social exclusion, by whether lives alone

Base: All non-married respondents *ELSA*

	Lives alone		
Risk maker clusters	Yes %	No %	Total %
No risk markers	10	14	11
1 risk marker	18	24	19
Multi: Lonely	12	12	12
Multi: Fear of local area	14	13	14
Multi: Low income	29	20	27
Multi: Poor Health	6	10	7
Multi: Poor Access	12	7	10
Weighted bases	*1105*	*360*	*1465*
Unweighted bases	*1156*	*361*	*1517*

Table 5-34 Multidimensional social exclusion, by whether has living siblings

Base: All respondents *ELSA*

Risk maker clusters	Has living siblings: Yes %	No %	Total %
No risk markers	21	23	23
1 risk marker	27	28	28
Multi: Lonely	10	9	9
Multi: Fear of local area	12	12	12
Multi: Low income	17	16	16
Multi: Poor Health	6	7	7
Multi: Poor Access	7	4	5
Weighted bases	*1132*	*3209*	*4348*
Unweighted bases	*1171*	*3345*	*4523*

Table 5-35 Multidimensional social exclusion, by whether has qualifications

Base: All respondents *ELSA*

Risk maker clusters	Has qualifications: Yes %	No %	Total %
No risk markers	29	15	23
1 risk marker	32	23	28
Multi: Lonely	9	9	9
Multi: Fear of local area	11	13	12
Multi: Low income	11	22	16
Multi: Poor Health	5	10	7
Multi: Poor Access	3	8	5
Weighted bases	*2404*	*1944*	*4348*
Unweighted bases	*2640*	*1883*	*4523*

Table 5-36 Multidimensional social exclusion, by tenure

Base: All respondents *ELSA*

	Tenure		
	Own	Rent	Total
Risk maker clusters	%	%	%
No risk markers	26	6	23
1 risk marker	30	16	28
Multi: Lonely	9	10	9
Multi: Fear of local area	11	15	12
Multi: Low income	14	27	16
Multi: Poor Health	6	13	7
Multi: Poor Access	4	12	5
Weighted bases	*3576*	*766*	*4348*
Unweighted bases	*3790*	*728*	*4523*

Table 5-37 Multidimensional social exclusion, by income quintile

Base: All respondents *ELSA*

	IMD Quintile					
	Lowest income quintile	2nd quintile	3rd quintile	4th quintile	Highest income IMD quintile	Total
Risk maker clusters	%	%	%	%	%	%
No risk markers		18	25	29	41	23
1 risk marker	18	27	30	31	33	28
Multi: Lonely	1	11	13	13	9	9
Multi: Fear of local area		17	17	14	12	12
Multi: Low income	69	12				16
Multi: Poor Health	6	9	9	8	3	7
Multi: Poor Access	5	6	6	5	2	5
Weighted bases	*870*	*870*	*869*	*868*	*870*	*4348*
Unweighted bases	*861*	*881*	*899*	*914*	*968*	*4523*

Table 5-38 Multidimensional social exclusion, by whether has limiting longstanding illness

Base: All respondents *ELSA*

	Has LLI		
	Yes	No	Total
Risk maker clusters	%	%	%
No risk markers	27	14	23
1 risk marker	31	22	28
Multi: Lonely	10	9	9
Multi: Fear of local area	12	13	12
Multi: Low income	17	15	16
Multi: Poor Health	1	17	7
Multi: Poor Access	2	10	5
Weighted bases	*2772*	*1576*	*4348*
Unweighted bases	*2891*	*1632*	*4523*

Table 5-39 Multidimensional social exclusion, by IMD quintile

Base: All respondents *ELSA*

	IMD Quintile					
Risk maker clusters	Most deprived IMD quintile %	2nd quintile %	3rd quintile %	4th quintile %	Least deprived IMD quintile %	Total %
No risk markers	10	14	23	25	33	23
1 risk marker	19	25	32	30	30	28
Multi: Lonely	10	10	8	9	10	9
Multi: Fear of local area	17	15	10	10	10	12
Multi: Low income	22	21	16	16	10	16
Multi: Poor Health	14	8	6	6	4	7
Multi: Poor Access	9	7	5	4	3	5
Weighted bases	*558*	*783*	*889*	*1075*	*1041*	*4348*
Unweighted bases	*546*	*793*	*921*	*1138*	*1124*	*4523*

Table 5-40 Multidimensional social exclusion, by well-being

Base: All respondents *ELSA*

	Well-being		
Risk maker clusters	High %	Low %	Total %
No risk markers	27	8	23
1 risk marker	31	16	28
Multi: Lonely	9	12	9
Multi: Fear of local area	12	13	12
Multi: Low income	16	15	16
Multi: Poor Health	3	21	7
Multi: Poor Access	2	15	5
Weighted bases	*3403*	*862*	*4348*
Unweighted bases	*3572*	*871*	*4523*

Table 5-41 Multidimensional social exclusion, by whether is a carer

Base: All aged 60-69 *ELSA*

	Carer		
Risk maker clusters	Yes %	No %	Total %
No risk markers	28	31	28
1 risk marker	31	32	31
Multi: Lonely	10	11	10
Multi: Fear of local area	12	13	12
Multi: Low income	11	7	10
Multi: Poor Health	7	6	7
Multi: Poor Access	2	0	2
Weighted bases	*1770*	*351*	*2121*
Unweighted bases	*1875*	*381*	*2256*

[A] Note based on 60-69s because caring is strongly related to age.

Table 5-42 Multidimensional social exclusion, by population density

Base: All respondents *ELSA*

	Population density			
Risk maker clusters	City %	Town %	Village %	Total %
No risk markers	21	25	29	23
1 risk marker	27	28	32	28
Multi: Lonely	9	9	10	9
Multi: Fear of local area	13	10	7	12
Multi: Low income	17	16	12	16
Multi: Poor Health	7	6	7	7
Multi: Poor Access	5	6	4	5
Weighted bases	*3221*	*524*	*601*	*4348*
Unweighted bases	*3325*	*558*	*639*	*4523*

5.4 Profile of the balanced panel sample

Table 5-43 Age and sex profile of the balanced panel sample

Base: Balanced panel sample *BHPS*

	Survey year								
	1997	1998	1999	2000	2001	2002	2003	2004	2005
Sex	%	%	%	%	%	%	%	%	%
Men									
60-69	62	56	48	43	37	30	24	17	9
70-79	33	38	44	46	49	53	55	57	62
80+	5	6	8	10	14	17	21	26	29
Women									
60-69	57	51	46	41	35	29	23	17	10
70-79	38	41	44	47	48	51	52	53	54
80+	5	8	10	13	17	20	24	30	36
Total									
60-69	59	53	47	42	36	29	24	17	10
70-79	36	40	44	47	49	52	54	55	57
80+	5	7	9	12	16	19	23	28	33
Unweighted bases[B]									
Men	*412*	*412*	*412*	*412*	*412*	*412*	*412*	*412*	*412*
Women	*575*	*575*	*575*	*575*	*575*	*575*	*575*	*575*	*575*

[B] Note balanced panel analysis was unweighted.

Table 5-44 Marital status, by sex and wave

Base: Balanced panel sample *BHPS*

	Survey year								
	1997	1998	1999	2000	2001	2002	2003	2004	2005
Sex	%	%	%	%	%	%	%	%	%
Men									
Married	80	80	78	77	76	75	75	74	71
Separated or Divorced	6	6	6	5	5	5	5	5	5
Widowed	9	9	12	13	14	15	16	17	19
Never married	5	5	5	5	5	5	5	5	5
Women									
Not marked by risk	53	51	49	48	47	46	43	42	41
Separated or Divorced	7	7	7	7	7	7	7	7	7
Widowed	35	36	39	39	40	42	44	46	47
Never married	6	6	6	6	6	6	6	5	5
Total									
Not marked by risk	64	63	61	60	59	58	57	55	53
Separated or Divorced	7	7	6	6	6	6	6	6	6
Widowed	24	25	27	28	29	30	32	33	36
Never married	5	5	5	5	5	5	5	5	5
Unweighted bases									
Men	*412*	*412*	*412*	*412*	*412*	*412*	*412*	*412*	*412*
Women	*575*	*575*	*575*	*575*	*575*	*575*	*575*	*575*	*575*

[B] Note balanced panel analysis was unweighted.

Table 5-45 Employment in the household, by sex and wave

Base: Balanced panel sample *BHPS*

	Survey year								
	1997	1998	1999	2000	2001	2002	2003	2004	2005
Sex	%	%	%	%	%	%	%	%	%
Men									
No one in employment	36	34	33	28	24	21	21	17	16
One person in employment	64	66	67	72	76	79	79	83	84
Women									
No one in employment	26	23	22	18	16	14	14	13	11
One person in employment	74	77	78	82	84	86	86	87	89
Total									
No one in employment	30	28	26	22	19	17	17	14	13
One person in employment	70	72	74	78	81	83	83	86	87
Unweighted bases									
Men	*412*	*412*	*412*	*412*	*412*	*412*	*412*	*412*	*412*
Women	*575*	*575*	*575*	*575*	*575*	*575*	*575*	*575*	*575*

[B] Note balanced panel analysis was unweighted.

Table 5-46 Population density, by sex at wave 1997

Base: Balanced panel sample *BHPS*

	Population density		
	City	Town	Village or hamlet
Sex	%	%	%
Men	71	15	14
Unweighted bases	*274*	*58*	*54*
Women	77	11	12
Unweighted bases	*403*	*58*	*63*
Total	74	13	13
Unweighted bases	*677*	*116*	*116*

[B] Note balanced panel analysis was unweighted.

Table 5-47 Index of Multiple Deprivation, by sex at wave 1997

Base: Balanced panel sample

	IMD2000				
	Most deprived IMD rank quintile	2nd quintile	3rd quintile	4th quintile	Least deprived IMD rank quintile
Sex	%	%	%	%	%
Men	20	19	21	20	19
Unweighted bases	*71*	*68*	*74*	*72*	*68*
Women	25	20	22	17	15
Unweighted bases	*125*	*99*	*109*	*85*	*74*
Total	23	20	22	18	17
Unweighted bases	*196*	*171*	*183*	*157*	*142*

[B] Note balanced panel analysis was unweighted.

5.5 Panel sample marker of risk 1997-2005

Table 5-48 Balanced panel sample: prevalence of risk markers

Base: Balanced panel sample *BHPS*

	Proportion marked by risk									
	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
Risk marker	%	%	%	%	%	%	%	%	%	%
Men										
Low contact with others	53	52	50	56	52	56	50	53	56	53
Low social support	42	40	43	40	42	38	39	33	37	39
No qualifications	39	39	39	39	39	39	39	39	39	39
Bad housing	25	26	26	24	27	25	22	22	20	24
Relative low income	18	22	21	26	25	26	27	28	29	25
Poor access to transport	18	18	19	19	21	21	22	24	25	21
Poor emotional health	12	11	9	12	11	11	15	15	16	12
Material deprivation	8	8	9	8	6	8	7	5	7	7
Poor general health	8	9	6	9	9	10	10	12	12	10
Low area satisfaction	6	5	5	6	5	5	5	5	5	5
Unweighted bases	*412*	*412*	*412*	*412*	*412*	*412*	*412*	*412*	*412*	*3708*
Women										
No qualifications	54	54	54	54	54	54	53	53	53	54
Low contact with others	51	50	53	53	47	54	50	55	54	52
Poor access to transport	38	39	40	41	43	43	43	46	48	42
Low social support	36	33	36	35	40	34	34	28	34	34
Relative low income	31	32	29	34	35	32	32	32	33	32
Bad housing	26	25	26	25	24	24	21	21	20	24
Poor emotional health	15	17	18	19	20	20	21	23	25	20
Material deprivation	9	8	7	7	5	6	5	5	6	7
Poor general health	9	9	5	10	12	13	14	13	12	11
Low area satisfaction	6	5	6	6	6	6	5	5	5	6
Unweighted bases	*575*	*575*	*575*	*575*	*575*	*575*	*575*	*575*	*575*	*5175*
Total										
Low contact with others	51	50	52	54	49	55	50	54	55	52
No qualifications	48	48	48	48	48	48	48	48	47	48
Low social support	38	36	39	37	41	36	36	30	35	36
Poor access to transport	30	30	31	32	34	34	35	37	38	33
Bad housing	26	26	26	24	26	24	21	21	20	24
Relative low income	26	28	26	31	31	30	30	30	32	29
Poor emotional health	13	15	15	16	16	16	18	19	21	17
Material deprivation	9	8	8	7	6	7	6	5	7	7
Poor general health	9	9	5	10	11	12	12	13	12	10
Low area satisfaction	6	5	5	6	6	5	5	5	5	5
Total unweighted bases	*987*	*987*	*987*	*987*	*987*	*987*	*987*	*987*	*987*	*8883*

[B] Note balanced panel analysis was unweighted.

5.6 Risk marker prevalence within clusters

Table 5-49 Dynamic social exclusion clusters, by year

Base: Balanced panel sample experiencing multiple risk markers *BHPS*

Longitudinal social exclusion Clusters	Multi: Low support & loneliness %	Multi: Low relative income and transport %	Multi: Health problems and loneliness %
1997			
Low relative income	6	70	20
Material deprivation	2	24	10
Poor access to transport	17	75	14
Low social support	70	27	50
Low contact with others	73	44	68
No qualifications	60	68	44
Poor general health		8	43
Poor emotional health		7	77
Bad housing	37	33	30
Unweighted bases	*286*	*287*	*139*
1998			
Low relative income	9	74	29
Material deprivation	2	24	6
Poor access to transport	35	69	22
Low social support	59	46	44
Low contact with others	62	39	55
No qualifications	73	76	55
Poor general health		9	45
Poor emotional health		6	83
Bad housing	66	23	32
Unweighted bases	*174*	*256*	*139*
1999			
Low relative income	10	70	19
Material deprivation	1	24	7
Poor access to transport	25	73	26
Low social support	80	30	53
Low contact with others	52	49	54
No qualifications	70	75	46
Poor general health	10	4	16
Poor emotional health		9	91
Bad housing	50	33	31
Low area satisfaction	12	5	13
Unweighted bases	*212*	*267*	*112*
2000			
Low relative income	9	74	37
Material deprivation	2	22	5
Poor access to transport	36	70	25
Low social support	58	44	46
Low contact with others	69	44	57
No qualifications	68	78	48
Poor general health		7	50
Poor emotional health		7	82
Bad housing	56	26	29
Low area satisfaction	13	6	13
Unweighted bases	*166*	*266*	*157*
2001			
Low relative income	14	73	28
Material deprivation	1	16	7
Poor access to transport	34	73	33
Low social support	88	33	62
Low contact with others	58	44	56
No qualifications	63	75	52
Poor general health		8	53
Poor emotional health	1	8	82
Bad housing	40	35	39
Low area satisfaction	11	7	12
Unweighted bases	*173*	*269*	*153*

Table 5-49 continued Dynamic social exclusion clusters, by year

Base: Balanced panel sample experiencing multiple risk markers *BHPS*

Longitudinal social exclusion Clusters	Multi: Low support & loneliness %	Multi: Low relative income and transport %	Multi: Health problems and loneliness %
2002			
Low relative income	11	73	27
Material deprivation	1	21	5
Poor access to transport	43	69	31
Low social support	54	44	48
Low contact with others	71	48	57
No qualifications	70	75	57
Poor general health		8	54
Poor emotional health		7	75
Bad housing	55	22	37
Low area satisfaction	8	6	13
Unweighted bases	*164*	*260*	*166*
2003			
Low relative income	13	72	26
Material deprivation	2	16	6
Poor access to transport	40	73	36
Low social support	86	25	51
Low contact with others	57	45	57
No qualifications	70	78	51
Poor general health		11	52
Poor emotional health		10	83
Bad housing	37	23	32
Low area satisfaction	9	6	9
Unweighted bases	*149*	*264*	*169*
2004			
Low relative income	9	72	30
Material deprivation	2	15	3
Poor access to transport	45	74	36
Low social support	51	32	44
Low contact with others	59	42	60
No qualifications	72	77	48
Poor general health		9	57
Poor emotional health	1	9	80
Bad housing	55	18	28
Low area satisfaction	13	3	10
Unweighted bases	*158*	*265*	*176*
2005			
Low relative income	13	70	30
Material deprivation	1	17	6
Poor access to transport	43	75	37
Low social support	83	25	47
Low contact with others	58	47	63
No qualifications	66	76	47
Poor general health		9	49
Poor emotional health	3	13	84
Bad housing	34	22	28
Low area satisfaction	11	5	10
Unweighted bases	*157*	*283*	*188*
Total			
Low relative income	13	70	30
Material deprivation	1	17	6
Poor access to transport	43	75	37
Low social support	83	25	47
Low contact with others	58	47	63
No qualifications	66	76	47
Poor general health		9	49
Poor emotional health	3	13	84
Bad housing	34	22	28
Low area satisfaction	11	5	10
Unweighted bases	*1639*	*2417*	*1399*

5.7 Socio-demographic characteristics of dynamic social exclusion clusters

Table 5-50 Dynamic social exclusion clusters, by sex

Base: Balanced panel sample *BHPS*

	Sex		
Longitudinal social exclusion Clusters	Men %	Women %	Total %
No risk markers	17	10	13
1 risk marker	29	23	26
Multi: social support & lonely	20	17	18
Multi: low income & transport	21	31	27
Multi: health & low social support	13	18	16
Unweighted bases	*3708*	*5175*	*8883*

[B] Note balanced panel analysis was unweighted.

Table 5-51 Dynamic social exclusion clusters, by age

Base: Balanced panel sample *BHPS*

	Age group			
Longitudinal social exclusion Clusters	60-69 %	70-79 %	80-89 %	Total %
No risk markers	18	11	7	13
1 risk marker	29	26	19	26
Multi: social support & lonely	21	17	17	18
Multi: low income & transport	18	30	40	27
Multi: health & low social support	16	15	17	16
Unweighted bases	*3122*	*4270*	*1491*	*8883*

[B] Note balanced panel analysis was unweighted.

Table 5.52 Dynamic social exclusion clusters, by family type

Base: Balanced panel sample *BHPS*

	Family type			
Longitudinal social exclusion Clusters	Living alone %	Living as a couple %	Living with others %	Total %
No risk markers	8	17	5	13
1 risk marker	19	30	20	26
Multi: social support & lonely	16	19	30	18
Multi: low income & transport	42	19	20	27
Multi: health & low social support	15	15	25	16
Unweighted bases	*3099*	*5354*	*430*	*8883*

[B] Note balanced panel analysis was unweighted.

Table 5-53 Dynamic social exclusion clusters, by marital status

Base: Balanced panel sample *BHPS*

	Marital status				
Longitudinal social exclusion Clusters	Married %	Divorced or separated %	Widowed %	Never married %	Total %
No risk markers	16	6	9	7	13
1 risk marker	30	23	20	21	26
Multi: social support & lonely	19	19	17	19	18
Multi: low income & transport	20	37	39	34	27
Multi: health & low social support	15	17	16	19	16
Unweighted bases	*5228*	*569*	*2620*	*466*	*8883*

[B] Note balanced panel analysis was unweighted.

Table 5-54 Dynamic social exclusion clusters, by housing tenure

Base: Balanced panel sample

BHPS

Longitudinal social exclusion Clusters	Tenure: Own home %	Buying with the help of a mortgage %	Social renter %	Total %
No risk markers	16	3	8	13
1 risk marker	30	11	19	26
Multi: social support & lonely	17	22	23	18
Multi: low income & transport	22	47	28	27
Multi: health & low social support	15	17	23	16
Unweighted bases	*6804*	*1894*	*185*	*8883*

[B] Note balanced panel analysis was unweighted.

Table 5-55 Dynamic social exclusion clusters, by population density at first wave

Base: Balanced panel sample at first wave (1997)

BHPS

Longitudinal social exclusion Clusters	Population density: City %	Town %	Village or Hamlet %	Total %
No risk markers	7	10	11	13
1 risk marker	18	22	27	26
Multi: social support & lonely	29	29	34	18
Multi: low income & transport	32	20	15	27
Multi: health & low social support	14	18	13	16
Unweighted bases	*677*	*116*	*116*	*909*

[B] Note balanced panel analysis was unweighted.

Table 5.56 Dynamic social exclusion clusters, by Index of Multiple Deprivation at first wave

Base: Balanced panel sample at first wave (1997)

BHPS

Longitudinal social exclusion Clusters	IMD2000: Most deprived IMD rank quintile %	2nd quintile %	3rd quintile %	4th quintile %	Least deprived IMD rank quintile %	Total %
No risk markers	7	6	8	6	13	13
1 risk marker	10	18	22	27	27	26
Multi: social support & lonely	32	35	20	36	31	18
Multi: low income & transport	42	27	33	17	17	27
Multi: health & low social support	10	14	17	15	12	16
Unweighted bases	*196*	*171*	*183*	*157*	*142*	*849*

[B] Note balanced panel analysis was unweighted.

5.8 Duration of multidimensional social exclusion

Table 5-57 Duration of low social support and loneliness multiple risk markers

Base: All in low social support and loneliness cluster on at least one occasion

	Multidimensional cluster
	Low social support and loneliness
Occasions in cluster	%
1	13
2	16
3	11
4	16
5	16
6	10
7	10
8	8
9	-
Unweighted bases	*822*

Table 5-58 Duration of low income and transport multiple risk markers

Base: All in low income and transport cluster on at least one occasion

	Multidimensional cluster
	Low income and transport
Occasions in cluster	%
1	18
2	14
3	11
4	11
5	8
6	10
7	10
8	7
9	10
Unweighted bases	*631*

Table 5-59 Duration of health and loneliness multiple risk markers

Base: All in low income and transport cluster on at least one occasion

	Multidimensional cluster
	Health and loneliness
Occasions in cluster	%
1	26
2	22
3	18
4	14
5	8
6	6
7	4
8	3
9	-
Unweighted bases	*642*

5.9 Persistence in clusters: cluster transitions

Low social support and loneliness cluster

Table 5-60 Persistence and movement of Low social support and loneliness

Base: Balanced panel sample *BHPS*

	Average wave by wave transition		
	t-1	t	t+1
Longitudinal Risk Marker Clusters	%	%	%
No risk markers	1		1
1 risk marker	16		15
Multi: social support & lonely	45	100	44
Multi: low income & transport	25		26
Multi: health & low social support	12		13

Table 5-61 Persistence and movement of Low income and transport Problems

Base: Balanced panel sample *BHPS*

	Average wave by wave transition		
	t-1	t	t+1
Longitudinal Risk Marker Clusters	%	%	%
No risk markers	0		0
1 risk marker	8		6
Multi: social support & lonely	17		16
Multi: low income & transport	67	100	68
Multi: health & low social support	8		9

Table 5-62 Persistence and movement of Health and loneliness

Base: Balanced panel sample *BHPS*

	Average wave by wave transition		
	t-1	t	t+1
Longitudinal Risk Marker Clusters	%	%	%
No risk markers	3		2
1 risk marker	16		16
Multi: social support & lonely	14		14
Multi: low income & transport	16		14
Multi: health & low social support	51	100	54

6 Annex B: Technical

6.1 Correlation analysis

Correlation analysis and latent class analysis, was used to explore the strong and weak associations between the 16 markers of risk experienced by older people.

Tetrachoric correlations between the 16 risk markers were investigated, and the resulting correlation matrix can be seen in Table 5-1. Correlations higher than 0.2 have been highlighted in table 1.1. (Tetrachoric correlations assume a latent bivariate normal distribution for each pair of variables).

Findings indicate that some of the 16 ELSA markers of risk correlate particularly highly with each other, while others do not. The highest correlation is between poor general health and not being physically active at 0.61. The results of the tetrachoric correlation analysis show the potential for some interesting overlapping risk markers, as some of the 16 risk marker from different themes in the B-SEM correlate together, for example low social support and material deprivation correlate together at 0.41, and poor general health and poor access to services are correlated at 0.45. The correlation matrix suggests that risk markers experienced by older people across the 16 Risk marker are multidimensional, and the experience is different for different people.

Table 6-1 Tetrachoric Correlation Matrix

	Relative low income among those aged 60 plus	Material deprivation	No pension wealth	Poor access to services	Poor access to transport	No financial services	Low social support	None or Low contact with others	Poor literacy and numeracy skills	Low political participation	Poor general health	Poor emotional health	Not physically active	Housing problems	Sense of not belonging	Fear of walking alone after dark
Relative low income among those aged 60 plus	1.00															
Material deprivation	**0.22**	1.00														
No pension wealth	**0.41**		1.00													
Poor access to services	0.08	**0.22**	0.12	1.00												
Poor access to transport	**0.20**	**0.35**	**0.28**	**0.55**	1.00											
No financial services	**0.27**	**0.21**	**0.32**	0.16	0.16	1.00										
Low social support	0.17	**0.41**	0.16	**0.20**	**0.35**		1.00									
Low contact with others		0.12	-0.15				0.17	1.00								
Poor literacy and numeracy skills	0.15	**0.24**	0.12	0.17	**0.22**	**0.27**	0.10		1.00							
Low political participation			0.12	0.13	0.10		0.10	0.12	0.09	1.00						
Poor general health				**0.45**	**0.40**	**0.28**	0.15		**0.22**	0.15	1.00					
Poor emotional health	0.12		0.12	**0.39**	**0.29**	**0.25**	0.19		0.19	0.14	**0.55**	1.00				
Not physically active		**0.22**	0.17	**0.51**	**0.54**	**0.34**	0.15	0.10	0.18	0.13	**0.61**	**0.35**	1.00			
Housing problems	0.07	0.12	0.12	0.15		0.17	0.15	0.12	0.08		**0.20**	**0.23**	0.09	1.00		
Sense of not belonging				0.13			0.12			0.17		0.19		0.18	1.00	
Fear of walking alone after dark	0.11	0.10		0.16	0.19	0.13	0.13		0.18		0.15	0.15	0.15		0.16	1.00

6.2 Detailing the Latent Class Analysis

6.2.1 Latent Class Analysis

LCA is a statistical technique that can be used to identify relationships in survey data when respondents' answers to questions are categorical. An LCA analysis divides respondents into groups (or latent classes) on the basis of their answers to a series of questions. The aim is for each class to be reasonably homogeneous, in that every individual in a class is assumed to be similar (in the sense of having the same response probabilities for each question) while respondents in different classes are assumed to be dissimilar.

Applied to the ELSA markers of risk, LCA allows us to investigate whether there are discrete groups of individuals who experience similar forms of multiple risk markers. Once groups such as these are found, the analysis generates a probability for each respondent of them being in each class and assigns them to the class for which they have the highest probability of membership. It will also usually be possible to relate membership of each class with the respondent's answers to each question and thus describe each class. This is not a straightforward task, but it can be done either by using the output from the LCA program or by performing a further analysis on the data in another package.

In Section 2.2 we discuss five clusters identify by the LCA analysis. In the next section of this technical report we will describe how this number of classes was identified.

6.2.2 Latent GOLD

The data were modelled using the package Latent GOLD[26], a software package that can implement several types of latent class models.

A useful feature of Latent GOLD is that it is compatible with packages such as SPSS. In the analysis of multiple risk markers we read the data from SPSS, used Latent GOLD to identify the classes and then exported the results back in to SPSS for further analyses. As a result, we were able to create an SPSS file with variables for:

- the respondent's serial number;
- the markers of risk experienced by respondents;
- the probability assigned to each individual of them being in each class; and
- the class for which they have the highest probability of membership.

A typical analysis involved fitting several models with different numbers of classes. It was then possible to write SPSS syntax to compare different models – for example to compare a model containing five classes with one containing six. This allowed us to identify the most useful model.

[26] See the user's guide for a full description: Vermunt, J.K. and Magidson, J. (2005) Latent GOLD 4.0 User's Guide. Belmont, Massachusetts: Statistical Innovations Inc.

6.2.3 Modelling multiple markers of risk

Features of the data

LCA can be used to model any data set where response variables are categorical (either nominal or ordinal) which has an underlying nominal latent variable to define latent classes. As the 16 markers of risk are nominal, it is amenable to analysis by LCA. Nevertheless, there are certain features of the data that required particular attention before using LCA:

- The ELSA data set is sparse. The data consist of 16 risk markers, each with 2 possible answers. This gives 2^{16}=65,536 possible patterns of answers. There are only 2,166 respondents experiencing multiple risk markers, so only a small proportion of the possible response patterns can be attained. A consequence of this is that many of the standard test statistics produced by LCA packages to compare a *k*-cluster model with a (*k*+1)-cluster model will not be valid and the user should treat the results of these tests with caution[27]. Although the sample size is such that standard statistical test can not be used to choose *between* models, once a model is chosen, provided the number of clusters is not too large, the sample size is sufficiently large to allow a good description of each cluster.
- The large number of questions used can also cause computational problems if a large number of clusters are fitted. With 16 risk markers, each with two possible answers, a *k*-cluster model involves estimating 1*16**k*+(*k*-1) parameters. It is possible that the programme will fail to find a solution (or find an incorrect solution) if *k* is large. Advice on how to guard against this is given in the Latent GOLD technical guide.

Identifying the number of classes

As part of a Latent Class Analysis we need to identify the number of classes. In practice, it is unlikely that there will be a single "correct" model so it is usual to consider a range of possible models containing different numbers of classes and choose the most appropriate using some criteria.

A general approach to statistical model fitting is to try to balance the fit and the parsimony of a model – generally if two models fit a data set equally well the one with fewer parameters will be chosen. Under this principle, in LCA, if a model with *k*+1 classes fits the data just as well as one with *k* classes the *k*-class model will be chosen.

LCA software packages such as Latent GOLD provide the analyst with statistics to help in the choice of the correct number of classes in the data. In particular a process analogous to a forward selection procedure in regression modelling is sometimes used. The process starts by fitting a one-class model and then adds a class at a time. A formal hypothesis test can be performed to see if a *k*+1-class model is an improvement on a *k*-class model. (The null hypothesis is that the *k*-class model generates homogeneous classes; the alternative hypothesis is that the *k*+1-class model

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[27] Latent GOLD calculates a statistic, L2, which is similar to a chi-squared statistic but the help system warns: “with sparse data, the chi-squared based estimation for the p-value associated with L2 cannot be trusted because these statistics do not follow a chi-squared distribution.” The reason for this is that chi-squared tests are only valid if expected cell sizes are not small (greater than 5 is a common cut-off point). With a data set as sparse as this many of the expected cell sizes will be far too small to allow use of either the standard chi-squared statistic or L2.

gives significantly more homogeneity.) If the test is statistically significant the *k*+1-class model is considered as being the preferred model. The process continues until adding a class does not lead to a statistically significant improvement.

This procedure can be performed wholly within Latent GOLD. However, there are two objections to this approach when applied to the multiple risk markers data. A technical problem is that mentioned above: the p-values calculated by the package are not valid when analysing a data set as sparse as the multiple risk markers data[28]. A second problem is that the size of the data set (16 questions) is large enough to mean that the significance tests might not be very powerful. Even when classes display a large difference on one or two questions the overall significance test will be found to be "not significant" if the classes are similar on the other questions. In other words, with a very large number of risk markers it is almost impossible to generate a small number of classes with homogeneity within these classes. As a result of this, the standard test statistics given by the package are of limited use and other means of testing that the classes are a reasonable summary of the data are needed.

This means that if an automatic selection routine *is* to be used (as we have done), then, rather than choosing a model on the basis of the p-values obtained from a formal hypothesis test, we recommend using an informal assessment. Part of this assessment can be based on a goodness-of-fit measure. A goodness-of-fit measure can be calculated for both the *k*-class model and the *k*+1-class model, and the *k*+1-class model would be chosen if its goodness-of-fit measure is better than that of the k-class model.

Latent GOLD provides several goodness-of-fit statistic statistics to help decide on an appropriate model. Three of these, the Bayesian Information Criterion (BIC), the Akaike Information Criterion (AIC) and the Akaike Information Criterion 3 (AIC3), are shown in the table below for multiple risk markers data.

[28] The Latent GOLD User's Guide suggests dealing with sparse data by calculating a bootstrap p-value. However, on a data set of this size this seems to be computationally intensive. It also does not overcome the second problem.

Table 6-2 Latent Class Analysis models and goodness-of-fit statistics

Number of classes	*BIC(LL)*	*AIC(LL)*	*AIC3(LL)*
1	31832	31644	31677
2	31782	31498	31548
3	31807	31426	31493
4	31849	31372	31456
5	31882	31309	31410
6	31961	31291	31409
7	31830	31353	31437
8	31830	31353	31437

The interpretation of BIC, AIC and AIC3 is that small values correspond to a good fit. On a strict interpretation of these statistics the “optimal” model suggested by BIC is a 2-clusters model. AIC and AIC3 both suggest an 6-cluster model (but both suggest it’s not much of an improvement on a 5-cluster model).

Thus, an automatic selection method would choose two clusters if BIC was used as the selection criterion, and five or six clusters if AIC or AIC3 were used. To decide between these options other criteria are needed: the approach we prefer is as follows:

First, Latent GOLD is used to fit models with varying numbers of classes. (For example, we might start by looking at every model from 1 to 8 classes). Goodness-of-fit statistics are then examined for each of the models. Examining these statistics should allow us to rule out certain models as having too poor a fit to be considered, and also give an upper limit for the number of classes that need to be considered. On this basis the models containing five and six classes should be examined in further detail – though to be safe both the 4-class and 7-class models could be considered.

The choice between these should then be made on the basis of several less formal considerations:

1. The class sizes should be examined. A statistically significant result need not be important in a practical sense. A model with a large number of classes might result with some very small classes.
2. The membership probabilities can also be examined. Ideally each individual would have a fitted probability of 1 of being in one class and probabilities of 0 of being in the others (thus indicating that we can assign each individual to its class with complete certainty). In practice the best that can be hoped for is that these probabilities will be close to either 1 or 0. Consequently an examination of these probabilities will aid in the choice of model.
3. Where two or more models seem equally good the principle of parsimony suggests the model with fewer classes should be chosen.
4. Finally, routines can be written (for example in SPSS) to establish which of these models leads to a sensible definition of classes.

When analysing the multiple risk markers data, we found there was not much difference between the six-, and five-cluster models. The six-cluster model gave sample sizes in one class that were too small for analysis so a five-cluster model was chosen as our working model.

Classifying individuals and describing classes

Once a working model has been chosen the analyst will usually try to relate membership of each class with the respondents' answers to each question and thus describe (label) each class.

One method of doing this is to examine the parameter estimates obtained by the model. Latent GOLD estimates the probability of membership of each class and the probability associated with each class for its answers to each question. For example, cluster one has a 99% probability of respondents being marked by income risk, whereas cluster 2 has 0%. Thus, cluster one will be more associated with relative low income than cluster two. Section 2.2 uses this method to define the clusters produced by the five-cluster model.

Another method is to examine the responses rather than the parameters. This is the type of analysis described in detail in chapter 2.3.

Either of these methods can be used to help describe classes. The first method has the advantage that it does not need to assign individuals to classes (the second method assigns respondents to their modal class and hence does not take into account the uncertainty concerning class membership). On the other hand, the second method might be preferable as its class labels are based on descriptions of a real sample rather than estimates of parameters (many of which could have quite large standard errors).

Table 6-3 Conditional probability parameters of Latent Class Analysis model

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Cluster Size					
Base	*429*	*527*	*701*	*304*	*205*
%	*20*	*24*	*32*	*14*	*9%*
Latent Class Analysis Probabilities					
Cluster probability	0.2086	0.2264	0.2819	0.161	0.122
	Probability of cluster membership	*Probability of cluster membership*	*Probability of cluster membership*	*Probability of cluster membership*	*Probability of cluster membership*
Relative Low income among those aged 60 plus	0.12	0.0199	0.9972	0.2407	0.2275
Material deprivation	0.0742	0.0635	0.0903	0.0013	0.1958
Low pension wealth	0.0593	0.0352	0.1381	0.0427	0.1047
Difficult access to services using usual transport	0.1766	0.1391	0.123	0.3318	0.655
No access to car or regular use of public transport	0.0315	0.044	0.0574	0.0004	0.5789
No financial services	0.0284	0.0347	0.0624	0.0915	0.0761
Low social support	0.4167	0.268	0.2762	0.1501	0.4098
Live alone and/or v. little contact with family/friends	0.3255	0.1451	0.0916	0.069	0.1202
Poor literacy and numeracy skills	0.2594	0.2952	0.2518	0.2713	0.3279
Low political engagement (not voted)	0.3395	0.201	0.1744	0.2172	0.2072
Poor self-reported health	0.0173	0.0486	0.0062	0.5026	0.3604
Poor emotional health (CESD)	0.1153	0.1322	0.1044	0.5304	0.323
Rarely or never do physical activity	0.0285	0.0422	0.0262	0.2505	0.4316
One or more housing problems	0.3997	0.2348	0.2038	0.333	0.1842
Feeling of not belonging in local area	0.2006	0.1711	0.0741	0.1195	0.0623
Fear of walking alone at night	0.0083	0.9974	0.4211	0.3199	0.4099

6.2.4 Using Latent Class Analysis longitudinally

Latent Class Analysis was run on a cross-sectional sample of older people aged 60 and over, in each wave for which there was complete data (waves 1997, 2001, 2003 and 2005).

The model structure produced by the analysis was similar across the four waves (Table 6-4). A three cluster model was the best fit according to the tests detailed in section 5.2.3, for each of the four waves. As the analysis produced similar results in four waves, one of these waves was used as a 'template' of how risk markers group together. This 'template' wave, from which cluster formation in subsequent waves was based, was the first wave in the analysis (1997).

Table 6-4 Latent Class Analysis model probabilities across 4 waves of BHPS

	Wave					Wave					Wave			
	1997	2001	2003	2005		1997	2001	2003	2005		1997	2001	2003	2005
	Low relative income & transport					Low social support & loneliness					Health problems & loneliness			
Low level of social support	0.39	0.54	0.46	0.44		0.81	0.90	0.46	0.57		0.57	0.61	0.47	0.43
Hhold income < 60% BHPS median	0.62	0.51	0.49	0.43		0.11	0.04	0.49	0.52		0.21	0.32	0.39	0.39
Material deprivation	0.24	0.12	0.22	0.21		0.03	0.00	0.22	0.04		0.09	0.07	0.06	0.06
No private transport	0.72	0.59	0.87	1.00		0.24	0.05	0.87	0.13		0.18	0.38	0.53	0.51
Housing problems	0.36	0.32	0.20	0.18		0.53	0.97	0.20	0.37		0.33	0.42	0.31	0.27
Low contact with people	0.43	0.54	0.54	0.53		0.58	0.63	0.54	0.53		0.63	0.42	0.55	0.60
No qualifications	0.74	0.74	0.72	0.67		0.73	0.18	0.72	0.76		0.47	0.45	0.63	0.52
Poor general health	0.11	0.12	0.00	0.07		0.00	0.05	0.00	0.14		0.39	0.52	0.48	0.38
Poor mental health	0.10	0.10	0.04	0.04		0.01	0.15	0.04	0.03		0.68	0.98	0.57	0.92
Low neighbourhood satisfaction	0.06	0.07	0.10	0.05		0.15	0.19	0.04	0.10		0.12	0.07	0.13	0.10

Using the recruitment probabilities produced by the Latent Class Analysis for the clusters in survey year 1997, the a posteriori probability of an individual's membership in each class was calculated for all nine waves in the analysis. In each wave of the analysis, an individual was assigned to the latent class with the highest a posteriori probability (modal assignment).

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