



# Living Beyond 100

A report on centenarians

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# Introduction

One manifestation of our ageing population structure is the rapid growth of ‘centenarians’: the group of people who have reached 100 years of age. There are a number of explanations as to why this group of individuals manage to surpass average life expectancy by twenty or more years. Genetic variation has been identified as a key predictor of ‘exceptional longevity’ (for example, Perls, 2003), alongside lifestyle factors, such as nutrition, exercise, avoiding obesity and long-term heavy smoking (Poulain, 2011), in addition to the element of chance (Kirkwood et al, 2005). However, while advances have been made in researching antecedent factors that predict living to 100, less attention has been paid to life as a centenarian; becoming a centenarian has become one of the most celebrated, if least understood, events of our time.

In fact, until now, centenarians have rarely been considered as a separate group by researchers and, when they have, the focus has tended to be on the predictors of longevity or the *size* of the group. We know relatively little about the profile or quality of life of centenarians, or how their socio-economic circumstances or health and care needs differ from those of younger cohorts of older people. Whilst there is considerable current debate about the policy implications of an ‘ageing society’, the specific implications for policy and service delivery of extreme longevity have not, to date, been drawn out. From an economic perspective, this group may be particularly significant in that they have generally spent longer in retirement than they have done in employment. This report aims to inform such debate by providing an overview of the literature on centenarians, and by presenting some of the policy implications of the key trends. We begin by outlining the demographic characteristics of centenarians before exploring in later chapters:

1. Health and Social Care Issues Affecting Centenarians: What is going to be the future impact of centenarians and the ‘oldest old’ on health and social care services?

Living longer does not necessarily mean living in good health. In fact, later life is often characterised by chronic conditions and disability, which may bring increased dependency. The chapter examining **Health and Social Care Issues Affecting Centenarians** aims to explore the health profile of centenarians and to highlight the implications of this for health and care policies.

2. Housing and Wealth Issues Affecting Centenarians: What is going to be the future impact of centenarians and the ‘oldest old’ on pensions, housing and the intergenerational transfer of wealth?

Evidence suggests that the oldest age groups tend to be the poorest within the pensioner population (National Equality Panel, 2010; Krach and Velkoff, 1999) and a rising population is likely to exacerbate this trend. Where individuals typically worked for 45 years up to the age of 65 and expected an average retirement of 15-20 years, in the case of centenarians, working lives and retirement can be equal in length. This poses serious implications for pensions systems, and may also have an impact on housing and intergenerational transfers of wealth. The chapter on **Housing and Wealth Issues Affecting Centenarians** provides more research on housing, income and wealth of the oldest old and centenarians.

3. Quality of Life of Centenarians: How can we promote quality of life for centenarians and the ‘oldest old’?

As we get older, we are more likely to report reductions in our quality of life. The oldest old and centenarians are more likely to experience social exclusion and loneliness, and appear to be significantly more isolated than other age cohorts (Barnes et al, 2006). The final chapter on the **Quality of Life of Centenarians** explores what we know about the well-being of centenarians and the oldest old.

Due to the limited body of UK literature focused specifically on centenarians, this report also draws inferences from research on the broader group of those who are aged 85+ (often labelled the 'oldest old' population). We have also reviewed a number of international studies and highlighted gaps in the current evidence base.

#### Definitions used in this paper

Oldest Old: people aged over 85 years;

Octogenarians: people from 80 to 89 years old;

Nonagenarians: people from 90 to 99 years old;

Centenarians: people who are at least 100 or over;

Semi-supercentenarians: people aged from 105 to 109;

Supercentenarians: people aged over 110.



## Overview

In this report, we present evidence suggesting that a substantial number of centenarians remain physically healthy and cognitively intact into the last years of their lives. Conversely, while those reaching 100 years may be reaching this point in comparatively good health, those currently aged 85-99 years may be increasingly likely to be living with disabilities or non-communicable diseases. This is likely a reflection of better health care management.

There do not appear to be reliable projections of the health and social care needs of future centenarians based on these trends. If it is the case that good health is a pre-condition for reaching very old age, this implies that the prevalence of ill-health and disability may not change among centenarians as they are necessarily in relatively good health. However, if management of disease and disability continues to improve, those experiencing ill-health at younger ages may well live past 100, demanding greater support than and different care solutions to the existing cohort of centenarians.

The body of evidence on centenarians is far from consistent or extensive, and throughout this report we encounter a dearth of evidence on the lives of centenarians. For example, levels of dementia among centenarians in some studies are placed at 0%, in others half of study members are found to live with dementia. In addition, at times, we also question the robustness of the extant evidence in terms of sample size, representativeness and reliability. These are caveats to our results, but they do not limit the applicability of our recommendations which include:

- Developing the evidence base around centenarians in order to inform current and future ageing strategies.
- There is an urgent need to understand more about the lives of the oldest old and centenarians who reside in communal establishments, who are routinely excluded from surveys and research.
- Greater targeting of prevention and health promotion programmes to include people in their 80s and 90s.
- Taking a more holistic approach to designing interventions that integrate health, care and housing solutions.
- Developing family care giving plans that recognise the needs of multiple generations of family members and the reciprocity of existing care arrangements
- Preserving, developing and investing in ways of increasing the accessibility of social or interest groups to centenarians as part of a holistic approach to raising levels of wellbeing among the oldest old and centenarians.
- Ensuring that housing and neighbourhoods are better designed and/or adequately adapted in order to encourage and enable centenarians to live for as long as possible in the community.

# Demographic trends

This introductory chapter aims to paint a picture of the number of centenarians in the UK and beyond. It provides current and projected estimates of the number of centenarians and identifies the reasons for the growth in their number over recent years.

## Background

### The emergence of the first centenarians

The increased likelihood of survival into later life, including to very old ages, has been a trend in developed countries throughout the second part of the last century. Centenarians were once an unusual phenomenon, attracting the attention and curiosity of both the media and the academic community. There has been some debate about the exact point in history when the first people began to reach 100 years of age. In 1995, Jeune (1995) claimed that 'supercentenarians did not exist before 1950 and centenarians not before 1800 in any population and in any period of world history'. However, writing six years later with Skytthe, Jeune conceded that 'the hypothesis that centenarians did not exist prior to 1800 for any population in the world is still under investigation' (Jeune and Skytthe, 2001, p.91). It seems likely though, that if centenarians did exist before 1800, they would have been very small in number. Yet, since then, the growth of the centenarian population - or "Generation C" as Willcox et al (2010) have called them - has been spectacular throughout low mortality countries of the world (Robine and Saito, 2009).

### Current estimates and projected growth

Recent UN World Population Prospects estimate that there are 317,000 centenarians worldwide. This figure is projected to grow to 3,224,000 million in 2050, reaching 17,795,000 million at the end of the century (United Nations, 2011). In the UK, the most recent figures estimate that there were 12,640 centenarians in 2010 (ONS, 2011a).

Centenarians still represent only a tiny proportion of the total population. However, projected figures suggest a twelve-fold increase in centenarians over the next thirty years (ONS, 2011a) and one prediction estimates that there will be at least half a million people in this age group by 2066 (DWP, 2010): a scenario that fits with Thatcher's (1992) promised 'centenarian explosion'. Over a quarter of children born in the UK today and about a fifth of younger people under 20 can expect to celebrate their 100th birthday (DWP, 2010).

The 2008 distribution of the very old population can be summed up as follows:

**Table 1: Estimates of older people in the UK (2010)**

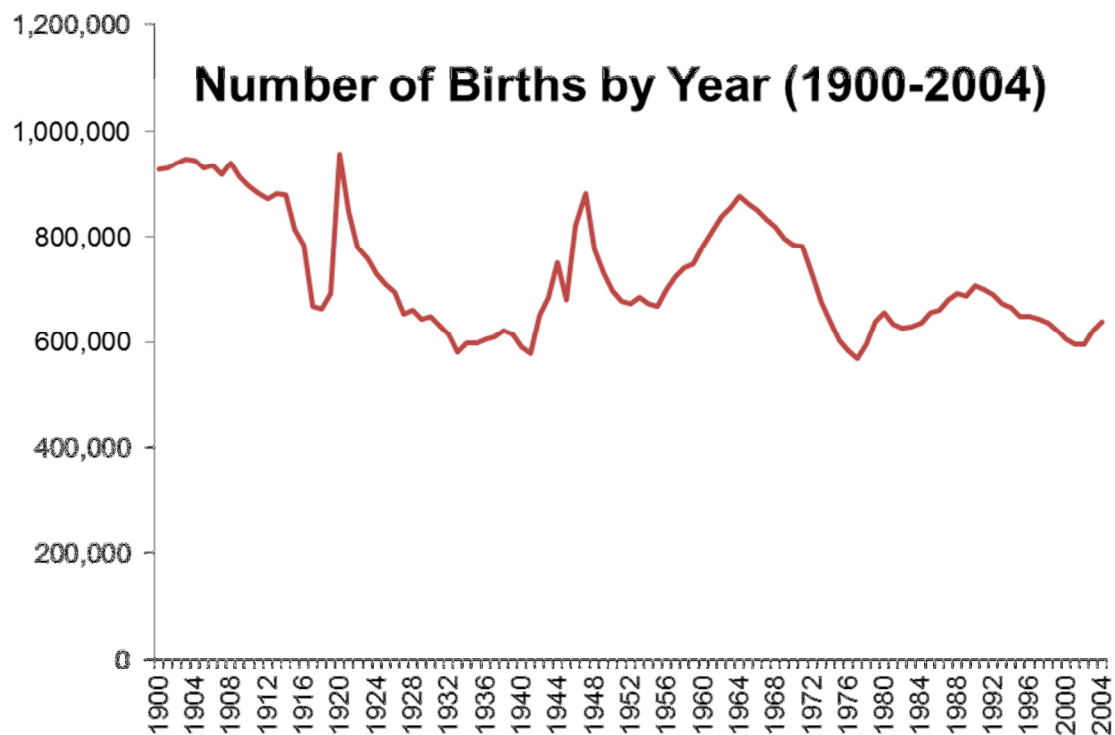
Age Group	No. of individuals in 2010	% of population in 2010
Oldest Old (85+)	2,903,300	4.67%
Octogenarians	2,427,200	3.90%
Nonagenarians	463,420	0.74%
Centenarians	12,640	0.02%
Semi-supercentenarians and Supercentenarians	640	0.001%

Source: ONS, Mid-2010 Population Estimates: United Kingdom and Mid-2002 to Mid-2010 Population Estimates of the very elderly (including centenarians)

The rise in the number of centenarians is a particular characteristic of European countries, in which the number of centenarians has doubled every 10 years since the Second World War (Vaupel and Jeune, 1995). However, contrary to recent trends, some have speculated that there will be a decline in the number of centenarians for a short time from 2014 (Robine and Saito, 2009), reflecting the dramatically reduced birth rate during the First World War (about 80 live births per 1000 women aged 15-44 compared to the 110 observed earlier between 1901 and 1905) (House of Commons, 1999 and Figure 1). However, this hypothesis is not supported by recent projections from the Department for Work and Pensions (DWP), which predict a constant increase in the number of centenarians over the next decade, from 11,800 in 2010 to 15,000 in 2015 and reaching 21,900 individuals aged 100 and over in 2020 (DWP, 2010).



Figure 1: Number of Births by Year in the UK (Source: Office for National Statistics 2005)



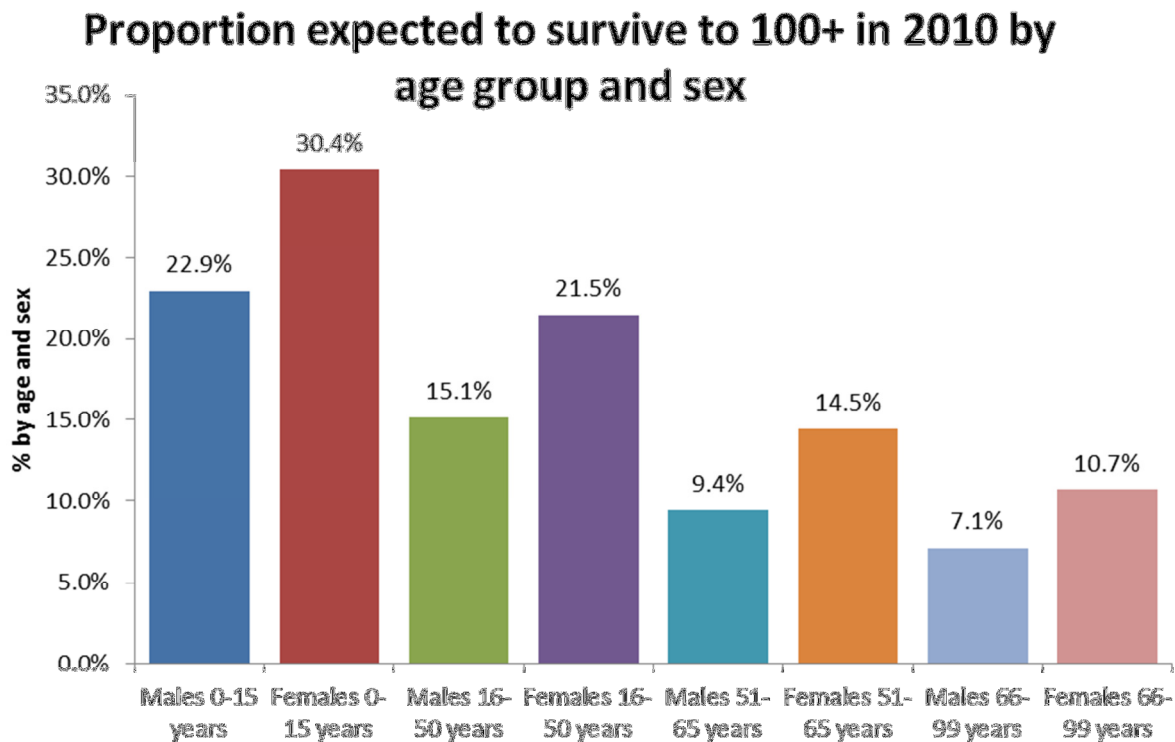
## Gender and exceptional longevity

Women outnumber men in every age group due to higher life expectancy and this is particularly striking in older ages (Tommasini, 2005). In 2006, there were a total of 49,078 female centenarians, compared to 8,228 male centenarians across twenty-seven European countries (Robine and Saito, 2009). Back in 1946, the Human Mortality Database reported that there were 235 male and 1098 female centenarians across seventeen European countries (ibid). This could suggest that the female centenarian population in Europe grew more quickly during this period than the male centenarian population.

However, there is evidence of 'gender-levelling' in the centenarian population as the ratio of female to male centenarians has begun to fall in recent years, as a result of improvements in male mortality. In 2000 there were approximately nine female centenarians for every male centenarian in the UK, in 2009 there were approximately six female centenarians for every male centenarian, and in 2010 the ratio fell to approximately five female centenarians for every male centenarian. Since 2000 the estimated number of male centenarians has nearly tripled from 720 to 1,970 in 2010. The number of female centenarians over the same period has increased by 58 per cent from 6,140 in 2000 to 10,670 in 2010. This gender-levelling within the oldest age groups is projected to continue, as the ratio of male to female centenarians increases with each successive age cohort (ONS, 2011a).

This gender-levelling is particularly important because it challenges our traditional view of the older population as being disproportionately female. Ageing women, particularly widows from the oldest generation, experience a double jeopardy caused by the combined effects of age and gender, which often translates into poverty and poor health and can make them vulnerable to poor mental health (Age Reference Group on Equality and Human Rights, 2005; Rodeheaver and Datan, 1988). Gender disparities in health and wealth appear particularly prominent among the centenarian population, and we will consider this in the third section of this report.

Figure 2: Proportion by age group who can expect to live to 100+ (Source: DWP 2010)



Notes: Based on estimates in DWP (2010)

## The geographical distribution of centenarians

The centenarian population has grown significantly in all four nations of the UK over the past decade. The growth has been the greatest in England and Wales, where the percentage increase has been 86% between 2000 and 2010. Northern Ireland has seen the smallest increase (at 47%) during this period. Scotland was in the middle, with a 70% increase (ONS, 2011a). The uneven distribution of centenarians in the UK is symptomatic of wider inequalities in life expectancy; substantial differences are also likely to exist within the different English regions. This reminds us that national policies which aim to improve life expectancy must take into account regional differences and inequalities and may need to target areas with low rates of life expectancy.

## Reliability of estimates

The accuracy of early estimates of the numbers of centenarians in the UK has been questioned. This is in part due to the lack of historical records of centenarians and in part to the concern that some older people may have overestimated their age (Thatcher, 1992; 2010). However, some doubts as to the accuracy of current estimates remain. For example, the Office for National Statistics (ONS) has suggested that the census count may over-represent the number of centenarians. In September 2007, the ONS released experimental estimates of the 'very elderly'. Using their model, they found for example that there were just 720 male centenarians in 2001, whilst the census suggests there were 1738 (2.4 times more). The census attributed this discrepancy to reporting errors among those aged over 95 (Dini and Goldring, 2008).

The UK does not seem to be the only country where there are issues in verifying estimates of centenarians: recent investigations in Japan found over 230,000 centenarians, listed as alive in registries, who could not be found (BBC, 2010). The Cuba National Centenarian Study has similarly

identified inaccuracies in studies of centenarians, linked to age verification, method of sampling, lack of control groups and differences between the centenarian groups (Giraldo, 2009). While this form of measurement error represents a caveat to the estimates presented on the size of the centenarian population, it may be considered less of a consideration in reviewing literature on the lives of centenarians to some extent, where studies have taken a more focussed approach in sample recruitment. It is the latter form of literature that is the subject of the remainder of this report, although we briefly examine estimates of the size of the oldest old population before focussing on this literature.

## **Oldest old: size and relevance of the population**

Due to the limited literature available on centenarians, we have broadened our review to include research which focuses on people aged 85 and over (sometimes referred to as 'the oldest old'). Findings from these studies can help us in making inferences about both the current population of centenarians (who are included but not considered as a distinct group within most of these studies) and the future population of centenarians (since these will be drawn from the current cohort of those aged between 85 and 99).

Older people have traditionally been portrayed as a homogeneous group, but this group is becoming increasingly diverse as a result of migration, widening social inequalities, advances in healthcare, and social change (Blood & Bamford, 2010). With increasing longevity, there is also a recognition that at least two generations may now exist amongst those of pensionable age. The 'oldest old' are the fastest growing group in the population (ONS, 2011e) and, given the likely differences between them and the younger cohort of older people, there is a clear need to focus on these people as a separate group.

At the beginning of the last century there were just 48,000 members of the 'oldest old' group in England and Wales (0.1% of the total population), a figure that had grown to a million a hundred years later (Dini and Goldring, 2008). Recent estimates from the Office of National Statistics show that, where those aged 85 and over accounted for just 1% of the UK population in 1985, this figure had doubled by 2010 (2%) and is predicted to reach 5% (equivalent to 3.5 million people) by 2035 (ONS, 2011e).

Women again outnumber men within this broader age group, with women over 85 representing 16% of the population of pensionable age (65+ years), compared to their male peers who represent 10% (ONS, 2011d). The oldest old age group are distributed across the UK in a similar pattern to the centenarian group, with the highest number of people aged 85 and over living in Wales (where they represent 2.5% of the population) and England (2.3%). Scotland follows with 2.04% of its population falling within this age group and Northern Ireland has the lowest proportion of the oldest old at 1.65% (ONS 2011d).

A similar process of demographic change is occurring in the majority of the 27 countries currently in the European Union. In 2001, Germany, Italy, France and Sweden had the highest proportions of oldest old in the European Union, representing around 2% of the total population (Tommasini, 2005). By the end of the decade, this had risen and according to Eurostat figures for 2010, the percentage of the population aged 80 years and over had risen to over 5% in all these countries (Lanzieri, 2011).

## Life expectancy of oldest old and maximum lifespan

Life expectancy has steadily increased due to falls in age specific mortality rates for all cohorts, including at very high ages. According to estimates for 2007-2009, life expectancy at birth has reached a record in the UK of 77.7 years for males and 81.9 years for females (ONS, 2011b). Life expectancy at age 80 has increased since 1981 when the average 80 year old man could expect to live a further 6 years and the average 80 year old woman a further 8 years. By 2041, it is projected to reach 12 years for men and 13 for women (Dini and Goldring, 2008). Recent data published by the Department for Work and Pensions point in this direction: in 2011 the chance of living to 100 for people aged 80 is 6.2% for men and 9.2% for women (DWP, 2011).

Record life spans have increased at a slower pace than life expectancy (Canudas-Romo, 2010). The highest recorded age in the UK is 115, and this is expected to rise only moderately in the near future (Thatcher, 2010). While there is no sign of a fixed upper limit to the length of human life; it is unlikely that record ages above 123 will be witnessed this century (Thatcher, 1999).

## Why is the centenarian population growing?

Thatcher (2001) identified the following causes of the increasing number of centenarians in the twentieth century:

- the increase in the number of births in 19th century;
- improvements in infant mortality and overall improved survival rates from birth to age 80;
- the decline of death rates at age 80 of 1.3 per cent annum for females and 0.7 per cent for males since 1950;
- increased survival from age 80 to 100 since 1936-40; and
- increased survival of centenarians.

In a more recent study of centenarians undertaken by the ONS, increased survival from age 80 to 100 was identified as the main factor contributing to the growing number of the centenarian population. This can be related to medical advancements, improvements in housing and living standards and improved nutrition (ONS, 2011a). The continued increase in the number of centenarians into the 21<sup>st</sup> century is also likely to reflect further gains in infant and old age mortality, more so than changing birth rates, which have declined throughout much of the 20<sup>th</sup> century (see Figure 1). Improvements in survival rates have traditionally disproportionately favoured women as reflected in the gender balance at old and very old ages, although as reviewed earlier, there is evidence of some degree of gender levelling in the older population.

## Summary and Recommendations

### *Summary of key facts:*

1. The centenarian population is growing rapidly in low mortality countries of the world.
2. There are currently 12,640 centenarians; more than 10 million of people in the UK can now expect to live beyond 100 (DWP, 2010).
3. The oldest old population (over 85) is the fastest growing age group.

4. Women are over-represented amongst the centenarian and oldest old populations; while there remains a wide gap in numbers between female and male centenarians, there is evidence that this is closing somewhat.
5. Life expectancy has steadily increased due to a fall in mortality at all ages, contributing in the growth of number of centenarians and oldest old.
6. The number of centenarians is likely to increase dramatically in the coming decades.

## **Policy**

There appears to be some discrepancy between Government estimates regarding the trend in growth of centenarians. While DWP (2010) suggests there will be 200,000 individuals aged 100 and over by 2045, ONS (2011a) estimates there will be 160,000 centenarians by mid-2040. Although this inconsistency underlines the fact that the UK evidence base regarding the profile, circumstances and experiences of centenarians is still fairly small, all sources show that the centenarian population is projected to rise substantially in the coming decades. Drawing together and developing the evidence base will be therefore become increasingly important, as policy-makers grapple with a number of important questions raised by the rapid growth of the oldest age groups.

Funding such research in a time of cuts in public spending and reduced research budgets is challenging. However, examining centenarians is of clear advantage to a number of industries and policies, for example the pensions, pharmaceutical, and retirement housing sectors to name but a few. Relevant public and private sector stakeholders should consider investing in research, either independently or collaboratively, in order to tailor future products and services appropriately.

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# Health and Social Care

In this section, we present the available evidence regarding the physical health and cognitive functioning of centenarians and other members of the 'oldest old' age group. We also consider their utilisation of health services and their social care needs. The section ends with a summary of key points and some emerging policy recommendations.

## Centenarians as a model for healthy ageing

### Physical Health

Medical research conducted on centenarians, their children, and siblings suggests that the absence of a genetic variation linked to premature death and non-communicable disease may explain their exceptional longevity (Perls, 2003). A number of studies find that many centenarians are healthy and independent for most of their lives, offering both genetic and lifestyle influences as explanatory factors (Hitt et al, 1999; Larkin, 1999). These include the US New England Centenarian Study, which proposed the idea that 'the older you get, the healthier you have been' (Hitt et al, 1999). Similarly, a Danish study also finds that centenarians represent a model of healthy ageing, drawing on evidence of the cohort's lower hospitalisation rates and shorter stays in hospital in old age (Engberg et al, 2009). Participants of the Okinawa Centenarian Study (Poulain, 2011), also appear to represent an example of healthy ageing and well-being at very advanced ages. The good health of the Okinawa centenarians seems to be associated with their healthy lifestyle choices, including a diet with low calorific intake and regular physical exercise. Low levels of cardiovascular pathologies, cancer, osteoporosis and dementia help the Okinawans to enjoy their advanced years in good health and free from disability. In general, centenarians seem to pay a lot of attention to food choices and habits when compared to younger older people, behaviours which Kropf and Pugh (1995) concluded reduced their risk of chronic diseases. A few years later, Larkin (1999) argued that centenarians' tendency to 'eat and exercise in moderation throughout life' contributed to their healthy and active ageing.

Given these research findings, we should not necessarily assume that centenarians will have higher health and social care needs than other groups of older people. On the contrary, the evidence appears to show a lower incidence of functional physical impairment, often confined only to the final years of life, among centenarians than people in younger age cohorts. Compared to younger age groups among the older population, centenarians seem to avoid many of the non-communicable diseases associated with old age (Hitt et al, 1999). This may also extend to those aged 110 and over: an American study of 32 supercentenarians found that they were no more susceptible to illness and disability than nonagenarians and showed similar levels of independence (Christensen et al, 2009). If nonagenarians and centenarians have similar levels of physical and cognitive impairments, it may be that the type and cost of health and social care provision needed by the two groups are similar.

Interestingly, some studies have found that centenarians perceive themselves to be in good health. Despite health problems typical of old age (such as vision and hearing impairments, heart problems, arthritis, poor circulation and incontinence) many centenarians reported themselves to be in good shape and rated their health as 'excellent or very good' (Kropf and Pugh 1995; Liu and Zhang 2004, Poon et al 2010). Although no direct UK evidence was found to support this argument among

centenarians per se, ELSA data suggests that a significant minority of the oldest old (24.5% of men and 25.6% of women over the age of 85) perceive themselves to have high levels of health (Gjonca et al, 2010).

Many studies have examined centenarian populations in an attempt to ascertain the reason for their longevity. Examples include studies by Bennati (2010) in the UK and Galioto and colleagues (2008) in Italy, both of which found that centenarians had better cardiovascular risk profiles than younger cohorts. For men in particular, a better cardiovascular risk profile was associated with survival over a hundred years. US researchers have used the New England Centenarian Study to explore the incidence of cancer among the oldest old and reported that 88% of centenarians delay or escape the age-related diseases with high mortality rates, including cardiac disease, stroke and diabetes (Andersen et al, 2005). Using a sample of centenarians who had experienced cancer of any type (excluding skin cancer), they found that their average age of diagnosis was 80.5 years, compared to 63.2 years among the general population. They concluded that the age of initial cancer diagnosis is relatively delayed in those who live to 100 years (Andersen et al, 2005). They also found that some cancers are very rare among centenarians, suggesting that these cancers may be incompatible with survival to extreme old age (Andersen et al, 2005).

Evert et al (2003) however suggest a more complex health profile of centenarians, characterising 42% as survivors (those who had actually developed NCDs<sup>1</sup> before the age of 80), 45% as delayers (those who developed NCDs after the age of 80), and 13% as 'escapers' (those who reached 100 having escaped development of NCDs). They conclude that there are multiple routes to achieving exceptional longevity and it is not necessarily determined by experiencing good health earlier on in life.

Despite the positive picture painted by the evidence on health conditions such as cancer and cardio-vascular disease amongst centenarians, other studies have suggested that there may be high levels of physical frailty and cognitive decline amongst the oldest age groups, both of which may jeopardise their ability to live independently and safely. For example, the Cambridge City Over 75-Cohort Study found that 60% of interviewees aged over 90 had experienced a fall. Of these, four out of five were unable to get up after at least one fall and almost a third were stranded on the ground for an hour or more. The researchers highlighted that difficulty in getting up after a fall was associated with advanced age, reduced mobility and severe cognitive impairment. Furthermore, lying on the floor for a long time was more likely to result in serious injuries, admission to hospital and subsequent moves into long term care (Fleming and Brayne, 2008).

Highly associated with the ageing process, sensory loss may also be a significant issue for the oldest old. Although the Okinawa study suggested that declines in hearing and sight functions were not as severe as declines in other activities of daily living such as dressing, bathing and standing in the ten years between the ages of 92 and 102 (Willcox et al., 2007), in the UK it is reported that 42% of people over 75 will develop cataracts, and almost 50% will have some symptoms of age-related macular degeneration (Age UK, 2011). A recent report by the Thomas Pocklington Trust highlighted how sight the onset of visual impairment among frail older people is often a catalyst for reduced mobility, ability to engage in social activities and communication, and that they frequently

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<sup>1</sup> This included 10 non-communicable diseases including hypertension, heart disease, diabetes, stroke, non-skin cancer, skin cancer, osteoporosis, thyroid condition, Parkinson's disease, chronic pulmonary disease, as well as one ocular disease (cataracts).

lacked information, help and support after diagnosis of eye problems (Thomas Pocklington Trust, 2010).

### **Cognitive Functioning and Dementia**

A high proportion of centenarians appear to enjoy relatively good cognitive functioning, at least until the very end of their lives (Perls, 2006), thus refuting the general consensus that people who reach very old ages necessarily experience dementia. In a systematic review of evidence from Europe, the US and Japan, it has been found that 'the likelihood of dementia-free survival after the age of 100 varied between 0% in smaller studies to as much as 50% in other studies', due to the 'inconsistency of the methods used in various studies' (Calvert et al, 2006, p.951). Other European research using the Heidelberg Centenarian Study found that around half of centenarians had moderate to severe cognitive impairment (Kliegel et al, 2004). However, Kliegel and colleagues noted that one quarter of the cohort remained 'cognitively intact', although they found significant acceleration in cognitive decline in the 6 months prior to death (Kliegel et al, 2004). It is generally recognised that dementia affects women disproportionately (Bamford, 2011) and female centenarians are more likely to have dementia than their male peers, since men generally tend to have a shorter life expectancy following a dementia diagnosis (Calvert et al, 2006). Poor diet, obesity and alcohol consumption are some of the lifestyle predictors of dementia (Alzheimer's Society, 2010) and the lower or delayed incidence of dementia among centenarians may reflect healthier lifestyles in earlier life.

The literature seems to support the notion that many older people achieve extreme longevity in relatively good physical health, although the evidence on cognitive health is more ambiguous. However, the reliability of the evidence on the health of centenarians is compromised by the small sample sizes of many studies, and by a dearth of in-depth research on this specific cohort. Whilst challenging our assumptions about the inevitability of decline and dependency in later life, the positive messages on the health of centenarians should therefore be treated with caution until further research is conducted.

## **Health among the oldest old compared to centenarians**

Since the 'oldest old' group (those aged 85 and over), contains centenarians and those who will become centenarians over the next decade or so, evidence about the health status of this group may be useful for drawing inferences about the current and future health of the centenarian population. In developed countries, the oldest old cohort is the age group with the highest incidence of illness and disability (Christensen et al, 2009). The increase in life expectancy has not been matched by an increase in *healthy* life expectancy. The average man or woman lives in good health until they are 63 and 65 years old respectively, yet they can expect to live until they are 77.7 years old (for men) and 81.9 (for women) (ONS, 2011). At the age of 85, men can expect to live another 6.2 years on average and women another 7 years; though less than half of this time can be expected to be disability free (ONS, 2008). After age 85, women are more likely than their male peers to experience ill-health, limiting long-term conditions (including dementia), and disabilities (Xie et al, 2008). In other words, older women are more likely to spend more of their remaining years in poor health.

Baltes and Smith's (2009) study concludes that, whilst former functioning and dignity are usually conserved amongst the 'young old' (under 85); the 'oldest old' population 'are characterised by

vulnerability, with little identity, psychological autonomy and personal control' (Baltes and Smith, 2009). Whilst there is clear evidence that the prevalence of health conditions does increase with age, there are small but significant numbers of people aged 85 and over who challenge Baltes and Smith's bleak conclusions. These are the people who are most likely to reach their 100<sup>th</sup> birthday. It is, however, not clear whether the increased life expectancy of those with serious health conditions and the growing numbers of those in the 85 to 100 year age group will lead to a future centenarian population with a more diverse profile of health and social care needs.

The 'compression of morbidity' theory states that if the incidence of limiting diseases can be postponed to later ages, then morbidity will be compressed into a shorter period of life (Tommasini, 2005; Fries 1980). In the UK at present, however, it looks likely that the average years spent with a disability and/or in poor health will continue to increase alongside, or even faster than, life expectancy (Blood, 2010; Falkingham et al, 2010). Recent evidence from the English Longitudinal Survey of Ageing highlights this ambiguity, in that disability rates among older people appear to have remained relatively stable throughout the bulk of the past decade, therefore representing a growth in the absolute numbers of older people with a disability (Zaninotto et al, 2010), who are themselves likely to be living longer.

Evidence on a number of specific health conditions demonstrates improvements in the survival of older people with NCDs. For example, although the age specific mortality rate for stroke is declining over time, the prevalence of those who had suffered a stroke among the older population (aged 75+) rose from nine per cent to thirteen per cent for men and from eight per cent to eleven per cent for women between 1994 and 2006 in England (Scarborough et al, 2009). Therefore, the numbers living with the aftermath of stroke and potentially in need of care are increasing, both through an increase in prevalence among the older population and an increase in the size of the older population

Other recent data on healthy life expectancy shows that average time spent with a limiting illness is 14.7 years for men and 16.9 years for women (ONS, 2011). This scenario fits with the fourth stage of Robine and Michel's (2004) model of morbidity:

1. An initial stage during which people, despite getting sick, increasingly survive;
2. A phase characterised by the control of the progression of chronic diseases;
3. Older people experience the effects of the compression of morbidity;
4. A new expansion of morbidity leading to more frail and sick older people as life expectancy rises.

The (albeit somewhat limited) evidence base on the health of centenarians seems to suggest that this group experiences better physical health than the broader group of the 'oldest old'. At least two factors may challenge this finding and what it implies for the health of future centenarians.

Firstly, it is possible that the evidence base has been skewed by relatively small scale studies that have sought out healthy centenarians in order to explore the predictors of extreme (and healthy) longevity. The extent to which existing studies are an accurate representation of the health profile of centenarians may also be compromised by the fact that older people with cognitive impairment and poor functioning are more likely to withdraw from longitudinal studies than other groups (King's College London, 2009).

Secondly, it has already been highlighted that the “oldest old” experience the highest incidence of ill-health in developed countries. As management of disease and frailty in later life improves with advances in healthcare, it may be that the oldest old can be supported to live even longer despite suffering from health conditions, becoming the future generations of centenarians. If this were the case, it could be another reason for the health profile of centenarians changing to include a higher incidence of morbidity in coming years. However, such a notion is contingent on the assumption

Data on dementia suggest that incidence continues to rise steadily with age. Recent analysis of EURODEM data (which unfortunately stops at age 99) shows a steady increase in the proportion of the population with dementia so that while 13.5% of women and 12% of men aged between 80 and 84 are estimated to have dementia, this rises to 36% of women and 31.5% of men aged 95-99 years (Falkingham et al, 2010). The likelihood of a high incidence of dementia and increasing long-term physical health conditions amongst the increasingly large population of centenarians suggest that policy-makers should be prepared for a less healthy centenarian population, or certainly one with more diverse health needs than is currently the case. Returning to Evert and colleagues’ (2003) characterisation of three groups of centenarians, this may mean an increase in the proportion of ‘survivors’ (and ‘delayers’) that comprise the centenarian population of the future.

### Utilisation of health services

Evidence regarding centenarians’ use of health services (particularly that specific to the UK) is scarce and, at times, seemingly contradictory. Kropf and Pugh (1995) argued that US health services are less likely to proactively target those over 85 and, in the UK, extensive evidence suggests the ongoing existence of both implicit age discrimination and explicit rationing of health services through the use of upper age limits (The King’s Fund, 2000; Centre for Policy on Ageing, 2009; Carruthers and Ormondroyd, 2009). Kropf and Pugh (1995) found evidence that people over 85 were less likely than younger cohorts of older people to engage in health-seeking behaviours; however the UK evidence is more ambiguous (Tomassini, 2006). Tomassini’s (2006) figures suggest that there has been a dramatic increase in visits to hospitals by people over 85 in recent decades, alongside very slight and fluctuating increases in their visits to the GP. The rise in hospital consultations is attributed to changes in the health status of the oldest old (Tomassini, 2006) but could also be attributed to improvements in access to healthcare for older people.

**Table 2: GP and Hospital Consultations over time**

	<b>Men</b>			<b>Women</b>		
	<b>1980s</b>	<b>1990s</b>	<b>early 2000s</b>	<b>1980s</b>	<b>1990s</b>	<b>early 2000s</b>
<b>85+ visiting the GP</b>	19.4%	21.1%	20.3%	18.9%	17.4%	21.9%
<b>85+ visiting the hospital</b>	13.1%	21.5%	27.8%	12.5%	18.2%	24.5%

Source: Tomassini C. (2006) The Oldest Old in Great Britain: Change over the last 20 years

More recent analysis undertaken by the Newcastle 85+ cohort study found that almost one third of the people involved in the study had visited clinics as outpatients in the three months prior to being surveyed, and almost all had consulted a general practitioner in the past year (Collerton, 2009).



## Care needs

The particular attention paid to the health of the oldest old population in the literature is likely to reflect policy concerns about the rising costs of their health and long-term care (Parker and Thorslund, 2007). As highlighted earlier, an increasing population of people aged 85 and over in poor health could have detrimental effects on the sustainability of welfare state arrangements (Christensen et al, 2009). However, there is little evidence regarding the specific care needs of centenarians, their current arrangements for both formal and informal care, and how these might differ from those of younger cohorts of older people. In their US-based review over fifteen years ago, Kropf and Pugh (1995) found that social workers were often not experienced in dealing with centenarians. The Newcastle 85+ cohort study provides more recent UK evidence regarding the care needs of the oldest old in a UK setting. Researchers conducted structured interviews with people aged 85 and over in Newcastle and North Tyneside in order to investigate their capability and dependency. They found that a high proportion (41%) of their participants were ‘independent’, according to their classification of need, and noted the particularly high number of men in this group (this may also help to explain the different residence patterns by gender we find in the next chapter). Of the remainder, 39% required help, but not on a daily basis, 12% required regular daily help and 8% required care 24 hours a day. Unsurprisingly, the care home residents they spoke to had significantly higher care needs, with 94% of them requiring daily or 24-hour care (Jagger et al, 2011).

Earlier, we raised the possibility that the health profile of centenarians may diversify in the near future. Such a population may require a more flexible care system which recognises that care needs are ‘amorphous’ and often cannot be clearly demarcated and quantified (Berry, 2011). In order to prevent or mitigate chronic diseases amongst the rising centenarian population and maximise their independence, we need to take a life-course approach to promoting healthy lifestyles (Taylor, 2011). The living arrangements of centenarians may also either support or reduce the amount of time they can live independently, whilst remaining safe and enjoying a good quality of life. We will explore this area in more detail in the Housing and Wealth chapter.

## Policy recommendations

### Summary

In this chapter we have presented evidence to suggest that:

- Centenarians may, as a group, avoid or postpone specific non-communicable diseases more than may be expected in comparison to younger cohorts of older people.
- There has been an increase in the proportion of the ‘oldest old’ living with a form of disability.
- The physical health of the centenarian population may be better than that of the ‘oldest old’ population. However, the health status of the oldest old population of today may have an impact on the centenarian population of tomorrow.
- Centenarians appear to be at high risk of developing dementia.

There appears to have been a distinct rise in hospital utilisation over the past few decades in the UK by the oldest cohorts. A key finding has been that there is a lack of UK-based evidence regarding the health and social care needs of centenarians as a specific age group and how this influences

engagement with health services. The dearth of evidence in this field risks underestimating the issues affecting centenarians and compromising the design and implementation of policies and services specifically targeted at them.

## **Policy and promoting health and well-being**

How to keep people healthy as they age is part of the current policy debate in the UK, and is viewed as key to promoting well-being and independence in old age. Obesity, in particular, is at the centre of the Government's priorities because it has a severe impact on people's health and represents a significant burden on health expenditure. We began this paper with some evidence linking the avoidance of obesity and long term heavy smoking with healthy life beyond 100 years.

We have noted the growing number of the 'oldest old' living with long term conditions and recommend that policy-makers consider the implications of more of this group surviving to become (and alter the health profile of) tomorrow's centenarians. One approach might be to ensure prevention and health promotion programmes include people in their 80s and 90s. A more holistic approach to designing interventions that integrate health, care and housing solutions should help to ensure that the oldest old and centenarians maintain their independence for the optimal amount of time. In particular the role of technology in promoting independent living among the oldest old needs to be explored much further. However, the absence of robust evidence makes it difficult to do more than speculate at this time.

Above all, this report highlights the importance of ensuring there is no age discrimination in healthcare and reinforces the need to ensure effective implementation of the age-related provisions in the Equality Act 2010, including ensuring all health professionals are trained and prepared to manage the health needs of the oldest old.

## **Policy and providing sustainable care**

Despite their exceptional longevity, centenarians are not necessarily more dependent than younger cohorts of older people (MacDonald et al, 2010). This is also supported by evidence suggesting that the 'burden' on caregivers does not seem to increase with the age of the person for whom they are caring (Freeman et al, 2010). However, the advanced age of centenarians means that family caregivers are also likely to be relatively old. Younger cohorts of retired people (50-74 years) often provide care for their very old relatives and, even if untrained and unmonitored, have a significant role as caregivers (Richmond, 2008). Family caregiving plans may be one way of supporting and sustaining these arrangements, by recognising that multiple members of the same family require assistance and care and that relationships between family members are often reciprocal at some level. Such plans might involve the provision of in-home support services, such as homecare services or home-based nursing care, and may also include respite services which give older family care providers a break.

Encouraging and sustaining family- and community-based care for the oldest members of our society is also likely to be more cost-effective than paying for residential and nursing care placements where these arrangements break down. Future long-term care funding policy will need to take into account not only the numbers but also the likely health and care needs of current and future centenarian populations. The recommendation of a minimum lifetime amount of funding an individual is expected to contribute to their own social care, and the proposed raising of the minimum threshold for means tested care (Commission on Funding of Care and Support, 2011) is

likely to be welcome news for older people, although there may be some questions of sustainability in the context of the continued rise in the centenarian population.

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# Housing and Wealth

As we have seen in earlier sections, current research suggests that centenarians may be in relatively good health compared to younger age groups. However, the current trend of gains in life expectancy without equivalent gains in disability free life expectancy may give rise to a future population of centenarians with different needs from the ones they currently present.

In this section, we present the available evidence regarding the housing type, living arrangements and tenure of centenarians. We then discuss the findings of our literature review in relation to the income and poverty of this group. The section ends with a summary of key points and some emerging policy recommendations.

## Housing and people aged 100

### *Residence type*

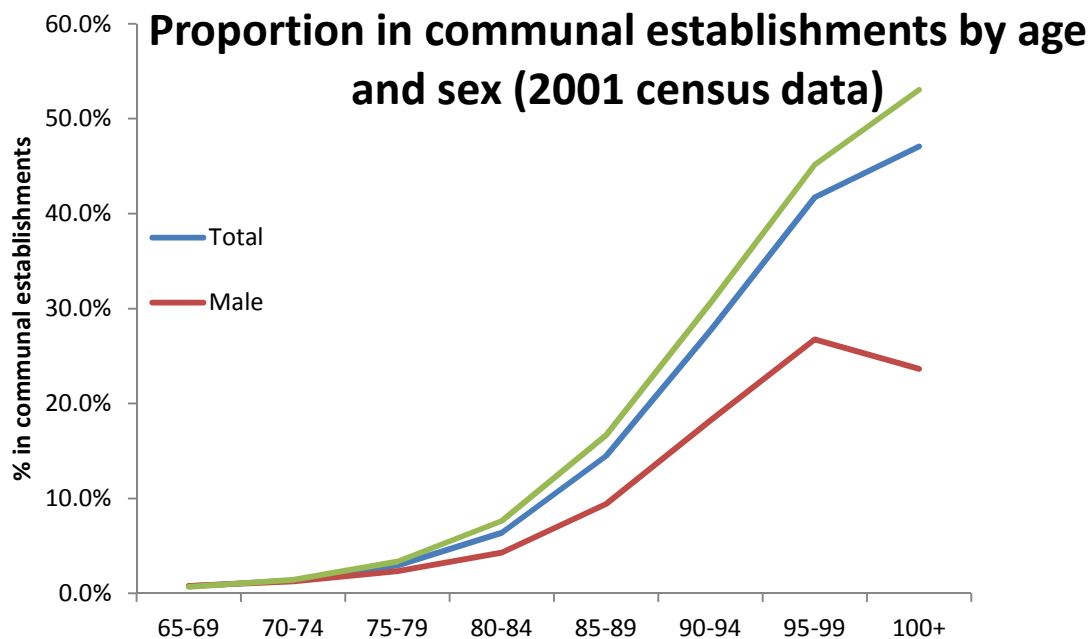
A high proportion of the centenarian and 'oldest old' populations of the US and UK live in institutional accommodation. Data from the Cambridge City Over 75s Cohort Study measured in the late eighties indicated that a third of nonagenarians lived in institutional accommodation (O'Connor et al, 1989), and this estimate seems to fit with the findings of the subsequent 2001 census. The 2001 census for England, showed that the proportion of nonagenarians resident in communal establishments<sup>2</sup> stood at just under a third (30.3%, Figure 1) while the proportion of centenarians in communal establishments stood at 47%. Goetting et al (1996) found a similar picture in the US where, at the time of their study, 50% of centenarians were living in nursing or care homes, and among those centenarians living in private households, many were living with their children (who were also of pensionable age) who provided care for them.

More recent estimates (2002) from the Cambridge City Over 75s Cohort Study indicate a small reduction in the proportion resident in institutional accommodation (26%) among a similarly aged, if slightly older population (aged 91-105 years old) (see Fleming et al, 2007). This slight reduction over time may be due to the implementation of policies to help older people to remain in their own homes (Tomassini, 2005). If so, we might expect to see a decline in the proportion of centenarians resident in communal establishments in the 2011 census. Though it is also possible that the impact of these policies on centenarians has been mitigated by an increase in the diversity of their health and social care needs.

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<sup>2</sup> These include residential homes, nursing homes, prisons, hotels and hospitals. In certain rare cases they may also include sheltered accommodation where less than 50% of the sheltered housing units in a development have access to individual cooking facilities.

**Figure 3: Proportion of older people resident in communal establishments**



(Source: 2001 census data accessed from <http://casweb.mimas.ac.uk>)

In the 2001 census data, the differences in the proportion of centenarians resident in communal establishments between the four nations of the UK were only slight (e.g. Wales 46%, Scotland 49%). Differences by gender were, however, much more pronounced. Women in the oldest age group were over twice as likely to be living in communal establishments as men (53% vs 24%). This difference is most probably explained by centenarian women's higher rates of disability and living alone (mostly due to widowhood) than their male peers (Bould et al, 1997; Falkingham, 2010). In addition, we do not see the linear increase with age in the proportion of men in communal establishments that we might expect to see: instead, the proportion of centenarian men resident in communal establishments was lower than the proportion of men aged between 95-99 years.

### ***Living arrangements***

As Falkingham et al (2010) point out, one of the most striking changes in the living arrangements of older people in the second half of the twentieth century, has been the rise in the proportion living alone. According to 2010 data from the Wave 4 ELSA report, a significant majority of UK women aged 85+ live alone (77.3%), compared to 43.8% among men of the same age (Gjonca et al, 2010). Similar patterns were identified in the US at the end of the twentieth century, with 43% of men in the oldest old age group living with a spouse, whereas just 7% of women did so (Krach and Velkoff, 1999). The differences in living arrangements between men and women in the oldest age groups reflect the fact that women have much longer average life expectancy than men.

Indicative evidence from Australia suggests that around a fifth of centenarian men had a living spouse compared to less than one-in-twenty centenarian women (Richmond, 2008). Specific data on the living arrangements and marital status of UK centenarians are scarce. Data from the 2001 census is combined for nonagenarians and centenarians and shows that: 33% of men and 7% of women in the 90 and over age group were married; 57% of men and 82% of women were widowed; and 8% of men and 11% of women had never married. It is possible that, had these studies included a distinct centenarian category in their analysis, they may have found a higher proportion of men than women living alone at the very oldest age group, like one Australian study, which found

that 27% of male and 14% of female centenarians were living alone (Richmond 2008). This reversal of the gender patterns around living alone may be explained by the greater likelihood of centenarian women to move into communal establishments than their male peers.

Having social support reduces the likelihood of older people living in institutional accommodation, and it is likely that a significant number of centenarians in the community may actually live with children and extended families (Goetting et al, 1996; Tommassini, 2005). Indicative data from the 2009 Understanding Society survey of those living in the community places the proportion of nonagenarian and centenarian men living with their own children at 4%, and the proportion of women higher at 25%<sup>3</sup>. As the children of centenarians may themselves be aged well into their seventies, these figures suggest that the 'burden of care' for a significant minority of centenarians and the oldest old may fall on to a population of carers who may themselves have social care needs.

### **Tenure**

Data from the 2009 Understanding Society survey (see footnote) estimates that around 8% of those aged 90 and over were living in privately rented accommodation and 30% in socially rented accommodation. The higher levels of renting among the oldest age group compared to younger cohorts of older people may reflect the need to free housing equity to pay for social care costs in later life, or alternatively, may reflect the low availability of specialist owner occupied housing available for older people (for example Ball et al, 2011). Analysis of those aged over 80 in the ELSA study found that there was no association between age and home ownership among men, but that renting becomes more prevalent in older ages among women, reaching 37% for those aged 85 and over (Gjonça et al, 2010).

Substantial numbers of centenarians and nonagenarians continue to live independently in the community, either alone or with family members. The housing options available to the very oldest population, both now and in the future will be shaped both by the supply of accessible housing and accompanying care, and by funding policies and the personal finances of centenarians.

## **Wealth and financial circumstances**

### **Poverty**

From an economic perspective, centenarians are a unique group whose working and retirement years tend to be of approximately equal length. Despite this, very little is known about their wealth and financial circumstances, with the literature tending to focus more broadly on the circumstances of those aged 65 and over. There is evidence that the oldest old (aged 85 and over) are, as a group, at greater risk of poverty than younger older people (aged 65-85) (National Equality Panel, 2010), and we might therefore reasonably expect that levels of poverty would be disproportionately high among centenarians (Goetting et al, 1996).

UK data on the material deprivation of pensioners aged 65 or over can give a picture of the poverty experienced at old age. According to the Household Below Average Income (HBAI) 2009/2010 report, 10% of the female pensioner population suffers from material deprivation compared to the

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<sup>3</sup> ILC-UK analysis. This is based on a small number of men (unweighted n=28) and women (unweighted n=60). For women, this 25% is considerably higher than the proportion among women aged 85-89, where the proportion living with children is 7%; for men, the 4% is actually slightly lower than the 8% among men aged 85-89, although the small size of the sample is a likely explanatory factor here.

7% of men in the same circumstances. Material deprivation seems to be fairly equally distributed between the old age cohorts (8-9%), with a slight peak in the 85+ group (12%) (DWP, 2010). Early evidence from the US supports the assertions of both the increased risk of poverty at older ages and the 'feminisation' of that poverty (Bould et al, 1997). Almost 12% of women aged 65-69 were found to be living in poverty in the 1990s, rising to over 25% for female centenarians, compared with 7% of men aged 65-69 and 21% of male centenarians (Krach and Velkoff, 1999). Centenarians were less likely to have savings compared to other older age groups, and were less able to afford luxuries (Goetting et al, 1996).

Marital status and the influence of a gendered labour market are likely explanatory factors for the gender differentials in levels of poverty among centenarians. Women without a spouse (either because they are widowed, divorced or unmarried) are particularly vulnerable to poverty in later life (Emmerson and Muriel, 2008). Married women tend to outlive their husbands and, once widowed, lose their husband's pension benefits, thereby sharply increasing their vulnerability to poverty. The current population of centenarian women experienced the majority of their working lives before the 'gender quake' of the 1960s (Bynner et al, 2000) where labour and educational market opportunities were expanded, and therefore have been particularly reliant on spousal income. Centenarian women are unlikely to have generous pensions in their own right because they tended to provide informal care to children, which consequentially lowered their pension entitlements (Bould et al, 1997). Among future cohorts of centenarians, this gender differential in poverty status may attenuate slightly, although is unlikely to change significantly for a number of years.

### ***Income and wealth***

While direct evidence from the UK on centenarians is scarce, that which we have suggests that the state pension remains the largest source of income for those in the oldest old age group (85+) (Muriel and Oldfield, 2010), although among younger age groups, income from private pensions is growing in importance. Evidence from the US, where the welfare state is much more minimal, finds that centenarians are less likely to have income from employment and retirement pensions than younger cohorts of older people, and are more reliant on regular economic help and assistance from family members (Goetting et al, 1996). A similar scenario has also been found for the oldest old (85+) in India, with remittances from children constituting almost half of total income (HelpAge India, 2010). In the UK, research findings suggest that direct and indirect financial contributions from family members are also very important for many of the oldest and poorest groups (Dominy, 2006).

Total net wealth (including state pension wealth) is generally found to decline with age after 65, reaching its lowest for oldest old (85+), who on average have £155,600 compared to the £379,200 of older people aged 65-69 (Banks and Tetlow, 2009). Given the expectation that people save assets during their working lives for consumption during retirement, data showing a decline in wealth with age are not in themselves surprising. However, for centenarians, a longer period of retirement and economic inactivity is likely to place an additional strain on savings and may alter the traditional flow of intergenerational wealth in families. In the context of current care funding policy, the very oldest members of society are perhaps most likely to have exhausted any private capital and to be in receipt of state funding for their care.

Longer working lives are now anticipated to pay for the greater number of years spent in retirement. Recent debates on pension reform are based in part on the recognition of the increase in life expectancy at birth; but they have not explicitly acknowledged the effect of an increase in the

population of centenarians (DWP, 2011). Recent proposals by the Dilnot Commission (2011) for a cap of £35,000 on the amount of individual contributions towards lifetime social care costs, as well as the proposed rise in the means-tested threshold, could help better-off centenarians to preserve some of their individual and housing equity wealth, and restore intergenerational wealth flows.

### **Consumption**

Increases in the price of basic goods such as food and domestic fuel, which rose by 7% and 59% respectively between 2004 and 2009 (Sinclair, 2010), have a disproportionate impact on the poorest households (Muriel and Oldfield, 2010). Given their increased vulnerability to poverty, the centenarian population may be particularly exposed to such rises. Indicative evidence from the 2008 sweep of ELSA on the oldest old population showed that those aged 85+ spent less per week on basic items than other age groups. This age group also have exhibited a decrease in the *proportion* of their income spent on basic items as a proportion of total spending in recent years (Muriel and Oldfield, 2010). However, since the same study shows that oldest old spend a greater proportion of their income on domestic fuel than younger age groups (8% for those aged 85+ compared to 6.5% among those aged 65-69), they may be most vulnerable to fuel price increases and reductions in Winter Fuel payments.

While the oldest old and centenarians may be those who are at greatest risk of poverty, Sinclair (2010) found that those aged 90+ were the least likely to *feel* that they had too little money to spend (15% of those aged 90+, compared to 19% aged 85-89 and 21% aged 80-84). New data from the Understanding Society survey also suggests that there is no significant difference in the level of satisfaction with household income by age among older people<sup>4</sup>. Price (2008) has sought to explain this disparity by arguing that many older people reduce their expectations regarding their income over time (and for some, after a lifetime of poverty) and that others may be too proud to admit that they do not have enough money.

## **Summary and recommendations**

As in previous chapters, our review of the housing and wealth of centenarians suggests significant heterogeneity among the centenarian population, which is likely to increase as this group increases and its social and health profile diversifies. As in the preceding chapters, our review has been hampered by difficulties in finding up-to-date and rigorous information which specifically relates to the 100+ age group in the UK. However, the evidence that we have reviewed in this section suggests that:

- A high proportion of centenarians (approximately 50%) live in communal establishments.
- There are high levels of widowhood among centenarians.
- A significant number of centenarians are likely to be living in the community with family members; but a striking number live alone in the community.
- There are substantial gender differentials in the living arrangements of centenarians, with male centenarians much more likely to live outside of communal establishments than female centenarians.
- There is a dearth of literature examining the financial circumstances of centenarians.

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<sup>4</sup> ILC-UK analysis.

- For pensioners in general, wealth decreases and poverty increases with age; yet the oldest old often report as much satisfaction with their financial circumstances as younger cohorts of older people.

Despite suggestions in the previous section that the health of many centenarians was better than we might expect, this section has identified high levels of the oldest old living in residential and nursing homes. It is likely that this pattern is caused by a combination of factors in addition to the health status of centenarians. In this section, we have seen that this age group experiences high rates of widowhood, which may precipitate a move to institutional care. Despite the focus of recent policies towards keeping older people resident in their own homes, we know that many older people, especially poorer home owners or those in the private rented sector, are living in inaccessible, damp or otherwise unsuitable housing, which does not support independent living well. The options for affordable specialist retirement housing are limited for many at present and residential care may seem to be the only option when independent living is no longer felt to be safe or desirable.

The development of integrated care and housing solutions, such as extra care<sup>5</sup>, may help alleviate reliance on communal establishments as homes for centenarians. Furthermore, the recommendation of the recent inquiry into social care funding to better support integrated housing and care solutions may allow for other innovations that combine social care and housing beyond institutional accommodation (Commission on Funding of Care and Support, 2011).

For the significant proportion of centenarians living with family members in private households, there is likely to be a need for service providers to design specific care services to better support older families to provide care. Housing and neighbourhoods will need to be better designed or adequately adapted if centenarians are to be encouraged to live for as long as possible in the community. The previous government launched the Lifetime Homes and Lifetime Neighbourhoods initiatives, which could help in this area, but implementation has been slow and, at the time of writing, there has been no further mention of these initiatives by the coalition government. A policy commitment to build more specialist retirement housing is also needed if we are to avoid a continuation of current rates of institutional care as the centenarian population increases.

It is also noteworthy that recent policies, such as proposals to shape long-term care funding (Commission on Funding of Care and Support 2011), have not included explicit mention of a rising centenarian population, as this population will undoubtedly be one of the most frequent consumers of social care.

In examining levels of wealth, women centenarians would appear to be disproportionately at risk of experiencing poverty, and policy-makers should recognise this gender imbalance. Furthermore, given that a higher proportion of household income spent by the oldest old, and possibly centenarians, is spent on fuel, this group is particularly exposed to changes in benefits, such as Winter Fuel Payments or Council Tax Benefit or to price fluctuations. Members of this age group may also be less likely than younger people to find the best deals from fuel providers, since older people are less likely than others to have internet access.

The main source of income for the oldest old is the state pension, and a large proportion of oldest old and centenarians currently live just above or below the poverty threshold. As the size of the

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<sup>5</sup> A recent ILC-UK report on the role for extra care housing is available at: <http://www.ilcuk.org.uk/record.jsp?type=publication&ID=100>



centenarian population increases in future, this may present a challenge for pension costs and this will need to be considered in pension policy. Moves towards a more staggered approach to retirement and a rise in the state pension age are likely to help in this respect in the long-term (see Berry, 2010).

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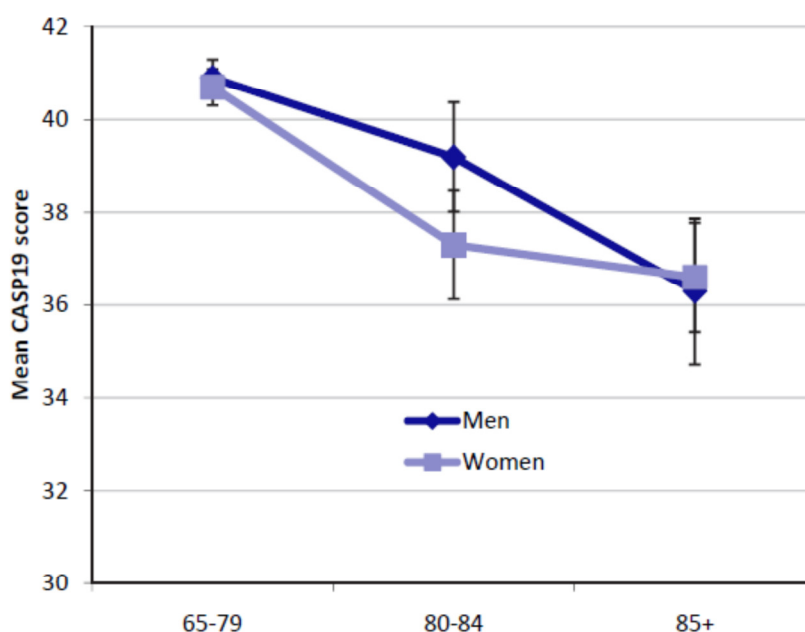
# Quality of life

Centenarians are an under-researched group and there is a lack of reliable evidence about how they view their quality of life. This section brings together what we do know or might reasonably assume about quality of life and begins to consider the response needed from policy-makers.

## Introduction

Interest in the lives of centenarians, including their quality of life, has recently attracted a higher profile as the numbers in this group are growing faster than any other section of society (as discussed in Chapter 1). Measuring well-being and quality of life in general is also attracting more attention among policy-makers. For example, part of the Conservative Party manifesto for the 2010 election was devoted to raising quality of life in the UK (Conservative Party, 2010) and the government has since set into motion steps to monitor quality of life in the UK through the development by the Office for National Statistics of a new UK-wide measure of well-being, alongside the more traditional GDP.

**Figure 4: Quality of life in older adults from ELSA, by sex taken from Gjonça et al 2010, p.236**



However, while the broader quality of life agenda is gaining prominence, there is a danger that the specific needs of centenarians are overlooked within this. In this chapter, as previously, we supplement the specific literature on centenarians with findings about the quality of life of the broader group of those aged 85 and over. According to results from the English Longitudinal Study of Ageing, as we get older, we are more likely to report a poor quality of life. Figure 4 demonstrates how ratings concerning quality of life fall for both genders with age, although at markedly different points (substantially between 65-79 and 80-84 for women, although between 80-84 and 85+ for men).

Comparisons between 2002-03 and 2008-09 in the ELSA study revealed that a larger number of oldest old group reported a decrease in quality of life than had experienced an improvement, with only 10% of those aged 85+ experiencing substantial improvement

(Demakakos et al, 2010). Poor quality of life among the oldest old is therefore a significant problem which demands monitoring as the numbers of the oldest portion of the population grow in coming years.

In the second chapter of this report, we considered the available evidence on centenarians' physical and cognitive health and found that many are living in better health than might be expected, given their advanced years. Health is clearly a key determinant of quality of life, but it is not the only factor influencing individuals' quality of life and how they perceive it. Understanding the other key elements which make up quality of life for centenarians, is crucial if we are to improve the experience of living past 100.

## **Measuring quality of life**

Different measures of quality of life have been produced that are designed to be specific to older people, but none have been produced with particular reference to centenarians. International measures include the cross-cultural World Health Organisation Quality of Life measurement module for older people (WHOQOL-OLD) (Power et al, 2005). However, this model focuses on health and social care and does not include other important areas that impact on quality of life such as functional ability and independence. In response to this gap, multidimensional measures based on needs and satisfaction criteria have been developed such as CASP-19, which examines Control, Autonomy, Self-Realisation, and Pleasure (Hyde et al, 2003). This is the measure used to assess quality of life in ELSA and in the British Household Panel Survey.

Other measures have been designed to include the subjective element of quality of life. The Older People's Quality of Life (OPQOL) measure developed by Professor Ann Bowling and colleagues (Bowling et al, 2002) attempts to address these issues by taking a 'bottom-up' approach, consulting with older people on the items that form the quality of life measurement. There is an increasing trend towards the production of such subjective measures to complement, if not replace, more objective approaches. Examples include a forthcoming publication from the Joseph Rowntree Foundation about what older people with high support needs value (Katz et al, forthcoming 2012) and the National Well-being measurement currently being developed by the Office of National Statistics (discussed above).

The development of the ONS measure has included a public, online consultation, and a number of discussion events. This consultation will be compared with the existing literature on quality of life and adjusted to be more robust – a similar approach taken by the smaller-scale qualitative Rowntree Foundation study (Katz et al, forthcoming 2012). However, no provision has been made by the ONS to include centenarians or the oldest old (ONS, 2011b), which leads us to question the applicability of this new measure to the 100+ age group. This seems to be typical of the frequent exclusion of this group from quality of life surveys and research in general.

## **Key determinants of quality of life for centenarians**

Health and socioeconomic status are key predictors for quality of life and happiness, and these have been examined in previous chapters. Here we will explore the other recurring themes from research into quality of life for centenarians and the oldest old, namely social resources,

independence and personal attitude.

### ***Social resources***

Having contact with other people and a support network have been found to be vital to maintaining quality of life for older people (Bishop et al, 2006; Bowers et al, 2009). Social resources might be gained from contact with family, neighbours and friends, through participation in groups or clubs, and through accessing support services that provide some human contact. Centenarians have been found to have lower levels of social resources than octogenarians and are more likely to be socially isolated than other groups (Randall et al, 2010; Barnes et al, 2006).

Social resources can be affected by living circumstances: the Georgia Centenarian Study found that centenarians living in nursing homes self-reported significantly lower social resources than those living in either private homes or personal care facilities (Randall et al, 2010). Another US study on the oldest old found that residential homes with increased opportunities for social engagement (either through family contact or regular organised activities) can improve residents' language performance and other outcomes (Keller-Cohen et al, 2006). This is particularly significant given that a large number of centenarians and particularly women centenarians live in communal establishments (see Chapter 3). However, there is also evidence to suggest that living in a communal setting (whether residential care or an extra care housing scheme) does not necessarily guarantee a higher level of social contact for older people, especially those who are ill or severely disabled (Bowers et al, 2009; Callaghan, 2009).

Findings from ELSA over two time periods (2002-3 and 2008-9) showed that the majority of the oldest old were in regular contact with their children, with 80% speaking to their children and nearly half meeting them on a frequent basis (once a week or more). However, around a third saw their children on only an infrequent basis (less than once a week) and the oldest old were much more likely to speak to their children on the phone rather than to meet them (Gjonça et al, 2010). We are not aware of any research exploring whether contact by telephone has the same benefit for quality of life as face-to-face social contact.

There is some evidence that the nature of friendship changes amongst the oldest old. For some people, loyalty to departed loved ones can mean that people are reluctant to try and replace lost friendships. As a result, rather than embarking on new relationships, the oldest old may be more likely to reclassify existing relationships. A generational shift may occur where friends become closer to the age of their children and form, to a certain extent, a role as a surrogate family. New friends within the peer group are often found in group settings and may be more emotionally distant than previous friendships (Jerrome and Wenger, 1999).

Despite evidence supporting social participation both as a means to improve quality of life (Bowling and Grundy, 2009), analysis of ELSA found that while over half of older people were members of at least one organisation, just under 10% of the oldest old had taken-up membership of social and community organisations between 2002-3 and 2008-9. Over the same period 15% stopped being a member of any organisation (Gjonça et al, 2010). Barriers resulting from the ageing process may be a factor in the decreasing participation in this oldest group. Dello Buono and colleagues (1998) found that most of the centenarians in their study reported sensory impairment (either sight or hearing loss) to some degree, and propose that this is a contributory factor in giving up recreational activities. There are, however, positive themes emerging from research commissioned by the

Joseph Rowntree Foundation as part of their Better Life programme on older people with high support needs (many of whom will be 85 years and over). These include, for example, the new social contacts that may arise from moving into communal establishments or receiving care (Katz et al, forthcoming 2012) and the reciprocal contributions which this age group often make and are a determinant of quality of life (Bowers et al, 2011).

Nevertheless, the oldest old are most likely to experience social exclusion: they appear to be significantly more isolated than other age cohorts and have difficulties accessing basic services like the GP, bank or post office (Barnes, 2006). A study of 30 people aged between 85 and 103 years, taken from the Swedish Umeå 85+ study, painted a complex picture of the experiences of loneliness among the oldest old (Graneheim and Lundman, 2010). While some felt loneliness in association with loss and saw it as a limiting factor in their lives; others reported that feeling confident and free was an “opportunity of loneliness”. Some loneliness may be associated with the high levels of widowhood for centenarians; for example, census data earlier in Chapter 3 showed that over half of male centenarians and over four-fifths of female centenarians were widowed. At all ages, widowhood is more prevalent for women than for men (Gjonça et al, 2010). This picture is changing and the ONS have projected a fall in the number of widows aged 80-84 and an increase in the number of women with partners at ages over 80 (ONS, 2010). ELSA researchers pointed out that if this happens, it could have an impact on the profile of care provision and spouse carers in particular as well as on levels of loneliness. As the number of male centenarians rises, we will hopefully see a centenarian cohort which is less likely to be widowed, potentially improving their quality of life in terms of social resources.

### **Independence**

Small-scale qualitative studies of centenarians have revealed that this group values their independence in spite of the limitations they may experience as a result of ill-health. There is a perception that the loss of physical independence is inevitable among centenarians and that all who reach the age of 100 will have some form of disability or health problem requiring care. This phase of life is sometimes referred to as ‘The Fourth Age’, characterised by ‘frailty, impairment, multi-morbidity, loss of autonomy and loss of personal identity’ (Smith, 2002). Many have challenged this negative view of the final years of our lives and the inevitability of disability, illness and dependency (for example, Christensen et al, 2008). Indeed, while there are some centenarians who will experience health problems, there are many who will live in good health for the majority of their lifespan (see the second chapter in this report on the Health and Social care of Centenarians ).

The attitudes and approach of family and caregivers often influence the amount of autonomy which older people experience. Lapin and colleagues (2011) found that caregivers tend to perceive the quality of life of the person for whom they care as lower than the individual’s own perception (this was found regardless of cognitive impairment). Other reports have suggested that carers can be overly protective of their relative or patient, exemplified by excluding them from trials such as the Newcastle 85+ study (Davies et al, 2010). Such behaviour may lead to control being taken away from the older person, thereby reducing their independence. Among centenarians suffering from cognitive impairment, relatives may be mandated to make decisions about care and finances for them. It can be difficult to maintain the balance between ensuring sound care and financial decisions are made and retaining an older person’s sense of control over their lives.



For those centenarians that have enough mobility to live independently or with minimal support, the availability of accessible transport can be a key factor in determining independence and quality of life. Analysis of ELSA found that over one in five people aged over 80 uses public transport often. However, the researchers found that “whilst 24% of those aged 85 and over with no car often use public transport, 64% only occasionally or never do, which could indicate a lack of independence in this group to move around outside the immediate area.” (Gjonca et al, 2010, p.227). We should also expect differences in public transport use based on location, for example people living in urban areas will have access to better public transport than those in rural areas.

Research from the Cambridge City over 75s cohort study has been used to consider the driving ability of the oldest old. Within this study, it was the younger group of participants (mean age 86.6) that was more likely to be driving. The researchers pointed out that whilst physical disability and cognitive impairment may be relatively common amongst this age group, those still driving had few physical limitations on their daily activities. Generally, people tend to stop driving when they lose capacity (Brayne et al, 2000), although there is some evidence to suggest that some people will need additional encouragement to prevent them from continuing to drive when it is unsafe for them to do so (Berry, 2011).

### ***Personal attitude***

Various studies have revealed that good quality of life in centenarians can be encouraged by a positive mental outlook on life and ageing. In Bowling and colleagues’ OPQOL measurement studies, having self-efficacy or a ‘can-do’ attitude was found to be an independent indicator of good quality of life, along with more anticipated factors such as good health and functionality ability. Having a sense of purpose has been found to be one of the nine key points shared by the oldest communities in the world by Buettner and colleagues (2010) in their research for the National Geographic. It may be that membership of groups and clubs is a way that centenarians are able to feel a sense of purpose, as well as through occupying roles such as grand-parent (or great grand-parent) (Katz et al, forthcoming 2012).

The personal ‘stories’ of ageing gathered by Tina Koch in the UK show a group of centenarians who seem to accept difficulties but endeavour to continue in their lives despite these (Koch, 2010). This group challenges stereotypes of ageing and the lack of participation discussed above, describing their continued ‘growth and development’ past the age of 100. Compared to younger groups of older people, centenarians have been found to have higher reported quality of life despite greater functional disability (Dello Buono et al, 1998). Happiness and self-evaluation of one’s current position in later life has been associated with a positive attitude in earlier life by centenarians in the Georgia Centenarian study (Bishop et al, 2010). This positivity in their self-perception had a particularly beneficial impact on the group’s subjective evaluations of their health and financial status. Similar results regarding an optimistic personal attitude have been found in other qualitative studies, although we should not assume that all share this positive outlook. Other centenarians have described their lives as being without purpose and said that they saw themselves as simply ‘existing’ (Hedburg et al, 2009).

Religion or spirituality has been shown to influence attitudes and coping mechanisms, allowing some centenarians to maintain a positive outlook on life. In a small scale study in Barbados, high levels of religiosity were found to be positively related to adaptation and life satisfaction (Archer et al, 2005). Taking solace in religion has been found to increase in centenarian groups relative to



younger samples (Dello Buono et al, 1998). In the Umeå study in Sweden, some of the oldest old interviewed expressed deep regret that they were not religious (Fischer et al, 2007). The combination of a sense of purpose combined with an active role in a religious organisation has been explored in some qualitative studies, and, according to analysis of ELSA, women tend to be more involved in religious groups than men (Gjonça et al, 2010, p.238).

## **Other factors and limitations of existing research**

Due to the limited data available on centenarians in the UK alone, it is necessary to look to research elsewhere to understand more about this group. However, it is important to not draw strong conclusions about the UK population of centenarians from limited or small-scale studies or those focussed on the oldest old more generally. While ELSA and other large scale studies are a useful resource, by failing to disaggregate the 85+ age group, they do not allow us to compare centenarians with others in this age band.

Difficulties gaining access to centenarians can be a problem for researchers wishing to explore their quality of life. Factors such as overly-protective carers and families preventing centenarian involvement in research are a possible explanation of the dearth of information on this group. Many will be cared for in residential care homes or at home. When residents in care homes are included in large household surveys (and they are often not), they may be interviewed by proxy meaning that it is particularly difficult to assess constructs such as quality of life. A significant proportion has dementia and is subject to an additional level of bias against inclusion in surveying. As such they are often excluded from research, and there can be considerable differences in recruitment for studies. Davies and colleagues (2010) discussed the additional cost of the measures that must be taken when conducting research with the oldest old and centenarians.

Subjective measurements, particularly of health, may be distorted somewhat in centenarian groups, as it is difficult to appreciate that your health problems are quite severe when in contrast you have outlived or are in much better health than your contemporaries. An example of this from the literature is the lack of health complaints from the centenarians in Dello Buono and colleague's study (1998) compared to younger groups and despite greater levels of disability. While there are arguments in favour of using subjective measures, centenarians may not fit into analyses in the same way as the rest of the population. Additionally, in the development of new subjective measures of quality of life, such as the national well-being measure currently under development by the Office of National Statistics, consultation processes may be prohibitive to the inclusion of centenarians and the oldest old. The initial consultation for the national well-being measure was conducted primarily through an online forum. Older adults are less likely to be using the internet either at home or elsewhere (ONS statistics released in August 2011 reveal that 5.7 million of people aged 65+ have never used the internet) (ONS, 2011a), and what usage there is declines with age. As a result, consultations such as this are likely to be missed by the older age groups and centenarians and the oldest old will be underrepresented. Using methods other than the internet alone to reach out to potential research or consultation participants might be a viable way to include the point of view of oldest old and centenarians, which otherwise might be missed.

There are currently a much higher number of female centenarians than male, and much of the literature on centenarians is focused on women only. Some evidence, such as the study of the delay versus compression of disability by Terry and colleagues (2008), shows that there can be

profound differences in how the sexes experience ageing past 100. In this research men experience a later, faster decline in functionality ability while among women this was slower and longer. As the gap between the number of centenarian men and the number of centenarian women closes (see Chapter 1), it is important to note these potential differences and to avoid making broad assumptions based on both limited data and existing female-focused studies.

## Summary and Policy implications

In this chapter we highlight that:

- Quality of life of centenarians is an increasingly important issue as the size of the centenarian age group continues to grow.
- Often our knowledge about centenarians' quality of life is inferred from broader studies of those who are 85 and over. Much of the existing research is qualitative, using very small sample sizes. At a national level, centenarians have not been included in larger studies such as the new measure of national well-being from the Office of National Statistics.
- Important factors for a good quality of life for centenarians in existing research include maintaining social resources, independence and functionality, and a positive personal attitude.
- More research is required into how subjectivity and characteristics like gender and religion influence quality of life and how it is rated by centenarians. Future surveys should include more detailed analyses within the 'oldest old' to ensure that variation within this group is examined.

Given the lack of good quality UK-based evidence and the rising numbers in this group, efforts should be redoubled to ensure that centenarians are included in wider quality of life research initiatives. Researchers must reduce indirect discrimination of the very old by avoiding exclusive use of online methods for the recruitment and involvement of their participants and by removing barriers to participation by those who find travelling difficult due to disability. New surveys such as the national well-being measurement must remove these barriers in order to ensure that centenarians and the oldest old are represented, particularly as the group is growing so quickly. Small-scale qualitative studies also have an important contribution to make to our understanding of centenarians and high quality studies of this kind should be supported.

Given the rise in the number of male centenarians and the gender differences apparent around living arrangements and poverty, research which helps us to understand the impact of gender on centenarians' quality of life should be encouraged. There appear to be biological differences in the ageing process for men and women, such as the variation in functional decline (Terry et al, 2008). Men and women's quality of life declines with age in a similar way, but there are slight differences throughout older age. Prior to age 75, men tend to have a worse quality of life than women; but the picture reverses after this age (ONS, 2009). The oldest age category currently used in many studies is 85+, giving us no detailed information on centenarians, although we might expect this pattern of gender difference to continue up to and past 100, based on the evidence of longer-term disability for women at this age. If further evidence-based differences between men and women are found, it would be useful to understand if this is a cohort or age effect in order to continue gender-appropriate improvements to quality of life for future centenarians.

A key area for future policy should be to increase the accessibility of social or interest groups to centenarians. This would both ensure a heightened level of social contact as well as a sense of

purpose, both important factors in improving quality of life. As in research recruitment, indirect discrimination through using exclusively online advertising for societies and clubs should be avoided. Where centenarians are living in residential care, particular effort should be made to incorporate structured social interaction in their daily lives since isolation is possible, even in communal or institutional settings.

The positive impact of a good psychological outlook on the experience of ageing has interesting implications for health care. If we believe that physical and mental health go hand in hand, psychological factors must be considered in medical treatment and clinical pathways. It has been suggested that a culture of this kind could be nurtured, which if brought to fruition, could have a considerable impact on how people develop coping strategies for all kinds of situations as they move into life beyond 100.

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# Living beyond 100: Summary and Conclusions

The picture of what it is like living to 100 is certainly a complex one. If we expect the number of centenarians to rise to over half a million by 2066, policy makers and service providers need to develop their understanding of this group and its needs. Despite the view that centenarians represent a healthy model of ageing, the growing number of oldest old living with long term conditions is likely to result in a future centenarian population with more diverse health and social care needs.

In examining the demography, health, housing and wealth, and quality of life of centenarians, we have identified the following **key points**, (summarised in greater detail the final sections of each chapter):

- There are a rapidly increasing number of centenarians in low mortality countries of the world.
- In the UK, there are currently 12,640 centenarians and supercentenarians and more than 10 million people can now expect to live beyond 100.
- The centenarian and oldest old populations are overwhelmingly female.
- There is indicative evidence that the physical health of the centenarian population is better than the oldest old population. However, the health status of the oldest old population of today might have an impact on the centenarian population of tomorrow
- Centenarians are at high risk of developing dementia
- There is evidence of an increase in the proportion of oldest old who are disabled
- There seems to have been a distinct rise in hospital utilisation in recent years by people aged 85 and over.
- A high proportion of centenarians live in communal establishments
- Centenarians have high rates of widowhood
- Substantial proportions of centenarians who live in the community do so with their children and other family members
- Male centenarians are much more likely to continue living independently in the community than female centenarians
- Wealth decreases and poverty increases with age among pensioners, although the oldest old perceive little difference in their financial circumstances compared to younger age groups.
- Quality of life decreases with age, although evidence on the quality of life of centenarians specifically is unclear

Here we review the findings examining the broad research questions and consider how these translate into recommendations, both for further research as well as recommendations for policy-makers. Our work clearly highlights the pressing need to undertake research to better understand the lives of centenarians as we exposed a dearth of literature on centenarians, and in particular their

housing and income circumstances. However, other emerging debates are forming regarding the future population of centenarians that also require attention.

Centenarians currently comprise a small proportion of the UK population; equivalent to around one in every 5000 persons, and the small size of the current population may be used by some as justification for overlooking their needs. However, this ratio is expected to grow, and by 2066 this will rise to thirty-one in every 5000 people. Centenarians therefore represent one of the fastest growing, although least understood sections of the population.

**Our main recommendation on the basis of this work is therefore a call to action for further research on centenarians focussed on two specific strands:**

- *Understanding the current living circumstances of centenarians in terms of health and social care, housing and wealth, quality of life, and other relevant domains.***
- *Understanding the implications on the centenarian population of the near future of the growing numbers of the oldest old population living with a disability. Specifically, this requires addressing whether the greater numbers of those in the oldest old category living with disabilities are also likely to survive into centenarian years.***

There is also a need to revisit other aspects of the health of centenarians and specifically whether the relatively good health of the current centenarian population represents a postponement of some of the major NCDs (see earlier footnote), or avoidance. Similarly, we need a greater understanding on how the patterns of 'survivors', 'delayers' and 'escapers' with respect to NCDs characterised by Evert et al (2003) vary by different types of NCD, and how these patterns may also differ in a UK population, particularly one where the over 85 population is showing signs of better healthcare management, as opposed to better health status. This type of research has obvious benefits for health service planning. This is particularly of value if applied to the case of dementia, for example, given that centenarians are thought to have a high risk of developing this condition.

In addition to new research projects, further research should include greater representation of centenarians, the oldest old, and older people in communal establishments in existing surveys.

Funding such research in a time of cuts in public spending and reduced budgets for research budgets is challenging. However, examining centenarians is of clear advantage to a number of industries and policies, for example the pensions, pharmaceutical, and retirement housing sectors to name but a few. For example, in this report we highlight that centenarians are the most likely of any age group to reside in institutional accommodation, and to have exhausted their financial resources to pay for an extended stay. Future research could focus on the factors that predict movement into an institution among this group, and given the relatively high cost and low desirability of this form of accommodation, progress to examine what the most appropriate alternatives are and how these can be implemented.

## **Recommendations**

In this report, we show that the body of evidence on centenarians is far from consistent or extensive, and throughout we encounter a dearth of evidence on the lives of centenarians. At times, we also question the robustness of the extant evidence in terms of sample size, representativeness



and reliability. Although these are caveats to our results, they do not limit the applicability of our recommendations which **in addition to:**

- **Developing the evidence base around centenarians in order to • inform current and future ageing strategies.**

**we also recommend that:**

- **Policy-makers should take a more holistic approach to designing interventions that integrate health, care and housing solutions.** This means joining silos of policy that have traditionally been regarded as separate to develop, evaluate, and expand new innovations. This is of particular relevance to centenarians, who may need assistance in accessing a range of services, and a holistic approach may best meet these needs.
- Given the growing population of oldest old who exhibit diversification in health needs but may survive to be centenarians, **health practitioners should respond by greater targeting of prevention and health promotion programmes to include people in their 80s and 90s.** This group is often excluded under the assumption that health status is a predetermined outcome, although the evidence to support such a notion is ambiguous at best.
- **Health and Social care practitioners should develop family care-giving plans that recognise the needs of multiple generations of family members and the reciprocity in care which may well exist in households where centenarians live with their ('younger older') children.**
- **In order to preserve the quality of life of centenarians, policy-makers need to develop and invest in ways of increasing the accessibility and appeal of social or interest groups to centenarians.** This may have a measurable impact on other aspects of the lives of centenarians, such as health service usage or housing.
- **Developers need to plan for growing numbers of centenarians through ensuring that housing and neighbourhoods are better designed and/or adequately adapted in order to enable centenarians to live for as long as possible in the community.** This includes building more homes that meet Lifetime Homes standards and developing neighbourhoods according to the principles of Lifetime Neighbourhoods, both of which appear to have fallen by the policy wayside in recent years. This requires a change in policy to ensure that developers take a longer-term stake in their developments and do not allow good and long-term cost-effective design to be sacrificed for short-term advantage.
- We would urge local authorities to develop a range of housing options for older people alongside local communities. This involves **the creation of Neighbourhood Development Plans that reflect the intersection of the different needs of older people in terms of tenure, functional ability, affordability and include recognition that these housing options may involve prolonged residence in the case of centenarians.**
- **Developers of specialist retirement housing need to take account of the changing demography of the oldest old population, which is likely to contain a higher proportion of men, through building more retirement housing for couples. Similarly, providers of communal establishments need to ensure that their establishments adequately cater for the needs of (centenarian) men.**

- **Within care home settings, social care practitioners should ensure the provision of structured opportunities for social interaction and, crucially, provide (funding for) and support to help those in particular who have high support needs.** This is likely to be of particular benefit to the centenarian population, who are thought to be at greatest risk of developing dementia and living in communal establishments.
- The oldest old, and by extension centenarians, are more likely than younger age groups to spend a higher proportion of household income on fuel. This group is most likely to be affected by fluctuations in fuel price, and unlikely to be able to access the best deals from fuel providers, since older people are less likely than others to have internet access. **Energy companies should ensure that their oldest customers access the best deals; this may involve the creation of specific tariffs for households headed by the oldest old and centenarians and the creation of specific teams within companies to protect the interest of older people from discrimination in terms of fair access to good and services.**
- Centenarians are found to be at high risk of physical frailty that can lead to a higher incidence of falls and poorer recovery afterwards. **Any local or national falls prevention strategy should therefore explicitly target the oldest old and centenarians.**
- **Given that many of the oldest old and centenarians have low levels of internet usage, initiatives that aim to raise levels of digital inclusion among older people should expand targeting those in the oldest age groups.** This would aid the oldest old and centenarians to access opportunities in terms of social resources, but also in terms of civic participation and financial resources. These opportunities will have to be structured around the health conditions facing centenarians, which may include sight loss in particular and other impairments which could impede or restrict access.
- Because of the advanced age of centenarians, family caregivers are inevitably likely to be relatively old. A growing number of centenarians is therefore likely to increase the demand for older carers. This could have a significant impact on the ability of men and women in their 50s and 60s to continue in work and could undermine attempts to extend working life. **Employers must ensure that they find ways to provide flexible working to ensure that caring responsibilities do not pull people out of the workforce early. The Government has supported the creation of childcare vouchers which provide fiscal support to help people to buy care for children. They should introduce a similar scheme which would allow people of all ages to buy care vouchers to support the needs of older adults.**





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