Government
Office for Science

Foresight

Future of an Ageing Population

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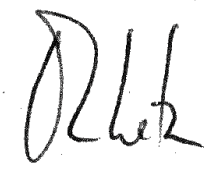
Foreword

People in the UK are living longer than ever before - a major achievement of modern science and healthcare. Older people make up a growing proportion of the population, and so make an increasing contribution to society. They are our workers, volunteers, taxpayers and carers.

However, the UK is not making the most of the opportunities afforded by an ageing population. Too many people are forced out of work in later life by poor health or unwelcoming attitudes in the workplace. Too few people access the training they need to adapt to a changing labour market. Too many families face the choice between working and providing care for a loved one. Too few homes meet the needs of older people.

The ageing of the population also challenges the UK's model of service provision. If an older population means fewer workers at the same time as greater demand for public services, this raises questions about the sustainability of the current models of working lives and care provision.

The UK has a choice. Will the growing number of people in later life be predominantly empowered, skilled, healthy and able to contribute fully to society? Or will we be increasingly unhealthy, disempowered and dependent? Answering this challenge cannot be Government's job alone. Employers will need to adapt to an ageing workforce. Families and communities have a role to play in supporting their loved ones to age well. Individuals can, and must be supported to, make choices which will better prepare them for a happy, productive and fulfilling later life.



The Rt Hon Oliver Letwin MP

Preface

The population of the UK has undergone a fundamental change in its age structure, with many people having fewer children and living longer lives. As a result the average age of the UK population is increasing. This has important implications for the whole of society. Growing up and living in a society where younger people are in a majority is fundamentally different to growing up in a society where the majority of people are in older age groups.

Responding to this demographic shift will require us to make adaptations across many aspects of our lives: how we work; how we care for, communicate and interact with each other; the built environment we live and work in; the way we live our lives; how we learn; and how we use technology. We need to understand the nature and implications of this population change in order to adapt successfully. This has been the driving force behind this Foresight project on the Future of an Ageing Population. We have brought together expertise from a wide spectrum of disciplines including demography, economics, design and technology, social and health policy, geography and gerontology.

We have gathered the best available evidence to understand what the ageing of the UK population means both now and in the future. We have considered evidence from a wide range of sources: through commissioning 22 peer-reviewed evidence reviews; through expert meetings to discuss topics ranging from health and care to housing; and through ten visits to different regions and administrations across the UK to learn directly about local and personal experiences of population ageing. We are indebted to the many experts who have been involved in all aspects of this work. This report brings together the evidence that will help policymakers to develop the policies needed to adapt to the demographic change of the UK.

Professor Sarah Harper

Sir Mark Walport

The Government Office for Science would like to thank the many contributors who generously provided evidence, advice and guidance to the project.

We would like to extend particular thanks to the project's Lead Expert Group:

- Professor Sarah Harper (Chair) - University of Oxford
- Professor James Banks - University of Manchester and Institute for Fiscal Studies
- Professor Paul Boyle CBE - University of Leicester
- Professor Tom Kirkwood - Newcastle University and University of Copenhagen
- Professor Martin Knapp - London School of Economics and Political Science
- Professor Jeremy Myerson – Royal College of Art
- Mrs Mary Sinfield OBE - Former Chairman of the New Dynamics of Ageing Programme's Older People's Reference Group
- Professor Alan Walker CBE - University of Sheffield
- Mr Oliver Wells - NIHR Healthcare Technology Co-operative for Devices for Dignity

The project team was led by Rebecca Jones and, over the course of the project, included Jessica Lawrence, Henry Green, Tom Wells, Stephen Bennett, Charles Jans, Poppy Groves, Rhian Reese-Owen, Shabana Haque, Sherelle Parke, James Pugh, Nitharna Sivarajah, Manon Ragonnet-Cronin, Kate Hamblin, Emily Georghiou, Parwez Samnakay, Philippa Shelton, Chris Bowden, Jo Dally, Moh Shabier and Chris Miles.

Executive Summary

The UK population is ageing. In mid-2014, the average age exceeded 40 for the first time. By 2040, nearly one in seven people is projected to be aged over 75. These trends, partially mitigated by migration rates, will have a major effect on the UK. The Office for Budget Responsibility projects total public spending excluding interest payments to increase from 33.6% to 37.8% of GDP between 2019/20 and 2064/65 – equivalent to £79 billion in today's terms – due mainly to the ageing population.

This demographic change will affect the whole country. To grow old in a society where more people are young is fundamentally different to doing so in a society where more people are in older age groups. It has implications for how each of us approaches and plans for our own old age, and for the old age of our family members. For government, it will shape how public services are planned and influence every government department. Perhaps most importantly, it will require a co-ordinated response between departments that reflects the robust evidence for the inter-connectedness of policies affected by ageing.

Without significant improvements in health, UK population ageing will increase the amount of ill-health and disability. Chronic conditions, multi-morbidities, and cognitive impairments will become more common. At the same time families will face increasing pressure to balance care with other responsibilities, particularly work. This is likely to mean that demand and supply of care will diverge, as the UK has more people needing physical and financial support, at a time when there are fewer people able to fund public services and provide care. Successfully meeting this demand will need adaptations to health and care systems and support for unpaid carers.

As the population ages, so will the UK workforce. The productivity and economic success of the UK will be increasingly tied to that of older workers. Enabling people to work for longer will help society to support growing numbers of dependents, while providing individuals with the financial and mental resources needed for increasingly long retirements. Supporting fuller and longer working lives, removing barriers to remaining in work, and enabling workers to adapt to new technologies and other fundamental changes to the world of work will be critical to the nation's economic wellbeing.

Learning and training will become of even greater importance as the population ages. Learning throughout our lifetimes will help us to participate for longer in the labour market, build personal and mental resilience and bring health and wellbeing benefits. Lifelong learning brings benefits to individuals, employers and wider society that will be increasingly valuable in an ageing population. Despite this, participation in adult education and training has fallen in recent years.

Suitable housing can significantly improve life in older age, while unsuitable housing can be the source of multiple problems and costs. Poor quality housing costs the NHS an estimated £2.5 billion per year. Homes will be increasingly used as places of work and care. Appropriately designed housing, that can adapt to people's changing needs as they age, has a number of benefits. These benefits include reducing demand on health and care services, and enabling individuals to work more flexibly in later life.

The ageing population presents opportunities to individuals and society. However, as with any major demographic change, it also presents challenges and ignoring these could undermine the potential benefits of living longer. This report brings together evidence about today's older population, with future trends and projections, to identify the most critical implications for government policy and the socio-economic resilience of the UK.

Key Findings

Working lives

The proportion of the working age population aged between 50 and the state pension age (SPA) will increase from 26% in 2012 to 34% in 2050 – an increase of over 5.5 million people. This is the result of increases to the SPA, as well as the so called 'baby boomers' reaching this age band. The productivity and economic success of the UK will therefore be increasingly tied to the productivity and success of its ageing workforce. Encouraging older people to remain in work will help society to support growing numbers of dependents, while providing individuals with the financial and mental resources needed for longer periods of retirement. The employment rate currently declines from 86% for 50 year olds, to 65% for 60 year olds and 31% for 65 year olds. Priority areas include:

- **Supporting the ageing population** to lead fuller and longer working lives. This means examining the factors that are causing employment rates at older ages to vary across the population.
- **Adaptations to the workplace.** These include addressing negative attitudes to older workers (see box A) and health needs, improving workplace design, encouraging access to new technologies, and adaptation of human resources policies and working practices.
- **Ensuring individuals re-skill throughout their life time.** As working lives lengthen, and the workplace undergoes major changes, job-related training will become almost as important to people in mid-life as at the beginning of their career. This will require the UK to move towards a model where training and re-skilling opportunities are available throughout people's careers.

Lifelong learning

Lifelong learning has a number of benefits alongside those related to work. Many kinds of learning boost mental capital[A], which in turn increases individual resilience in later life. There are positive effects of learning on both physical and mental health, improving wellbeing and reducing pressures on family and community resources and services. Despite this, 40% of 55 to 64 year olds have undertaken no formal training or education since leaving school. Priorities include:

- **Addressing falling participation in lifelong education and training.** Older workers are currently less likely than younger workers to receive workplace training or participate in learning, and there are differences in participation

A Please see glossary for detailed explanation of all technical terms used in the report.

across different socio-economic groups, genders and ethnicities. Improving participation in learning could enhance later life working and productivity and build mental capital and resilience.

- **Addressing barriers to later life learning.** There are significant benefits to moving away from a model where education only happens at the beginning of a person's lifetime. The principle challenges may be cost and who is responsible for paying. Others include attitudes (amongst learning providers, employers and older people) and personal circumstances, such as lack of time, work and family commitments.
- **Specific focus on technological and financial skills through life.** These skills are important for an ageing population, with benefits for retirement planning, work, connectivity and health. Older age groups generally experience greater barriers to developing and retaining digital and technological skills. While future older people will benefit from the technological skills they develop during their lifetime, it is less clear whether they too will be able to use future emerging technologies.

Housing and neighbourhoods

By 2037 there are projected to be 1.42 million more households headed by someone aged 85 or over – an increase of 161% over 25 years. Suitable housing can maximise the ageing population's positive contribution to the success and resilience of the UK, while unsuitable housing is the source of multiple problems and costs. Poor housing creates hazards that cost the NHS an estimated £2.5 billion per year (across all ages), comparable with the cost of physical inactivity (£1 billion) and alcohol abuse (£3.2 billion). Future homes will have an even greater effect on health and wellbeing as technologies develop that mean they are increasingly used as places of work and care. Priorities include:

- **Ensuring there is appropriate housing.** Demand for housing that meets the needs of older people will increase as the population ages. Adapting existing housing stock to meet this demand is critical as even by 2050 the majority of housing will have been built before 2000. Ensuring new housing can adapt to people's changing needs as they age will also be important, reducing demand on health and care services and enabling people to work flexibly and for longer.
- **Thinking 'beyond the building' to include the neighbourhood and community.** Interventions that improve homes are likely to be less effective without similar improvements in the neighbourhood. The ability to socialise and to access services are particularly important.

- **Preparing for the impact of variable home ownership rates.** Housing can be a financial asset, providing financial security, a source of funding for care and being passed on as an inheritance. However, housing can also represent a significant financial burden if individuals still have large mortgages or rent when they enter retirement. Home ownership rates currently vary widely across regions, socio-economic groups and birth cohorts.

A central role for families

Families are a central component of the drivers and implications of population ageing. Family decisions regulate the number of children born, and families are responsible for transferring money and support between the generations. Families also play a major role in providing care – 73% of disabled people over 65 receive some care from a spouse or other family members. The ageing population, alongside a major increase in the diversity of family types, is likely to change the role of families, and challenge policies that rely on them. Priorities include:

- **Understanding the impact of increasingly diverse family types on policy, especially adult social care.** In parallel to ageing, the structure of UK families is becoming increasingly diverse. For example, the number of lone parent households increased over the past decade from 2.7 to 3.0 million, a growth of 11%. There is limited understanding of the impacts this trend will have, especially on the future provision of unpaid care.
- **Responding to smaller and more 'vertical' family units.** Families are experiencing a process of 'verticalisation' where more generations are alive simultaneously. This provides a number of opportunities, particularly for increasing the positive contribution of grandparents, but it may also increase the pressure on individuals to care for dependents for longer periods of time.
- **Considering policies' effects on the whole life course and understanding the dependencies between generations.** Policy that impacts on younger adult life, such as when adults are caring for young children, will impact on later life experiences and need for support, for example by affecting an individual's ability to save for retirement. It is especially important to understand the gender dimension of inter-generational issues – for example unpaid caring responsibilities currently predominantly fall on women.

Health and care systems

Ageing will increase the total amount of ill-health and disability in the population. There will be an accompanying change in the nature of ill-health, with a relative shift away from acute illness towards chronic conditions, multi-morbidities, cognitive impairments and long-term frailty. In parallel, families and communities will play an increasing role in providing care services.

Priorities include:

- **Adapting health and care systems to meet changing demand.** In particular, future health and care costs can be reduced and resources better used by interventions which prevent and manage chronic conditions, and provide individuals with the tools to take more responsibility for their health.
- **Supporting family and other unpaid carers.** Between 2007 and 2032, the number of people aged 65 and over who require unpaid care is projected to have grown by more than one million. Supporting these unpaid carers to balance other competing responsibilities, particularly work, will help meet the increasing demand for unpaid carers.
- **Capitalising on the opportunities from new technologies.** Assistive technologies, home-based health monitoring equipment and smart use of big data all have the potential to change care in the home and community, reducing national health and care spending and improving wellbeing. Capitalising on these opportunities will require action to address the barriers to uptake of these technologies, and sensitivity to public concerns on privacy.

Social, physical and technological connectivity

Connectivity – the ability to use technology, access services, travel easily and socialise – will be particularly important as the population ages. Levels of connectivity can determine work, education, health and care outcomes. Beyond the ability to physically travel, new technologies and digital tools have an increasingly important effect on a person's ability to interact with the world around them. Barriers to physical and virtual connectivity create issues for individuals and society. Priorities include:

- **Responding to the transport needs of different age groups.** For people aged 70 and over, the primary challenge is maintaining physical connectivity. For the population as a whole it is important to ensure that transport options are as appropriate as possible for their physical, cognitive and financial needs. This is particularly the case for those older adults who are now extending their working lives. Other issues include the growing population of older people in rural and semi-rural areas, and the reliance on cars in areas with limited public transport options.
- **Successfully designing the built environment.** A well-designed built environment can maximise the physical mobility of older people, leading to increased activity levels, better health, and improved quality of life for a full range of users.
- **Addressing barriers to technology use.** Technology can improve connectivity,

address health, work and care challenges, and help people unlock the potential benefits of living longer. Barriers include a lack of skills and access, cost, and older people's assumptions about technology's usefulness and affordability.

A coherent response to ageing

The ageing population presents real opportunities. However, there are challenges, and ignoring these could undermine the potential benefits of living longer. This report combines evidence about today's older people with future trends and projections to identify the most critical implications of the ageing population for government policy and the socio-economic resilience of the UK. The following principles will help to ensure a coherent response to ageing:

- **The future success and resilience of the UK will be determined in a large part by its ageing population.** Nowhere is this more apparent than the productivity of the UK workforce, which will see a major increase in the number of workers aged 50 and above. The effect of an ageing population on health and care services will likewise have a major impact on the UK.
- **Issues cannot be addressed in silos.** For example, the productivity of the ageing population will be influenced by the skills and health of older workers, competing family care responsibilities, and connectivity. A co-ordinated response is likely to be more successful than addressing issues in isolation.
- **Most domestic policy areas will be affected by the ageing population.** Beyond the expected, such as health and care, this report illustrates that a wide-range of policy areas will be affected, including housing, transport, infrastructure and technology.
- **Factors throughout an individual's lifetime affect how they age.** To improve outcomes for people as they age – whether in skills, health, employability, housing and assets to fund retirement – requires interventions from an early age, and an understanding of the impact of policies through the life course.
- **Regional variation must be understood.** Connectivity challenges will differ between urban and rural areas, while different home ownership levels around the country will create regional differences in older people's financial assets and the support they need. There are also important differences between how the devolved administrations will experience ageing. This project has produced an online tool to map the different characteristics of ageing across the UK (see Box B).

Box A: Perceptions of youth and old age across Europe

The European Social Survey analysed perceptions of youth and old age across Europe. It found that perceptions of old age vary considerably between countries. In the UK, old age is perceived to begin at 59 – the second youngest of the countries surveyed. Youth is perceived to end at 35 – again earlier than most countries, and far younger than in Cyprus or Greece where 52 is regarded as young.

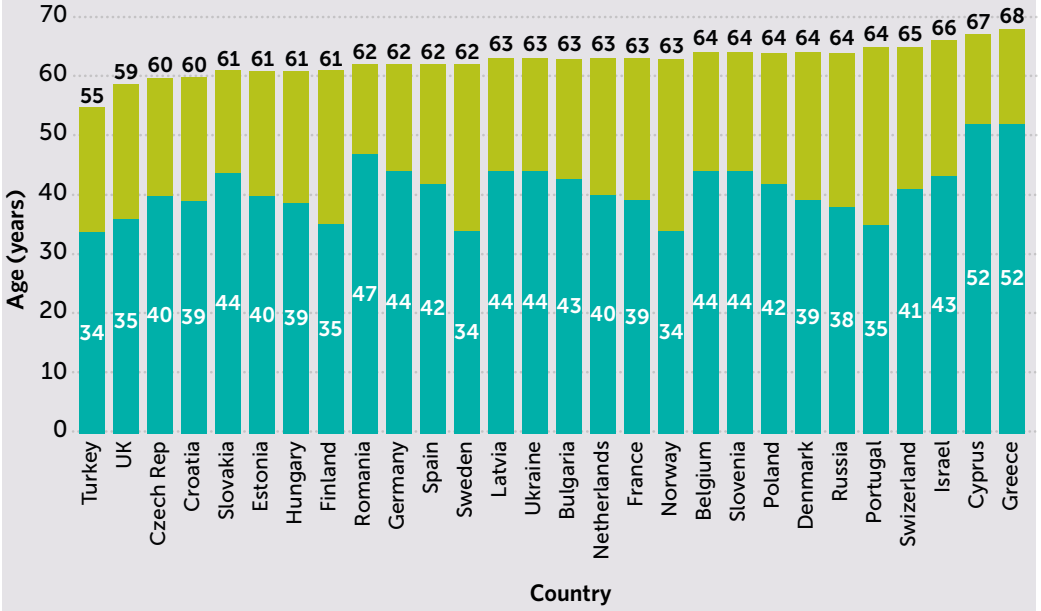


Figure A: Perceived age at which youth ends and old age starts[1].

Box B: Mapping the ageing population: regional variation

The Future of an Ageing Population project, in collaboration with the ONS, designed 62 cartograms showcasing local disparities in factors relating to the ageing population. Maps show the UK comprised of hexagons each representing one local authority.

http://neighbourhood.statistics.gov.uk/HTMLDocs/dvc325/small%20multiple%20maps/wrapper.html

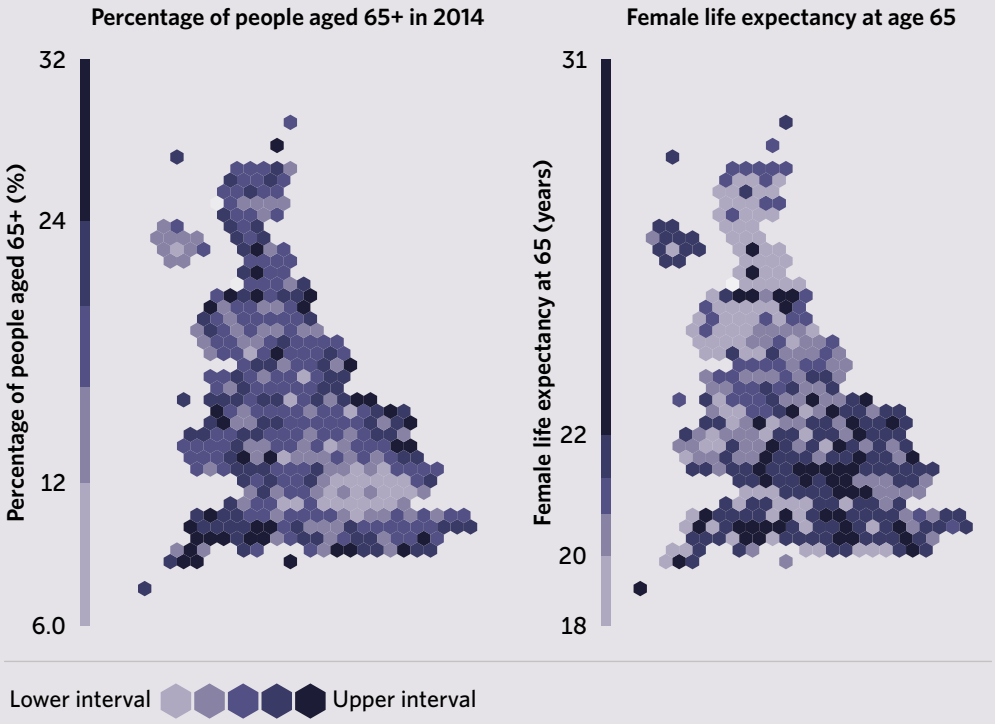


Figure B: Foresight mapping tool

These interactive maps choose breaks in the data to minimize the variance within classes and maximise the variance between classes - known as the Jenks natural classification method. Please see the website for further information.

Future of an Ageing Population

Evidence base

The Foresight Future of an Ageing Population team considered a wide range of evidence and commissioned 22 peer-reviewed evidence reviews (see below). The evidence review topics were chosen with guidance from the project's Lead Expert Group.

The project team also held regional meetings with experts and local representatives to discuss the effects of the ageing population in Sunderland, Margate, Swansea, Leicester, Manchester, Oxford, York, London, Stirling, and Belfast. Notes from these meetings will be made available on the project website.

Evidence reviews:

- Abrams, D , Swift, H. J., Lamont, R. A. and Drury, L. (2015) The barriers to and enablers of positive attitudes to ageing and older people, at the societal and individual level
- Bennett, K. M. (2015) Emotional and personal resilience through life
- Buckle, P. (2015) Workplace infrastructure
- Damant, J. and Knapp, M. (2015) What are the likely changes in society and technology which will impact upon the ability of older adults to maintain social (extra-familial) networks of support now, in 2025 and in 2040?
- Damodaran, L. and Olphert, W. (2015) How are attitudes and behaviours to the ageing process changing in light of new media and new technology? How might these continue to evolve by 2025 and 2040?
- Higgs, P. and Gilleard, C. (2015) Key social and cultural drivers of changes affecting trends in attitudes and behaviour throughout the ageing process and what they mean for policymaking
- Hoff, A. (2015) Current and future challenges of family care in the UK
- Hyde, M. and Phillipson, C. (2015) How can lifelong learning, including continuous training within the labour market, be enabled and who will pay for this? Looking forward to 2025 and 2040 how might this evolve?
- Jagger, C. (2015) Trends in life expectancy and healthy life expectancy
- Johnson, S. (2015) How are work requirements and environments evolving and what will be the impact of this on individuals who will reach 65 in 2025 and 2040?

- Keating, N , Kwan, D., Hillcoat-Nalletamby, S. and Burholt, V. (2015) Intergenerational relationships: Experiences and attitudes in the new millennium
- Kishita, N., Fisher, P. and Laidlaw, K. (2015) What are the attitudes of different age groups towards contributing and benefitting from the wider society and how are these experienced by individuals in those age groups? Looking forward to 2025 and 2040, how might these evolve?
- Leeson, G., Nanitashvili, N. and Založnik, M. Foresight Trends: Future of an Ageing Population
- McKnight, A. (2015) The income and asset profiles of cohorts born in 1960 and 1975 and the likely adequacy of accumulated resources in supporting these cohorts in retirement
- Mountain, G., Gomersall, T. and Taylor, J. (2015) Developing medical, fitness and well-being environments to maintain health and well-being over the life course
- Nazroo, J. Y. (2015) Addressing inequalities in healthy life expectancy
- Nazroo, J. Y. (2015) Volunteering, providing informal care and paid employment in later life: Role occupancy and implications for well-being
- Ormerod, M., Newton, R. and Phillips, J. (2015) How can transport provision and associated built environment infrastructure be enhanced and developed to support the mobility needs of individuals as they age?
- Robinson, L. (2015) Present and future configuration of health and social care services to enhance robustness in older age
- Silcock, D. (2015) Challenges for the retirement income market over the next few decades
- Torrington, J. (2015) What developments in the built environment will support the adaptation and 'future proofing' of homes and local neighbourhoods so that people can age well in place over the life course, stay safe and maintain independent lives?
- Windle, K. (2015) What role can local and national supportive services play in supporting independent and healthy living in individuals 65 and over?
- Withnall, A. (2015) What differences are there across the life course in learning processes, and how might public policy enhance learning capacity?

All the evidence reviews can be found on the Foresight website: https://www.gov.uk/government/collections/future-of-ageing

Chapter 1

Introduction

1.1. The ageing population

In mid-2014, the median age of the UK population exceeded 40 for the first time, up from 33.9 years in 1974[2,B]. The gradual increases in life expectancy and average age seen during the 20th century are projected to continue. Over 70% of UK population growth between 2014 and 2039 will be in the over 60 age group, an increase from 14.9 to 21.9 million people (see Figure 1.1).

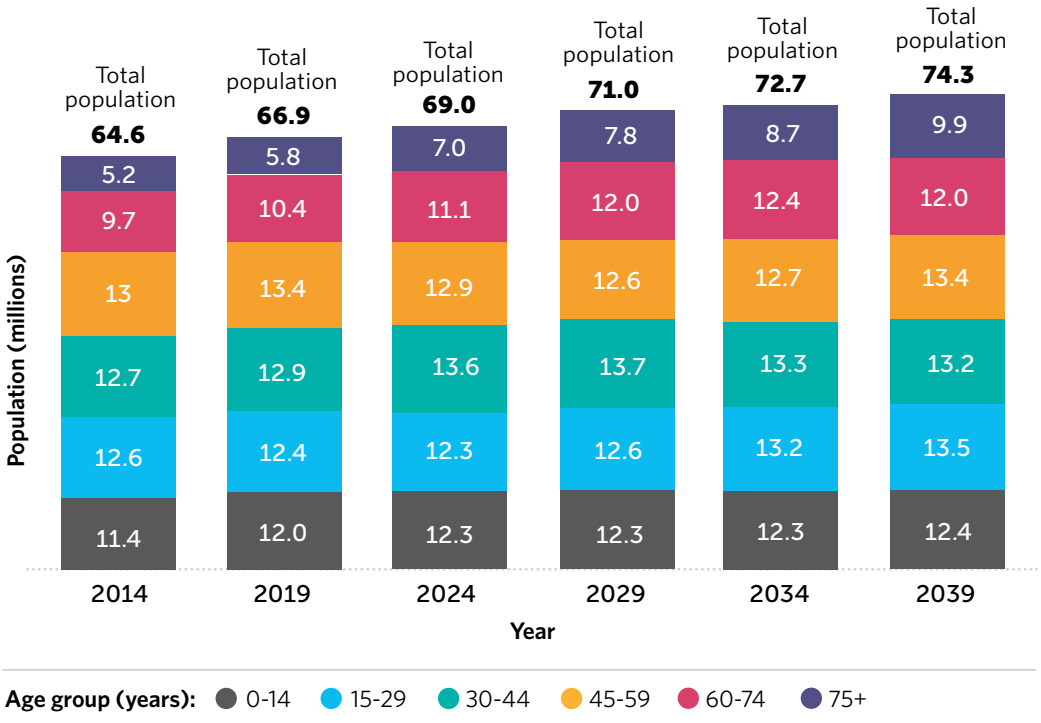


Figure 1.1: Population estimates and projections, based on ONS principal population projections, 2014[3].

B The median age is that at which half the population is younger and half the population is older

Population ageing refers to a change in the age structure of the UK population, in which the proportion of older people is increasing. This is driven by two trends: historically low fertility rates and falling mortality rates. Low fertility rates mean that fewer young people are entering the population. Falling mortality rates, particularly among the over 65s, are leading to the increase in the number of older people.

1.2 Understanding the demographic changes

The two drivers of the ageing population – falling fertility and mortality rates – are both long-term trends. The UK has experienced almost 40 years of fertility rates below the replacement level of 2.1 children per woman[4]. In 2014, the total fertility rate (TFR) in England and Wales was 1.83 children per woman, compared to a peak of 2.93 in 1964 (see Figure 1.2). The long-term decline in mortality rates has been particularly strong among the oldest age groups. For example, the mortality rate of women in their early 80s declined from about 120 per thousand population in the 1950s to 75 by the 1990s, and fell from around 160 to 120[5] per thousand men in the same period.

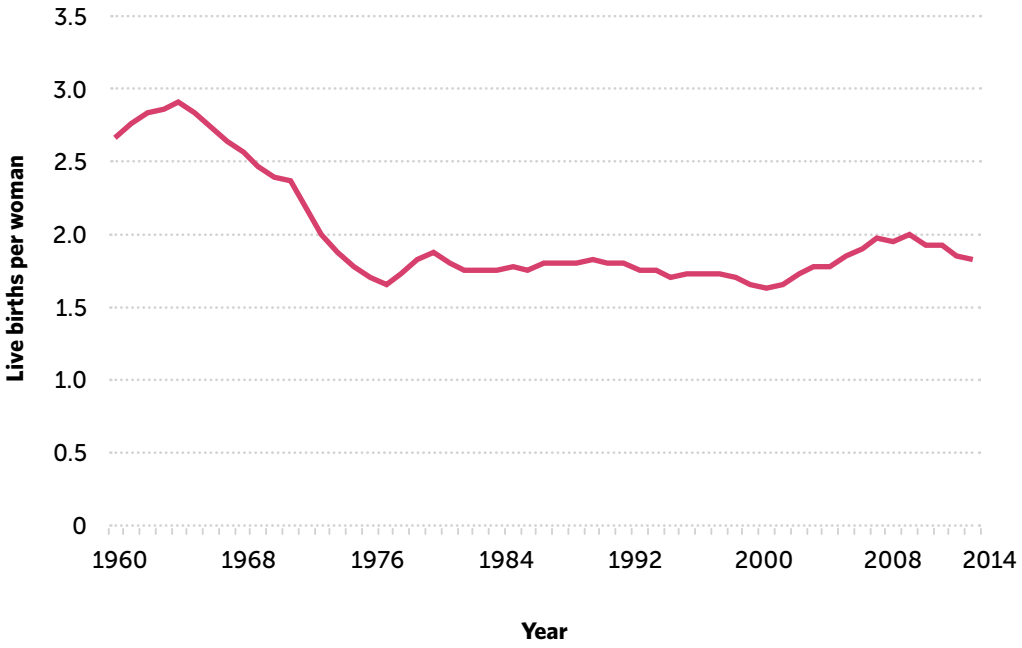


Figure 1.2: Total fertility in England and Wales, 1960-2014[6].

Long-term falling mortality rates among the over 65s are also driving increasing life expectancy – a trend which is expected to continue (see Figure 1.3 and Box 1.1). Historically life expectancy increases have been driven by a reduction in infant and child mortality, but today the dominant factor is falling mortality rates amongst those over 65. Historic high fertility rates are also contributing to the UK's demographic change – although this is a time-limited effect. A high number of births after World War II, and a longer 'baby boom' during the 1960s, introduced large cohorts of similar ages into the UK population. The cohort of people born just after World War II are now in their late 60s and will be in their 90s in 2040; the 'baby boomers' are now in their 50s and will be over 70 in 2040.

Box 1.1: How is life expectancy calculated?

Life expectancies are statistical measures of how long an average person is expected to live, given their birth year, age, gender and location. They are calculated from data on the probability of dying at each given age, known as age-specific mortality rates. The most well-known measure is life expectancy at birth, although the same method can be used to calculate life expectancy at any age – this report also uses figures for life expectancy at 65 and 85. There are two types of life expectancy: 'period' and 'cohort'. We have used the former throughout this report.

Period life expectancy for a given year is calculated from mortality rates for all ages in that year. Period life expectancies are a good measure of mortality rates experienced at a given time. If mortality rates continue to fall, period life expectancy will underestimate how long an 'average' person will actually live, as they do not account for future improvements in healthcare and technology which may extend people's lives.

Cohort life expectancies are calculated using mortality rates throughout life. These use real data for past years and are projected for all future years. Cohort life expectancies are thus more likely to reflect how long people will actually live, although projected mortality rates become increasingly uncertain in the distant future[C].

C By way of example, a period life expectancy at birth for 2014 (see Figure 1.4) is based on observed mortality rates for each age in 2014. These mortality rates are used to estimate the number of people expected to survive to each age, and therefore the average length of life. The equivalent figure in 2020 would be based on projected mortality rates at all ages in 2020. By contrast, a cohort life expectancy at birth in 2014 uses the estimated mortality rate for new-borns from 2014, and projected mortality rates for one year olds in 2015, two year olds for 2016 and so on, including the mortality rate for 99 year olds in 2113 – a significant distance into the future. A cohort life expectancy at birth for 2020 would use data even further into the future.

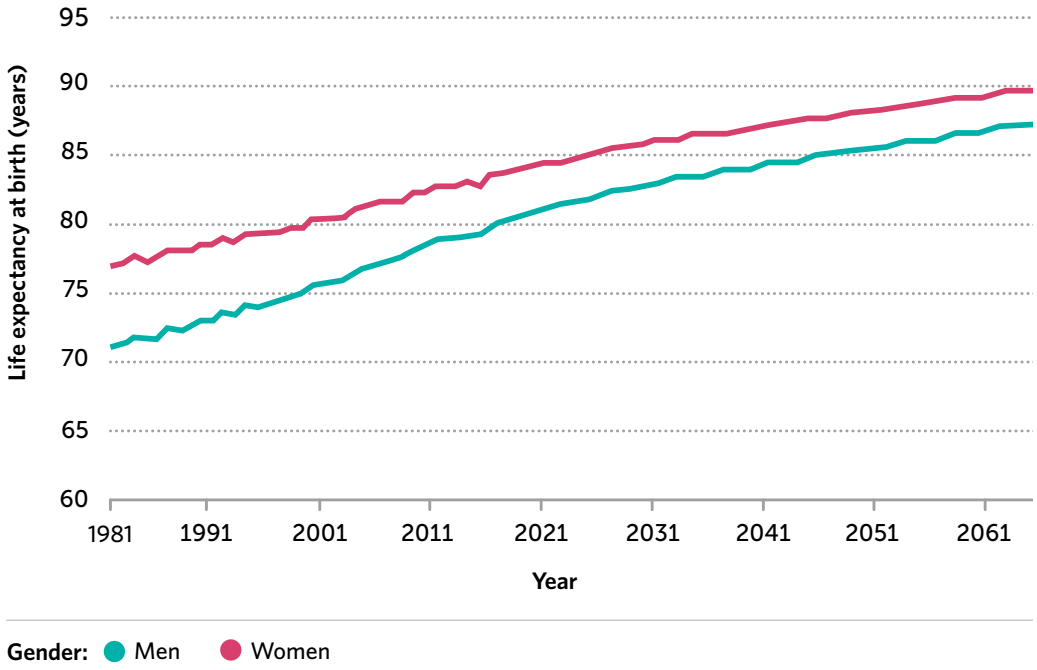


Figure 1.3: Historic and projected period life expectancy at birth in the UK 1981-2064[7]*.*

1.3 Implications for society: dependency and healthy life expectancy

Population ageing and increasing life expectancy have a number of implications. One of the most important is that there may be a lower proportion of individuals to pay taxes, work and provide care for those who need it. For this reason, growing old in a society which is itself growing old is fundamentally different to growing old in a population where most people are young[8].

The old age support ratio is one way to measure the proportion of people that may be working, paying taxes and providing care in a society. It is calculated by dividing the number of working age people by the number of people eligible for the state pension (see Figure 1.4)[D]. The old age support ratio sets a baseline figure for this balance which can be altered as working lives are extended. In 2012, the ratio was 3.21 people of working age for every person of SPA. Although planned changes in SPA[E] mean that the ratio will rise to a projected 3.47 in 2020, by 2041 it will have fallen back to 2.65 workers for every one person over SPA. This is because, despite increases to SPA, the number of

D This is the best available method for measuring dependency, but it is not perfect. It assumes that all people of SPA or above will not be working, while all of those between 16 and SPA will be in employment. In the absence of a better method, it provides an indicative measure of those most likely to be working or in retirement.

E Between 2012 and 2018, SPA will change from 65 years for men and 61 years for women, to 65 years for both sexes. Then between December 2018 and October 2020, SPA will change from 65 years to 66 years for both men and women, based on the 2011 Pensions Act. Between 2026 and 2028, SPA will increase to 67 for both sexes and is currently set to increase to 68 between 2044 and 2046.

pensioners is increasing faster than the number of working age people – a growth of 37% (to 16.8 million) from 2012 to 2041, compared to 13% (to 44.6 million). These rates vary between the UK's devolved administrations (see Figure 1.5).

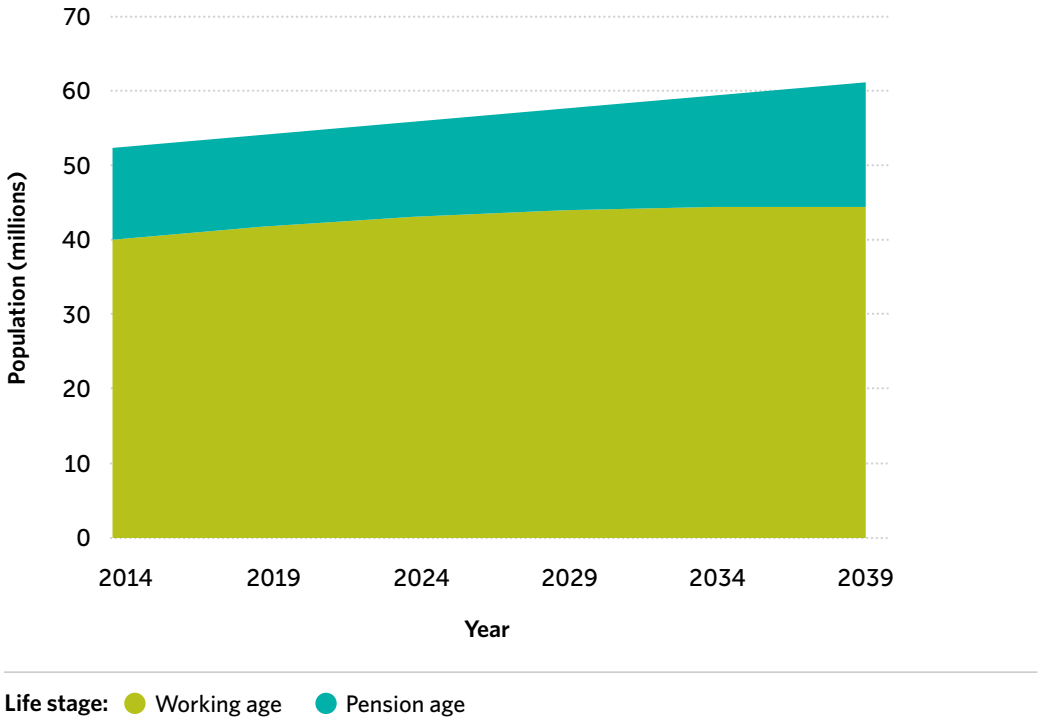


Figure 1.4: Estimates and projections of UK working and pensionable age populations, 2014-2039[9].

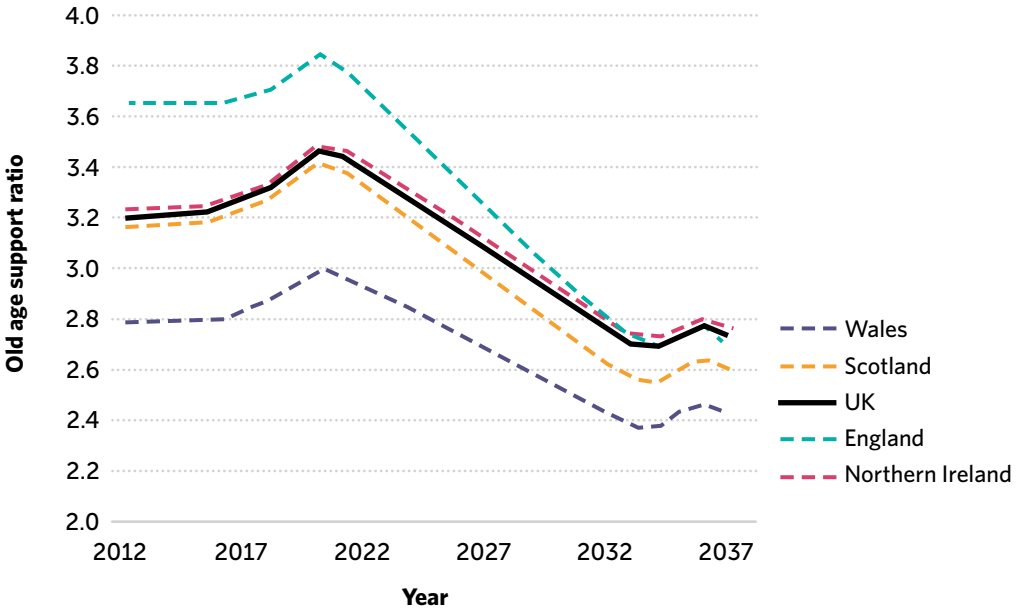


Figure 1.5: Estimates and projections of old age support ratios (number of working age people divided by number of people eligible for the state pension), UK 2012-2037[10].

Increased life expectancy is the result of many scientific and societal successes. In the first decade of the 21st century, Healthy Life Expectancy (HLE)[F] at birth rose more than Life Expectancy (LE). This indicates a reduction of years spent in ill-health[11,12]. However, increases in HLE measured at 65 and 85 are not keeping pace with improvements in LE. This suggests that real health improvements are being experienced by younger people and that people over 65 are spending more time in ill-health[11] (see Figure 1.6). Therefore, unless this trend can be reversed, another major challenge for an ageing population is likely to be an increasing prevalence of the health conditions associated with old age. It is worth noting that other European countries, such as Belgium and Sweden, have seen a reduction in years spent with disability (although this could be in part due to smaller gains in life expectancy in these countries)[11].

Box 1.2: How are health expectancies calculated?

Health expectancies are calculated in a similar manner to period life expectancies. There are two measures produced by the ONS – Healthy Life Expectancy and Disability Free Life Expectancy. The former is calculated by asking survey respondents to self-rate their health and is a measure of health-related wellbeing. The latter asks respondents whether they have a physical or mental health condition or illness which limits normal day to day activities. These are combined with age-specific mortality rates to estimate the average number of years spent in good health or free of limiting illness (disability).

If health expectancy increases faster than life expectancy, this suggests those additional years are spent in good health. In contrast, where life expectancy rises faster than health expectancy, this suggests extra years of life are spent in poor health or states of dependency.

When measured from birth, health expectancies cannot tell us when poor health is experienced. However, using health expectancies measured at older ages, and more detailed cohort studies, it is possible to shed light on when poor health is most often experienced.

F For more information about how health expectancies are calculated, please see Box 1.2.

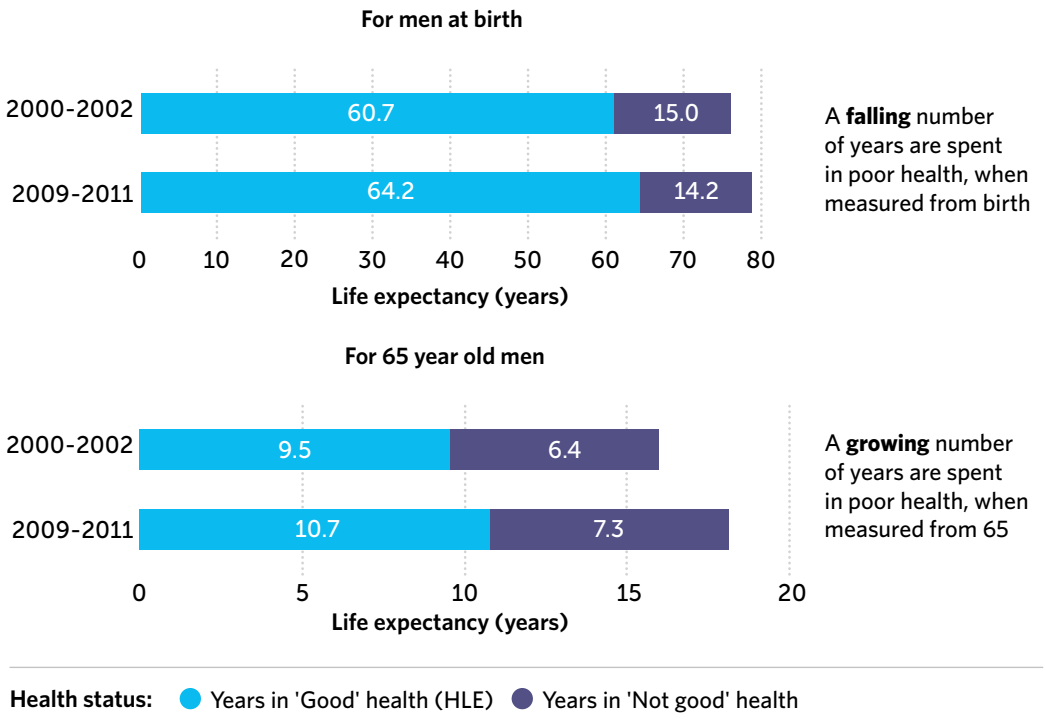


Figure 1.6: Changes in life expectancy and healthy life expectancy for men in the UK, 2000-2002 to 2009-2011[12].

The two major demographic trends of age structural change and increasing longevity will have major impacts on the UK. The shift from a predominantly young to an older population has clear implications for how resources and responsibilities are allocated between generations. Rising life expectancy (particularly the growing numbers of the oldest old people) – without improvements in healthy life expectancy – will increase demands for resources to support the increasing numbers of people with age-related health and care needs. These two trends are linked, particularly because longevity is occurring alongside below-replacement child bearing, which is reducing the potential numbers of workers to provide financial and practical support to the increasing number and percentage of older dependents.

1.4 Impact of demographic change on policy issues

This report has focused on six areas that evidence shows will be significantly affected by the population ageing and increasing life expectancy. They are **work, learning, housing, families, health and care, and connectivity**. This section briefly explains why these policy areas will be particularly affected by the demographic changes described above. Box 1.3 discusses the pension landscape in the UK.

Work

Population ageing, combined with people retiring later, means that the average age of the workforce is rising. This will make older workers increasingly important to the UK economy. The combination of people living longer and the ageing of the population will challenge the relationship between generations. Chapter 2 explores the full implications of demographic changes on work, in the context of the other major demographic, cultural and technological changes facing the UK economy.

Learning

Population ageing and increased life expectancy are likely to change traditional thinking about learning. Longer working lives and other changes to the labour market will mean in the future workers will need to be more adaptable than they are today. Meeting this need will require suitable training for people throughout their careers. More broadly, evidence shows that life-long participation in learning can improve people's health, cognition, wellbeing and resilience. The need to reduce the level of dependency in society means that learning, and any other tool for extending the period of time that people can live independently, will be increasingly important in the future. Chapter 3 explores the full implications of demographic change on learning and training for people of all ages.

Housing

Demographic change will greatly increase demand for housing that meets the needs of older people. The suitability of future housing stock is important because unsuitable housing has a damaging effect on individual wellbeing and is a major cost to the NHS. Higher life expectancy is likely to mean people having longer periods of retirement and, without improvements in healthy life expectancy, longer periods of ill-health. Demographic change also affects how housing will operate as a financial asset. Both have the potential to reduce housing assets in later life. Housing assets play a major social role in later life – funding retirement and transferring wealth between generations. Chapter 4 explores the full implications of demographic change on housing, and the wider neighbourhood.

Families

The family is one of the major drivers of demographic change. At the same time, families themselves will be greatly affected by population ageing and increasing life expectancy. Higher life expectancy will change the structure of families, increasing the likelihood that a child is born with all four grandparents still alive. Families' traditional responsibilities – particularly providing care for young and old, and transferring wealth between generations – will also change as the population ages and life expectancy increases.

Changing family responsibilities are best understood in the context of wider societal change. There have been important declines in the permanence and homogeneity of long-term relationships between couples. Co-habitation and childbearing outside marriage or civil partnership are becoming much more common, and unions – whether marriage or co-habitation – are less stable. These changes have led to the emergence of new social risks relating to population ageing – for example, how to meet the increasing demand for unpaid care. One likely outcome is that there will be an increase in the level of responsibility and risk borne by individuals. Chapter 5 explores the full implications of demographic change on families.

Health and care

Without significant advances in healthy life expectancy, longer lives will have a large effect on the total amount of ill-health and disability in the population. This will result in a major shift in the allocation of resources and the configuration of services. Health and care is one of the major areas where life expectancy and the population ageing interact with each other. Changing dependency ratios will mean that while the need for care and support increases, the UK will have proportionately fewer people to provide it. Chapter 6 explores the implications of demographic change on health and care in more detail.

Connectivity

Connectivity is critically important for people of all ages. The enablers to connectivity, particularly technologies, transport systems and the built environment, will all need to adapt to the major demographic changes described above. Chapter 7 explores the full implications of demographic change on connectivity.

Box 1.3: Pension landscape

People within the UK are ageing not only within a changing population structure, but also with a pension system which defines their access to late life income.

Over the last 20 years, most developed countries have reformed their pension systems in the hope that they will continue to achieve their underlying objectives – to prevent poverty in old age and to provide income security – at a time when life expectancy is increasing and the ratio of contributors to beneficiaries is shrinking. The UK government, more than most Organisation for Economic Cooperation and Development (OECD) countries, has reformed pension provision[13]. There have been two recent pension commissions[14,15] and a series of detailed reports from the Department for Work and Pensions[16]. The Government has also recently appointed an independent reviewer of the SPA to consider how the SPA should be adjusted in the light of rising life expectancy.[17]

Chapter 2

Working Lives

Summary:

2.1

Longer working lives bring significant benefits to individuals, employers and wider society. Many of the benefits are non-financial, including cognitive and health benefits if work is appropriate in its nature.

2.2

Employment rates among older people vary across the population. The causes of these differences must be addressed to ensure that the whole country achieves the potential benefits of longer working lives.

2.3

There are a range of adaptations and approaches to overcoming barriers to working longer and enhancing productivity in the ageing workforce including addressing negative attitudes, health needs, workplace design, technology and adaptations in HR policies and working practices. An important policy question is where the balance of costs lies between the state, employer and worker.

2.4

Longer careers, a more dynamic labour market and the impact of automation on jobs mean that lifetime learning and training will be essential to the future of an ageing workforce. If successful, this can help the UK's workforce, increase productivity and ensure people have higher levels of financial, social and mental capital going into later life. Failure will likely result in skills gaps at the same time as older people are leaving the labour market.

2.1 Longer working lives

Working later in life has benefits for individuals, employers and the state. Although on average people are first entering the labour force at older ages, working lives in the UK are getting longer. This is driven by late-life labour market participation rates which have been increasing over the last 15 years[18]. Men and people with more education and higher status occupations are more likely to work in later life[19].

Retirement ages in the UK are expected to continue increasing, driven by increases in the SPA, the abolition of mandatory retirement, and older people's expectations. Expectations could change in part because of financial necessity: as people live longer they will need to save more to have the same standard of living in retirement as current generations[20]. This will be increasingly important as life expectancy continues to increase, and will be a particular issue for women, because of their higher life expectancy[19].

There are non-financial benefits to working longer. Evidence shows that it gives people increased resilience in later life[21] and those in employment perform best on almost every measure of cognitive function (although it is unclear whether work is the cause or the effect)[22]. Studies have found that working can have health benefits, particularly for people with mental health issues[23].

Retaining older workers is likely to be increasingly important for employers. Staff who have been in roles for long periods of time develop industry-specific knowledge and networks. These intangible assets are not readily available from new hires[24]. Beyond this, demographic projections reveal the importance of retaining older workers for businesses. One study estimates that between 2012 and 2022 12.5 million jobs will be opened up through people leaving the work force. Over this period 2 million new jobs will be created, yet there will be only 7 million new workers entering the work force which leaves a significant gap[24]. If current workforce exit rates continue for the over-50s – especially the steep decline in employment after age 53 (see Figure 2.1) – the UK will face a labour shortage[25].

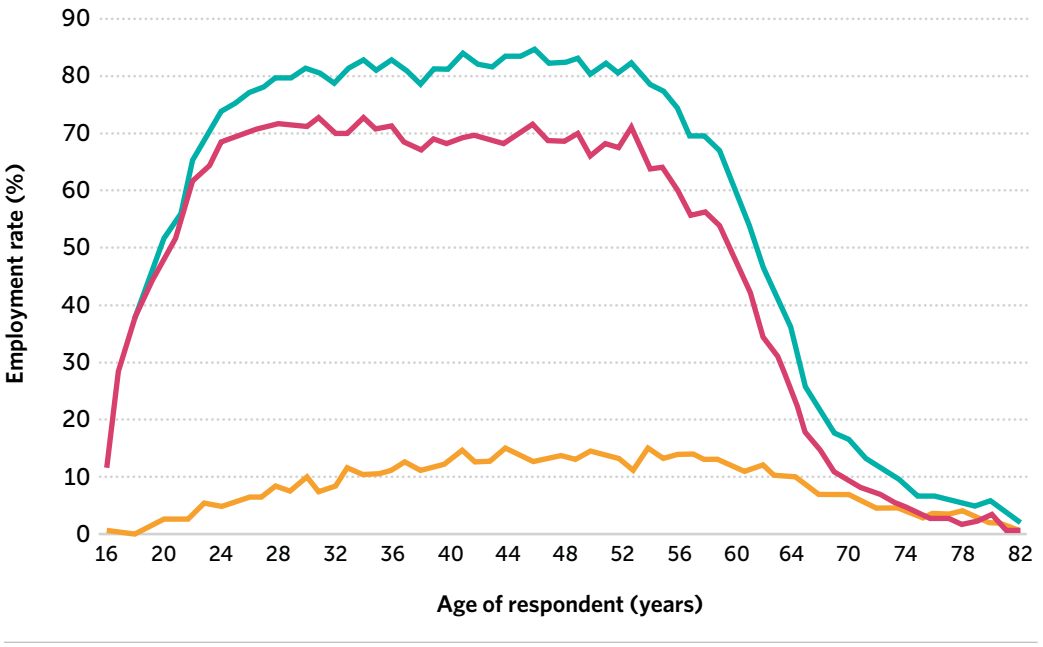


Figure 2.1: Employment rate by type of employment and by age in the UK, 2014[26].

The UK's employment rates for older people are around the average for OECD countries (see Figure 2.2), although the trend has been downwards in the last decade. PricewaterhouseCoopers calculate that the UK's GDP would have been 5.4%, or approximately £100 billion higher between 2003 and 2013 if we had the same level of older worker employment as Sweden[27]. Although a degree of uncertainty surrounds such evidence and the macroeconomic consequences of it, it is likely that prolonging working lives could bring significant benefits to the UK. Importantly, evidence suggests that retaining people aged 50 and over in employment does not mean fewer jobs for young people whose employment prospects actually rise as the number of older people increases[28]. Longer working lives could also reduce the welfare bill[29]. There are 2.9 million people out of work aged between 50 and SPA, and in 2014 the government was spending around £7 billion on out-of-work benefits for people in this age bracket[30].

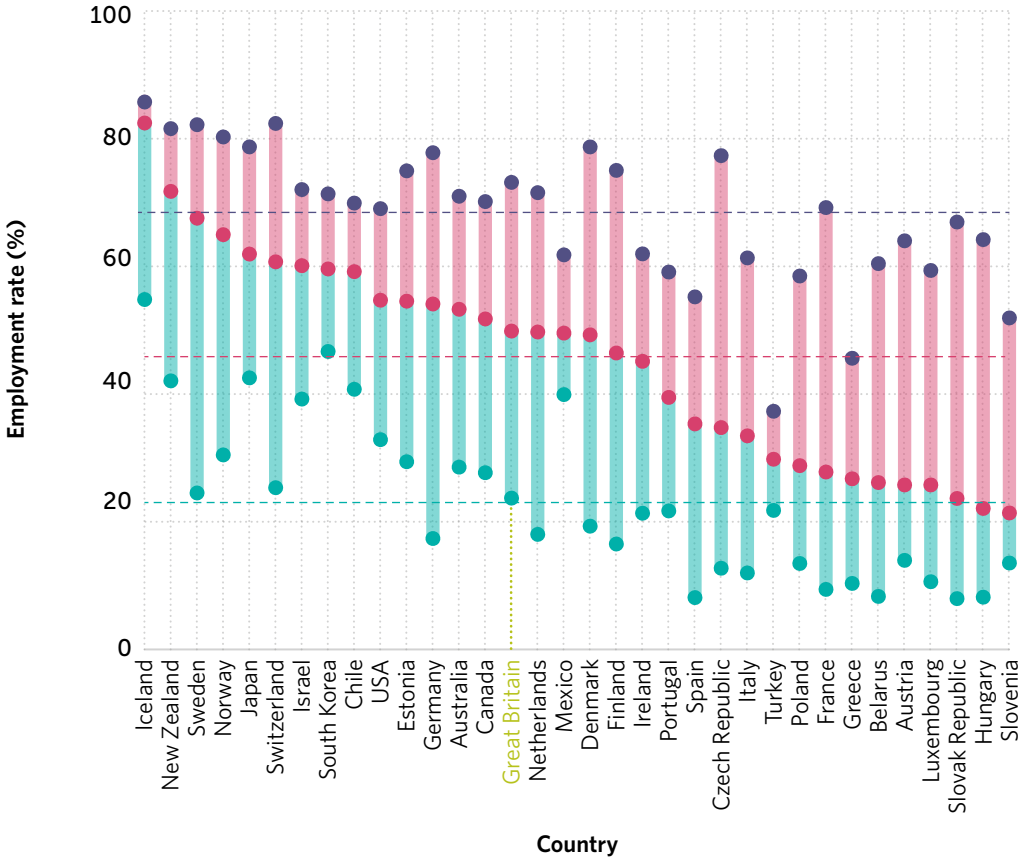


Figure 2.2: Employment rates of older people by age group for OECD countries, 2014[31].

Policy Implication

Longer working lives bring significant benefits to individuals, employers and wider society. Many of the benefits are non-financial, including cognitive and health benefits if work is appropriate in its nature.

2.2 Differences in the length of working lives

Employment rates among both older men and older women have increased since the mid-1990s (see Figure 2.3), although older male employment rates are still lower than in the early 1970s[G]. Many sectors, such as transport, manufacturing and construction, have already seen an increase in the average age of their workforce[32].

G This is because of the recessions in the early 1980s and, to a lesser extent, the early 1990s. These had a particularly large and lasting effect on the employment of older men, who are less likely to return to the labour market once they have left it.

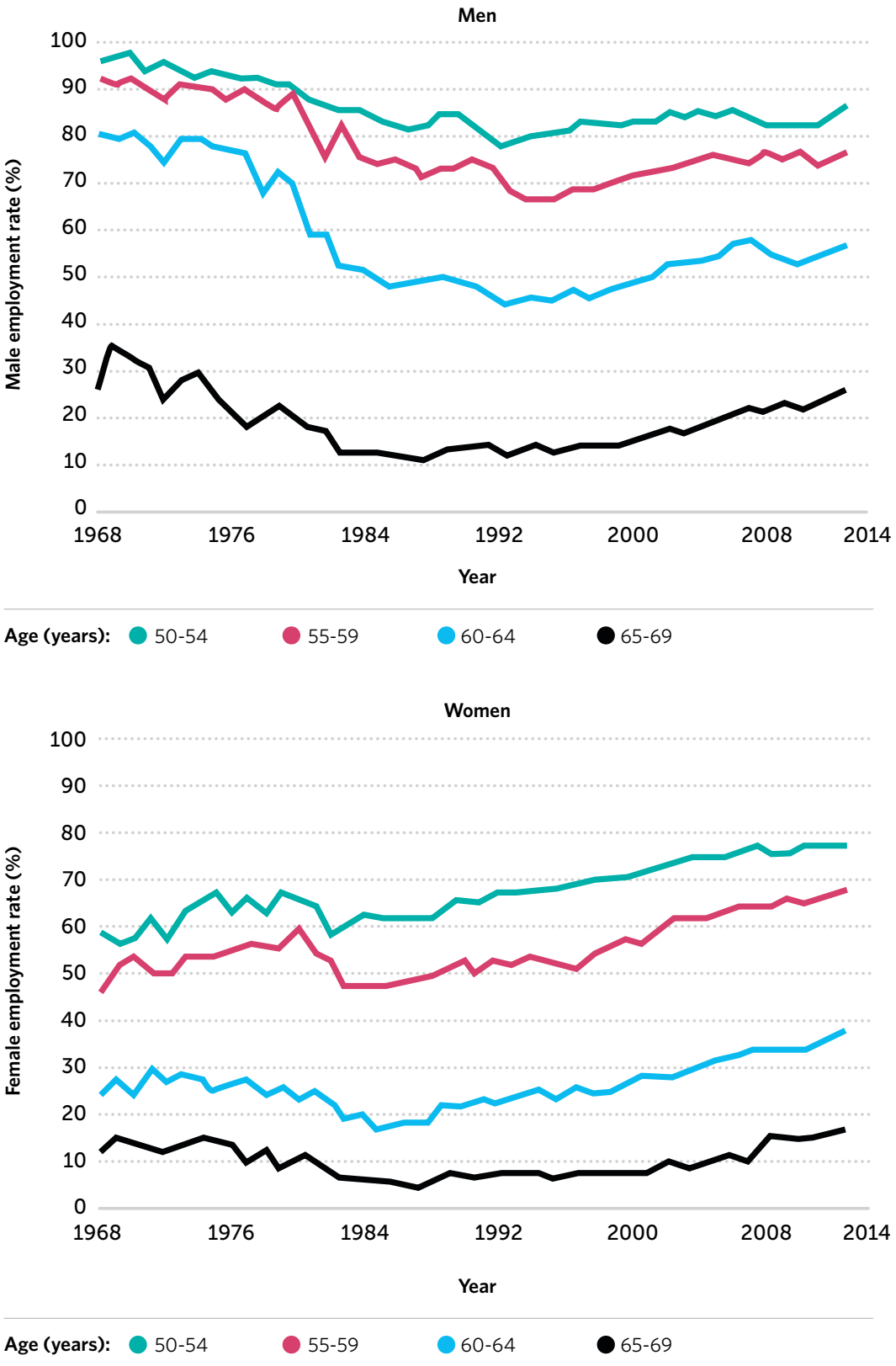


Figure 2.3: UK employment rates of older men (top) and older women (bottom), 1968-2013[33].

However, there is evidence that the length of working lives varies across the population. For example, there are significant differences in current employment rates by region (see Table 2.1): London and the South East have the highest percentage of men above SPA in employment, and the North East has the lowest[34]. Employment in later life is heavily influenced by employment in early life, and there are differences between socio-economic and ethnic groups. Female labour market participation rates vary by ethnic background with Pakistani origin women, for example, having lower levels of economic activity than Black Caribbean and White women[35].

	Employment rate (%)	
Region	**Men**	**Women**
London	16.9	10.0
South East	16.9	8.5
South West	15.2	8.9
East	14.8	9.6
Northern Ireland	14.2	5.3
East Mids	13.9	6.9
Wales	12.9	7.9
West Midlands	12.9	5.3
Yorkshire & The Humber	12.0	6.7
Scotland	11.8	5.9
North West	10.7	6.5
North East	9.5	6.4

Table 2.1: Regional employment rates of men and women aged 65+, 2016[36].

This variation raises concerns about the extent to which all of society will benefit from enhanced labour market participation. There are a wide range of external factors which make longer working more difficult or less desirable. Such barriers are evaluated in the next two sections, which also outline approaches to overcoming them.

Policy Implication

Employment rates among older people vary across the population. The causes of these differences must be addressed to ensure that the whole country achieves the potential benefits of longer working lives.

2.3 Overcoming barriers facing the ageing workforce

In many countries, the pension system is a barrier to longer working lives because it provides a financial incentive for older people to retire. This is less of a factor in the UK. The UK pensions system is already conducive to working longer, with recent reforms expected to further increase the number of older workers[34].

Negative attitudes towards older people, taking the form of outdated stereotypes, unconscious bias, and age discrimination, can prevent them from staying in or returning to work[25]. A 2015 Eurobarometer report found that 42% of people regard age discrimination towards those over 55 as 'widespread'[37]. People in the UK are the second most likely in Europe to see ageism as a problem (see Figure 2.4). While 30% reported having experienced unfair treatment because of their age, it is important to emphasise this is not limited to older people – consistently across Europe those in the 15-24 age group are most likely to report experience of unfair treatment because of their age. Nevertheless 50-64 and 65-74 age groups are most likely to be worried that employers will show preference to those in their 20s[38]. Internationally, employment rights and anti-discrimination legislation have been shown to help older people remain in work. Evidence from some European countries suggests that training managers about the requirements of an ageing workforce has benefits[32].

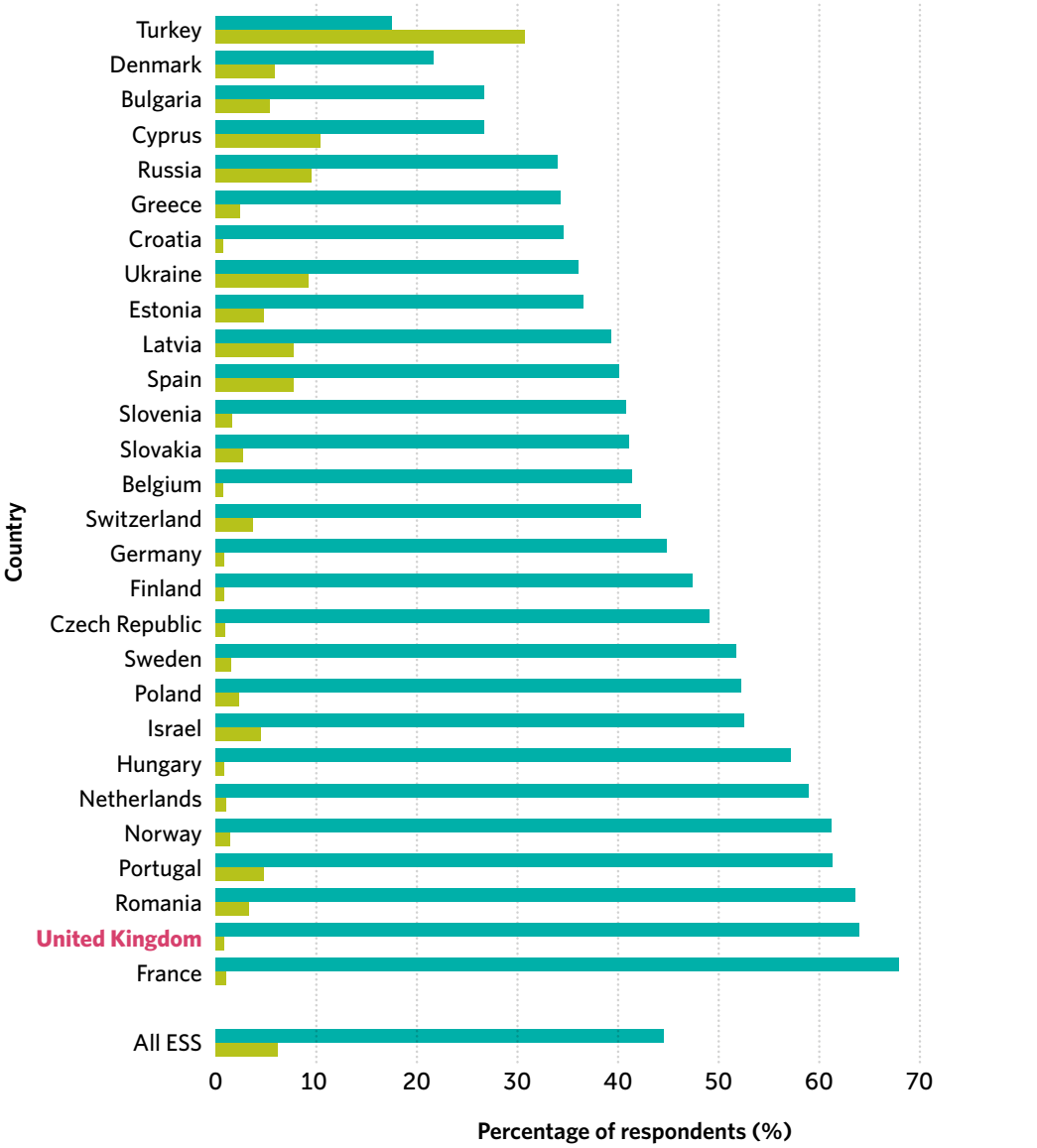


Figure 2.4: Percentage of people in European Social Survey countries indicating age discrimination as a 'very serious' or a 'quite serious' problem or that it 'does not exist', 2010[38].

Health is another factor that affects the employment and effectiveness of older workers. Ageing is associated with physical changes including deterioration of visual acuity, hearing loss, decline in respiratory and cardiovascular functions and reduced muscle and grip strength (see Chapter 6). There are large parts of the UK where disability free life expectancy is below the SPA, suggesting that poor health among older people may already be affecting the size of the UK workforce[39]. Almost half of people aged between 50 and the SPA have at least one long-term health condition[30]. Certain types of work can worsen health problems. Long shifts, for example, can lead to chronic fatigue and lack of sleep[32]. Those exposed to chronic stress over extended periods of time through their work may also suffer certain forms of cognitive deficit (for example, impairment of particular types of long- and short-term memory)[40]. One solution would be policies to reduce the prevalence of health conditions which are limiting individuals' ability to work, particularly for those conditions where adaptations are of limited utility in enabling people to work for longer. While health interventions are discussed in Chapter 6, it is important that their positive effects on work are included in cost-benefit analysis.

The impact of poor health on work is not inevitable – technological improvements mean there are few jobs that the average 70 year old physically cannot do[41]. Instead, health is often a barrier because of poor workplace design or management practices. Evidence shows that older people are more likely to remain in the work force if they are in good quality employment that is characterised by low physical and mental stress[42]. In the manufacturing sector the physical effects of ageing can be offset by increased mechanisation and automation[32], although this can also lead to jobs being replaced. Different design approaches, such as co-design and participatory design, have been successfully used by some employers[43]. Similarly, technology can play a transformative role in overcoming specific barriers faced by older people if they are able to access it. Advances in remote access and smart working, for example, could allow greater home-working which in turn could address physical challenges and help the ageing population to balance the competing responsibilities that they are likely to have when working. Chapter 7 identifies some of the specific opportunities and challenges relating to technology in an ageing population.

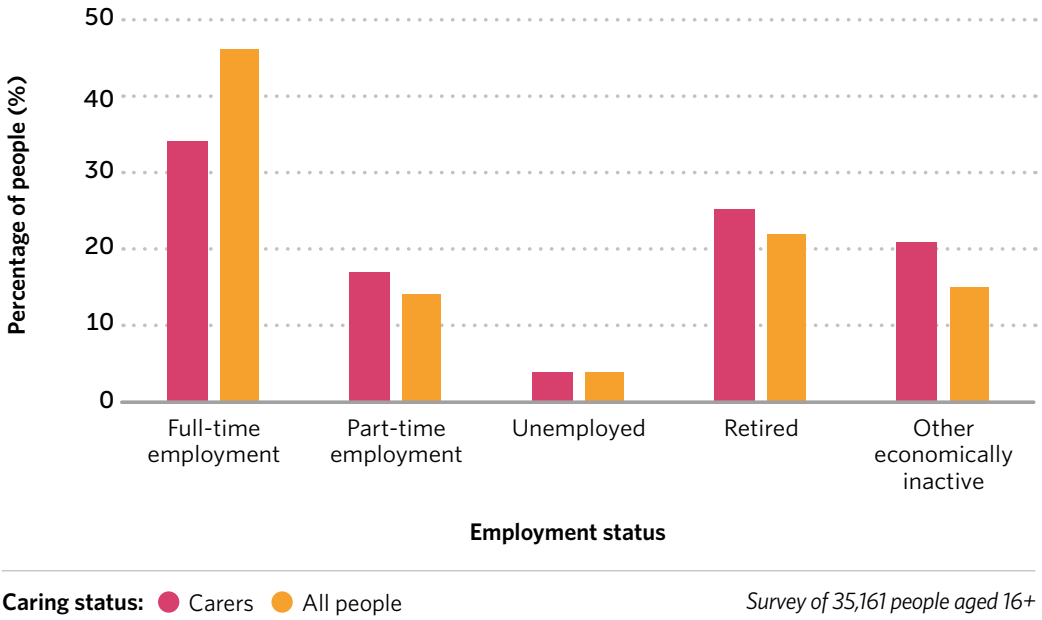


Figure 2.5: Employment status for adult carers and all adults in the UK, 2013/14[44].

Caring responsibilities are another major factor in people's ability to work. Evidence shows that carers often withdraw from paid work and do not return[45]. They are less likely to work full-time and more likely to be economically inactive (see Figure 2.5). If this continues, the growing demand for care created by the ageing population (see Chapter 5) could have major implications for the size of the UK workforce[35]. Flexible working is likely to help address this. Carers are more likely to work part-time or be self-employed, suggesting that being able to balance work and care successfully is important to increasing older adult labour market participation. Adaptations in HR policies and working practices can support older people working for longer or returning to work after taking time out for unpaid care[45]. The provision of part-time or flexible hours can also be important for those managing a long-term health problem, and a period of part-time work before retirement is often preferable to the traditional fixed retirement date[25]. Women over 60 and men over 65 are already more likely to work part-time than full-time (see Figure 2.6). Such adaptations are consistent with broader trends in the workplace. Generally organisational structures in business are evolving and becoming more flexible and more networked[46]. Home-working is also rising – 4.2 million people do not work in a fixed place, 40% of whom are over 65[47]. Self-employment may also offer a more flexible form of working, which may prolong participation for older age groups – the data in Figure 2.1 show that self-employment levels are considerably more resilient between ages 50 and 65, albeit from a lower base.

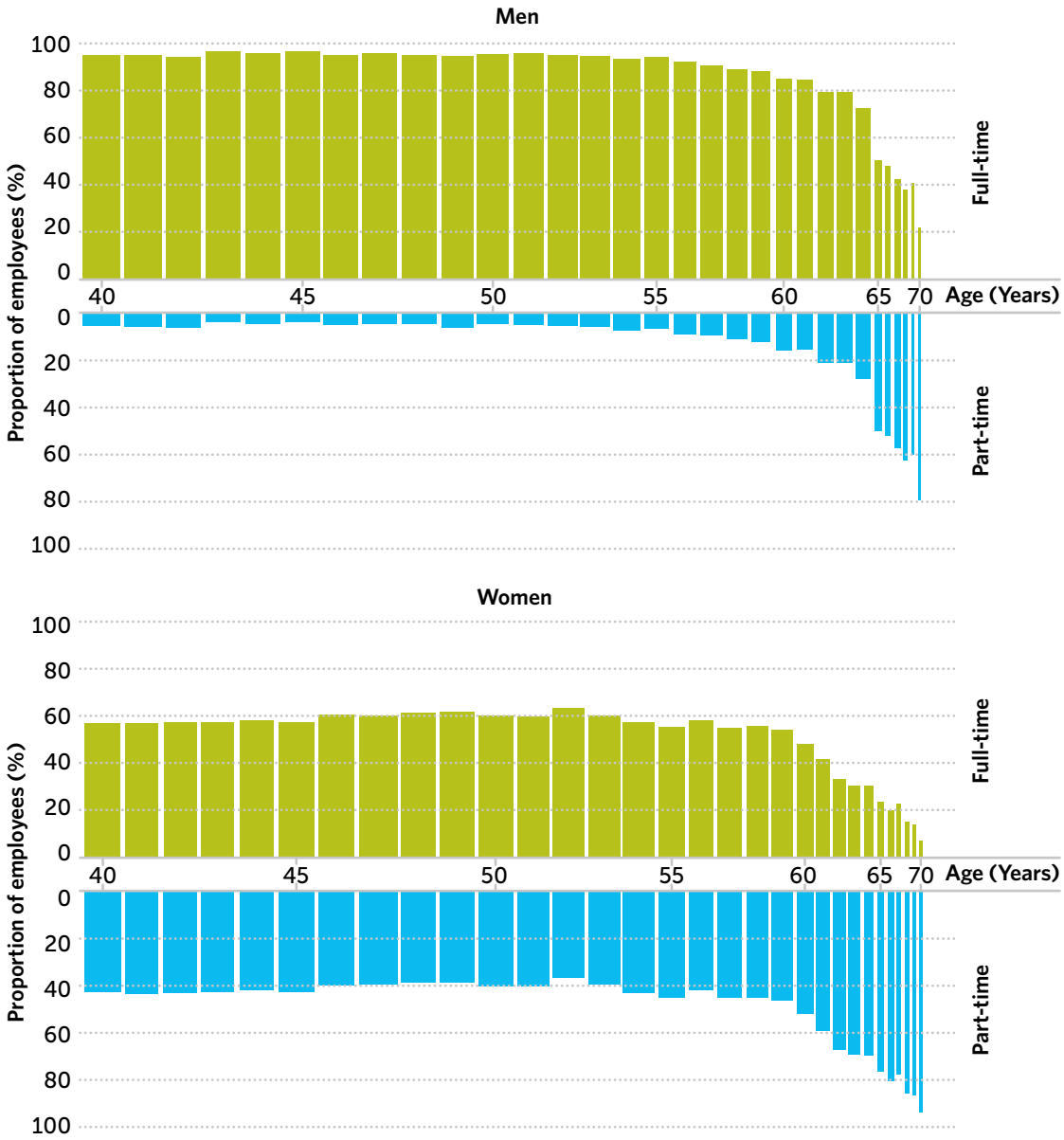


Figure 2.6: Proportion of men and women in employment aged 40-70 in full-time or part-time work in the UK, 4th quarter average 2011. Width of band indicates numbers of workers [48].

Policy Implication

There are a range of adaptations and approaches to overcoming barriers to working longer and enhancing productivity in the ageing workforce including addressing negative attitudes, health needs, workplace design, technology and adaptations in HR policies and working practices. An important policy question is where the balance of costs for adaptations lies between the state, employer and worker.

Box 2.1: Special circumstances relating to Small and Medium Enterprises (SMEs) and older people

Certain types of employment may be accompanied by specific challenges when addressing barriers to working longer. 41% of workers aged 65 and over are self-employed, compared to 15% across the whole working population[49]. A third of workers in SMEs are over 50[50]. Both are becoming more common types of employment across the whole population[51]. SMEs may lack the resources or scale needed to provide training[52] or support the changing needs of older workers, for example to implement major health initiatives and provide occupational health support[50]. Similarly the self-employed, particularly sole-traders, may face difficulties due to a lack of support services[32].

2.4 The importance of skills to the ageing workforce

There are broader shifts in the labour market which are vital to understanding the implications of an ageing population for work and productivity. Important trends include the growth of the service sector, computerisation, globalisation, and increasing workforce diversity. Perhaps the most significant driver of changes to the future world of work will be advances in technology, such as automation, machine learning, big data, the internet of things and the digital economy[53]. These changes may affect how people work, where they work and, in cases where functions become fully automated, whether they work at all. Some analysts suggest 35% of jobs in the UK are at risk from automation[54], with certain sectors particularly vulnerable (see Figure 2.7). The rates of change, the types of jobs that are replaced and the extent of job creation through new technologies are all uncertain. However, evidence suggests that lower paid jobs are five times more likely to be replaced than those with higher pay. In a study of future employment in the USA, jobs requiring high levels of creative or social intelligence were at much lower risk[54].

As working lives get longer and the pace of change increases, it is likely that individuals will have to adapt to more frequent and significant changes during their working lives. One of the key determinants of older workers' employment and productivity will be their ability to adapt to these changes, including re-training and re-skilling[H], particularly as early life education may not provide the skills to sustain longer and fuller working lives.

H For example, the Department for Work and Pensions Fuller Working Lives strategy describes the importance of three Rs - Retain, Retrain, Recruit.

Demand for skills is already changing – 71% of employers in 2013 predicted that their skills requirements would change over the following 12 months[55]. The need to re-skill is likely to be particularly important for individuals whose jobs are less suitable for older workers or whose jobs are likely to be automated. Automation is expected to reduce employment opportunities for those with few qualifications and limited literacy and numeracy. This poses a significant challenge for the UK, where nearly seven million people have serious problems with literacy and handling numbers[56]. The timing of training is particularly important. Once people have become unemployed, training is less likely to help them get back into work (unless it is linked to other strategies such as work placements) and this is especially true for people in their 40s and 50s[41].

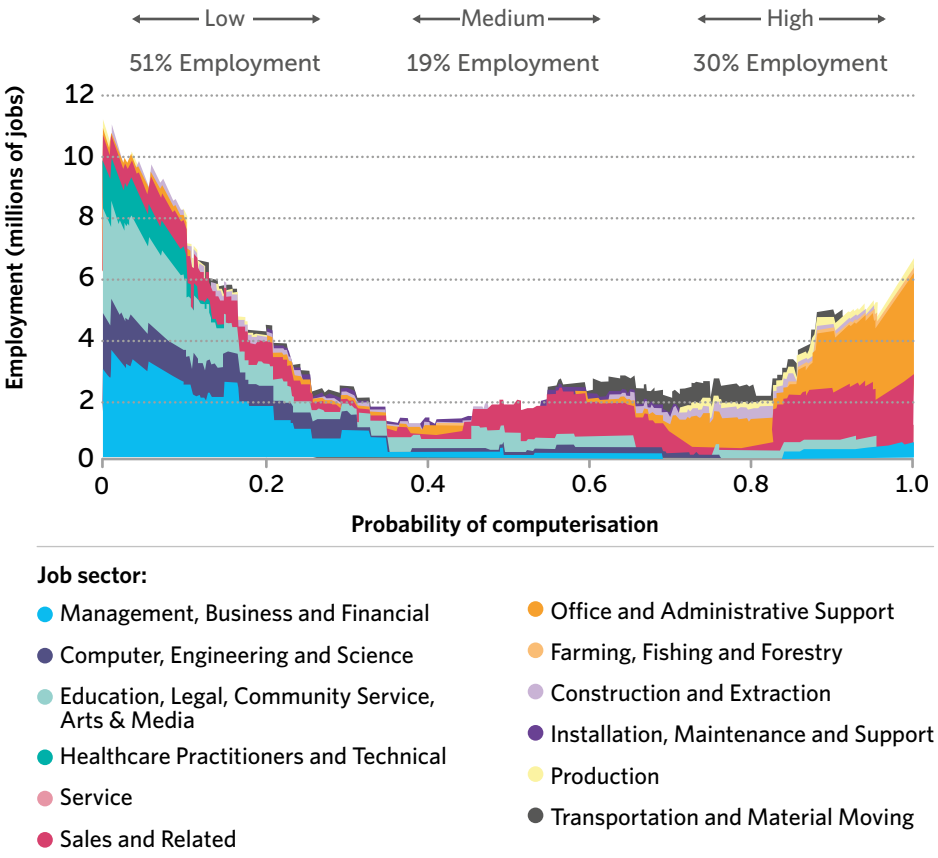


Figure 2.7: UK jobs at risk of computerisation by sector[54].

The UK's ability to meet this demand for re-skilling may be undermined by barriers to education and training for older workers. Workplace training is currently declining across all occupational groups, with workers in low-skilled occupations the least likely to receive training[57]. Those aged 50 and over are less likely to take part in workplace training than their younger colleagues[26], and older people report that they are less likely both to seek work-related training, and to be offered it[57]. Section 3 describes the barriers to education

and learning faced by older people. The need to re-skill and adapt to change is expected to increase the existing correlation between education levels, employment and pay[58]. As people lack the skills allowing them to remain in employment for longer this will have consequences for funding their later life. Failure to address these barriers may have a greater effect on inequalities as skills have a greater impact on employment.

Policy Implication

Longer careers, a more dynamic labour market and the impact of automation on jobs mean that lifetime learning and training will be essential to the future of an ageing workforce. If successful, this can help the UK's workforce, increase productivity and ensure people have higher levels of financial, social and mental capital going into later life. Failure will likely result in skills gaps at the same time as older people are leaving the labour market.

Chapter 3

Lifelong Learning

Summary:

3.1

Continuous learning throughout life can bring people a range of benefits. Education and training improve mental capital, which in turn increases resilience in later life. Learning can also help improve physical and mental health, reducing pressure on family and community resources.

3.2

Financial and technological skills will be increasingly important as the population ages. Evidence shows that these skills can improve people's retirement savings and their work and health outcomes. However they are particularly problematic for older people to develop and maintain, so may require specific focus from policymakers.

3.3

Participation in organised adult learning is falling. Older people are currently less likely to receive workplace training or participate in adult education, and there are differences in participation across socio-economic groups, genders and ethnicities. Participation rates need to be increased to fully realise the benefits of lifelong learning.

3.1 Lifelong learning to enhance mental capital and health

The previous chapter discussed the benefits that work-related training can bring people throughout their careers. This is just one of the important ways that continuing to learn throughout life can improve the ageing population's quality of life and health in the future.

Mental capital is an important concept. Mental capital encompasses cognitive ability, flexibility and efficiency when learning, social skills and resilience. Higher levels of mental capital can help mitigate cognitive decline associated with old age. People with high levels of mental capital are more likely to remain independent for longer, require less support, and be better equipped to respond to change[59]. Mental capital grows during youth, plateaus in middle age, and declines as people get older[39].The period between five and twelve years of age is a crucial phase in acquiring mental capital[59] and changes to childhood and adolescent education could impact on mental capital later in life. Those reaching 65 in 2025 and 2040 (today's 50 and 35 year olds) have predominantly left formal education, but their mental capital can still be improved. Learning, which can boost mental capital at any age, is one of a range of factors to determine this trajectory. Lifelong learning helps people to make informed choices about their lives, particularly during periods of crisis and transition[60]. During adulthood, mental capital is protected by good health (nutrition, exercise, avoidance of alcohol and drug abuse), and the updating and enhancement of skills, which improves memory, reasoning and attention and how people cope with adversity[59].

There are many different types of learning which confer varying benefits. Accredited learning (resulting in a qualification) has a positive effect on men's perception of self-efficacy[61]. Work-related non-accredited training can have a positive impact both on life satisfaction[62] and on self-efficacy for men and women, while leisure or interest-related learning can increase life satisfaction and decrease depression in women[63]. Figure 3.1 indicates the range of motivations for work-related learning.

It is now widely accepted that mental activity has a similar impact on health and wellbeing as physical activity. Both accredited and non-accredited learning have direct impacts on the mental health and wellbeing of the population across all age groups[59]. The anticipated increase in demand for community resources and services and older people's greater risk of isolation and loneliness (see Chapter 6), makes this particularly relevant to the ageing population. Active, healthy and well-informed adults are less likely to place demands on family and community resources and services[57]. However certain target groups – for example older men – often shun clubs catering specifically for older people[64]. Men's Sheds, an Australian initiative, provides a shared space for

men to learn and take part in activities together. This has been found to have a positive impact on men's health and the adverse effects of retirement and social isolation[65], although there is a lack of robust evidence to assess which community learning initiatives are effective[66].

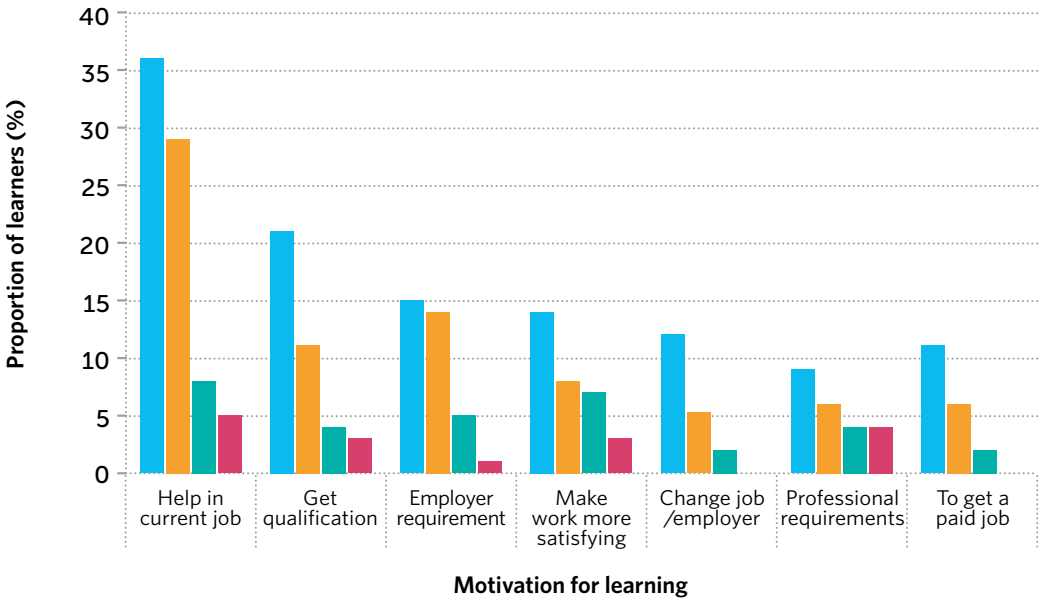


Figure 3.1. Work-related motivations for learning among workers aged 50+, 2012[67].

Policy Implication

Continuous learning throughout life can bring people a range of benefits. Education and training improve mental capital, which in turn increases resilience in later life. Learning can also help improve physical and mental health, reducing pressure on family and community resources.

3.2 Financial and technological skills

Adult education will have an important role in how the ageing population responds to challenges. Pensions are a good example of this. The UK is moving away from Defined Benefits schemes, where risks of shortfall are pooled and held by employers, to Defined Contributions schemes, where risks are borne more by individuals[19]. Education is increasingly important in this context, since people with low levels of Defined Contribution savings appear to be least well equipped with the necessary skills to take the best decisions about their pensions[68]. These changes will increase the benefits of having basic financial

and numerical skills. People without these skills are less likely to explore the market and shop around for pensions. Those who actively plan for retirement tend to accumulate more wealth than those who do not[68]. Interventions to provide financial education can be effective, but only if they are prolonged[69].

Technological skills are similarly important. They are one of the main factors that prevent people from using and benefiting from technology, particularly in later life. 60% of non-internet users aged over 64 consider the internet "too difficult to use"[70]. Currently a large proportion of this age group have no internet skills, and they are significantly below the population average for having 'medium' or 'high' internet skills[71]. There is also a strong correlation for people of all ages between internet use and education level.

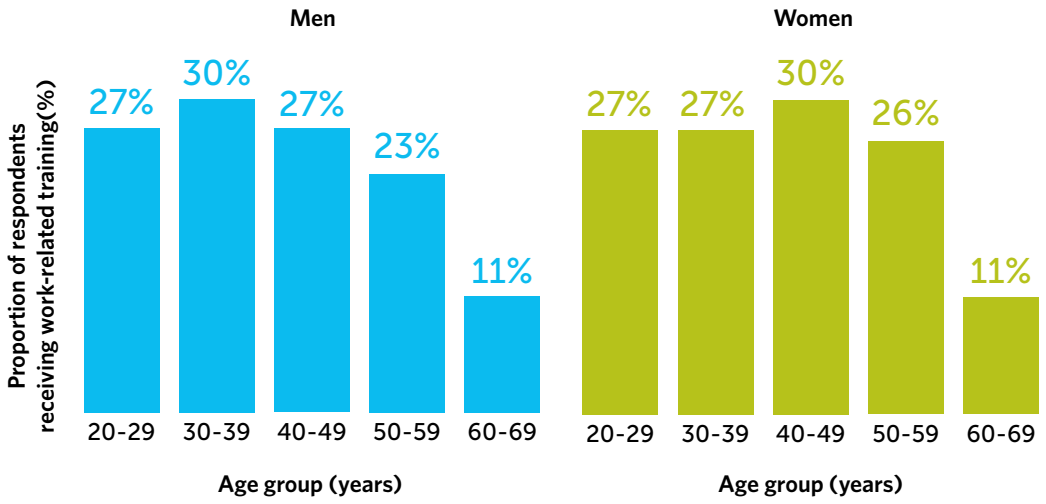
The future importance of technology creates even greater impetus to address any skills gap in people of all ages. Uptake of technology in early life is a significant determinant of usage in later life. Skills can be improved through initiatives such as 'Digital by Default' which provide 'push' to encourage non-users to engage digitally with services (although this may risk excluding those without internet access). A complementary approach is to create 'pull' for sustained digital participation. For example community learning initiatives can encourage older people to explore and learn digital skills in the pursuit of activities that are enjoyable, meaningful and worthwhile[72].

Policy Implication

Financial and technological skills will be increasingly important as the population ages. Evidence shows that these skills can improve people's retirement savings and their work and health outcomes. However they are particularly problematic for older people to develop and maintain, so may require specific focus from policymakers.

3.3 Barriers to participation in adult education

Despite all the benefits of continuing to learn throughout life, older people are currently less likely to participate in learning (see Figure 3.2 for work-related training) than younger age groups. Rates of participation in learning activities have fallen in recent years, and projections suggest that if these patterns continue, learning rates for those aged 50-59 could fall as low as 20% by 2040[57]. A 2012 survey revealed that over 40% of people aged 55-64 had undertaken no learning since leaving school[67], and while 64% of people aged 50-54 in 2012 had done some learning, this stood at 39% for those aged 75 and over[67].



Survey of residents aged 10+ of 40,000 households

Figure 3.2: Proportion of men and women by age group that reported receiving work-related training in the UK in the past 12 months, 2012[73].

The type of learning people undertake varies across the life course, dictated partly by employment status. Currently, while younger people are more likely to participate in formal or vocational learning, older people are more likely to take part in non-vocational or informal learning[74]. The uptake of certain types of education varies depending on age, ethnicity and gender[75].

An analysis of the barriers to learning helps make sense of the differences in participation. Attitudinal barriers exist, with evidence showing that both older people and learning providers can have negative perceptions of older people's ability, motivation and interest in gaining new knowledge[57]. Older people, for example, are less likely to be considered for work-related training; this phenomenon becomes more pronounced when the training decision is made by the employer rather than the individual[76]. Evidence suggests that the attitudes of older people themselves can act as a barrier, with people's desire to participate in learning declining as they get older[77]. The reason for this reluctance tends to be the perception that they are too old to learn. In some cases, participation will be affected by the attitudes of both the provider and the older person[57].

Personal circumstances can also prevent participation with cost, lack of time, work and family constraints having a major effect[57]. Those with higher levels of education (see Figure 3.3), higher incomes or in full-time work are more likely to participate in learning activities[57]. Other factors, including gender, employment status, and ethnicity also affect participation[57]. For example, a

smaller proportion of men of any age group use adult education classes, and these differences between the genders become more pronounced with age[57]. Looking forward, the increasing demand for unpaid care (see Chapter 6) may also increase the barrier to participation in adult education.

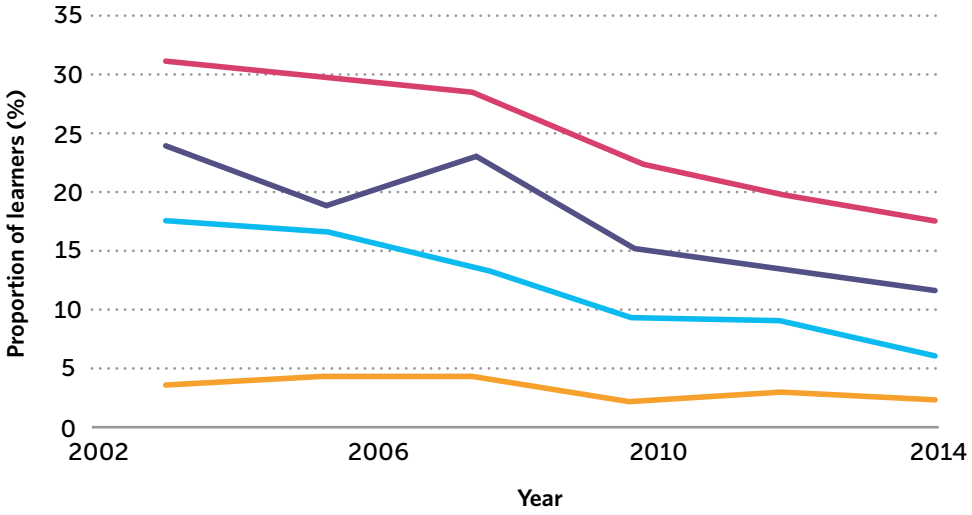
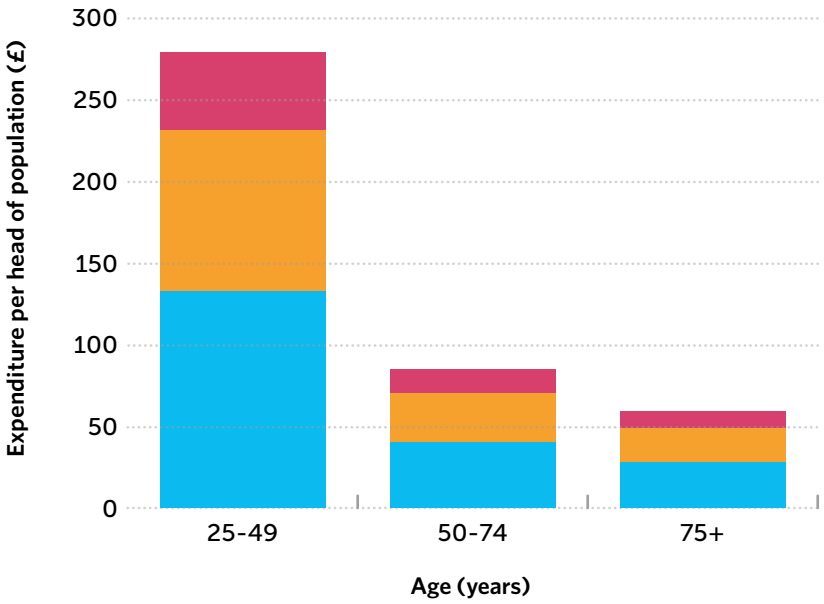


Figure 3.3: Proportion of UK residents who report taking part in formal education or training in the last 12 months, by highest educational qualification, 2002-2014[57].

Funding is one of the major factors affecting provision and therefore participation. Currently, public expenditure makes up the largest share of spending on adult education, followed by private employers and then individuals[79]. Reducing budgets may challenge the assumption that adult learning and training are the state's responsibility[57]. It remains to be seen what impact the apprenticeship levy (a new scheme where control of apprenticeship funding will be put in the hands of employers) has on the balance of funding[l]. Currently 86% of spending on adult education is focused on the under 25s, with significantly less provision for those aged 50 and over[57]. Private and public spending on learning declines rapidly per head of population for those over 25 (see Figure 3.4) and the proportion of training paid for in part or in whole by employers reportedly also declines with age (see Figure 3.5). However, training older employees has been seen as a good return on investment for some SMEs[32].

In future, it is likely that some balance between public, personal and employer finance will continue to be needed, coupled with the provision of information to support individuals to take more control over their employment paths[57].

l https://www.gov.uk/government/publications/apprenticeship-levy



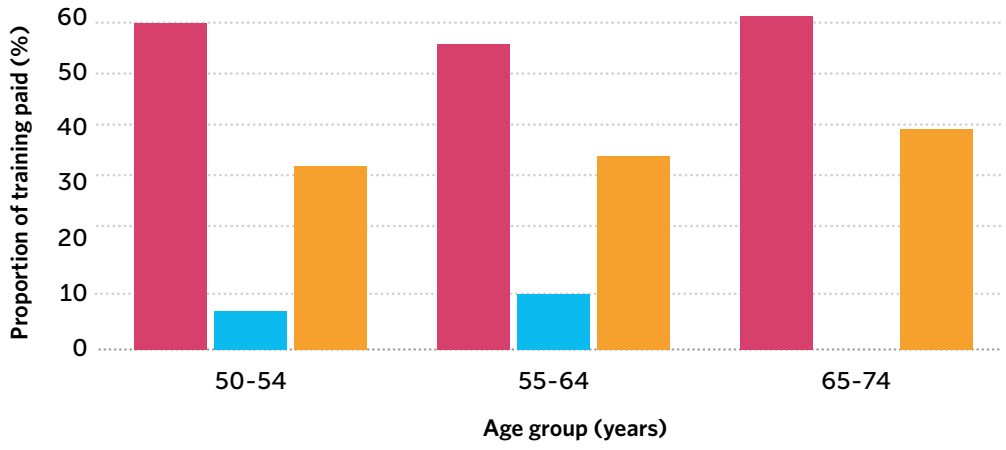
Funding source:

Public expenditure Private employer expenditure Individual/community sector expenditure

Survey of 5,000 people aged 17+

Figure 3.4. Annual UK learning expenditure per head by age group, 2009[78].

Part of the solution may be to redesign how people learn in later life. Organisations such as the University of the Third Age and the Women's Institute engage groups who do not traditionally participate in adult education through an informal model of knowledge sharing, while universities and colleges now offer web resources such as free online courses. Inter-generational or family learning can also be a very effective way of engaging adults who do not usually participate in formal learning[80].



Funding proportion: All the cost Some of the cost None of the cost

Survey of 421 working learners aged 50+

Figure 3.5. Proportion of training paid for by employer, survey of British workers aged 50+, 2012[67].

Policy Implication

Participation in organised adult learning is falling. Older people are currently less likely to receive workplace training or participate in adult education, and there are differences in participation across socio-economic groups, genders and ethnicities. Participation rates need to be increased to fully realise the benefits of lifelong learning.

Chapter 4

Housing and Neighbourhoods

Summary:

4.1

The ageing population will change demand for housing. In particular, it is likely that more adaptable and specialised housing will be needed.

4.2

Building suitable new homes and supporting the adaptation of the existing housing stock will be critical as the population ages. It is also important that older people can move to a more appropriately-sized home with ease.

4.3

Housing should be considered in the context of the wider neighbourhood. Interventions that improve people's homes are less likely to be effective without similar improvements in the neighbourhood. Accessibility and social cohesion are two of the most significant factors that affect how older people experience their neighbourhood.

4.4

Homes have great potential as places of healthcare. This could reduce demand on health and care services, but will require homes that support new technologies and are safe, accessible and adaptable.

4.5

Working from home is likely to become increasingly common in the future, particularly among older people. As with care in the home, this can be supported by suitable design and enabling access to necessary technologies, such as high-speed broadband.

4.6

Many of today's older people own their home, giving them some financial security and allowing them to leave an inheritance. Increasing property prices and decreasing levels of home ownership in younger generations could affect this, turning homes from financial assets into financial burdens.

4.7

Housing plays an important role in transferring wealth from one generation to the next. Extending life expectancy and falling home ownership rates are likely to reduce or negate the value of future inheritances, as housing wealth increasingly funds longer periods in retirement and ill-health.

4.1 Changing demand for housing

In the next 25 years, the UK's ageing population will drive considerable change in the demand for housing. The proportion of households where the oldest person is 85 or over will grow faster than for any other age group – by 2037 there are projected to be 1.42 million more such households in England, an increase of 161% (see Figure 4.1). Homes that meet the needs of older people will therefore be in greater demand.

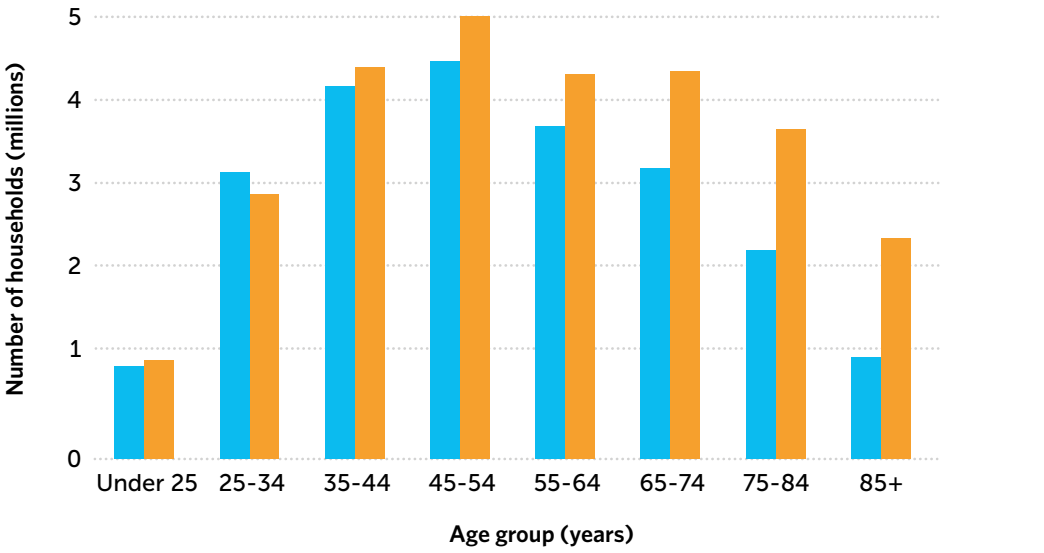


Figure 4.1: Head of household in England by age, estimations for 2012 and projections for 2037[81].

35% of households currently consist of older people living either alone or as a couple[82], but most homes were designed for families and 42% of homes in England and Wales have three bedrooms[83]. As a result, there are concerns that housing designed for families is being occupied by older people. Evidence suggests that there are substantial numbers of people who would like to move to smaller homes, but cannot find a suitable property[82]. Without action, the ageing population will exacerbate any existing shortage in housing that meets older people's needs.

While the older population is so diverse that it is inappropriate to suggest that there is an 'ideal' home, there is consensus that the home should enable people to maintain a good quality of life and be adaptable to suit their health and care needs[82]. Over half of the non-specialised housing stock is estimated to require structural alterations to provide suitable access for older people, and over a quarter of inaccessible homes are not adaptable at all[82].

Residents of specialised housing generally show high levels of satisfaction, improved wellbeing, better health outcomes and reduced healthcare costs[82]. Specialised housing is also likely to be more in-demand as the population ages, with one prediction suggesting a 70% increase in demand by 2033 to 86,000 units per year[84]. Growth in demand is likely to be driven by higher numbers of older people with acute or chronic disabilities.

This ageing population is not the only trend that will affect the demand for homes in the future – social trends will also play an important role. Whereas the vast majority of older people currently live as married couples[35], 66% of all people living in one-person households by 2037 will be aged 65 and over[81]. This may be due in part to increasing divorce rates – between 2003 and 2013 the divorce rate of women over 60 increased by 21% from a rate of 1.4 to 1.7 per thousand married women[85]. Any increase in demand for suitable housing for single older people has implications for the size and variety of housing needed.

The changing demand is occurring in the context of historic falls in home-building rates over the past decades[86]. This can risk a drop in provision of housing for older people.

Policy Implication

The ageing population will change demand for housing. In particular, it is likely that more adaptable and specialised housing will be needed.

4.2 Meeting the changing demand for housing

Potential ways to meet the changing demand for housing could involve providing suitable new homes, ensuring that the existing housing stock is appropriate and adaptable, and helping people to move to a home that is appropriate for their needs[87].

There are challenges to meeting the increased demand for specialised housing. If current build rates continue (see Figure 4.2), it is likely that the needs of the increasing numbers of older disabled people will not be met. There is a regional element to this – more specialised housing has been built in the South of England than the North relative to the number of older households in those regions[88]. This is despite people in the North being more likely to live with disabilities for longer[89]. There are also regional variations in the provision and cost of providing care homes[90]. The funding needs of an area are affected by both the demands of the population, and the cost of providing the individual places in that location.

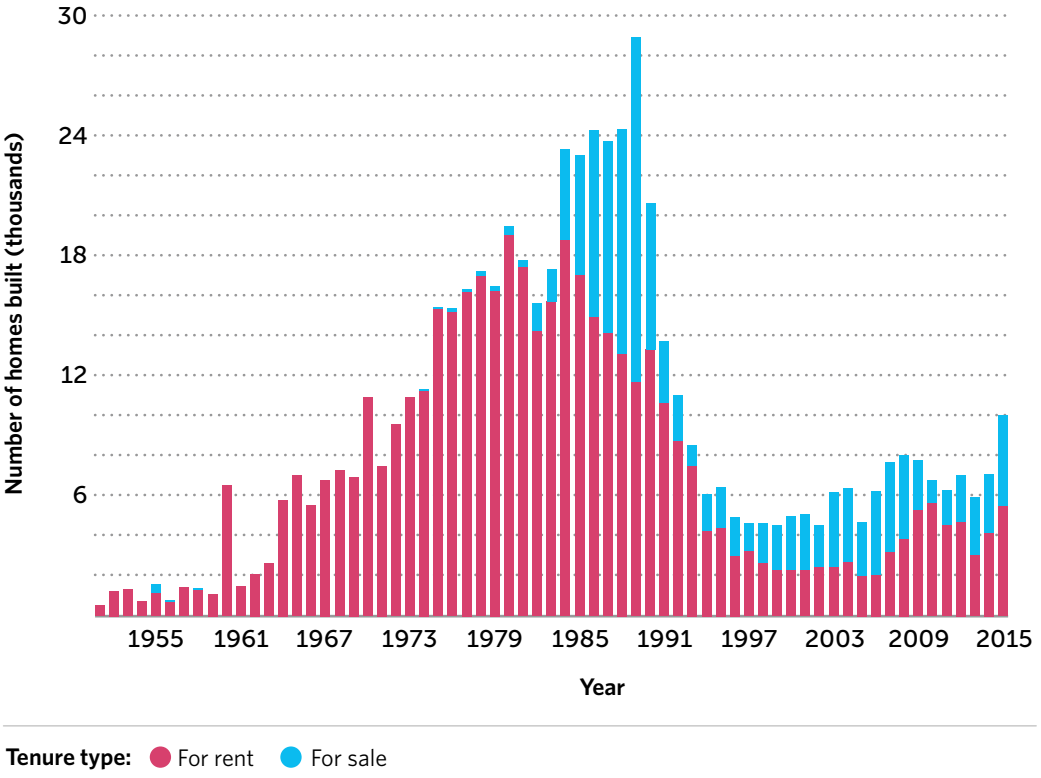


Figure 4.2: Number of specialised homes built in England by tenure type, 1951-2015[91].

Although meeting the demand for specialised housing is important, it is likely to remain a relatively small part of the solution. Currently only 7% of older people live in specialised housing[82]. The suitability of mainstream housing is therefore likely to have a greater impact on the ageing population. Despite this, the majority of guidance on design for older people focuses on specialised housing. For example, two thirds of people with dementia live in mainstream housing[92] but research on design for dementia primarily focuses on specialised accommodation[93].

Inadequacies in current housing stock are likely to continue to cause problems because, even in 2050, the majority of housing stock will have been built before 2000[94]. The adaptability of existing stock is therefore crucial. Financial assistance to future-proof homes can help people pay for adjustments to their homes. For example, evidence suggests that the Disabled Facilities Grant administered by local councils, decreases financial outlay in the longer term by reducing home care needs and the residential care requirements[95]. One of the potential challenges to adjusting homes will be the possibility of a reduction

in home ownership rates – discussed in more detail below – which could lead to more older people living in rental accomodation. This could pose a problem because rented accommodation appears to be less likely to be adapted, unless it is social rental housing[96].

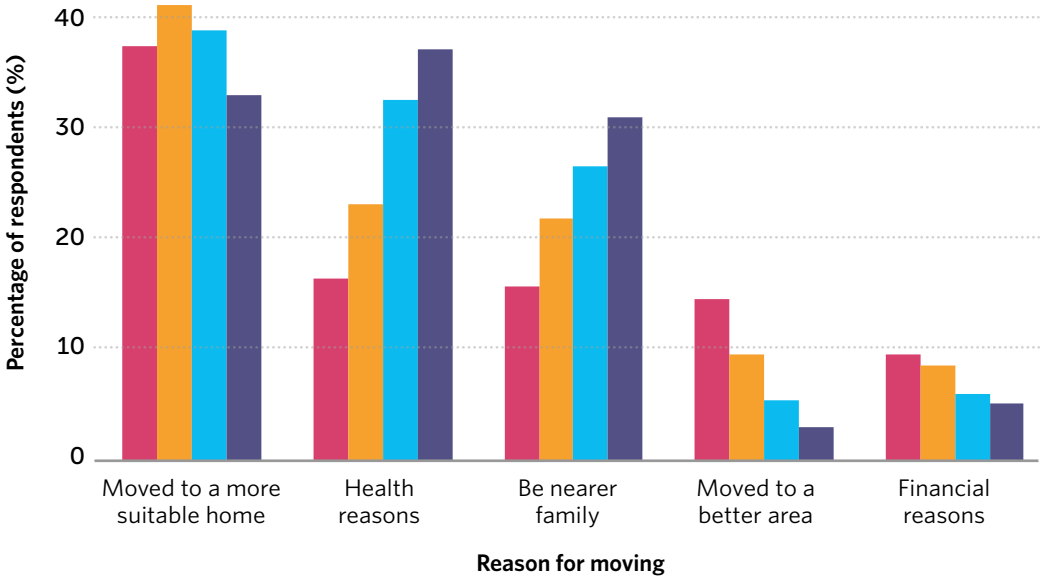


Figure 4.3: Reasons cited for moving home by age, 2004-2010[97].

Beyond improving supply, there is an opportunity to make it easier and more attractive for older people to move home. One study found that 58% of people over 60 were interested in moving[98] and evidence suggests that some of the most common reasons for wanting to move, such as those relating to health or family, grow in importance as people get older (see Figure 4.3). Evidence also suggests there may be a financial barrier to downsizing as it is rarely cost-effective unless the home being sold is particularly large or expensive[99]. There are also emotional challenges, with some people moving from a home where they have lived for many years reporting a loss of autonomy and control[82].

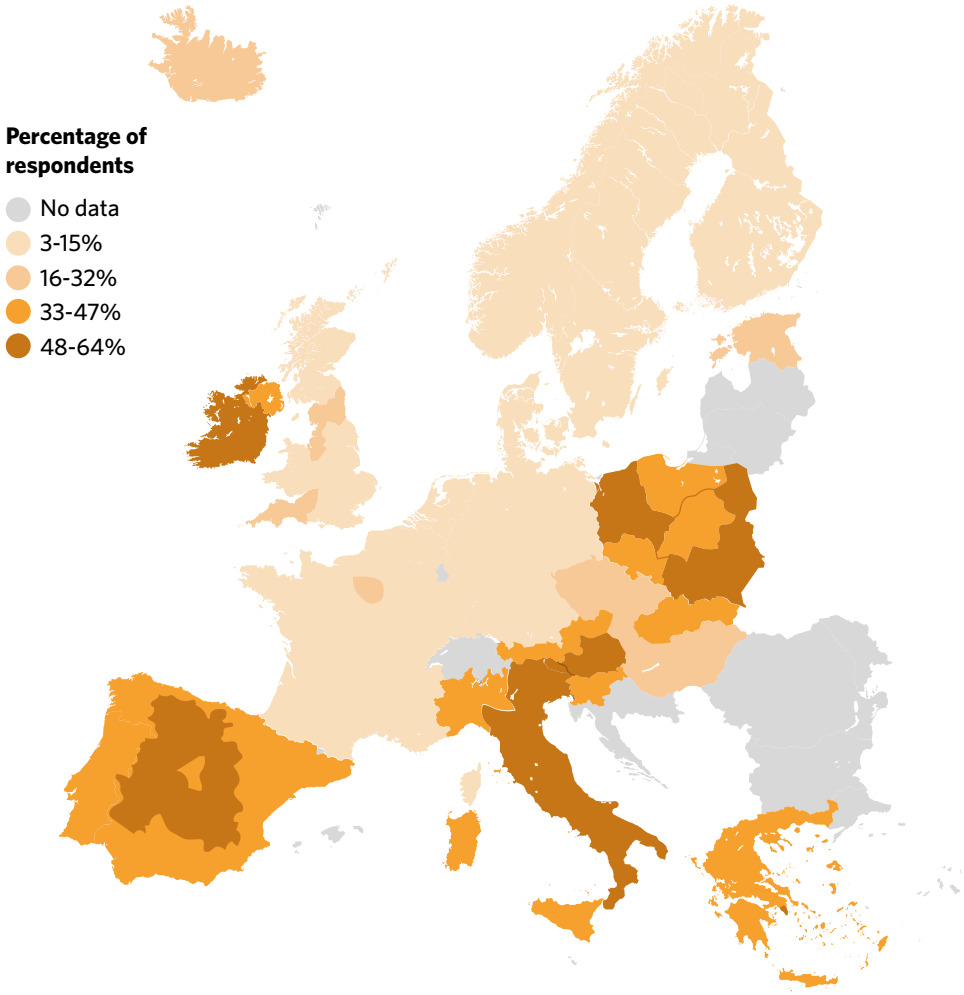
International Case Study: Intergenerational living in Spain

Part of a programme of older and younger generational engagement, Spain's inter-generational buildings include rental homes for independent older people in which a pre-determined number of units are reserved for

younger people who commit to providing services to the community. The main objectives of the model are to provide decent low-cost housing and reduce loneliness and social isolation while providing housing and a sense of community engagement for younger people in need.

To live in an inter-generational building, such as the Plaza de América in Alicante, the older people have to be over 65, able to live independently, have no other habitable dwelling and have an income below €21,000 per year. Younger people need to be under 35 years of age, willing to commit to provide services, not already have adequate accommodation and have a personal income below €21,000 per year. Younger tenants are committed to involvement in community service and looking out for four of their older neighbours[100].

Inter-generational living in the UK may also become more common as the population ages. In some European countries nearly half of people over the age of 55 live with adult children, whereas less than 15% do so in the UK (see Figure 4.4). Inter-generational living could bring benefits to all age groups, addressing loneliness and social isolation among older people, facilitating care for older and younger relatives, and reducing housing costs. The increasing numbers of generations alive at the same time (see Chapter 5) suggests that demand for inter-generational living will increase in the future. Current barriers include a lack of suitable housing options, and financial concerns such as the cost of adaptations and the impact of inheritance tax on co-owned properties[101]. Outside of the family, a recent homeshare initiative in the UK matched younger people requiring low-cost housing with older people requiring domestic help and companionship[102]. These models may become increasingly common as the demand for inter-generational living increases.



Survey of 47,035 people aged 15+ across Europe

Figure 4.4: Percentage of respondents aged 55 or older living with at least one of their children in the household, per Nomenclature of Territorial Units for Statistics (NUTS) region, 2004/05[103].

Policy Implication

Building suitable new homes and supporting the adaptation of the existing housing stock will be critical as the population ages. It is also important that older people can move to a more appropriately-sized home with ease.

4.3 The importance of the wider neighbourhood

A person's living environment extends beyond their home. Enabling people of all ages to live healthy and successful lives requires neighbourhoods with suitable physical, social, and virtual environments.

Access to services and the promotion of outdoor mobility can have significant health benefits for people of all ages. The International Longevity Centre cites evidence that physical activity among older people has been linked to better cognitive performance, reduction in morbidity and mortality and increased wellbeing, and suggests that encouraging active travel among older people could confer health benefits[104,105,106]. Other evidence suggests that neighbourhoods can contribute to health by providing opportunities for exercise, and to wellbeing by providing opportunities for social interaction and contact with nature[107]. The ability to access open space also influences people's satisfaction with life[108].

The neighbourhood social environment has also been shown to have an impact on mental health. One study on the relationship between the neighbourhood social environment and symptoms of depression found that cohesive neighbourhoods can contribute to better personal relationships, better sense of control and fewer symptoms of depression[109].

Older people are likely to form an emotional attachment to their neighbourhoods, as they are with their homes. In a large-scale study of people living in private households, participants described how their neighbourhoods contribute to a good quality of life. The features of neighbourhoods that were prized by participants in the study were: a safe, supportive environment where people enjoy good relationships with their neighbours; the ability to go for walks; good views and the availability of good services and facilities[110]. The sense of belonging to a place is connected with identity. Deterioration in a neighbourhood and fear of crime has a strong negative influence on well-being by limiting activity and engagement with the outside world. These difficult-to-define qualities are part of the identity that people draw from their neighbourhoods[111].

Policy Implication

Housing should be considered in the context of the wider neighbourhood. Interventions that improve people's homes are less likely to be effective without similar improvements in the neighbourhood. Accessibility and social cohesion are two of the most significant factors that affect how older people experience their neighbourhood.

4.4 Homes that support better health and care

Poor quality housing (for people of all ages) costs the NHS £2.5 billion a year: for comparison, smoking costs £2.3-3.3 billion and alcohol £3.2 billion[82,112]. Older people are disproportionately likely to live in poor quality housing or housing in need of serious repair, particularly when they live in socially disadvantaged areas[82,113]. Damp, lack of insulation, poor heating, unsafe stairs[112], and low levels of both artificial and natural light[114] can all affect mental and physical health. A significant risk is from cold and damp homes, which are a major factor contributing to England having 40,000 more winter deaths than would be expected based on mortality rates during the remainder of the year[115]. Falls are the other major health risk, costing the NHS upwards of £600 million a year[116]. As well as putting them at greater risk of physical harm, poorly-designed or maintained housing can increase an older person's risk of loneliness. For example, steep or poorly lit stairs significantly affect older people's ability and confidence in leaving the home.

The health-limiting effect of current housing stock provides a significant potential challenge to homes becoming places of care. Future housing has the potential to do far more than today's. Smart home technology, for example, can enable remote monitoring, turning the home into a place of healthcare. This would provide users and carers with a greater degree of flexibility and choice, freeing up hospital beds. Other potential benefits include healthcare professionals providing treatment or advice in the home, lowering the frequency of costly emergency visits and unnecessary hospitalisation. This could also lower the need for routine diagnosis and monitoring to be done in person, potentially reducing the cost of healthcare. Although predicting the nature and impact of future technologies is challenging and there is uncertainty about their current cost-effectiveness (see Chapter 6), there is significant potential for future savings in health spending.[117]

Policy Implication

Homes have great potential as places of healthcare. This could reduce demand on health and care services, but will require homes that support new technologies and are safe, accessible and adaptable.

International Case Study: De Hogeweyk, Netherlands

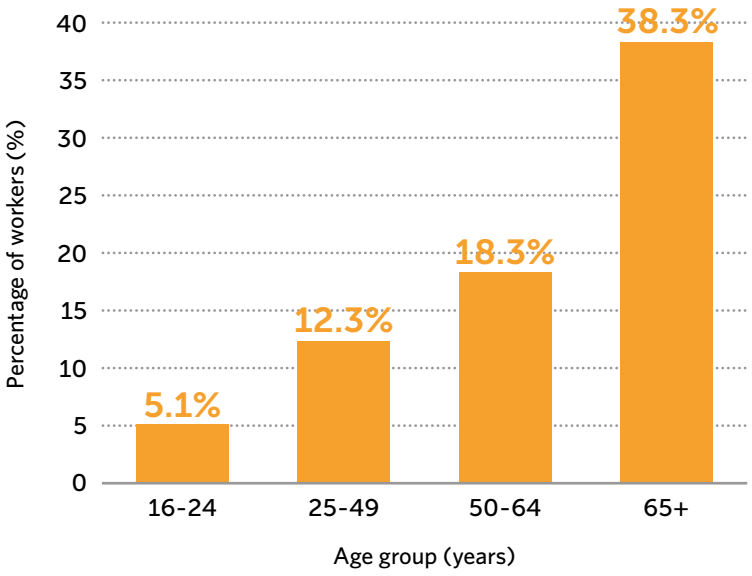
Dementia is age-related and it is currently thought that 40% of people aged 85 and over will develop dementia and be in need of long-term care[118]. The Netherlands has several examples of residential care for people with dementia, carefully designed to offer a more home-like, normal and enjoyable experience. Opened in 2008, De Hogeweyk is a dementia care facility, modelled as a village or neighbourhood.

De Hogeweyk has its main accommodation around the edge and contains an area of streets, squares, alleyways, gardens and a park, within which the residents with dementia can move safely and securely. The 152 residents are organised as 23 households, each made up of six or seven residents and containing a kitchen, and dining and living areas. Each household has a dedicated team of six to eight staff who work two at a time, helping and caring. Communal facilities include shops, cafes, a theatre and a traditional Dutch pub.

Residents have an average age of 84 and usually live in De Hogeweyk until death. Each place costs €5,800 (£4,500) per month, paid for by the Dutch long-term care insurance scheme and resident contributions up to a maximum of €2,400 (£1,850) per month[119].

4.5 Smarter homes for work

In the future, home-working is likely to become more common. This will be driven by significant changes in the labour market, for example growing rates of self-employment[49] (see Chapter 2). Older people are particularly likely to work from home (see Figure 4.5). Evidence suggests that home-working and other forms of flexible working help older people to remain in work and balance competing responsibilities such as care.



Survey of residents aged 10+ of 40,000 households

Figure 4.5: Percentage of UK workers currently using home as a workplace by age group, 2014[47].

For this to happen successfully, older people's homes need to be suitable working environments. Poor quality housing can make the home an unsafe workplace and prevent individuals from accessing home-based technologies. Sufficient space is also an important factor – homes built recently are smaller than in the past[120] leaving less room for home offices or other suitable working spaces. In comparison to the UK other Western European countries build larger new homes, with the average new home in Denmark (the Western European country with the largest new homes) being 80% larger than in the UK. This represents the comparison between the average 85 square metre new home in the UK, and the 137 square metre new home in Denmark [121]. Home-working also requires appropriate infrastructure and supportive workplace policies.

Policy Implication

Working from home is likely to become increasingly common in the future, particularly among older people. As with care in the home, this can be supported by suitable design and enabling access to necessary technologies, such as high-speed broadband.

4.6 Housing - a financial asset or a financial burden

Older people are currently more likely to own their home outright (see Figure 4.6). By owning their homes outright, people have the benefit of having neither a mortgage nor rent to pay. This helps free up income for other uses. Housing can also be used as an asset from which to release equity, and this can be used to pay for costs in later life.

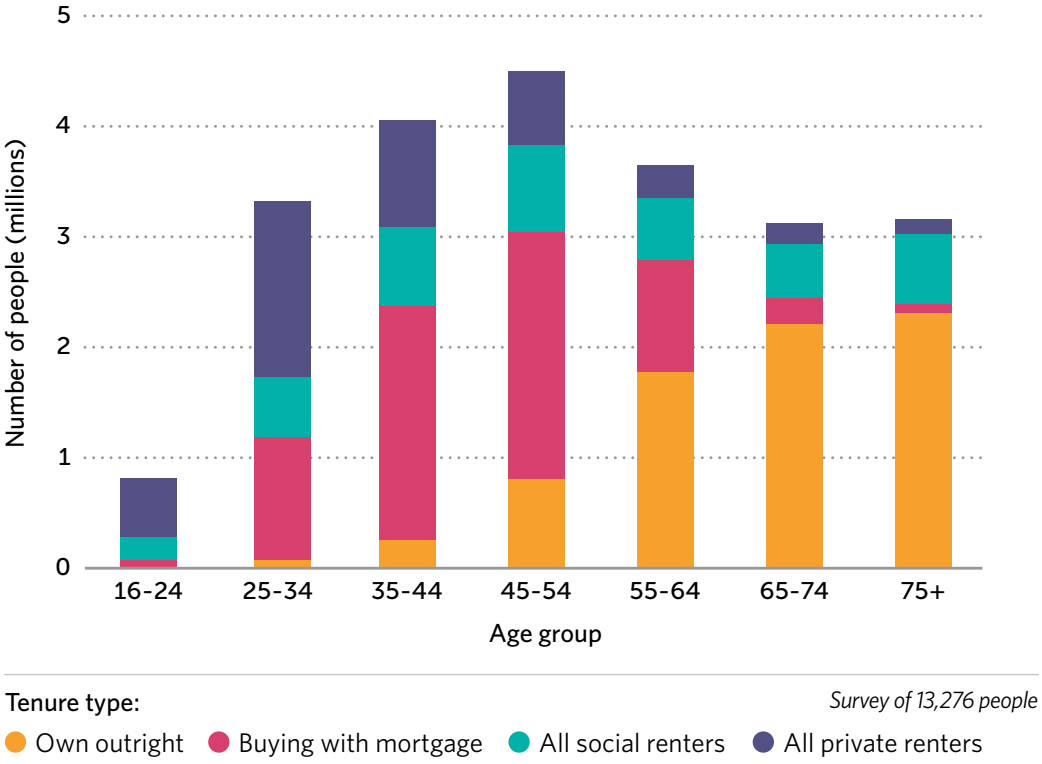


Figure 4.6: Number of household reference people by tenure and age group in England, 2013/14[122].

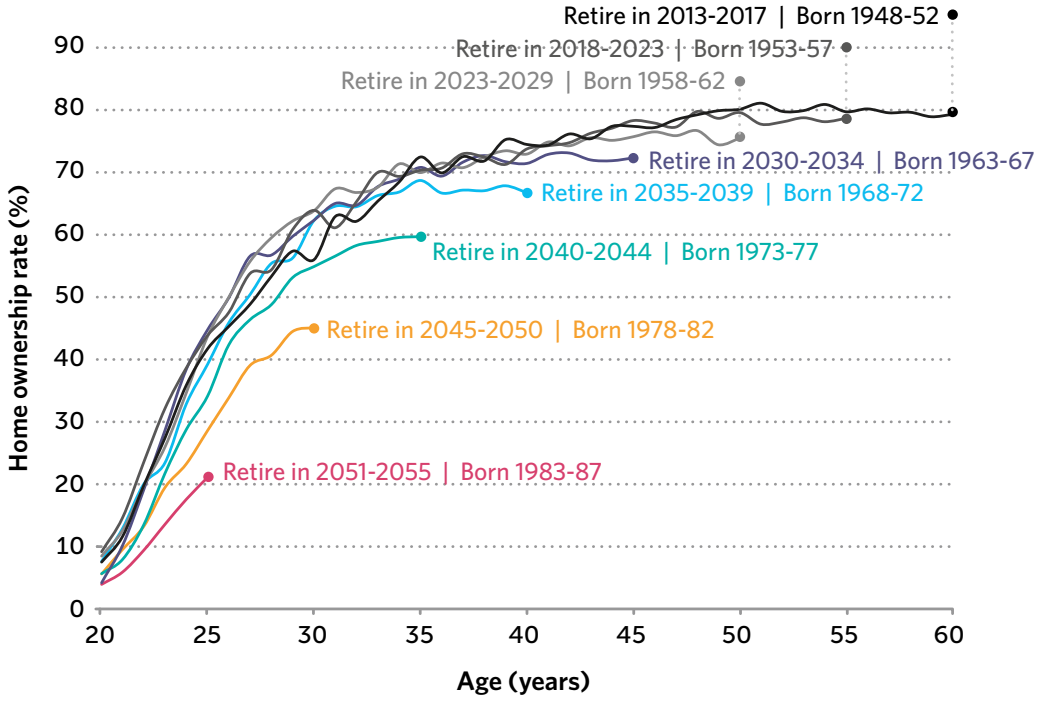


Figure 4.7: Home ownership rates by birth year and age[123].

Current trends indicate a reduction in home ownership rates for more recent birth cohorts (see Figure 4.7). The proportion of older people owning their own homes not only varies by cohort, but also between regions of the UK (see Figure 4.8). In both cases this may have implications for future policies which rely on housing assets for funding, for example later life care. This may also have geographical implications, especially on local authorities with lower levels of home ownership.

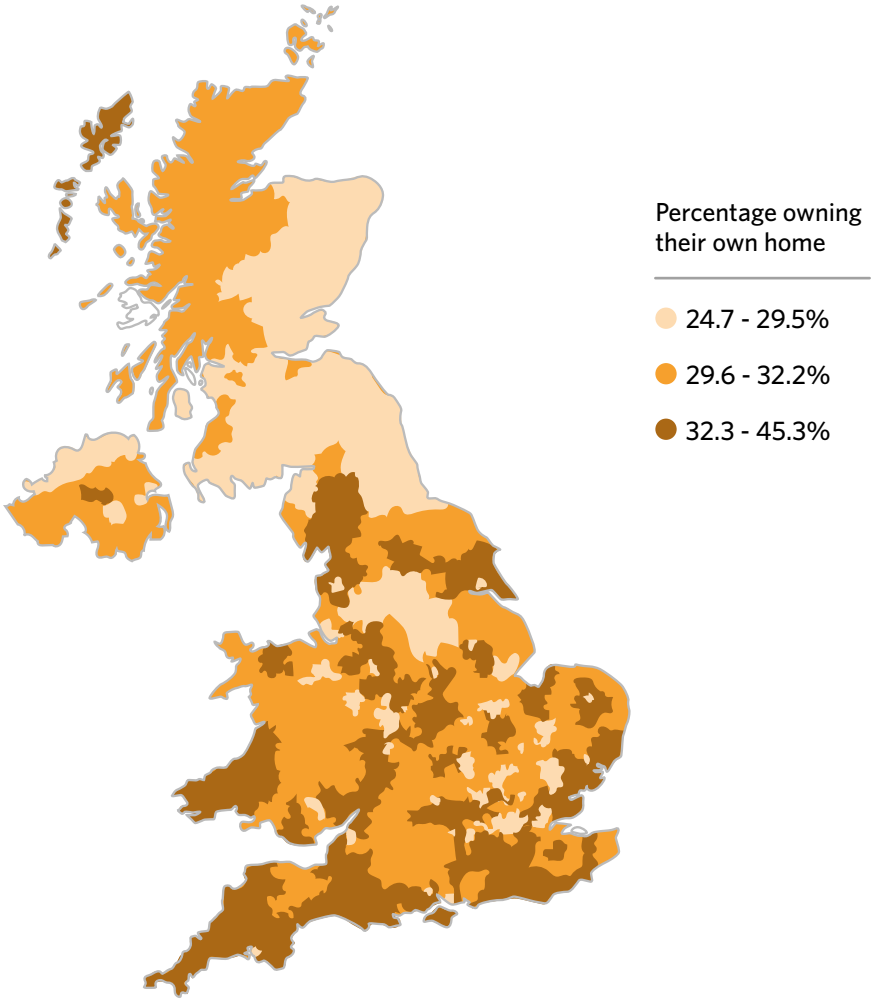


Figure 4.8: Proportion of people aged 65+ owning their home by local authority, 2011[124].

Traditionally, housing costs have tended to decrease over the life course as mortgage debt decreases (younger people in 2014 spent on average more than £100 a week on housing compared to £25 a week for those aged over 60)[123]. There is a significant negative financial impact throughout the life course on those who are not able to own their own homes. Compared to mortgage-payers, private renters spend twice as much of their income on housing (30% vs. 15% in 2012)[19]. It has been suggested that the diversification of types of housing being built, and a range of ownership models including for example co-housing schemes, deferred payment and shared ownership, could help to address this issue[125].

Policy Implication

Many of today's older people own their home, giving them some financial security and allowing them to leave an inheritance. Increasing property prices and decreasing levels of home ownership in younger generations could affect this, turning homes from financial assets into financial burdens.

4.7 Housing to enable inter-generational financial transfers

Housing plays a significant role in transferring wealth from one generation to the next. However, the ageing population and increased longevity are likely to affect the size of inheritances as well as when people receive them.

Younger cohorts are on course to have lower net wealth than older generations - this may be the product of falling wages since the recession, however there is evidence that today's younger people are less likely to have savings or assets even when they earn more than older cohorts did at the same age[126]. This indicates that there may be a generational difference in attitudes towards saving. This may be driven by the increase in home-ownership in the second half of the 20th century, which has resulted in more younger people receiving or expecting to receive some kind of inheritance[19]. Lower savings among younger cohorts may be entirely rational if they receive their expected inheritances, and these inheritances in turn could increase their rates of home ownership[19].

Although there is no definitive measure for judging the adequacy of retirement savings[19], the gap between expected and actual inheritance poses a potential problem for future generations.

As life expectancy increases, there is a greater likelihood of two generations of a family living until both generations have entered retirement. This means that, even if people do inherit money and are able to use it to buy their home, they will do so at a later stage in life. This may leave them with more of the mortgage to repay in later life. The expected effects of the ageing population on time spent in ill-health could also significantly affect the value of future inheritances, as people potentially need more of their assets to fund retirement and care[19].

Policy Implication

Housing plays an important role in transferring wealth from one generation to the next. Extending life expectancy and falling home ownership rates are likely to reduce or negate the value of future inheritances, as housing wealth increasingly funds longer periods in retirement and ill-health.

Chapter 5

A Central Role for Families

Summary:

5.1

Families have long been a central component of the drivers and implications of population ageing. Children are born into families and family decisions regulate the number of children born; dependant individuals both young and old are typically supported and cared within families; transfers of finance, support and care are moved between the generations within families.

5.2

In parallel to ageing, the UK population is experiencing a growth in the plurality of family structures. There is limited evidence on the impact heterogeneous family types may have on important issues relating to ageing, especially later life caring responsibilities. Understanding this is a priority for understanding the resilience of UK care policies.

5.3

Informal caring responsibilities currently predominantly fall on women. This can have important negative consequences for women's health, wealth and wellbeing, with the full implications realised throughout the life course. The ageing of the population is likely to increase the demands for informal care, and other things being equal this will disproportionately impact women.

5.4

The 'verticalisation' of family structures associated with an ageing population brings a number of opportunities and challenges relating to housing provision, grandparent care and the capacity of smaller family units to care and provide support across generations.

5.5

Successful policy responses in an ageing population are likely to be those which take a whole life course approach and identify the dependencies between generations. It will be particularly important to recognise that policy which impacts on younger adult life – for example when adults are caring for young children – will impact on later life experiences and support requirements.

5.1 Family trends occurring in parallel to ageing and because of ageing

Families[J] are central to understanding an ageing population. Chapter 1 showed how changing family structures and decisions are important drivers of ageing in the population, manifested most obviously through below-replacement fertility rates. In turn, ageing will change family structures and relations, including leading to a 'verticalisation' of families and affecting inter-generational caring responsibilities. These issues are the subjects of sections 5.4 and 5.5 respectively.

There are also a number of changes to families happening in parallel to population ageing. These trends may be related to population dynamics or may be the result of other societal or behavioural trends, but they are important as they are likely to affect the way that population ageing plays out in the UK. Section 5.2 considers the diversification of family structures, while section 5.3 considers the changing role of women in an ageing population.

Policy Implication

Families have long been a central component of the drivers and implications of population ageing. Children are born into families and family decisions regulate the number of children born; dependant individuals both young and old are typically supported and cared for within families; transfers of finance, support and care are moved between the generations within families.

5.2 Towards a plurality of family structures

In recent decades, the UK, like many countries across the developed world, has witnessed an evolving pattern of change in the nature of family structures, roles and relationships. Attitudes are changing towards marriage, cohabitation, single parenthood, divorce and childlessness. Marriage is no longer regarded as the only framework in which it is possible to live as a family and to have children. The result is that, while the marriage is still the dominant form of family, families are becoming increasingly heterogeneous and complex in size, character and location (see Figures 5.1 and 5.2).

J A family is defined by the ONS as a group of people who are either:
- a married, same-sex civil partnership, or cohabiting couple, with or without children
- a lone parent with children,
- a married, same-sex civil partnership, or cohabiting couple with grandchildren but with no children present from the intervening generation, or
- a single grandparent with grandchildren but no children present from the intervening generation.

For further information see: http://web.ons.gov.uk/ons/guide-method/census/2011/census-data/2011-census-user-guide/glossary/index.html

The number of lone parent families increased over the past decade from 2.7 to 3.0 million, a growth rate of 12% (in comparison the number of all other types of family grew at a rate of 7% over the same period)[127]. In England, such households are predicted to increase by 59% each year between 2008 and 2033[128]. Lone parenthood comes either from never having partnered, having separated/divorced or being widowed. In most European countries, single parents are mainly divorced or separated. In the UK these are more likely to involve early births, often unintended and outside marriage. Lone parent households present distinctive policy problems, such as access to an adequate income, child care and difficulties in reconciling work, all of which have more pronounced implications as individuals, and thus the population, ages.

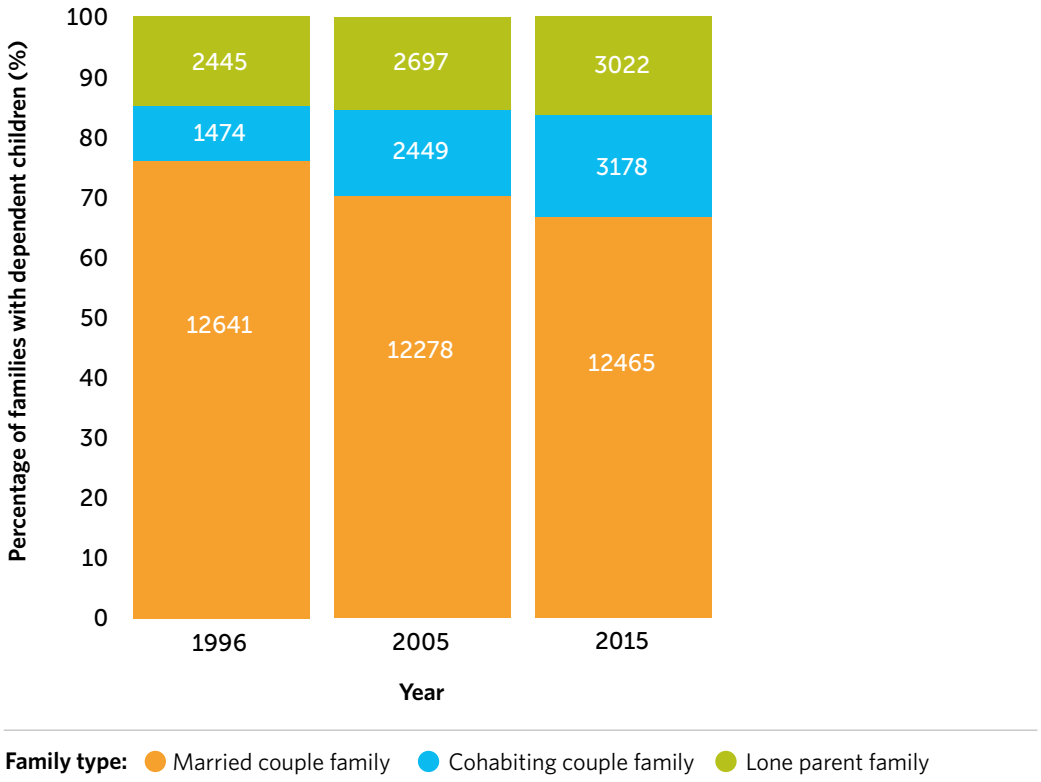


Figure 5.1: UK family structures, in numbers (thousands) as a percentage of population, 1996-2015[127].

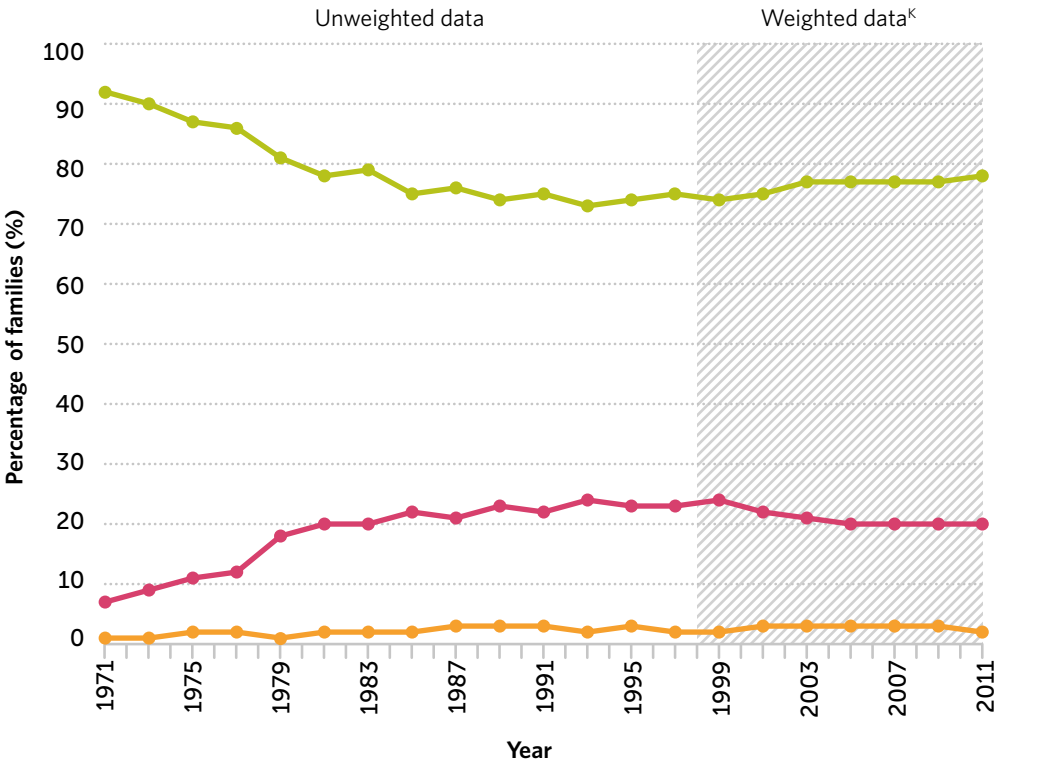


Figure 5.2: Families with dependent children by family type, 1971-2011, Great Britain[K, 129].

While reconstituted or step-families are not new, the trajectories into this family form have changed. Historically, widowhood was the most common path into a step-family; today, single parenthood, separation or divorce, are the main pathways. In addition, step-father families – where the children reside with the mother and step-father – are now much more common than in the past, where death in childbirth usually removed the mother and the children were brought up by a step-mother[130].

A decrease in fertility is increasing childlessness. The proportion of childless women in the UK has increased from 11% amongst those born in 1942 to 18% for those born in 1969[L,131]. Individuals may have few or no 'vertical' kin: no children or grandchildren, or no surviving parents or grandparents. This may be due to childbearing and mortality patterns, but may also be socially constructed – for example men, in particular, may lose contact with their biological children following divorce. Table 5.1 shows how levels of childlessness are projected to increase over the next decades, with a disproportionate impact on 65-74 year old men.

K Weighting of data is used to correct for non-respondents to the survey and to match the results obtained to the characteristics of the UK population in terms of age group, gender and region. Weighted data are not available for years prior to 1988. Although weighting will have some impact on the average household size, both weighted and unweighted data have been included to allow some comparison of long-term trends.

L These data define 'childlessness' as having no surviving children.

		Percentage of childless people by year (%)					
Age (years)		**2007**	**2012**	**2017**	**2022**	**2027**	**2032**
65-74	**Men**	14.0	14.5	16.8	19.8	21.7	22.8
	Women	11.3	10.0	10.5	11.1	12.1	13.2
75+	**Men**	15.1	14.2	13.3	14.6	17.0	19.5
	Women	15.4	13.6	11.9	11.8	12.5	14.0

Table 5.1: Estimates and projections of percentage of people aged 65+ who are childless, by gender and age group, England 2007-2032[132]

These trends are interrelated. For example, increased longevity means that marital and similar unions have the potential to last far longer than historically has been the norm, and this has placed strains on such relationships, ultimately contributing to additional marital break-up and divorce. More people are divorced at an advanced age than before: in 2013, the rate of divorce for older men had increased by 29% over the previous 20 years - an increase in the rate of divorce from 1.7 to 2.3 divorces per thousand men over the age of 60 in England and Wales[85]. In parallel to the increasing heterogeneity of family types, families are becoming more geographically dispersed and long distance and transnational family relations have become a reality of family life in the UK. While such relationships can be maintained through communication technologies (see Chapter 7), this interaction is different to face-to-face contact and long-distance family relations may change the nature of family solidarity.

In general, evidence suggests that many of the changes in family structure observed over recent decades will continue into the future[133]. An important policy issue is how traditional assumptions of care and support in later life hold for the growing plurality of family structures. Evidence suggests that, within the complex family structures which result from marital disruption and remarriage, lines of responsibilities become blurred or uncertain between generations. US research, for example, has suggested that parental divorce and step-family formation has negative effects on the support that adult children provide to their parents in old age. In addition there is a strong gender dynamic with adult children having lower contact with divorced fathers and higher contact with divorced mothers when compared with married parents, so that divorced fathers (in the US at least) receive the lowest level of personal care from their children[134].

There is also limited evidence on the impact of childlessness on care and support across the life course. A related, unresolved, question is how the future care needs of older people without children can be met within communities and society. This question is also important for those people whose children have care needs themselves, or whose children are unable to offer unpaid care due to health, wealth, family relationships or distance. Evidence from the Netherlands suggests that while childless older people have smaller care networks, they have more disposable income with which to purchase paid care[135]. Furthermore it may be argued that childless individuals adapt across the life course and develop social alternatives to children[136].

Finally, it is unclear over the following decades the extent to which mainstream changes in British society will also impact upon minority families, and how this will differ between ethnicities. A key question is whether minority ethnic families will follow the path of "individualisation" (rising patterns of cohabitation, divorce, fewer children, lone parenting) that is increasingly characterising white majority families, with unknown implications for provision of care and wellbeing in specific ethnic groups.

Policy Implication

In parallel to ageing, the UK population is experiencing a growth in the plurality of family structures. There is limited evidence on the impact heterogeneous family types may have on important issues relating to ageing, especially later life caring responsibilities. Understanding this is a priority for understanding the resilience of UK care policies.

5.3 The changing role of women and an ageing population

Female employment rose from 53% in 1971 to 67% in 2013, and is projected to continue rising[137], driven by increasing female tertiary education, employment-oriented family policies and rising housing costs[35]. The proportion of British women aged 30-34 years who completed tertiary education increased from 33% in 2004 to 48% in 2013[138]. The changing role of women is taking place in parallel to the ageing of the population. It is potentially a driver of ageing – increasing female employment is occurring alongside a decline in fertility rates[35] – but some of the most profound effects can be understood alongside population ageing. For example, women's mass entry into the labour market has meant that the standard division of labour within families has changed. The domestic, child and elder care work that used to be performed on an unpaid basis by women, including care for frail older or disabled people, now needs to be externalised. It can be either obtained from the state or bought on the market.

Where there is no adequate formal care provision, women are generally still expected to provide supplementary care. Although men are playing an increasing role, there are continuing assumptions about women's role as the primary carers in a family[139] and daughters tend to be more heavily involved than sons in providing care, domestic assistance and emotional support to ageing parents. For such individuals, caring for ageing relatives may result in a reduction in earnings and thus pension provision for their own later life, increased stress and ill-health and inability to carry out their employment tasks successfully[35,140]. Similarly, women who leave full-time employment to care for young children are likely to have less financial resources in their own old age. In addition lack of support from formal services may also impact upon the quality of elder care provided. These problems are particularly pronounced for lone mother families.

Policy Implication

Informal caring responsibilities currently predominantly fall on women. This can have important negative consequences for women's health, wealth and wellbeing, with the full implications realised throughout the life course. The ageing of the population is likely to increase the demands for informal care, and other things being equal this will disproportionately impact women.

5.4 The impact of ageing and 'verticalisation' on families, care and support

Population dynamics relating to ageing – falling fertility, falling mortality and increased longevity – are also having direct impacts on families. The shift to a low mortality society leads to an increase in the number of living generations, a process known as the 'verticalisation' of family structures. The result is that most individuals will spend some time as part of a three or four-generation family.

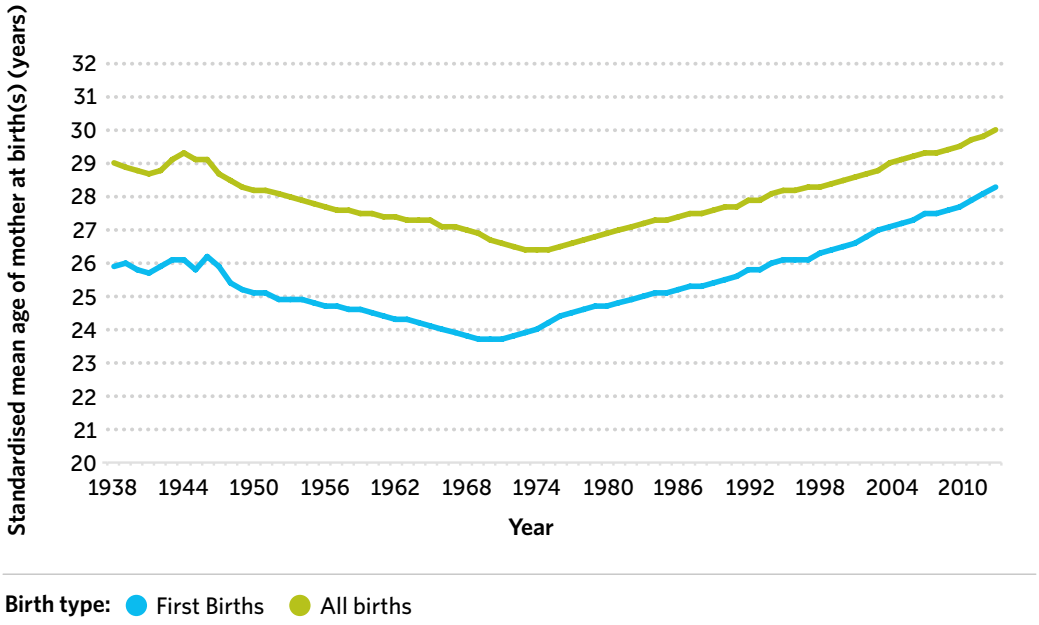


Figure 5.3: Standardised mean age of mother for England and Wales, for all births (including first, second, third births etc.) and for first births only, 1938-2013[141].

The rising mean age of first birth means there will also be longer gaps between the generations[M] (see Figure 5.3). This trend is related to increasingly delayed life course transitions, such as full economic independence from parents, formal adult union through marriage or committed long-term cohabitation and purchasing of an independent home. Falling fertility means that 'verticalisation' and the delay in life course transitions take place in parallel to a decrease in the number of living relatives within each generation - a reduction in horizontal

M Increasing longevity and postponed childbearing have opposing effects on the generational structure of families. Longer lives mean that several generations of family members are more likely be alive at the same time; delayed childbearing results in a growing age gap between generations, which reduces the likelihood that multiple generations are alive at the same time. In the UK increases in longevity are outpacing delays in childbearing, meaning on average more generations will be alive at the same time, but with longer gaps between the generations.

familial relationships. In summary, we will see an increase in the number of living generations, but a decrease in the absolute number of living relatives. There are ramifications of these changes for individuals, society and policy-makers.

The first is that there may be increased demand for housing appropriate for multiple generations co-habiting. Currently the UK has lower levels of intergenerational living than many other European countries (see Figure 4.4) but demographic changes may put pressure on this.

Second, there appears to be an opportunity to maximise the positive impacts of grandparenting. Longer life has heightened the likelihood of people having four living grandparents at birth, as well as at the transition to adulthood. Grandparents already play a significant role in the provision of childcare. One study showed that the value of grandparental childcare to the UK economy was £7.3 billion in 2013, almost twice the estimate for 2004[142]. The millennium cohort study found that grandparents provided at least some care for 42% of families with a 9 month old infant, rising to 71% of families where the mother was in employment or studying[143]. Availability of grandparent care helps younger generations remain in employment, fosters a child's sense of wellbeing and is likely to present opportunities for greater sharing of skills and support. Grandparents who are enabled to provide child care for their grandchildren allow women in particular to maintain full-time employment and full pension contributions. Providing unpaid care and grandparenting may also promote resilience in later life[21].

Considering the evidence relating to the increasing plurality of family types, grandparents may become more important to grandchildren when parents separate[144]. Within the context of step-families, grandparents can have a stabilising role during the separation process[145]. Research has also suggested that the rising proportion of single parent families leads to grandparents having more responsibility for financial support and care provision[146]. Higher levels of divorce in later life may give rise to new concerns over rights to maintain relationships with grandchildren after the divorce of parents, an issue which may become more prominent for policy-makers in the coming years.

Age (years)	Care receipt	2007	2032	Percentage growth (%)
65+	No informal care	740	1265	71
	Informal care from spouse	500	960	92
	Informal care from child	530	810	52
	Informal care from child & spouse	145	275	90
	Informal care from others	200	340	68
	All with informal care	**1380**	**2385**	**73**
75+	No informal care	480	860	80
	Informal care from spouse	250	580	133
	Informal care from child	425	680	60
	Informal care from child & spouse	70	155	133
	Informal care from others	155	260	68
	All with informal care	**890**	**1670**	**87**

Table 5.2 Past and projected numbers (thousands) and percentage change of people with disabilities aged 65+ and 75+ by receipt of informal care in private households in England, 2007 and 2032[132].

Third, there are tensions between increasing expectations of families to care for dependent members and the capacity to care[147]. This is partly because increased longevity may increase the duration spent by individuals in certain roles like spouse, parent, child or sibling, including the financial and personal obligations expected in those roles. Partly this is also because dependency and obligations will be focused on a smaller group of individuals, as horizontal family support structures – including the numbers or existence of siblings, cousins and extended family – shrink across the population. Table 5.2 shows that children and spouses are already most likely to provide informal care to people with disabilities aged over 65 and over 75, with the numbers projected to increase over the forthcoming decades (this trend is strongest for spouses).

Policy Implication

The 'verticalisation' of family structures associated with an ageing population brings a number of opportunities and challenges relating to housing provision, grandparent care and the capacity of smaller family units to care and provide support across generations.

5.5 The impact of an ageing population on inter-generational caring responsibilities in families

The increasing value of grandparent care and the growing demand for unpaid care both point towards the growing importance of the relationships between generations[148]. It is important to fully understand these inter-generational dependencies. For example, evidence from the European Social Survey suggests that the need to provide grandchild care might encourage older workers to leave the labour force before the official retirement age. It found that just over 50% of grandmothers had retired before reaching the age of 60, compared to 37% of women without grandchildren (the difference among men was smaller at 27% compared to 23%)[149]. However, evidence throughout this report shows that older people are also more likely to be working, reskilling, paying mortgages/rents and even caring for older parents who are still alive.

These effects are likely to be transmitted from one generation to the next. Caring for an elderly family member in mid-life can impact upon an individual's earning capacity. Career interruptions or part-time work due to child or elder care currently reduce pension entitlements with consequences for income in later life. The provision of care is a significant factor in withdrawing from the labour market, and family carers can experience detrimental effects on their health, particularly when little support is available, and particularly in later life[150]. Some grandparents who raise their own grandchildren also report experiences of isolation, discrimination (seen as too old to care) and a lack of support (financial and practical)[151].

While these inter-generational impacts can affect all individuals of all ages, there are certain 'at risk' groups. The current generation of 50-70 year olds are sometimes referred to as the 'sandwich' generation, squeezed between competing demands, caring for their own parents[152] and their children or grandchildren. As noted above, daughters across all age groups tend to be more heavily involved than sons in providing support to ageing parents, with implications for stress, ill-health, employment, earnings and pension provision in their own later life. Generally the impacts of caregiving fall predominantly to women, although men are playing an increasing role[35]. There are differences in the strength and structure of family support networks across different ethnic groups. Compared to the White ethnic groupings, women are more likely to provide family care in Bangladeshi, Indian and Pakistani minorities, even when controlling for age, sex or socio-economic background[153].

In summary, it is likely to be important to examine the ways in which caring responsibilities for the young and the old have been allocated in existing policies. It may be ultimately ineffective to separate care and financial policies into those pertaining to children and those to older dependent adults, as that

approach overlooks interdependencies between generations. Policy initiatives which facilitate both working and caring responsibilities are of growing importance to the 'sandwich' generation who may have caring and support responsibilities for both older and younger generations. However, they will be important across the generations, in particular where they affect individuals who would otherwise be taken out of the labour market.

Policy Implication

Successful policy responses in an ageing population are likely to be those which take a whole life course approach and identify the dependencies between generations. It will be particularly important to recognise that policy which impacts on younger adult life - for example when adults are caring for young children - will impact on later life experiences and support requirements.

Chapter 6

Health and Care Systems

Summary:

6.1

An increasing number of people with long-term disability, chronic conditions and multiple health conditions will increase the need for care, and change the nature of the demand. This will put pressure on health and care systems to adapt to meet these changing demands.

6.2

Without improvements in healthy life expectancy or in the productivity of the health service, the UK's health and care costs will increase as the population ages. Interventions throughout a person's lifetime, such as those promoting healthy living and decreasing social isolation, have significant potential to affect their health in old age.

6.3

Demand for people to provide care for family and friends will increase. Supporting these carers, and addressing the health and employment outcomes associated with providing unpaid care, will be critical to ensuring this demand is met sustainably.

6.4

New and emerging technologies have the potential to change care in the home and community. Capitalising on the opportunity this offers will mean addressing barriers and being sensitive to public concerns around privacy.

6.1 Changing health and care needs

As discussed in Section 1.3, improvements in Healthy Life Expectancy at ages 65 and 85 are not keeping pace with increasing Life Expectancy. Unless this trend is reversed, an ageing population will mean increased overall demand for health and care services. The Personal Social Services Research Unit (PSSRU) projects that users of publicly funded home care services will grow by 86% to 393,300 in 2035 (see Table 6.1).

	Number of people (thousands)		
	2015	2035	Percentage Growth (%)
Direct payment users (funded by local council)	45.5	74.4	**63**
Home care users (publicly funded)	211.3	393.7	**86**
Home care users (privately funded)	93.9	139.5	**49**
Care home residents (publicly funded)	172.1	257.1	**49**
Care home residents (privately funded)	157.1	330.4	**110**

Table 6.1: Past and projected numbers (and percentage change) of people aged 65+ using social care, by type of care and funding source in England, 2015 and 2035[154].

As well as an increase in the amount of ill health, population ageing will mean a greater prevalence of age-related conditions. The 'oldest old', who have a substantial risk of requiring long-term care, are the fastest growing age group in the UK[155]. As a result, there has been an increasing prevalence of age-related conditions, including mental health conditions such as dementia. Between a quarter and a half of people over 85 are estimated to be frail, which is associated with disability and crisis admissions to hospitals[156]. Between 2002-03 and 2011-12, the number of disabled older people increased by 400,000, a growth of 8.5%[157]. Although age-specific dementia incidence rates have decreased since 1991[158], projections are for a substantial increase in the overall number of cases from 822,000 to 940,000 by 2021 and more than 1.7million by 2051[159]. Chronic conditions affecting the heart, musculoskeletal and circulatory systems are also more prevalent in older age.

Within the national trends, there are significant variations in health and wellbeing in later life by socio-economic position, ethnicity, gender and region[160]. Those living in the most deprived areas of England have nearly two more years of 'not good health' after 65 than those in the least deprived areas (see Figure 6.1). Geographical variations in perceptions of good health are more pronounced in older populations (see Figure 6.2). This suggests that older people in some parts of the UK are at risk of spending more time in ill-health than others.

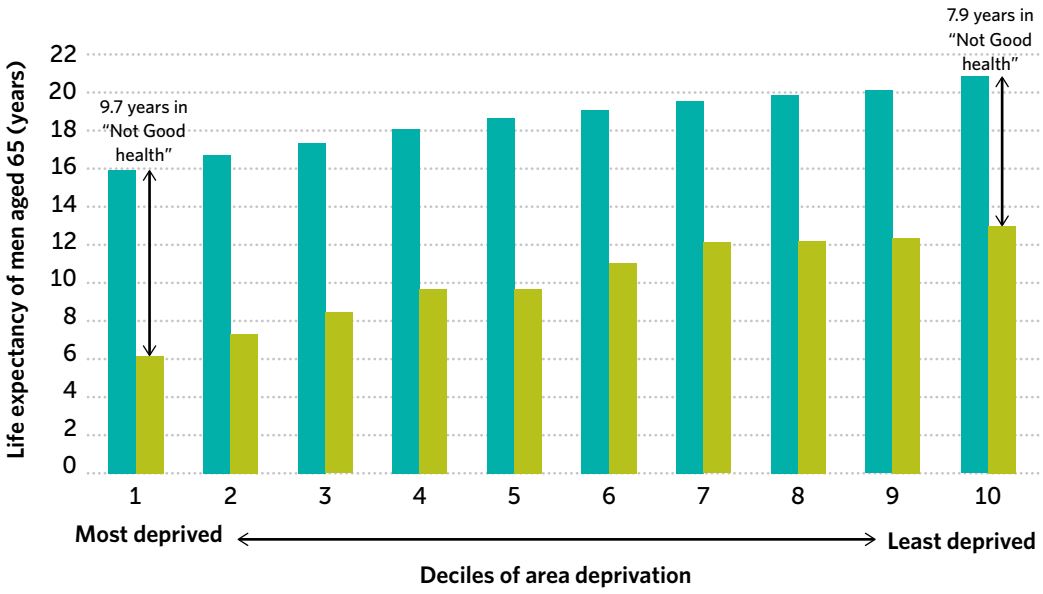


Figure 6.1 Healthy life expectancy (HLE) and life expectancy (LE) for men at age 65 by national deciles of area deprivation in England, 2012-2014[161].

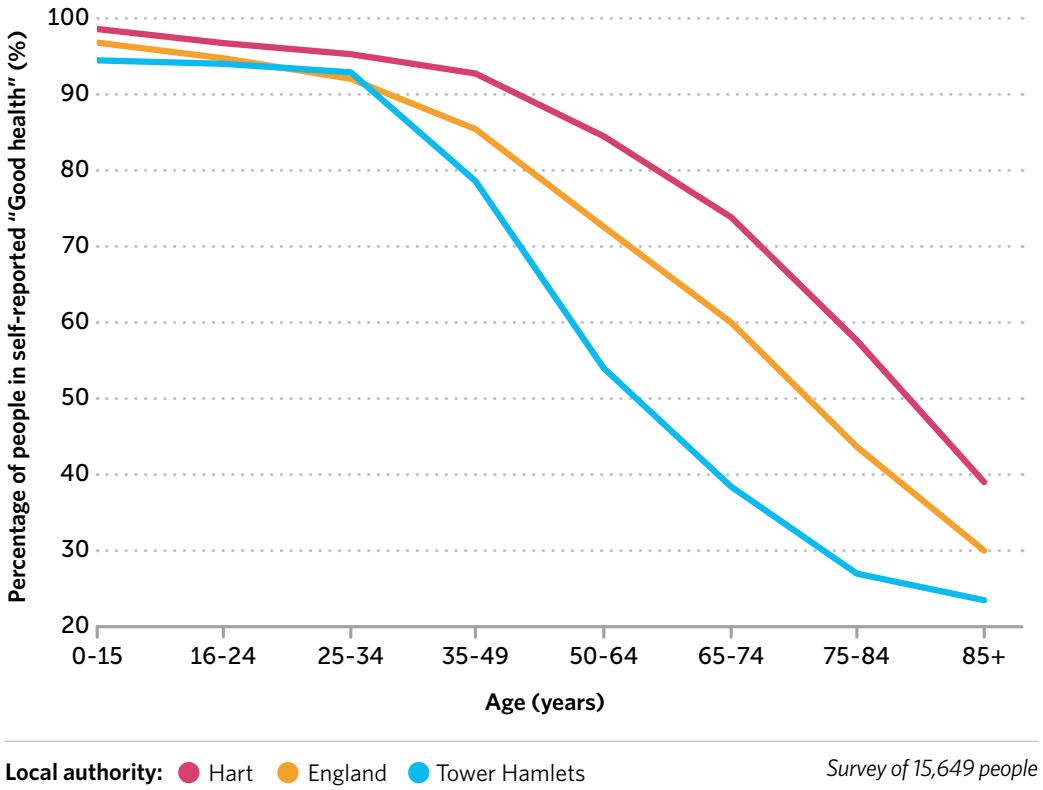


Figure 6.2 Variation in self-assessed "Good health" by age group by local authority in England, 2011[162].

Social isolation affects 7-17% of older adults, and is becoming more prevalent[163]. Social isolation is associated with an elevated risk of mortality[164] – there is a 50% reduction in likelihood of mortality for individuals with strong social relationships[165]. Although loneliness and isolation can cause depression and poor cardiovascular health, there is relatively little known about the mechanisms causing this[66]. Social isolation is also associated with higher rates of emergency admissions, rehospitalisation and earlier entry into care homes[163].

Loneliness is not necessarily the result of living alone; those who live with others can still experience loneliness. Interventions that increase the opportunity for social interaction with the right people at the right time, and provide support for older people to feel more confident interacting with communities, are more likely to impact social isolation[166]. Chapter 7 considers how to reduce social isolation by improving people's ability to interact with the world around them. Other possible interventions include community learning initiatives (see Chapter 3) and opportunities in care housing and retirement communities which could also have a role in providing support (see Chapter 4).

The changing health demands of the UK population will affect the provision of health and care over the next decade. Over the last 20 years, the management of chronic disease has moved from secondary care to primary and community care, with older people receiving the majority of their personal care from family and other unpaid carers[167]. This trend is set to continue. Chronic illness management is currently based on a single disease paradigm[163] which may lead to fragmented and ineffective primary care. Individuals with multi-morbidity (having several chronic health conditions at the same time) require a more complex care environment, with increased physician and specialist visits, and are likely to have higher prescription costs and use multiple medications. Identifying more integrated and person-centred ways of managing people with multi-morbidity could help services to adapt[168]. There is however a lack of evidence on the effectiveness of many therapies in patients with multi-morbidity. Training practitioners to provide support to people with complex conditions could play a role[168].

Policy Implication

An increasing number of people with long-term disability, chronic conditions and multiple health conditions will increase the need for care, and change the nature of the demand. This will put pressure on health and care systems to adapt to meet these changing demands.

6.2 Future healthcare costs

The increase in demand for health and care services has significant implications for future public expenditure. The Office for Budget Responsibility (OBR) identifies health and long-term care as two of the "main drivers of the increase in non-interest spending... due mainly to the ageing population". They project expenditure on health to grow from 7.3 to 8.3% of GDP and on long-term care from 1.1 to 2.2% of GDP (see Figure 6.3).

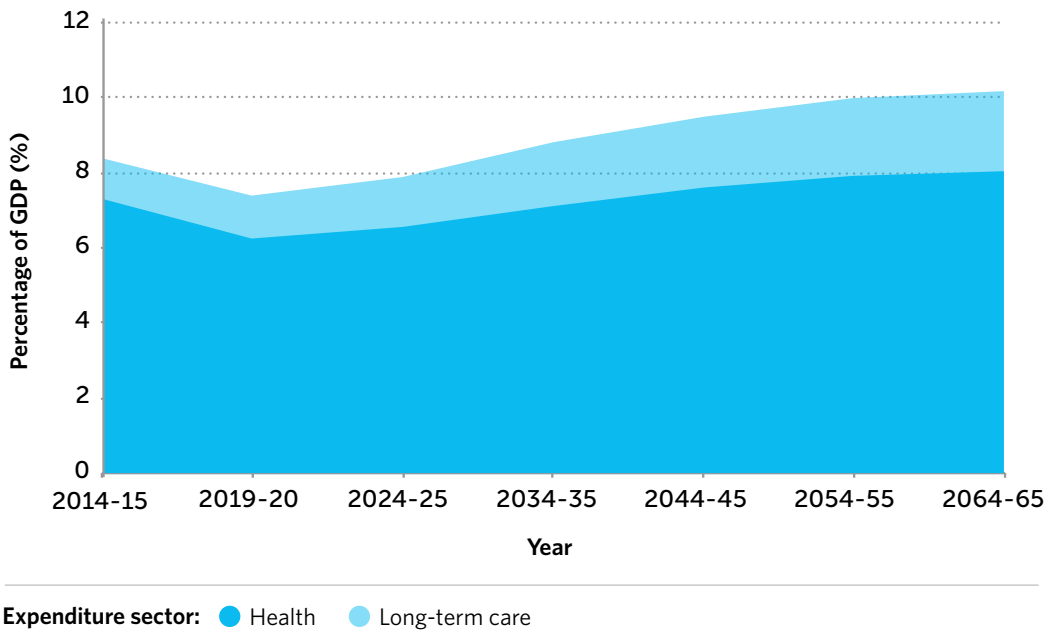
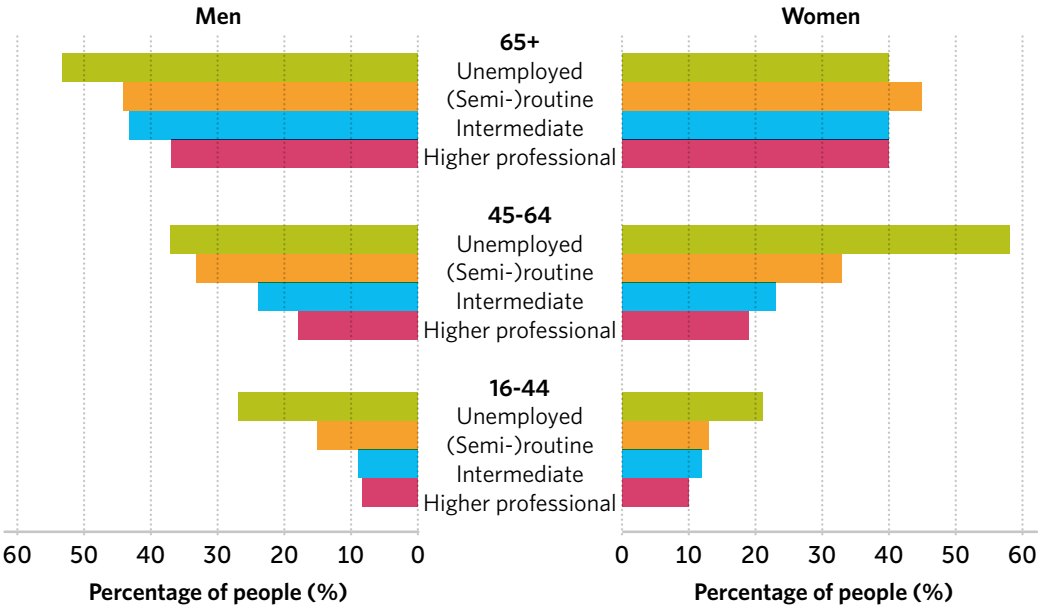


Figure 6.3: Projected public expenditure on health and long-term care from 2014/15 to 2064/65 as a percentage of UK GDP[18].

Average life time expenses for social care faced by people aged 65 and over exceed £30,000[169]. The cost of dementia in the UK was estimated at £26.3 billion in 2013, with 39% due to social care and 44% to unpaid care[159], and is projected to rise from 0.6% of GDP in 2002, to 0.82-0.96 % of GDP by 2031[170]. Dementia patients often have longer hospital stays than other inpatients, and are less likely to return to their home after a hospital stay[171]. The inevitability of multi-morbidity with advancing age will compound this, further increasing health care costs because health care spending increases with each additional chronic condition a patient has[172]. One recent project aimed at improving collaboration between primary, community, mental health, and social care concluded that multi-morbidity was a key driver for social care costs[173].

Reducing the predicted increases in public and private expenditure on health and care will require the productivity of the health and care systems to increase or for demand to be reduced. Both new technologies and the increasing

transfer of care into the community may reduce people's reliance on hospitals, nursing homes and other high-cost services. This does, however, shift more responsibility to families and communities. In other countries, advanced care planning has provided cost savings for long-term care service providers, care of dementia sufferers living in the communities, and in other areas that have high end of life care spending[174].



Survey of 13,100 people aged 16+

Figure 6.4: Percentage of the UK population with limiting long-term illness by age and socio-economic classification of household reference person, 2011[175].

Interventions throughout the life course reduce the time spent in ill-health. Behaviours including not smoking, moderate alcohol consumption, good nutrition, and physical activity have a positive effect on health in later life, but while reductions have been observed in smoking and alcohol consumption, there is an increase in physical inactivity in the UK. There is a strong association between these behaviours, socio-economic status and health in later life. In those aged 65 and over lower socio-economic status is associated with more physical, psychological, cognitive and overall frailty[176] (see Figure 6.4). Some evidence suggests that reducing smoking and obesity have a more significant impact on HLE than LE, affecting the proportion of life spent in ill-health[11], although there is an overall lack of evidence of how lifestyle impacts on HLE[11].

Although the health of younger people tends to be less strongly affected by their behaviour, occupation or wealth, unhealthy behaviours in youth and early adulthood significantly determine a person's health in later life[163]. The health of older people can be affected by policies that promote health throughout their lifetime. Interventions in many areas can improve the health of future

older people. Interventions to promote learning through the life course, better housing conditions and environments that promote active lives are examples. Physical activity clearly plays a role in disease prevention and positive health outcomes, but less is known about how to encourage people to be more active. Current evidence suggests that successful interventions should focus on small improvements, include several components (e.g. physical activity and diet), and offer a wide variety of activities to choose from with regular follow ups over a long period of time to ensure activity levels are maintained[177]. Self-management interventions, such as wearable technologies, have a small but varying effect across a wide range of outcomes, but little is known about the mechanisms behind this[177] and if interventions in later life are effective across large population groups.

Policy Implication

Without improvements in healthy life expectancy or in the productivity of the health service, the UK's health and care costs will increase as the population ages. Interventions throughout a person's lifetime, such as those promoting healthy living and decreasing social isolation, have significant potential to affect their health in old age.

6.3 Care in the home and community

The health and care sectors are set to experience a significant growth in demand resulting from increasing prevalence of ill health in the population. Projections suggest an increase of over 600,000 jobs in caring and personal services by 2022[178]. However GP recruitment, and that of other healthcare professionals, is declining at a time when people increasingly receive treatment and support at home and in the community[163]. The increasing ratio of older people to those in work may limit the number of people available to work in the care sector and the number of people who can fund state care provision, and the rest of the health care system. The future health service will also require a much wider range of staff capacities than at present, including people who

combine health and social care skills.

Demand for family and other unpaid care is similarly expected to increase. PSSRU projections from 2015 suggest that between 2015 and 2035, the number of people aged 65 and over who require unpaid care will grow by more than one million[154]. This is based on ONS demographic projections and an assumption that the proportion of care demand met by friends and family remains constant within each age group. If this trend continues, there will be an estimated shortfall of 160,000 unpaid carers in England by 2032[179]. Projections by PSSRU suggest that demand will increase more rapidly from 2017 onwards[180], in line with ONS data which show only a small increase in adults receiving care between 2005 and 2014. The ONS data also show that between 2005 and 2014, the total number of hours of unpaid care given increased by 25% from 6.5 to 8.1 billion hours a year. This means that, while the number of people receiving care has not yet increased significantly, the amount of care being provided has[181].

It is important to understand the impact of care on the carer. The evidence is mixed. For example, unpaid care responsibilities are associated with poor health (see Figure 6.5). One study found unpaid carers are 2.5 times more likely to experience psychological stress than non-carers[182]. On the other hand, a recent study suggested carers experience reduced mortality[183] compared to non-caregiving reference groups. Many carers also report positive experiences of caring and have a greater longevity than non-carers[184]. Whilst evidence gives an inconsistent picture on the effects of caring responsibilities on carers, it is clear that a growing number of carers will need support to minimise the negative impacts of providing care. Support is particularly important for those trying to manage competing responsibilities such as work. Evidence shows that working carers can experience a range of difficulties including lack of time, excessive stress and resulting health problems, and financial pressures[185]. The impact of this on the labour market is discussed more fully in Chapter 2.

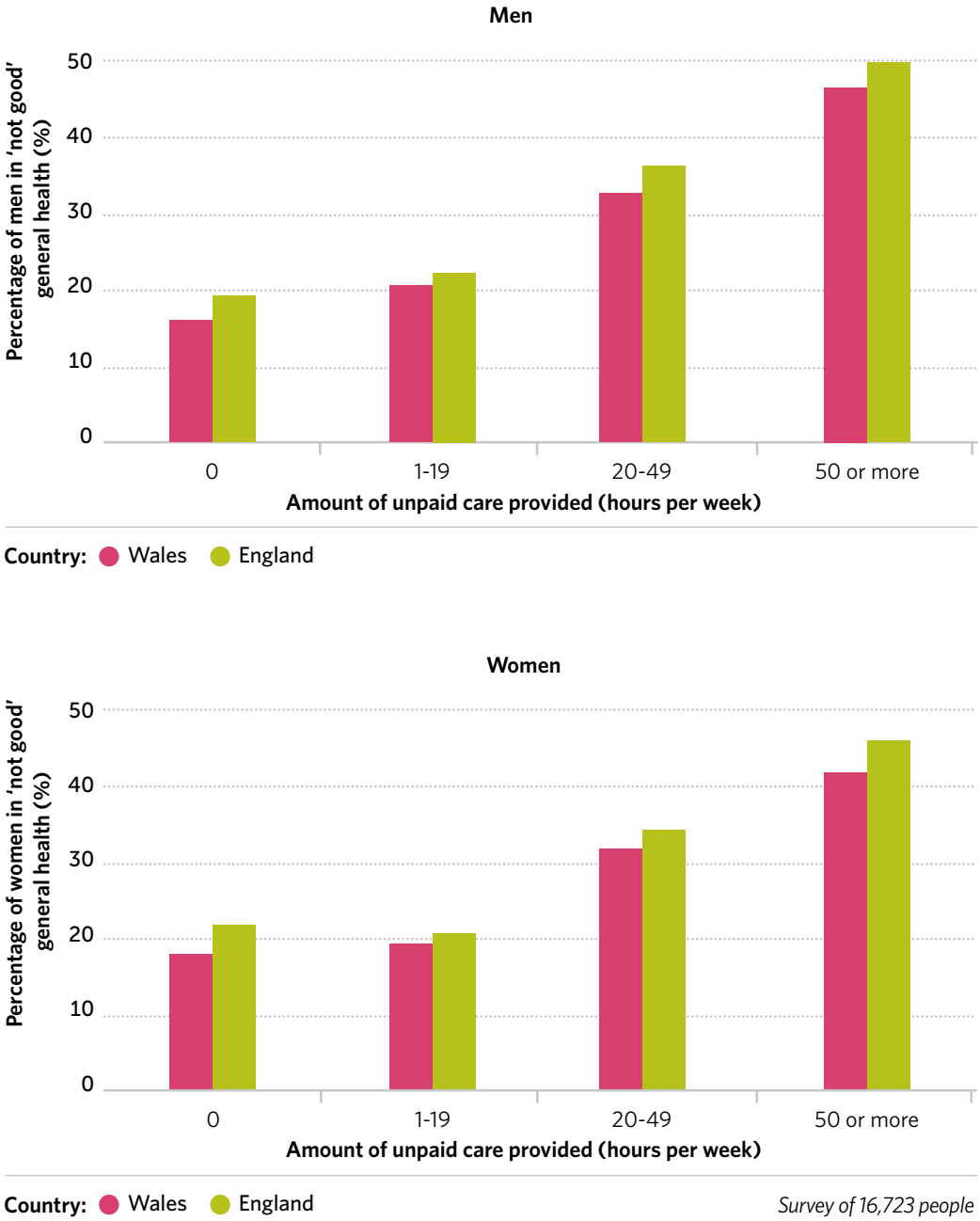


Figure 6.5: Percentage of males and females with 'Not Good' general health by extent of unpaid care provision they provide per week in England and in Wales, 2011[140].

Policy Implication

Demand for people to provide care for family and friends will increase. Supporting these carers, and addressing the health and employment outcomes associated with providing unpaid care, will be critical to ensuring this demand is met sustainably.

6.4 Medical and assistive technologies

Technology is likely to play an increasingly important role in providing health and care support, and in connecting people. This may include the mainstreaming of technology-enabled care services, for example home health monitoring tools, the use of social media to create and sustain online communities with shared interests and the increasing and more sophisticated use of health data to improve clinical treatments[177].

The rapid evolution of medical and assistive technologies makes predicting the scale of their impact difficult[186]. The speed of development also creates a need for new methods of evaluation of these technologies[177]. While technologies that assist in health and care could be significant contributors to the growth in expenditures in these sectors in the short term, they could potentially reduce costs significantly in the medium and long-terms. These savings will depend on the type of technology, for example whether they treat symptoms, prevent disease, change behaviour, radically innovate or incrementally improve, and how they are implemented[187,188].

Developments such as 3D-printed joints and organs, therapeutic robotics and genomics have great potential to improve health outcomes across the population[189], while improvements in personalised ('precision') and stratified medicine may allow better targeting of medicines, making treatments more cost-effective[190]. Increases in real-time data collection, driven by developments in wearable technology and other forms of telemonitoring, will enable healthcare professionals to provide more appropriate treatment and support for patients and carers[191] while the resulting large datasets could drive forward research in many areas and potentially help improve prevention and early intervention[177]. Technology such as alarms, home monitoring systems and GPS locators can help carers locate people with dementia, although ethical issues can arise. There is evidence that carers are already using off the shelf technologies such as baby monitors and smartphone-based GPS tracking apps in supporting people living with dementia[192], but specialised technology could be more widely and effectively used.

To capitalise on the advances in assistive technology, a number of barriers will need to be overcome, those being common to all technologies (see Chapter 7) and some specific to assistive technologies. As with many new technologies, cost can be a barrier to their implementation. The use of telecare to improve social and health care for vulnerable older people was judged not yet cost-effective when assessed[193,194], and the commissioning of technology could be inhibited because the public service provider might not benefit directly from the potential savings[195]. Local authorities could fund care-assisting technologies but the NHS would gain benefits through, for example, reductions in hospital admissions.

A joined-up approach between health and social care provision is required to make progress in this area.

Professionals, (including those in healthcare), patients, service users, and carers will also need to be able to operate technologies. Healthcare professionals have had mixed reactions to technological advances such as e-prescribing and computerised physician order entry, expressing worries that these new systems may disrupt professional routines and increase workload[196]. A technology which has been successfully demonstrated with one patient group will not necessarily work for other groups or in different regulatory environments. People with higher incomes are likely to be healthier and to own and use new technologies. Given this, there is a risk that the potential of technologies to support health will not translate to those with highest need, exacerbating existing health inequalities.

Policy Implication

New and emerging technologies have the potential to change care in the home and community. Capitalising on the opportunity this offers will mean addressing barriers and being sensitive to public concerns around privacy.

International case study: Long-term care insurance in Germany and Japan

Compulsory long-term care insurance was implemented in Germany in 1995, initially to protect against the financial hardships associated with disability and chronic illness. Later reforms included the introduction of long-term care for dementia patients, earnings replacement for up to 10 days of acute family care, and rehabilitation benefits to avoid or delay the need for long-term care[197].

Long-term care insurance is a compulsory 'pay-as-you-go' system with contributions, based on salary, split equally between employer and employee. To compensate employers for the additional cost, one public holiday was declared as a working day. Contribution rate was initially 1% of salary in 1995 but has increased over the years to 2.35% in 2015. Childless employees over 23 pay an extra 0.25%[198].

Anyone with a physical or mental illness or disability, who has made contributions for at least two years (reduced from five years in 2008),

can apply for benefits. Applications are assessed across six categories: mobility; cognitive skills; mental health; self-care; ability to deal with illness; and managing everyday life. On average 30% of applications are rejected each year[199].

The insurance is not intended to cover all costs but just basic needs. The amount of care provided depends on the needs of the individual but is limited in value according to level of dependency. Benefits received can be in kind, such as in the form of care services, but also as cash payments to the individual[199].

Japanese Long-Term Care Insurance (LTCI) was introduced in 2000 with the intention to "maintain dignity and an independent daily life routine according to each person's own level of abilities". The programme aims to transfer some of the responsibility for social care from the family to the state, and to give frail older people autonomy at home without family support.

LTCI is a form of 'social insurance'. Premiums are compulsory for anyone in employment aged 40 and above. The premium is split 50-50 between employer and employee. It is typically paid as a supplement of around 1% on health care insurance and is collected by the employee's chosen health care insurer. The long-term care itself is then financed 50% from LTCI premiums and 50% from general taxation. Thirty percent is from premiums paid by 40-64 year olds, 20% by those aged 65 and over, 25% from central government taxation, 12.5% from prefectures and 12.5% from municipalities. In addition service users make a 10% co-payment for the services they use, plus fees for meals and accommodation costs for institutional care. These payments are capped at £75 per month for low earners[200].

LTCI, as initially set up, is a universally available needs-based service and is not means tested. Older eligible Japanese people select the services they need from an array of for-profit and not-for-profit providers. Several measures to contain costs have been introduced, such as charges for accommodation and food in 2005, and home help services have been restricted to those who live alone or with severe disabilities. Total cost of long-term care services in Japan is projected to rise from ¥8.9 trillion (~£55 billion) in 2012, to ¥18-21 trillion (~£111-130 billion) in 2025[201].

Chapter 7

Physical, social and technological connectivity

Summary:

7.1

Connectivity will be increasingly crucial to the health and wellbeing of the ageing population. It should be considered in a holistic way which includes physical mobility, transport, the built environment, the virtual world and the physical-virtual intersection.

7.2

Different age groups have particular challenges remaining well-connected. Transport and other mobility policies should be sensitive to this diversity and to the growing numbers of older people living in rural and semi-rural areas.

7.3

Design of the built environment can enable older people to access their neighbourhood and surrounding areas, leading to increased activity levels, better health, and improved quality of life. The built environment is most likely to facilitate this if it is underpinned by inclusive design, and considers the needs of all users.

7.4

Technology can help to provide the solutions to challenges faced by the ageing population, and help to realise the benefits of longer lives. Barriers that need to be addressed include a lack of skills and access, high cost, and older people's assumptions about technology's usefulness and affordability.

7.5

Virtual connectivity is increasingly likely to enable physical mobility with a range of benefits for social connections, health, wellbeing and safety. However, there are still likely to be barriers to the full realisation of these benefits.

7.1 Benefits of connectivity

Connectivity – the ability to use technology, access services, travel easily and socialise – is a key issue as the population ages, and includes not only physical mobility but also virtual and digital interactions. Connectivity is crucial in allowing people to care for others, interact socially, participate in society (for example, through volunteering and working), and access services such as health prevention and health treatment. In 2011, 630,000 of over 65s found it difficult or very difficult to travel to their GP, while less than half of those aged 80 and over said they found it easy to travel to a hospital. Those in the worst health and with the lowest incomes found it the most difficult to travel to health services[202].

Loneliness and social isolation have impacts for individuals and society, for example people with a high degree of loneliness are twice as likely to develop Alzheimer's as people with a low degree of loneliness[203]. A large proportion of older people 'feel lonely some of the time or often', with those in the oldest age groups being most likely to feel this way (see Figure 7.1). A range of factors cause isolation and loneliness in later life, including children leaving home, death of partners, retirement, and reduced mobility[204].

Figure 7.1: The proportion of people feeling lonely some of the time or often by age group and gender in the UK 2009-2010[204].

Isolation affects all age groups, but is often associated with later life. Social connections are a key dimension of a good later life. Improving the factors that facilitate social connection, such as transport, also bring other benefits to the ageing population, such as access to services. Initiatives to promote social interaction can include: inter-generational projects; good neighbour schemes; improving provision of transport and access; and projects that address fear of crime, and incorporate security-conscious design features[205].

Policy Implication

Connectivity will be increasingly crucial to the health and wellbeing of the ageing population. It should be considered in a holistic way which includes physical mobility, transport, the built environment, the virtual world and the physical-virtual intersection.

7.2 Physical connectivity including transport

Mobility is not just important for practical reasons, but helps to facilitate social networks and promote identity and self-esteem[206]. It can also help fulfil people's more aesthetic needs, such as visiting nature, travelling and leaving the house for its own sake[207]. However, most transport provision for older people centres on improving mobility for practical reasons[207].

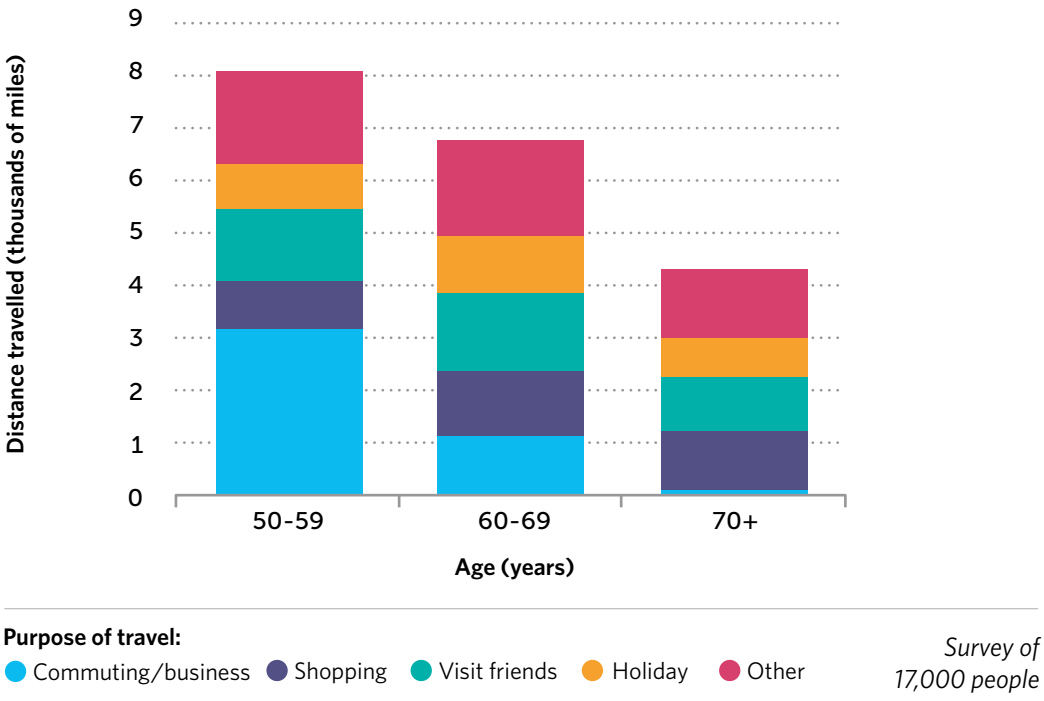


Figure 7.2: Miles travelled per person per year by age and purpose, England, 2014[208].

Travel habits change over the life course (see Figure 7.2). The 50-59 age group travel nearly 30% more than the average across all age groups, while the 60-69 age group travel fewer miles but still more than average. For these age groups, the challenge is not to improve their mobility but to ensure that the transport options are suitable given the physical, cognitive, and financial challenges that individuals in these age groups can experience. Those aged 70 and over travel significantly less, covering only 64% of the miles of the average across all ages, with much of this travel being for shopping or visiting friends.

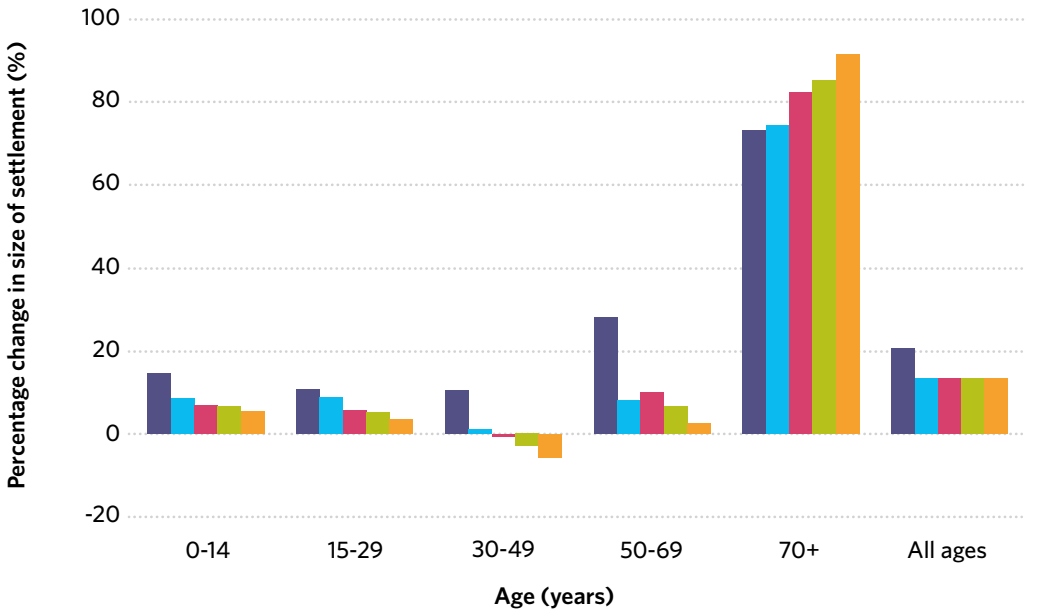


Figure 7.3: Projected percentage change in size of age groups, 2012-2037 for five settlement size groups[209].

The 50-59 and 60-69 age groups may travel more partly for commuting and business reasons, but also because they are more likely to live in rural areas and towns than large or major cities[210]. People aged 50 and over comprise approximately 50% of the population of small towns and rural areas with the number and proportion projected to increase by 2037 (see Figure 7.3).

In 2014, 62% of those over the age of 70 had a driving license[211]. Owned cars are the most common mode of transport for older people (see Figure 7.4). This reliance on car use means that loss of car access can have severe consequences, and losing access to a car (whether as driver or passenger) has similar long-term effects as losing a spouse or job in terms of contraction of social networks and reduction in wellbeing[212]. A 2012 survey found that 67% of those living in rural areas without access to a car said that they were restricted in their participation in community activities, and over 25% reported that they

were not involved at all[213]. In rural areas in particular, reliance on cars may be due to a lack of public transport, difficulties in accessing available services and perceptions of the unsuitability of public transport[214].

Transport habits vary by age group. Reliance on cars remains consistent throughout later life. While use of trains declines for older age groups, use of buses increases. Free bus travel is a good example of a successful scheme to improve the mobility of older people and reduce the need for car travel while maintaining their independence – evidence suggests this has led to an increased number of trips, improved wellbeing and produced economic benefits of £2.87 for every £1 spent on bus passes[215].

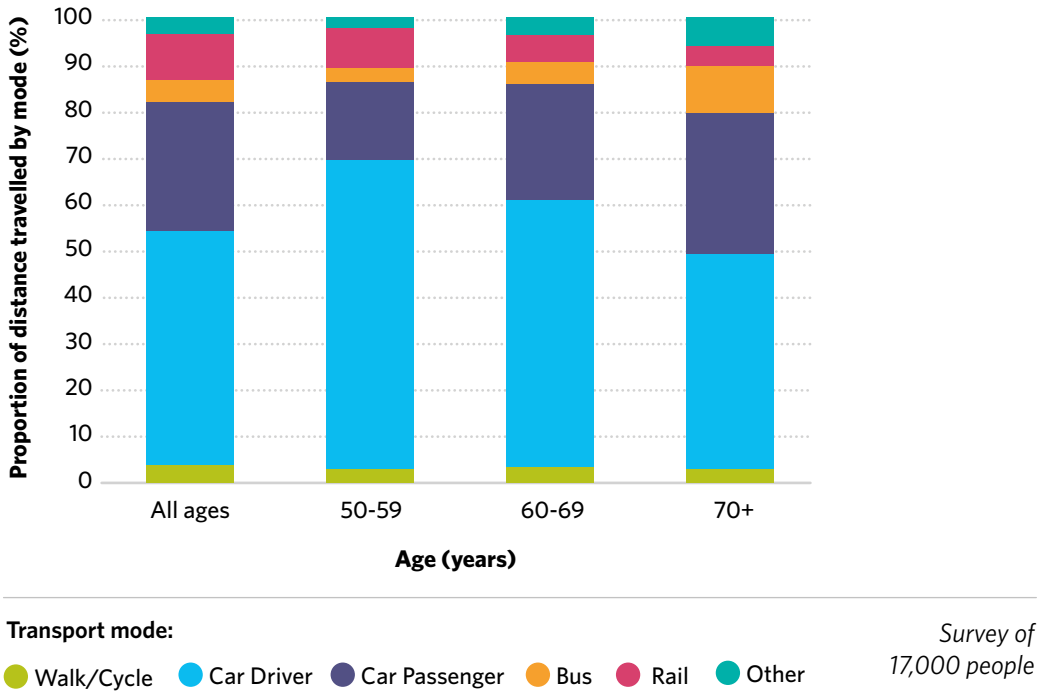


Figure 7.4: Proportion of distance travelled per person per mode of transport by age group, England, 2014[208].

New technology has the potential to address some of the transport challenges that arise from the ageing population. The trend towards people purchasing transport as a service (as opposed to owning modes of transport such as a car) is being facilitated by apps. Technology may also reduce older people's need to travel in the first place. Innovations such as social networks and online shopping can provide social interaction and participation and access to services without the need to leave home. However research does suggest that online tools cannot fully recreate the social experience of actual travel[113].

Policy Implication

Different age groups have particular challenges remaining well-connected. Transport and other mobility policies should be sensitive to this diversity and to the growing numbers of older people living in rural and semi-rural areas.

7.3 The built environment

Factors throughout a journey, from planning to arrival, determine how it is experienced and how likely a person is to repeat it. For example, inclusively designed buses are less likely to be used if the pavement next to the bus stop is poorly maintained and does not allow easy access[205].

The built environment is an important facilitator of active transport which involves physical activity, such as walking and cycling. Active transport can bring social and physical benefits, but a poorly designed built environment can present safety problems for older people walking and cycling. Cycling accounts for only 1% of all journeys amongst people aged 65 and over in the UK compared to 23% in the Netherlands, 15% in Denmark and 9% in Germany[216]. In the UK, older people represent around 23% of the population, cover 19% of all trips and miles walked, yet account for around 44% of all pedestrians killed[217].

Older people report various factors that impact on access to their wider neighbourhood including lack of seating and public toilets, the condition of pavements, lack of provision of local shops, fear of crime, fear of going out after dark, lack of space for community activities, and major roads acting as barriers, (for example between a local park and the housing area)[218]. Adapted environments can address some of the challenges related to vision, hearing and mobility that older people face when travelling, for example ensuring that places are dementia-friendly or that signs are in legible fonts. Toolkits already exist to provide practitioners with advice on factoring the needs of older people into inclusive design of neighbourhoods[219]. A potential challenge is that adaptations to help some people may hinder other groups. For example, meandering routes and curved walls that are helpful for people with dementia could be hazardous to people with sight loss[220]. Similarly, tactile paving can help those with sight loss, but hinder wheelchair users and older people with balance problems[221].

Policy Implication

Design of the built environment can enable older people to access their neighbourhood and surrounding areas, leading to increased activity levels, better health, and improved quality of life. The built environment is most likely to facilitate this if it is underpinned by inclusive design, and considers the needs of all users.

7.4 Technological connectivity

New and existing technologies have great potential to improve connectivity. There are, however, major barriers that currently prevent some groups, including older people, from accessing technologies and gaining the full benefits of them.

Other chapters in this report describe how technology could help to address many of the challenges of the ageing population. Technology also has the potential to facilitate social connectivity and alleviate some of the loneliness that many older people report. Older adults often benefit from using information and communications technology (ICT) applications such as email and video calling services such as Skype to remain in contact with their family members and friends, and those who use ICT appear to experience positive impacts on their level of participation in voluntary social, religious and political activities, clubs and organisations[70]. Technologies such as augmented reality services can facilitate virtual participation in a wide range of activities such as social events, the pursuit of hobbies or virtual tourism. Older people – especially those who are geographically isolated or have limited mobility – could benefit by feeling more connected, empowered and independent through using ICT to access information and services[70]. However, ICT could also lead to the breakdown of traditional forms of social interaction, and is often used to reinforce existing social contacts, rather than to build new ones[70].

As the current cohort of individuals age they become less likely to embrace and use new technologies[222]. In 2014, of the 6.4 million people in the UK (13% of the population) who had not used the internet, 5.6 million were aged 55 and over[223]. While 'catch up' does occur as cohorts who have experience of using particular technologies, such as the internet, enter older age groups (see Figure 7.5), this is balanced by the increasingly rapid pace of technological change as the growth in patent applications and awards implies (see Figure 7.6). While people currently reaching older age may be comfortable using the internet, they are less likely to be comfortable using emerging technologies, such as virtual reality or robotics, which may become increasingly important.

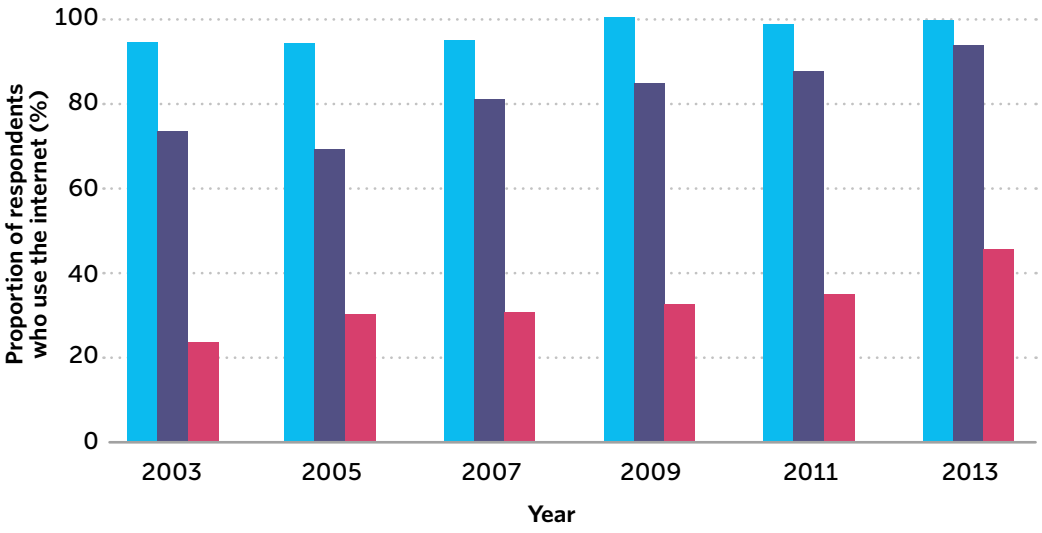


Figure 7.5: Internet use by life stage, 2003-2013[224].

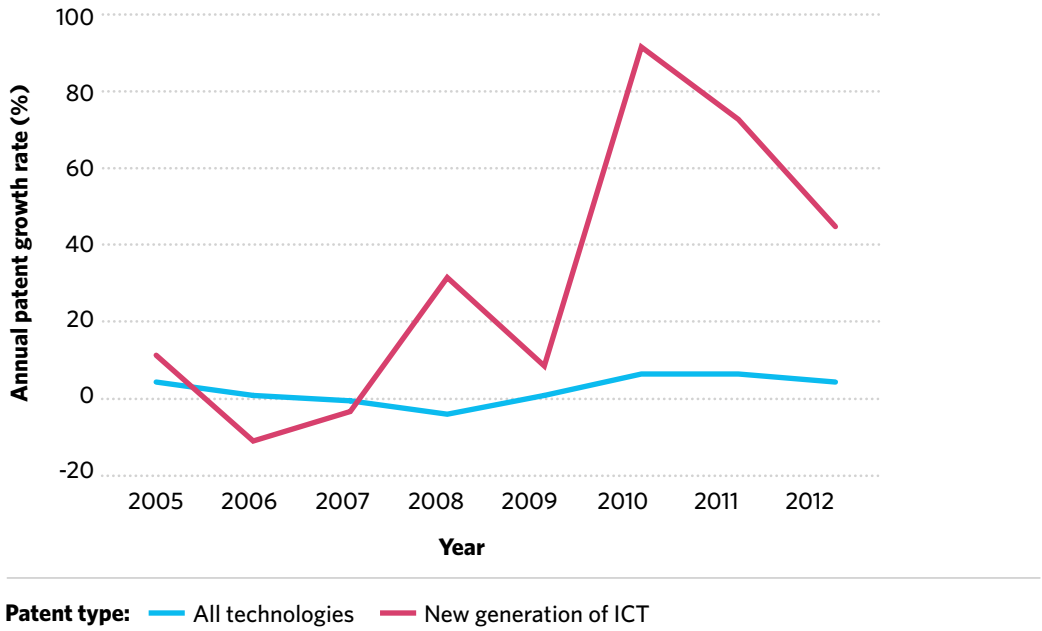
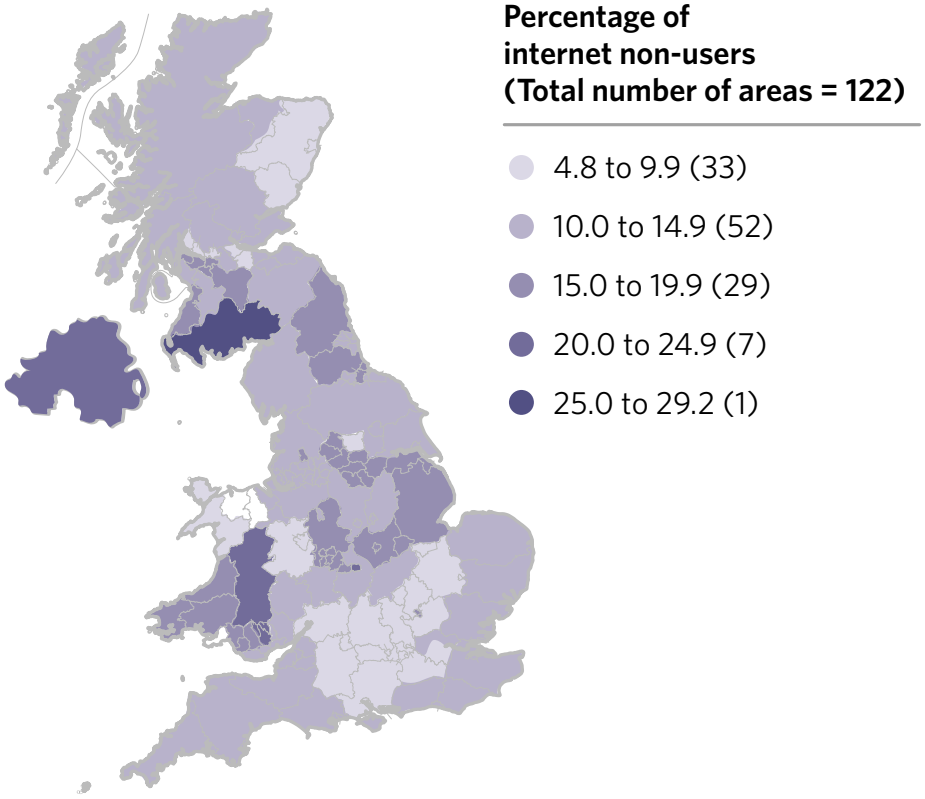


Figure 7.6: Annual growth of patents granted for all technologies and new generation of ICT, 2005-2012[225].

Across all ages, there is a broad 'digital differentiation' in technology uptake within cohorts, usually associated with factors such as material deprivation, ethnicity, gender, and geographical location[226] (see Figure 7.7). While 99% of the population earning £40,000 or over use the internet, under 60% of those earning less than £12,500 do, and while 84-95% of people with qualifications use the internet, only 40% of those without qualifications do[224]. These differences are likely to become more entrenched as cohorts enter old age.

Given the potential benefits that technology can bring, it is important to understand the barriers that can prevent the uptake of new technologies and the role for government in addressing them. These barriers include a lack of digital and technological skills as 79% of 65-74 year olds had 'low' or 'no' internet skills in 2013[70]. Evidence also suggests that many older adults are ambivalent towards ICT, using it for limited purposes and only when it does not interfere in their daily lives[70]. Although many older people who do not use assistive technologies see them as being of tremendous potential benefit to other older people, they are less willing to contemplate them as options for themselves[186]. Many older adults perceive ICT to be a luxury and are reluctant to spend money on items that need continual updates and maintenance[227]. Many older adults fear that using ICT will have a negative effect on their sense of privacy and personal security[70], with choice, control, and fear of reduced social interaction being key concerns for older people considering assisted living technologies[228] and telecare[229]. There are also accessibility issues with some types of technology, and furthermore perceptions of accessibility can prevent uptake[70].



Survey of 6,440 people

Figure 7.7: Internet non-users as percentage of population by UK county, 2014[223].

Although provision is largely market-led, technology is increasingly seen as an essential public service. The government is already doing much to improve technology infrastructure, including planning to provide superfast broadband coverage to 90% of the UK by early 2016 (completed) and 95% by December 2017, along with access to basic broadband (2Mbps) for all from December 2015[M]. Other potential ways to improve the uptake of technologies include supporting community-based ICT schemes which can be effective in engaging hard-to-reach adults[186].

Design can play a critical role in making technologies accessible and appealing, including for groups of the population who are generally slower to adopt technology, such as older people. Age-friendly and inclusive approaches, can maximise accessibility and uptake of technologies for older people[186].

M For information on current government action: http://dcmsblog.uk/2016/01/digital-engagement/

Demonstrators of innovative and disruptive technologies can enable people to experience novel technologies such as pervasive computing or smart homes, and promote awareness of potential developments[186]. Further development of standards may be important for helping with trust and confidence: for example a new International Standard (ISO 13482) has recently been released to address safety standards for personal care robots, which could lead to greater consumer trust and confidence[186,230].

Government has the potential to continue to embed digital inclusion in policy outcomes, and require that ICT products, systems and services paid for by the government include design features that are appropriate for older people. Some potential technological solutions for an ageing population may require innovative business models to make them financially sustainable, for example those requiring significant up-front expenditure, because older people may not want to spend money on or be able to afford these technologies. Government could consider playing a role in supporting these innovative business models, properly quantifying the benefits of successful outcomes (like keeping people mobile) and ultimately helping with costs for those unable to pay.

Whatever initiatives are undertaken, there is always likely to be a group who remain unengaged with technology and who may require a different type of support.

Policy Implication

Technology can help to provide the solutions to challenges faced by the ageing population, and help to realise the benefits of longer lives. Barriers include a lack of skills and access, high cost, and older people's assumptions about technology's usefulness and affordability.

7.5 Increasing links between virtual and physical connectivity

The distinction between physical and virtual connectivity will be less relevant in the future, as tools for digital connectivity will increasingly have the potential to enhance physical mobility. For example, through providing live departure information about buses on the internet or via text message (see Box 7.1 for other examples). However, as with other technologies for digital connectivity, there are barriers to the use of these tools.

'Smart' transport systems use technology within the transport system or linked systems to provide benefits, such as more personalised, efficient or safer transport. However, these systems need to be supported by suitable compatible technology, data and system infrastructure. Government may need to consider who can co-ordinate this infrastructure.

Policy Implication

Virtual connectivity is increasingly likely to enable physical mobility with a range of benefits for social connections, health, wellbeing and safety. However, there are still likely to be barriers to the full realisation of these benefits.

Box 7.1

Technologies to enhance physical mobility range from hi-tech and futuristic developments to the more effective use of current technologies:

- Partially-assisted vehicles with features like rear-view cameras for reversing, blind-spot warning systems and auto-parking technology, could increase the independence of road-users with limited upper-body mobility.
- Better electric bicycles, which provide riders with extra support on longer journeys or when travelling up hills, could enable older people to maintain/take up cycling.
- Expansion of real time audio and visual information for public transport, for example at bus stops or on buses, can help individuals prepare for boarding or alighting from the vehicle.
- Technology can provide a platform for older individuals to book and arrange to share modes of transport, for example 365 Response. Lift sharing is already common in rural communities but online lift sharing platforms and mobile phone apps have the potential to open up such schemes to a greater number of volunteer drivers and to make it easier for people to see available lifts.
- Autonomous or near-autonomous vehicles could allow people to drive for longer into later life, preserving social networks and wellbeing and providing potential road safety benefits both for drivers and other road users.

Conclusion

The response to an ageing population

A report published in March 2013 asked 'Is the Government ready for ageing?'[231] In seeking to answer the question, it should be understood that no single department has overall responsibility to address all of the challenges presented by demographic shift faced by the UK or to capitalise on the opportunities this presents. Rather, the implications are spread across many departments, with policies implemented by one often having a direct or indirect effect on another. The diagram overleaf shows an illustrative snapshot of some of those complex interrelationships.

These relationships mean that one department's policies can potentially achieve others' objectives. In some cases, the department that implements a policy will not be the one that benefits most from it, or the benefits will be shared between many departments. Moreover, some of those benefits may not materialise for many years. To ensure that these policies are properly considered, departments need to act co-operatively. More broadly, co-operation is needed with other sectors. Business and civil society can achieve things that government itself cannot, for instance developing new technologies and providing community services.

Advances in medical and social science have extended UK lifespan at a time when fertility rates have been falling. Much has already been done to help position the UK to manage the ensuing future challenges of an ageing population. Now, we have the opportunity to capitalise on this work, and live happier, healthier and more prosperous longer lives.


Working lives
Lifelong learning
Housing and neighbourhoods
A central role for families
Health and care systems
Physical, social and technological connectivity
COMMUNITY
CULTURE
INFRASTRUCTURE
ECONOMY
Digital inclusion
Higher level of community involvement
More people have information and access to services for active ageing
Reduced avoidable inequality in health outcomes
More access to care health and support affordably
Population confident, resillient and secure
People treated with dignity and respect throughout life
People participating in learning, mentally stimulating activities throughout life
Maximise accessibility of transport especially rural areas
People better connected to services and social networks
Supply of transport meets demand
Minimised cost impact on the health and care system
Reduced welfare bill
Sustainable public finances


INDIVIDUAL HEALTH
Coloured arrow shows positive influence
Thick arrow shows a reinforcing loop
uced impact
ess, including
rm conditions,
quality of life
Reduced incidence and prevalence of cognitive disorders: especially dementia
More people in good health (reduced morbidity)
uced
ental
impact
liness
Fewer deaths (reduced mortality)
People follow active and healthy lifestyles and proactively manage their health
Improved health and wellbeing of carers
BETTER LIVING
Health and wellbeing of all people
People more physically, socially, economically and mentally active
peing
gh the
ourse
Older people live longer in their own homes
People planning earlier for housing and care in later life
Increase planning for old age (both financial and other)
Keeping people independent as possible as long as possible
Individuals financially secure
Increased resident satisfation with housing and services in their local area
people
ised as
rs and
umers
More first time buyers, increased home ownership
HOUSING
uced
oyment
Fuller working lives
Greater flexibility and choice with their pensions
Achieving the maximum number of employees signed up to a work placed pension
l national
ctivity
Child care needs met, with grandparents playing a major role
Informal carers supported and valued
EMPLOYMENT

Glossary

Term	Definition
Accredited training	Training leading to a qualification.
Age structural change	A change in the proportions of the population in each age group.
Ageing population	Rise in the median age of a population.
Assistive technologies	Any object or system that increases or maintains the capabilities of people with disabilities.
Autonomous vehicle	A vehicle that is capable of sensing its environment and navigating without human input.
Care homes	Homes with 24 hour support offering meals and personal care. Usually residents have their own rooms and share communal facilities.
Chronic disease	A long-lasting or recurrent condition that cannot be cured.
Co-design	An approach to design which actively involves all stakeholders to help ensure the result meets the needs of the end users.
Concealed families	A family living in a multi-family household in addition to the primary family, such as a young couple living with parents.
Defined benefit (pension)	An employer-sponsored retirement plan where employee benefits are determined by a formula using factors such as salary history and duration of employment.
Defined contribution (pension)	A pension into which a certain amount or percentage of money is contributed by an individual or their employer.
Demography	The statistical study of populations.
Dependency ratio	The ratio of the number of dependents to the number of those of working age. (The UN define working age as between the ages of 15 and 64.)
DFLE (disability-free life expectancy)	Average number of years a person at a stated age would expect to live with no long-term illness or disability.
Fertility rate	Number of births per thousand women.

Frailty	An elevated risk of catastrophic declines in health and function, usually among older adults.
GDP (gross domestic product)	Gross domestic product is the monetary value of all finished goods and services produced in a particular country.
HLE (healthy life expectancy)	The average number of years a person at a stated age would expect to live in good health.
Household	One person living alone, or a group of people (not necessarily related) living at the same address with common housekeeping.
ICT cohort	Group of individuals with similar ICT capabilities (sometimes born within the same year or group of years).
Inclusive desgin	Design aiming to enable everyone to participate equally, confidently and independently in everyday activities.
Informal care	Providing care for a relative or friend who needs support because of age, physical or learning disability or illness.
Intergenerational living	People from three or more generations living within the same household.
Labour market	The supply and demand for labour (where employees provide the supply and employers the demand).
Life course	A sequence of socially defined events and roles that the individual enacts over time.
Life expectancy	How long an average person is expected to live, given their birth year, age, gender and location.
Longevity	Long life.
Mainstream housing	'Ordinary' housing – often the family home.
Mental capital	The totality of an individual's cognitive and emotional resources, including their cognitive capability, flexibility and efficiency of learning, emotional intelligence, and resilience in the face of stress.
Morbidity	A diseased state, disability, or poor health.

Morbidity rate	Number of deaths in a particular population over a given time period (usually per thousand people per year).
Multi-morbidity	Several chronic health conditions.
Non-accredited training	Training that does not lead to a qualification.
Oldest old	Those aged 80 and over.
Owner occupier	Accommodation that is lived in by the person who owns it outright (or is paying for it with a mortgage).
Personalised medicine	Medicine that uses an individual's genetic profile and environment to guide decisions made about the prevention, diagnosis, and treatment of disease.
Prevalence	The proportion of a population found to have a particular condition.
Productivity	An economic measure of output per unit input.
Reconstituted families	Families headed by two parents with children from a previous relationship.
Resilience	An individual's successful adaptation and functioning in the face of stress or trauma. Psychological resilience is that feature of a personality that allows an individual to bounce back from adversity.
Self-efficacy	One's belief in one's ability to succeed in specific goals or accomplish a task.
Smart home	A dwelling incorporating a communications network that connects the key electrical appliances and services, and allows them to be remotely controlled, monitored or accessed.
Social care	A range of services to help people maintain their health and independence in the community including home and personal care, day services, respite care and residential and/or nursing care.
Social rental housing	Housing owned by local authorities and private registered providers, for which guideline target rents are determined through the national rent regime.
Specialised housing	A group of dwellings intended for older people and served by a resident or non-resident warden/scheme

	manager with specific responsibility for the group.
State pension age (SPA)	The earliest age at which an individual can claim their State Pension.
Stratified medicine	Medicine in which tools are used to stratify cohorts of patients by subclass of disease or the likelihood of responding to a particular therapy, intervention, or disease management strategy.
Technology readiness	People's propensity to embrace and use new technologies for accomplishing goals in home life and at work.
Telecare	Remote care, usually using a network of sensors throughout a property to react to untoward events and raise an alarm automatically.
Telemedicine	Use of electronic communication and information technologies to provide or support clinical care at a distance.
Telemonitoring	The use of information technology to monitor patients at a distance.
Total fertility rate	The average number of live births per woman a group of women would have by age 50 if they were subject to the age-specific fertility observed in the population in a given year.
Unpaid care	Provision of unpaid support needed because of age, physical or learning disability, or illness.

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Government Office for Science
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Tel: 020 7215 5000
Email: contact@go-science.gsi.gov.uk

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