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Active Ageing: Live longer and prosper

*Realising the benefits of extended healthy life expectancy
and 'disability compression' in Europe*

'We realize that for all practical purposes the lives of the aged are useless, that they are often a burden to themselves, their family and the community at large. Their appearance is generally unaesthetic, their actions objectionable, their very existence often an incubus to those who in their humanity or duty take upon themselves the care of the aged' (Nascher, 1914).

This quotation is from the preface of one of the first gerontology textbooks (O'Neill 2011). It shows that prejudicial views about older people are nothing new. The social changes of the last century mean that today such opinions are far less likely to be tolerated. But even so, negative attitudes towards population ageing persist.

However, reducing the number of premature deaths and opening the way to active ageing (defined as continuing to live independently as an engaged member of society) is better seen as a success to be celebrated, not a problem to be contained. Loss of a productive social role because of disabling diseases or cognitive decline is not an inevitable consequence of reaching 65, 75 or 80 years of age. As people live longer there are also increasing opportunities for compressing their experience of seriously disabling illness into reduced periods. Even when the challenges of disability have to be faced, there is much that could and should affordably be done to help ensure that life continues to be valued and free from social handicap.

Against this background, this report explores aspects of health in later life and the significance of the 2012 *European Year for Active Ageing and Solidarity between Generations*. It in particular seeks to highlight the part that pharmacists, pharmacies and pharmaceuticals should in future play in extending healthy life expectancies, and ensuring that longer lives are also prosperous and happy lives. Priorities for the future include:

- communicating more effectively to the public and to health and social care professionals that population ageing is not a negative development, which will undermine national productivity and extend suffering. With the right policies in place, it will lead to positive benefits;
- promoting the use of community pharmacy and other accessible and affordable services, designed to extend healthy, disability free, life expectancy. These can complement traditional public health programmes by helping individuals to adopt protective life styles and use medicines and vaccines safely, rationally and effectively to prevent health problems in later life; and
- improving medicines taking by people with established non-communicable diseases, to minimise their impacts and delay their progression. This will become increasingly important as medicines to effectively control conditions such as arthritis, chronic pain, COPD, diabetes, dementia and heart disease become more available.

Dr Jennifer Gill and Professor David Taylor

Summary

- During the twentieth century, average life expectancy at birth in Western Europe increased by about 30 years. It is today about 80 years. Similar progress is now occurring world-wide. This has mainly been achieved by reducing infant, child and younger adult mortality. But in recent decades older people have started to live longer.
- Since the formation of the NHS, life expectancy in the UK at age 65 increased by about five years, or roughly one year per decade. Along with factors such as reduced smoking rates, better pharmaceutical and other forms of care have in addition played a role in enhancing healthy life expectancies.
- Population ageing (involving a rising proportion of older people in the community) is today a global phenomenon. By 2050 about a third of all Europeans will be aged over 60. This compares with a quarter of British citizens, and a projected world average in 2050 of one in five. A little over 20 per cent of the UK population is currently aged over 60, as opposed to 15 per cent in 1948. When the NHS was first established there were only 200,000 individuals aged 85 and over. This compares with 1.4 million today, and an anticipated total of almost 3 million in 2050.
- It is often feared that population ageing will impose such heavy strains on EU economies that providing good quality welfare systems will become unaffordable. But this is unlikely to be the case. Neither better survival in later life nor greater numbers of older people should be unfairly blamed for economic and other difficulties that stem from other causes, such as excessive community wide consumption levels.
- In the 1980s and 1990s NHS outlays grew by over 3 per cent per annum. Yet the direct effects of population ageing may only have accounted for a cost rise of 0.2 per cent per annum. Current data indicate a health spending increase of around 1 per cent per year attributable to all forms of ageing (see Box 2). But the health sector effects of ageing remain limited. This is partly because as people live longer they tend to stay fitter. Achieving disease and disability compression and reducing the periods during which people lose their capacity to live independently is a goal to pursue alongside increasing life expectancy.
- Failures to account correctly for such factors can exaggerate the negative impacts of living longer, and may encourage denials of the benefits of population ageing. Active older people can not only enjoy their own lives but contribute significantly to their families' and to their wider communities' wellbeing. Greater participation by people in their 60s and 70s in formal and informal work, coupled with decreases in the numbers of life years spent disabled, might (depending on wider constraints) in future decades increase the productivity of ageing societies by up to 10 per cent of GDP (see page 15).

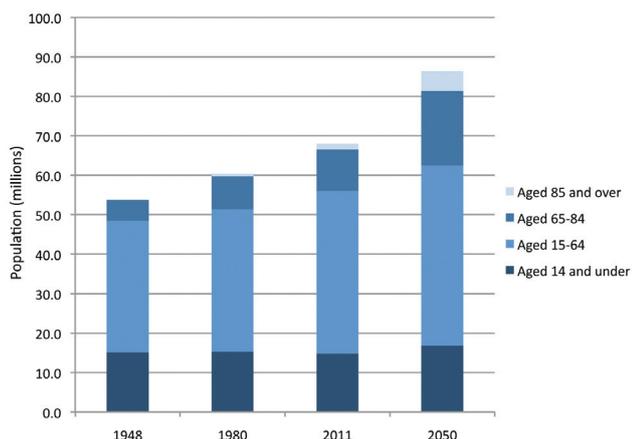
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- Well planned, adequately resourced, approaches to facilitating ‘morbidity compression’ ought to significantly increase the competitiveness of economies like those of the EU by extending active working life and/or decreasing disability related costs. This was recognised by the decision to make 2012 *The European Year for Active Ageing and Solidarity between Generations*. It should in future be clearly reflected in Member States’ health and social care policies.
 - The potential benefits of pharmaceutical care innovations range from reducing avoidable hospital admissions and supporting more effective medicines taking through to enhancing access to preventive medicines and vaccines. Across Europe, progress towards better pharmaceutical services in the community is taking place. But it has been limited by various factors, including low public expectations and inconsistent funding for non-dispensing services. In England there are presently uncertainties as to the impacts that the creation of local Clinical Commissioning Groups and Health and Wellbeing Boards will have on local pharmacy service financing.
 - Robust national resourcing arrangements could help prevent the ‘post-code rationing’ of enhanced and advanced pharmacy services. Strengthened national support for new primary care developments involving pharmacists, GPs and community nurses could raise health and social care efficiency and contribute to extended healthy life expectancy (see pages 27–31).
 - The mature products of ‘the first pharmaceutical revolution’ are now well understood. Established medicines are increasingly available for safe and cost effective provision via pharmacists and other care providers. The disabling consequences of conditions like atherosclerosis and diabetes have already been substantially modified. Current research in genetics and allied areas is opening the way to developing new diagnostic techniques, and fundamentally more effective treatments for the non-communicable diseases prevalent in later life.
 - Key drug development targets range from developing better medicines for arthritis and Alzheimer’s and Parkinson’s diseases to improving medical abilities to prevent disabilities associated with strokes, vision loss, the cancers and COPD. The extent to which twenty first century medicines will in regions like Europe increase life expectancy is uncertain. But they can confidently be expected to improve the quality of life for people of all ages. New pharmaceuticals should further compress morbidity and disability, and promote active ageing.

Introduction

Over the course of the last century average life expectancy at birth rose by 30 years in the UK, from under 50 years to almost 80 years. This progress, which reflects similar European and global health achievements, was the result of a series of major social and medical successes. They include the control of much infectious disease and radical declines in infant and maternal mortality in the decades before the creation of the NHS, and more recent advances in preventing events such as strokes and treating conditions like coronary heart disease and diabetes.

Nevertheless, 'population ageing' is a critical challenge facing nations like Japan and the Member States of the European Union. It has recently been noted, for example, that for the first time in British history the population aged 60 and over now outnumbers that of children and young adults aged under 16 (HM Government, 2009, see Figure 1) and that the population aged 85 and over is growing faster than any other section of the modern UK community.

Figure 1 Numbers (millions) of the population in each age group projected to 2050 in the UK.



Source: ONS data

When the NHS was first formed in 1948 only 10 per cent of people were aged over 65, and only 200,000 were aged over 85. Today the equivalent figures are approaching 18 per cent and 1,400,000 respectively. It is commonly – if also questionably – assumed that continuing increases in the number of older people are threatening to drive up health and social care costs to unaffordable levels. Current projections suggest that by the middle of the twenty first century there will be about half a million centenarians in Britain, compared with a little over 10,000 today (ONS; Harper, 2012). Similarly, recent data suggest that (barring environmental catastrophes or major wars) about a third of children born today will live to over 100.

At worst, ageing is seen as a problem in Europe which is causing nations such as those of South and East Asia to be more economically competitive than countries like Britain, France, Italy and Spain. Some commentators

fear that it may in future require the public funding of welfare provisions ranging from pensions to social care for disabled older people to be radically curtailed.

Other negative views imply that more and more individuals are surviving to face increasingly prolonged periods of isolation, loneliness, indignity and distressing physical and mental decline. It may in addition be suggested that family finances are being undermined by occurrences such as people living on for 'too long' in their family homes, and denying their children resources which in the past they would have inherited at an earlier stage in life (see for example, Willetts, 2010).

Rising rates of unemployment and a lack of fulfilling employment opportunities for younger Europeans are also sometimes linked to population ageing, and the financial burdens it is said to be imposing. Some regard public health interventions and pharmaceutical care successes such as reductions in smoking rates and widened access to medicines that reduce blood pressure and lipid levels as 'poison pills', which in social and economic terms are causing more harm than good.

However, the analysis offered in this UCL School of Pharmacy report (which draws on work initiated in response to the European Commission's decision to make 2012 the *European Year for Active Ageing and Solidarity between Generations*) rebuts such views. They are in large part based on prejudice, and inconsistent with the available evidence (Thane, 2012a; Thane, 2012b). It instead finds that 'population ageing' is being unfairly blamed for problems ranging from failures of public and private service management to (arguably) a relative over-consumption of scarce resources by entire communities, rather than just older people within them.

Drawing on a range of principally European and North American studies, this publication's findings indicate that population ageing has in reality brought positive benefits that serve to balance and in some contexts (such as the avoidance of grief and long term harm often associated with premature deaths) outweigh its costs. Some challenges, such as the growing prevalence of Alzheimer's Disease, are unquestionably pressing, both socially and financially. But this report argues that respect for the needs of all sections of the community, coupled with better quality management of health and other welfare systems and further bioscientific innovation, could and should enable even these barriers to continuing welfare improvement to be overcome. Given robust, well informed, policies, and appropriate developments in areas such as primary health and social care, the majority of British and other European citizens who will in future live longer will also, in age specific terms, be healthier and wealthier.

Against this background, the first sections of this report outline processes of demographic and epidemiological change which first started in countries like France, Great Britain and The Netherlands in the seventeenth and eighteenth centuries, and which are still progressing throughout the world. The reasons why supposed disadvantages such as those said to be linked to

adverse 'dependency ratio' trends in societies which have undergone ageing are often misunderstood are discussed. So too is how increased longevity ought in future to be associated with a decreased risk of physical disability and social and economic handicap in any given stage of later life (see Box 1 and Figure 2).

The approaches to health and social care needed to prevent costly phenomena such as avoidable personal 'health crises', unnecessary hospital admissions and counter-productive losses of independent living are also reviewed, along with the potential roles of new (and better use of established) preventive and curative medicines. In the latter context the extended provision of pharmacy based risk management and (public) health improvement services designed to increase healthy life expectancy via the cumulative effects of supportive interventions offered throughout the stages of life is also explored. The economic as well as the potential biomedical benefits of such developments are considered.

Reducing further the incidence of individual tragedies that involve death before 'old age' – which in today's terms is perhaps best thought of as not commencing until 80¹ – remains for many members of the public a high priority when they are considering what they most desire for themselves, their families and their friends. Yet along with seeking to concentrate mortality at the far

1 The boundaries at which states such as youth end or early middle life and old age begin are arbitrary. But for the purposes of this paper it may be suggested that early later life should today be normally thought of as beginning at 65 or 70, and old age at 80.

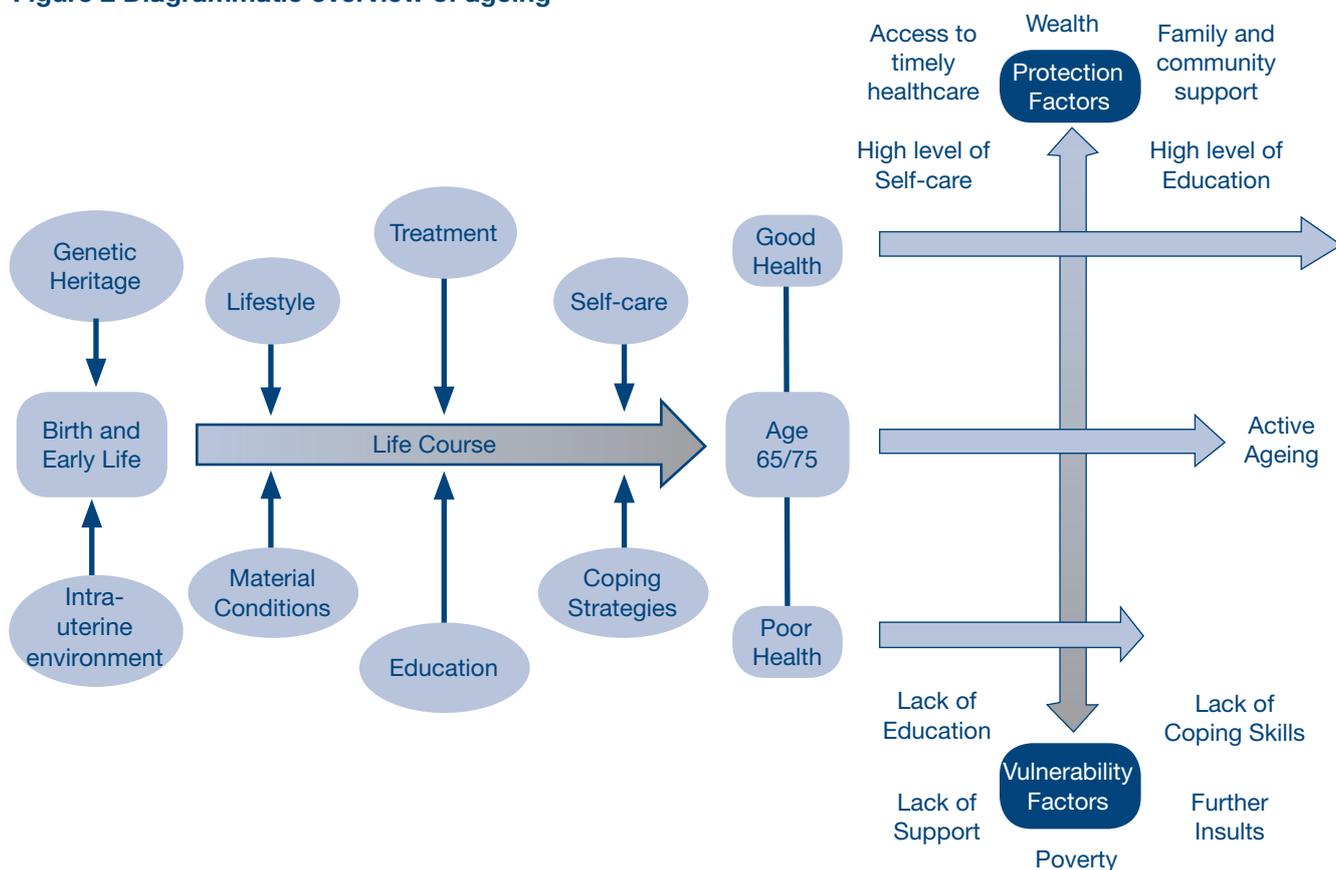
Box 1. Impairment, disability and handicap

Identifying disabilities and evaluating their severity can be more problematic than is commonly appreciated. The extent to which a particular limitation will undermine a person's capacity to live normally may depend as much on the surrounding world as it does on the individual in isolation. For instance, having a condition such as dyslexia might present relatively little difficulty for someone living in a rural community in a less developed country. But in circumstances in which a high level of reading and writing skills are essential it could prove a much more serious problem.

One model aimed at enabling a better understanding of the ways in which a long term condition such as arthritis might impact upon older (and other) people was developed by the WHO in the 1970s. It differentiates between impairments such as malfunctioning joints or damaged nerves, disabilities such as being unable to climb a flight of stairs, and handicaps. These last are in the main socially and environmentally defined. For instance, if a person cannot work because of being unable to walk easily this might be regarded as a social handicap due in part to factors such as employers' policies and expectations.

By the same token it may be that a functional loss of capability sufficient to cause one person to stop working might not have the same effect on another psychologically more resilient subject. Such variations indicate a need for flexibility in areas ranging from the ages at which pensions can be claimed to the provision of social care support for independent living.

Figure 2 Diagrammatic overview of ageing



end of each population's average life span, compressing the occurrence of activity limiting chronic illnesses and disability towards the end of life is arguably in the modern world an even more vital collective goal. There is growing evidence that, in the UK and elsewhere in the world, new approaches to pharmacy based and other forms of health care could help achieve this end in ways which are affordable, and consistent with evolving public values and expectations.

Continuing human development

It is presently predicted that by 2050 the world population will be in the order of 10 billion. Of this total about 800 million people will be living in Europe, up to 80 million of whom will be British. Of the 10 billion global total just over two billion (22 per cent) may be expected to be aged 60 or over by the middle of this century. This compares with some 35 per cent of all Europeans.² World-wide, the numbers of people living to old age are increasing rapidly: by 2050 there will be approaching 30 times more people aged 80 or over on earth as compared to the figure of 14 million recorded in 1950 (Bloom et al., 2009).

An important understanding to draw from these data is that although Europe remains at the forefront of population and social change, the process of ageing is a global event. Over what is in historical terms a relatively short time it will impact on all economies in broadly similar ways. Population 'greying', as characterised by an increasing percentage of the population being aged over, say, 65 or 80, has three main drivers. It is a function of:

1. The (common, universally relevant) long term fertility declines that characteristically follow falls in infant and child mortality rates. As parents become more confident of their children surviving and women gain extended social and economic roles, populations stabilise. The ratio of younger people (infants and children) to adults of all ages automatically declines.
2. Shorter term (special cause, local) fluctuations in fertility associated with factors such as economic cycles and population movements from poorer to richer (post-transitional) areas. These may be referred to as 'age dynamic' effects. They can lead to some cohorts being significantly larger or smaller than those which immediately precede or succeed them.
3. Increases in average life expectancy and individual longevity amongst the older population *per se*. It is this last which many people associate with the term population ageing. Yet the significance of living longer in later life has to date been more limited than is frequently assumed.

Declining fertility (defined as the number of babies the average woman has in her life) is as noted above associated with reduced infant mortality, greater levels of female education, more paid employment opportunities for women and the provision of family planning services.

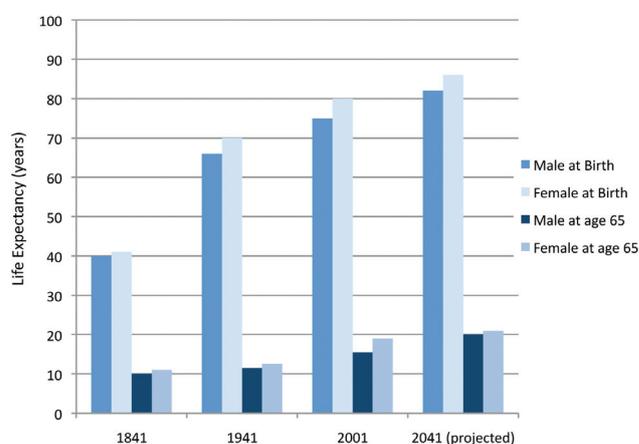
² The equivalent estimate for the UK is 25 per cent (Cracknell, 2010).

It is the single most important structural driver of population ageing. It is sometimes suggested that people living in regions such as sub-Saharan Africa, and in immigrant communities whose members have moved from less economically advantaged areas to affluent settings and have subsequently sought to preserve their separate cultural identities, will not follow such general trends. However, this is unlikely to be so in the long term.

By contrast dynamic ageing effects are driven by more locally engendered changes in birth and – on occasions – death rates. For instance, following the end of World War II there was in the UK a period of increased fertility. It lasted between 1946 and 1964. Members of this generation, popularly termed 'baby boomers', are now nearly all in their fifties or sixties. They represent an expanded group of relatively vocal, informed and active older people. This example illustrates the need to distinguish between different communities within the overall population of older people. A healthy, active person in her or his 70s should not be expected to have the same needs, abilities, values and preferences as a frail 95 year old.

The third factor influencing population ageing is improvement in overall survival duration. Between 1900 and 2000 average life expectancy *at birth* in England and Wales increased from nearly 50 to 78 years (Figure 3). Similarly, global average life expectancy at birth is predicted to reach 76 years by 2050, some 30 years more than it was in 1950 (United Nations, 2010).

Figure 3 Life expectancy in England and Wales, 1841 to 2041



Source: Office of Health Economics, 2008

The majority of such changes have been due to reductions in infant and other early life mortality, which have allowed increasing proportions of the population to reach the beginning of later life. But after that point increases in age specific life expectancy have been more modest, and of more recent origin.

In Britain, for instance, life expectancy at age 65 for both men and women has to date increased by about five years since the creation of the NHS (life expectancy at birth grew by 10 years over the same period). By comparison, in the century between 1840 and the

decade before the mass introduction of antibiotics (that is, until the end of the 1930s) life expectancy at age 65 grew by only one to two years.

Recent improvements in the survival of older people have been influenced by life style factors such as reducing smoking rates in men and the availability of improved medicines for reducing cardiovascular and allied hazards, most notably those of type 2 diabetes. The resulting gains are unquestionably significant. But they are not as dramatic as is sometimes suggested. The extent to which they have been accompanied by declines in age specific disability rates (see below) is a critically important issue, which has until very recently received comparatively little public attention.

Ongoing transitions

The term ‘demographic transition’ was first coined in the 1920s. It describes the complex developmental process via which populations move from a state of high stable fertility balanced by high, on occasions fluctuating, mortality to low rates of both births and deaths. This is characteristically accompanied by not only a phase of fast population growth and subsequently ageing and a relative increase in the prevalence of chronic non-communicable conditions (this has since the 1970s been referred to as epidemiological transition), but also by major changes in the way that people live and work. These include shifts in religious belief and professional structures, altered sexual behaviours and values and increased levels of investment in and access to health and related services.

Such trends (which can be called care transition – Taylor and Bury, 2007) have been relatively strong in Europe during the last half century or so. The proportion of a typical EU Member State’s GDP being spent on health services rose from under 4 per cent at the start of the 1950s to around 10 per cent today. However, health spending increases in the United States – which still has a relatively small proportion of its population in later life – have been greater than those seen in Europe. In Japan, where ageing has been more apparent, they have been more modest. Such observations indicate that population ageing alone should not be regarded as the only, or even the main, driver of health care cost increases.

In what are sometimes questionably termed ‘developed’ countries³ the main conventionally recognised stages of demographic transition were completed before the end of the last century (Fries, 2000). But significant structural changes associated with ageing are continuing. Elsewhere in the world population sizes are still increasing, while the numbers of retired people remain for the moment comparatively low.

Exceptional States and areas such as Singapore and Hong Kong are enjoying what can be regarded as a ‘demographic dividend’ in that the proportions of both children and young adults in education and economically

inactive older people are very small as compared to their working age populations. Such observations have led some commentators to believe that ‘ageing’ represents a special problem in EU countries like the UK, for the NHS and the economy alike. However, as indicated in the introduction to this report, this is not the view taken here.

The reasons for this in part relate to the fact that (locally) Britain’s population is not in fact ageing as rapidly as many others. This is mainly due to an unexpected increase in births to older women and in sections of the immigrant British community in the last decade or so. Similar phenomena are emerging in some other parts of northern Europe. It is also important to observe that:

- the costs of population ageing are on occasions – deliberately or because of ignorance – exaggerated, while its benefits are under-stated; and
- many of the world’s ‘emergent economies’ will also face a rapid onset of ageing related social challenges in the near future. They may in some respects not be as well placed to adjust to them as many European Member State communities have already shown themselves to be.

Aspects of these issues are discussed later in this UCL School of Pharmacy report. But before that the remainder of this section examines three related issues that are central to understanding the ongoing process of ageing.

Comorbidities, frailty and disability

The prevention of disability and the management of frail elderly people with multiple co-morbidities are major goals of modern medical, nursing and pharmaceutical care (Landi et al., 2010). These three terms are often used interchangeably when discussing the needs and care of older people. Yet they are arguably better regarded as referring to discrete variables that, although interrelated, encompass distinct health and social care management challenges.

Frailty is defined here as a state of increased vulnerability to stressors due to decreased physiological reserves. It has been said to affect some 40 per cent of adults aged 80 and over in the USA (Fried et al., 2004). Being ‘frail’ is a risk factor for disability and can contribute to the development and/or progression of chronic diseases. It can also be exacerbated by disabilities and specific disease states.

As people age the risk of them developing chronic conditions increases. So too does the probability of their suffering multiple long term disorders (Marengoni et al., 2011). The concept of comorbidity relates to the concurrent presence of two or more medically diagnosed diseases in an individual (Fried et al., 2004). In the UK understanding and being able effectively to treat comorbid states is often considered central to the expertise of general medical practice.

³ Questionably because global development is continuing

The existence of comorbid states is sometimes regarded as an independent risk factor for avoidable hospital admissions, and hence increased health care spending and in some instances raised patient mortality rates. There is no doubt that comorbidities can and do complicate pharmaceutical and other forms of care. However, recent studies have found that having multiple diseases does not in itself systematically affect survival or the risk of losing independence in later life.

The implication of this is that rather than seeking to assess the simple sum of diagnosed clinical conditions affecting individuals and groups, health workers and analysts should concentrate more on evaluating variables such as specific disease severity levels and the degrees of functional disability with which individuals are living (Landi et al., 2010). From a public health perspective rising disease prevalence and comorbidity prevalence rates in ageing populations should not in themselves be taken to be accurate indicators of health care need, or of individual or collective quality of life.

Disability can, as noted in Box 1, be defined in terms of the degree of difficulty or dependency on others experienced in carrying out activities that are part of normal daily living. Some observers differentiate between essential self-care (activities of daily living – ADLs) and desirable activities important for maintaining a satisfactory quality of life (instrumental activities of daily living – IADLs). However, the validity of such distinctions is in some ways doubtful. It should also be accepted that variations in social contexts and psychological competencies have significant impacts on disability experiences. A given physical or mental state may or may not be disabling in one context as opposed to another.

Current US estimates put the level of community dwelling adults aged 70 or over with a disability at 20-30 per cent (Fried et al., 2004). Rates of disability and disability severity increase with age. Eleven per cent of British men aged 50-54 reportedly have difficulties with ADLs, compared with 42 per cent of those aged 80 and over (English Longitudinal Study of Ageing, 2003). As mentioned above it is disability, rather than the presence of disease or diseases *per se*, which is most reliably associated with an increased risk of institutionalisation and ultimately mortality, and with long term care needs and costs (Landi et al., 2010).

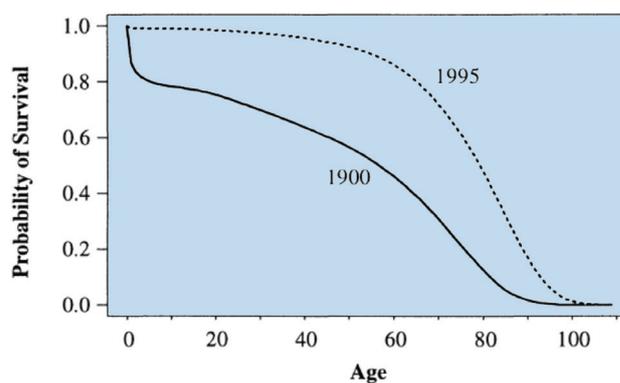
Some US and other commentators have forecast that increasing rates of disability in older people will inevitably raise demand for institutional care in the period to 2050 (Stuck et al., 1999). However, as is discussed further later in this report there is also evidence that as people live longer age specific disability rates tend to fall (see, for example, Jagger et al., 2007; Manton, 2008).

The compression of mortality, morbidity and disability

Concepts such as mortality and morbidity compression have critically important implications for active ageing policies. Mortality compression takes place when an

increasing proportion of the deaths in a population occur in old age. As deaths concentrate in late old age so the degree of compression increases and from a health economics perspective the premium social value attached to preventing mortality, severe morbidity and disability at earlier stages in the life cycle tends to increase. The twentieth century survival curves shown in Figure 4 illustrate the ‘rectangularisation’ of mortality associated with the compression driven by declines in the relative number of deaths occurring in childhood, middle and early later life.

Figure 4 The rectangularisation of survival curves



Source: Wilmoth and Horiuchi 1999.

The compression of morbidity and disability are potentially even more important concepts in today’s environment. If the average age at death were to increase without the onset of physical and mental decline being postponed, then the individual and overall social benefits of enhanced longevity might well be judged relatively limited. By some measures they might be regarded as negative (Bloom et al., 2009). However, if significant disability is postponed and quality of life maintained then older people will not only receive tangible benefits themselves but should, especially given appropriate policies and environments, be able to make more valuable social and economic contributions within their families and to their wider communities.

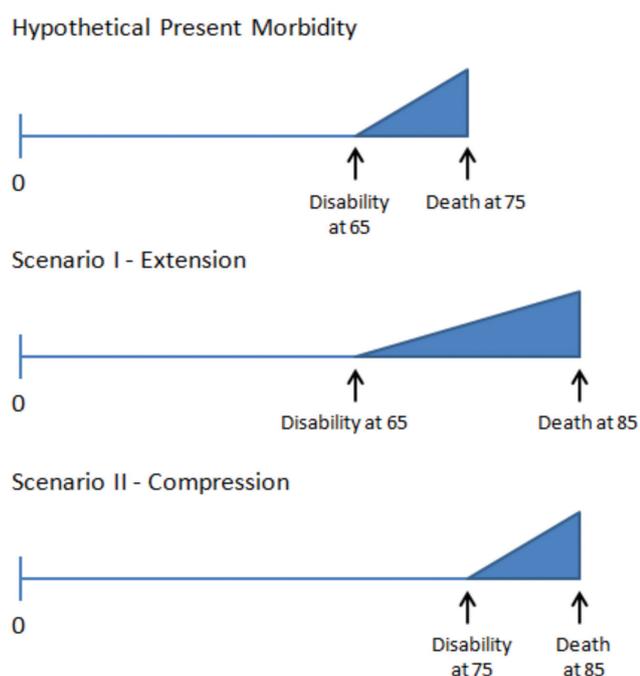
This is a field in which there has been considerable academic debate during the past three to four decades. The main schools of thought include:

- **The expansion of morbidity ‘pessimists’.** This group assumes that increasing life expectancy is predominately the result of the ‘*survival of the sickest*’, rather than a decline in morbidity and disability (Kramer, 1980). This leads to an increase in the years lived in poor health - the so called ‘failure of success’ (Fries, 2000).
- **The compression of morbidity ‘optimists’.** Members of this school believe that along with improved survival to and in later life the onset of disability will be delayed, partly due to improvements in prevention. This view was at one time linked to an assumption that overall life expectancy at birth would not increase beyond a ceiling of around 85

years, and that after that pharmaceutical and other health related advances would in the main lead to functional and disease free life gains (Fries, 1980; Fries, 2000). 'Optimists' suggest that decreases in the prevalence of chronic diseases (or at least their severity) will allow people to remain fit until a final breakdown of homeostatic mechanisms results in a brief period of frailty and a relatively rapid death (Figure 5). However, it is now widely accepted that the existence of a life expectancy ceiling is not necessary for the compression of morbidity/disability in later life to take place (Fries, 2004). Rather, disability free life expectancy (DLFE) simply needs to increase faster than overall life expectancy.

- **Dynamic equilibrium 'realists'**. Proponents of this final paradigm emphasise the complexity and depth of the links between mortality, morbidity and disability. They argue that an increased prevalence of chronic diseases in ageing populations is likely to be broadly counterbalanced by a decrease in disease severity (Manton, 1982).

Figure 5 The compression of (chronic) morbidity



Source: Adapted from Fries et al., 2000.

Note: The shaded area represents years of morbidity, disability or raised health and social care cost due to the loss of independence.

Achieving clarity in this field demands a degree of rigour not always apparent in political and wider public debate. For example, it is vitally important to distinguish between disability and handicap compression – both of which it is argued below should be achievable – and diagnosed morbidity compression. The latter is (at present at least) demonstrably not taking place.

The available evidence indicates that the dynamic equilibrium and disability compression models are at this point in human development more likely, even without well focused policies in place, to apply to Europe's experience in the coming few decades than are the more 'apocalyptic' demographic scenarios sometimes put forward. The extent to which professions like pharmacy and agencies such as the research based pharmaceutical industry can help to ensure that this in practice transpires is considered in later sections of this report. Questions about the extent to which increases in healthy life expectancy – absolutely and relative to overall life expectancy – will generate economic as well as social gains are also addressed.

Changing dependency ratios

One traditionally employed way of relating the age structure of populations to their productive potential is to calculate the so-called 'dependency ratios' within them. These include:

- The 'elderly dependency ratio' (EDR). This is normally defined as the ratio of the number of people aged 65 and older to the number aged 15 to 64 years.
- The youth dependency ratio (YDR). This is conventionally taken to be the ratio of the number of young people aged up to 14 years to the number aged 15 to 64.
- The total dependency ratio (TDR). This has been historically defined as the ratio of the sum of the populations aged 0-14 and 65 and over to the number of people aged 15-64.

Concerns about the 'greying population' have been largely based on projected changes in EDRs, and the belief that people over 'retirement age' cannot participate effectively in the labour market and are therefore 'unproductive'. Some recent estimates indicate that in EU countries such as Italy and Spain the EDR will reach almost 70 per cent by 2050 (Eurostat data) as compared to less than 30 per cent at present. The EDR for the UK is projected to be 45 per cent by 2050.

However, these population ageing related dependency ratio increases are occurring concurrently with YDR decreases due to decreased fertility rates. This means that TDRs in countries like the UK will remain more or less stable (Select Committee on Economic Affairs - House of Lords, 2003) while in countries such as China the TDR will probably fall despite ageing effects. (In TDR terms Spain is projected to reach almost 90 per cent in 2050, compared to 70 per cent for the UK and 66 per cent for Denmark.) Additional points to consider in relation to such figures include:

- as the dominant means of production in societies become more complex and more capital intensive, formal educational periods tend to extend. Such trends raise significant questions as to the continuing relevance of traditionally calculated YDRs to modern societies; and

- if health in later life improves so that the active involvement of people aged over 65 in socially and economically relevant activities is markedly increased, this again raises important questions about the practical value of crude EDR and TDR data. It is in addition relevant to observe that as the proportion of highly educated 'high human capital value' people in a workforce increases, so will the individual and collective economic advantages of extending the formal working life span.

To the extent that intellectual labour continues to replace physical labour, this might in addition to the effects of better population health reduce future barriers to increasing the ages at which significant life events of all types (from leaving schooling to retiring from paid employment) customarily take place. It is reasonable to conclude that if in Europe total dependency ratios stay broadly stable, and even if only limited morbidity and disability compression were to be achieved, an ageing population could well prove not only socially but also economically beneficial.

Extending healthy life expectancy

From a biological perspective ageing involves a gradual deterioration of physiological functioning, which is sometimes marked by crisis points that serve as 'steps' between one level of overall performance and another. Notwithstanding its positive aspects, such as those related to the ongoing acquisition of experience and judgement, ageing tends to be linked to decreased muscle and bone mass, reduced or altered metabolic and endocrine activity, and declines in hearing and vision. As later life progresses there are characteristic changes in bodily organs and systems ranging from the eye and the gut to the brain, kidneys, lungs and the immune system (Magalhaes, 2008).

Expressed dispassionately, ageing involves the progressive impairment of homeostasis and losses of adaptability which in the final analysis result in death (Fairweather, 1991). However, along with such biomedical/bio-pathological explanations, human ageing is also a social and psychological phenomenon which is highly variable in its nature. For more advantaged people ageing can be associated with increased social status, wealth and personal authority and choice. But for others less fortunate it may involve becoming isolated because of the deaths of friends and partners, coupled with lost competencies and reduced income.

Factors such as involuntary exclusion from participation in the workforce or valued leisure activities have often exacerbated such problems. Loneliness and illness can in effect narrow unsupported older people's lives, so that they have little to enjoy or look forward to and in the end are effectively confined to just a single room or just their bed.

Prejudice (see, for instance, Neuberger, 2008; O'Neill, 2011) frequently adds to and amplifies the negative psychological, social and economic aspects of ageing. These interact with its physical manifestations and with problems such as inadequately treated pain and/or depression. The promotion of healthy and active ageing, which can be defined in terms of continuing to be involved in normal adult daily life, demands wherever possible both the slowing, halting or reversal of its unwanted physical dimensions and the elimination of its undesirable and avoidable cultural dimensions.

This can be achieved via appropriate access to pharmaceutical and other health and social care interventions throughout life's stages, and the inter-generationally just maintenance of fulfilling ways of living throughout society. Seen from this perspective, healthy ageing does not require freedom from medically diagnosed chronic or other illnesses, desirable though that might be. It is centrally about finding personally satisfactory and collectively affordable ways of coping with and enjoying later life, despite its undeniable challenges. Professional attitudes and service values should reflect this 'bottom line'.

Future life expectancy trends

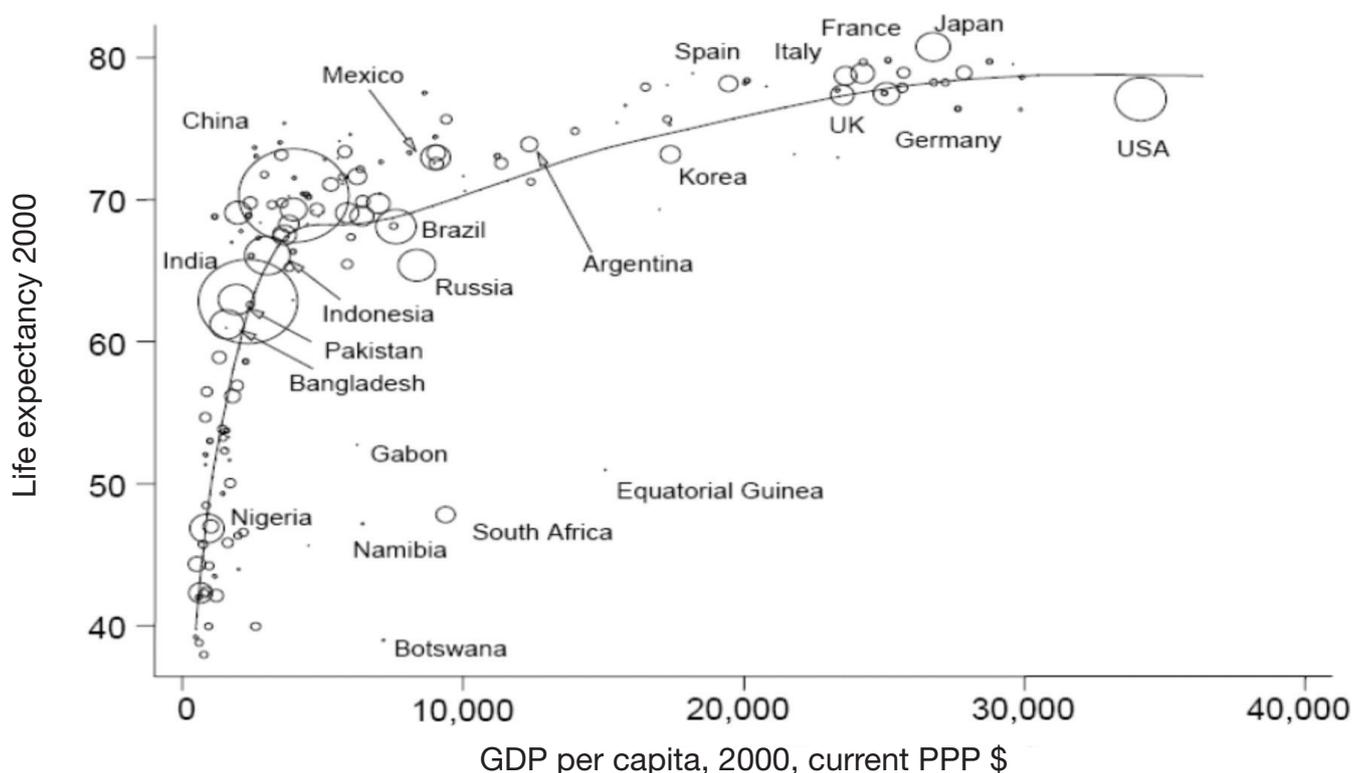
Increasing the human lifespan has been a topic of interest to people throughout recorded history. However, despite current encouraging world-wide progress towards enhanced survival (see, for example, Rosling 2010), significant variations in both overall and healthy life expectancy at birth still exist within and between countries. WHO statistics show that life expectancy at birth in sub-Saharan African countries like Malawi remains under 50 years (in part because of the continuing burdens imposed by HIV and other infections, such as TB) while in Japan it is approaching 85 years.

Figure 6, which is based on global mortality rates and life expectancy projections for the year 2000, illustrates what is known as the Preston curve. Following on from the demographic transition process described previously, its characteristic shape implies two fundamental stages of development.

The first relates to the type of social and public health progress normally found in communities as their average incomes rise from a basic subsistence level to about \$3-5,000 (£2-3,000) per capita in today's terms. It is mainly characterised by falling infant, child and younger adult mortality. The second starts at much higher levels of income, typically £20-30,000 per head in current price terms. It is mainly driven by enhanced survival in later middle age and old age. This is the era in which countries such as those of the EU are now placed (Olshansky et al., 2005).

Looking to the future, uncertainties remain as to the extent to which further extensions in life expectancy will prove viable (Jacobzone et al., 1999; Bloom et al., 2009). Most of the opportunity for reducing mortality before the

Figure 6 The Preston curve comparing life expectancy with GDP per capita in the year 2000 (circles have diameter proportional to population size).



Source: Deaton 2004.

beginning of later life has now been realised in nations like the UK. The projections offered by agencies such as the Government Actuary's Office (which suggest that the trend towards increased life expectancy for people aged 65 and over may end by the middle of the twenty first century) have been questioned by some commentators.

An alternative view is that ongoing medical and pharmaceutical advances will mean that past rates of progress will continue indefinitely. Others argue that life expectancy in richer countries will in future fall as the long term consequences of phenomena such as the current obesity pandemic strike home.

There is a logical case for all these views, albeit that recent information indicates that previously firm links between being significantly overweight and/or having conditions such as type 2 diabetes and dying before old age have already weakened. The implication of such observations is that technical innovation could well ensure continuing life expectancy gains. However, from the standpoint of this paper it is not important to know whether or not populations will on average continue to live progressively longer after 2050. More immediate questions relate to the quality of life that will be enjoyed by older individuals in the next ten to twenty years, and whether or not age specific disability rates will fall.

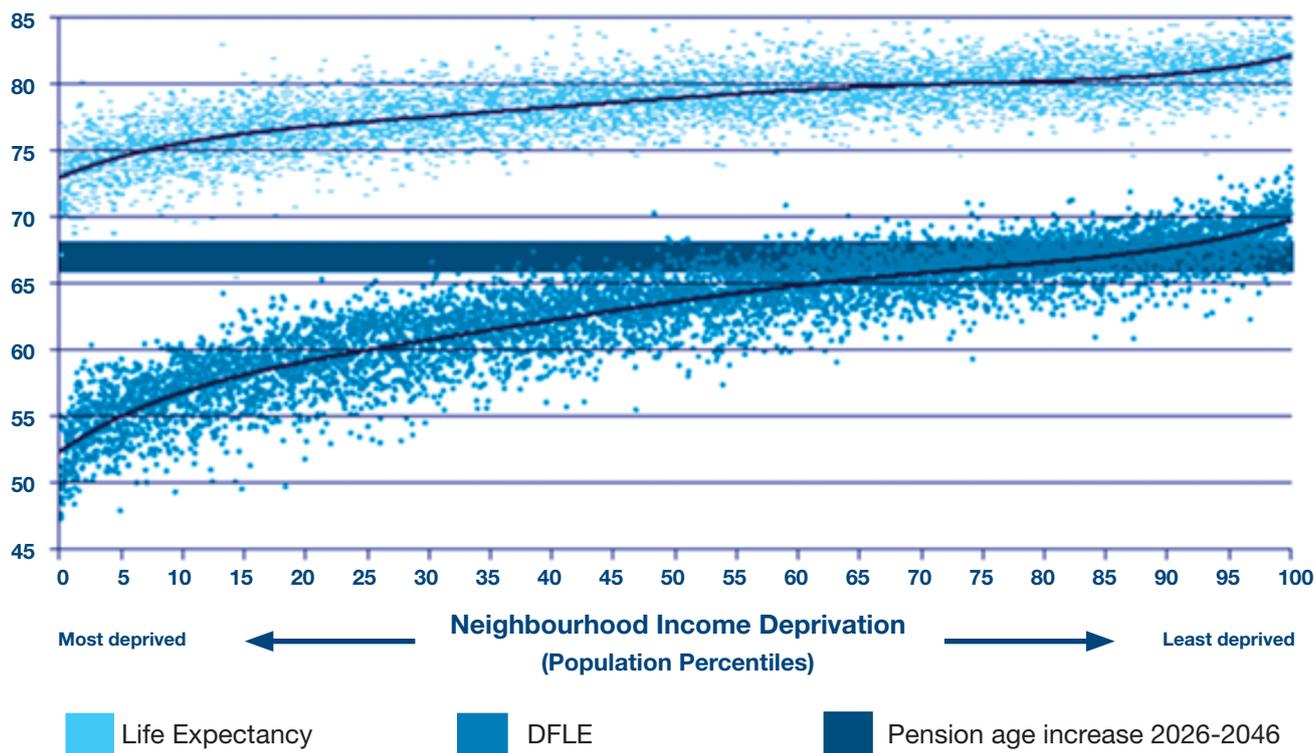
Delaying non-communicable diseases, preventing disability and promoting independence

The calculation of 'health expectancies' brings a quality of life dimension to life expectancy data (Jagger et al., 2008). Relevant measures include 'expected lifetime without chronic morbidity or impairment', 'expected lifetime without disability (DFLE)' and 'expected lifetime with self-reported good health'. Since observing trends in healthy life expectancy demands detailed understanding of the measures used in differing studies, considerable caution is needed in interpreting the available literature. This is likely to be especially so in the context of international comparisons (Jeune & Brønnum-Hansen, 2008).

It is also of note that self-reported good health is often more of an indicator of expectation levels in contrasting communities than it is of constantly defined disability or illness (see, for example, Mackenbach et al., 2008). Factors such as labour market conditions and the availability of employment for older middle-aged people might also influence morbidity experiences and reporting, as might medical cultures and payment systems.

Figure 7 Life expectancy and disability free life expectancy (DFLE) at birth, persons by neighbourhood income level, England, 1999-2003

Age



Source: Office for National Statistics/Marmot et al., 2010.

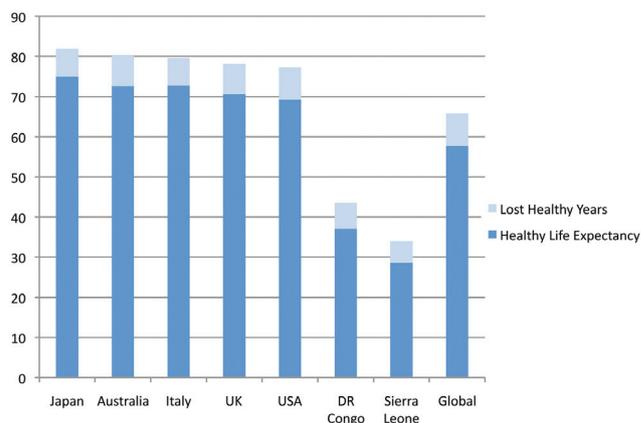
Figure 7 is from *Fair Society, Healthy Lives* (Marmot et al., 2010). These data indicate that amongst the most advantaged members of the English population life expectancy at birth was already over 80 years by the start of this century, as compared with a recorded DFLE of about 70 years. By contrast, the equivalent figures for the least advantaged were a little over 70 and 50 years respectively. One important implication of these findings is that in future the social and other changes needed to extend overall life expectancy could increase healthy life expectancy even more significantly across much of the British population.

The relatively few international studies that have been carried out in this field have found considerable variation. For example, in Estonia healthy life expectancy at age 65 is reportedly three years for men and women, whereas in Denmark it is 13 years for women and 14 years for men (The Futurage Group: European Commission, 2011). Other sources suggest that the average American spends less of their life post-65 disability free as compared with the average Japanese individual.

These data in part reflect the fact that more people live on into 'advanced old' age in Japan than in America, which is also the case with Denmark compared with Estonia. The reliability of such observation is limited (Knickman & Snell, 2002). But they too suggest the existence of

morbidity and disability compression, as do the WHO data on healthy life expectancies shown in Figure 8.⁴

Figure 8 Healthy life expectancy and expected lost healthy years at birth (early 21st Century)

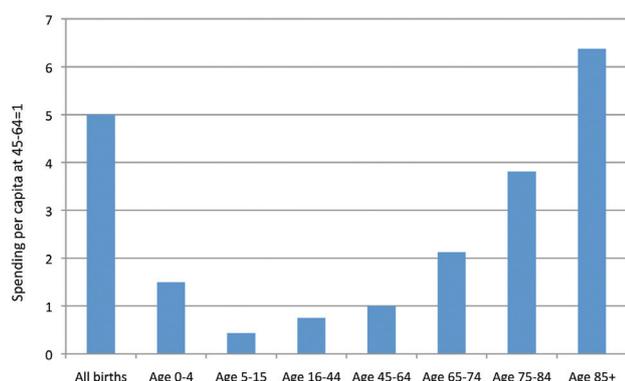


Source: Annex Table 4, World Health Report 2004 (www.who.int/whr)

⁴ Between 2000 and 2001 the World Health Organisation (WHO) conducted a Multi-Country Survey Study on Health and Responsiveness (MCSS), using a standardised health status survey instrument. The figures shown in Figure 8 are derived from that research.

There is a large body of research on whether or not healthy life expectancy is increasing at the same rate as life expectancy overall, and the extent to which population ageing due to increased longevity (as opposed to fertility changes) will impact on people's wellbeing and public and private care costs. It cannot be comprehensively reviewed here. Yet ongoing work on pharmaceutical and public health policy at the UCL School of Pharmacy suggests that in the foreseeable future age specific disability rates will continue to decline in ways that will to a significant degree offset the cost increases that simple projections linked to the type of data contained in Figure 9 are sometimes taken to predict.

Figure 9 NHS Spend on hospital and community care by age group, 2004



Source: Derived from Office of Health Economics, 2008

In addition, UK and other research suggests that in past decades population ageing effects associated with individuals living longer have, apparently contrary to popular and much political belief, not in themselves been a dominant factor in increasing NHS spending (Box 2). Yet to the extent it proves achievable, extending healthy life expectancy (HLE) relative to overall life expectancy could have an appreciable cost containing impact. One influential study indicates that if a rate of improvement equivalent to gaining a year of additional healthy life per decade were sustained over the coming 20 years, then health and social security cost savings equivalent to between 10 and 15 per cent of total anticipated sector outlays could be generated (HM Government, 2009; Mayhew, 2009).

There is concern that in the UK healthy life expectancy at birth did not increase as fast as overall life expectancy in the last two decades of the twentieth century (Parliamentary Office of Science and Technology, 2006). Nevertheless, there is also research that suggests positive underlying trends. For example, Jagger and her colleagues compared people aged over 75 in 1981 with a similar cohort aged over 75 in 1988. They found people in this second group to on average be more independent than those in the first. Its members had less trouble getting in and out of their chairs and beds, and had more ability with dressing, bathing and getting to and from the lavatory (Jagger et al., 1991).

Box 2 Increasing NHS costs and the ageing population

NHS spending increased in cash terms from under £500 million at the end of the 1940s to a current total of over £120 billion. Expressed in constant price terms this represents a ten-fold increase. In terms of the total proportion of national wealth spent on the health service, it went from under 4 per cent of GDP to between 8 and 9 per cent today.

The extent to which this increase in outlays has been due to population ageing as compared to other factors, such as increases in professional and managerial staff numbers and earnings, is debateable. For example, Hawksworth (2006), quoting OECD data, attributed only 0.2 per cent of the 3.4 per cent annual increase in NHS spending observed in the 1980s and 1990s to ageing.

Since then NHS investments in social care have increased, along with changes in other variables. Some estimates suggest that population ageing (including age dynamic effects) will cause NHS spending to rise at (or require efficiency gains equivalent to) around 1 per cent per annum in the coming decade. This implies a figure of approaching £2 billion a year, over and above the increasing costs of social care. However, exaggerated claims that health and/or social care costs for older people are escalating unaffordably should not be accepted. Neither should suggestions that private insurance funded or independently delivered care would necessarily prove better value for money than that offered by well-run public services.

Subsequent MRC funded investigations of a sample of over 13,000 older people found that (over a decade) significantly more disability-free years than life years were gained by individuals who were free of stroke, diagnosed arthritis, cognitive impairments and visual impairments at the start of the analysis. This suggests from a pharmaceutical and wider care perspective that enhanced preventive and/or effective early stage interventions in these areas would be particularly beneficial in terms of helping achieve HLE extensions.

In the USA data derived from the National Long-Term Care Survey shows that the prevalence of disability in the population aged over 65 fell from over 25 per cent to just under 20 per cent between 1982 and 2004. This was in large part due to the translation of biomedical research into clinical innovations (Manton, 2008). Such figures can be seen as meaning that the bio-science based technologies that are presently (notwithstanding the value of life style changes like stopping smoking) in large part responsible for further reducing mortality are simultaneously reducing disease severity levels and improving health outcomes, despite rising rates of diagnosed illness.

In this sense at least 'medicalisation' has not been undesirable from a broad public health perspective. However, US government statistics additionally confirm a consistent longer term decline in age specific disability rates dating from the start of the 1900s. The duration of this trend almost certainly confirms that other health linked factors, such as improved diets and the changing

nature and risks of work, have had important cumulative impacts, over and above those delivered by doctors, nurses and pharmacists.

In Europe there is not the same level of comprehensive information available over time. However, the published evidence is also broadly consistent with a picture of health improvement running parallel with population ageing. In Finland, for instance, researchers found the proportion of people aged 90 and over classified as severely dependent decreased from 18 per cent in 2001 to 13 per cent in 2007 (Sarkeala et al., 2011). In Italy disability free life expectancy has also been found to be increasing more rapidly than life expectancy among people aged 65 and over (Burgio et al., 2009). Similar results have been reported in Denmark (Jeune & Brønnum-Hansen, 2008).

More equivocally, the European Health Expectancy Monitoring Unit assessed the proportion of life spent free of disability in 15 EU countries between 1995 and 2001. They found that European countries appear to fall into one of three groups:

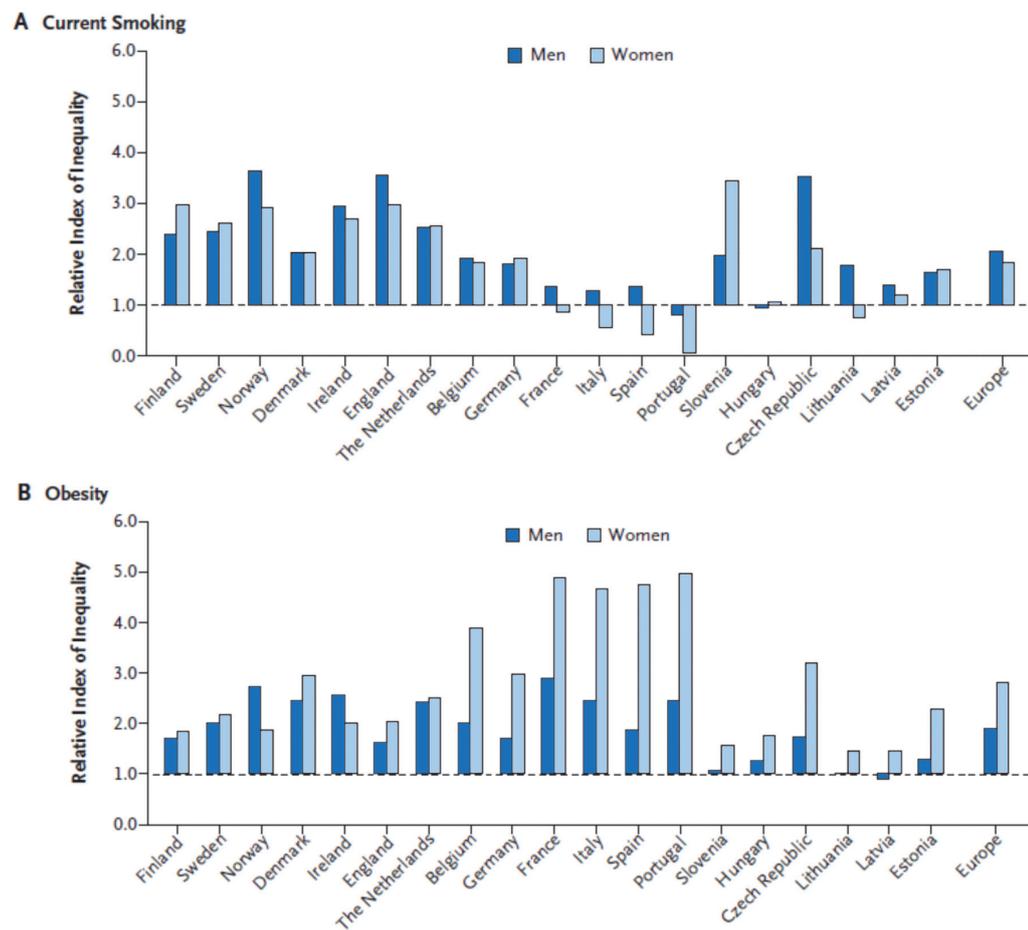
- first, those where the proportion of disability free life years increased in a manner consistent with compression theory, such as Italy and Belgium;
- second, those where the proportion stayed the same, as was found to be so for UK women and in France and Spain; and

- third, those in which a reducing proportion of the overall life span spent disability free was observed. This was so in Denmark (for men), Sweden (men), the UK (men), Germany (women) and Greece (women) (Jagger & EHEMU Team, 2005).

It may be concluded from the above summary that although the further compression of morbidity is not inevitable in the EU and Member States such as Britain, it can occur at certain stages of epidemiological transition and – seemingly whether or not structured policies have been introduced – in certain social contexts (Fries et al., 2011). In general, morbidity and disability compression seem to be favoured in groups and communities where health related gradients of all sorts are relatively small. Policies aimed at reducing health inequalities could, therefore, contribute to improved health expectancies. Yet even so, the view taken here is that in future it would be desirable to place an increased direct emphasis on extending healthy life as an explicitly planned, high priority, objective.

The implications of the last point for pharmacy and other service providers are explored further in later sections of this UCL School of Pharmacy report. But Figure 10 is taken from a study of inequalities in health in 22 European countries. The data gathered related to the 1990s and early 2000s. It showed that across Member States there are, when educational levels are taken to be representative of material and other dimensions of

Figure 10 Relative inequalities in the prevalence of smoking (figure A) and obesity (figure B) between persons with the lowest and those with the highest level of education according to sex



Note: The incidence of relative inequality compares rates in the most advantaged section of each population to those in the least advantaged. This means, for example, that in Portugal more advantaged women smoke more than the less advantaged, whereas in Slovenia the reverse is so.

Source: Mackenbach et al., 2008.

wellbeing, major disparities in relation to social advantage and its links with disease risk factors such as smoking and obesity.

Spain, for example, has one of the least encouraging records on smoking and health in Western Europe. Yet in life expectancy terms it is apparently one of the most equal societies in the EU. Similar points could be made about the UK and obesity, even though the links between the latter and avoidable death and disability are of a different nature. One relevant conclusion to draw from such apparent paradoxes is that each national population, and the social groups within them, needs to be individually understood. The substantive determinates of variations in healthy life expectancy relative to overall life expectancy should be rigorously analysed, and effective local policies developed to achieve relevant and mutually compatible ends.⁵

The benefits of active ageing

The further development of effective health and allied policies to support active ageing should be based on a robust awareness of risk factors for and influences on disease and disability in later life. But before turning to this area, the benefits of individual and population ageing need further elucidation. Postponing the onset of significant ill-health and/or disability should enable older members of society to make more effective contributions to their families and communities. For example, in economic terms Mayhew (2009) has (as previously mentioned) calculated that improving HLE by one year in every ten could over two decades generate a 10 per cent saving in health care costs and a 15 per cent saving on benefit spending, other factors notwithstanding.

The same author has also highlighted the fact that per capita earning increases will also, macro-environmental conditions and other variables permitting, benefit individuals and the wider economy, assuming that improved health permits more people to work beyond the age at which they would otherwise retire. The success of recent steps to raise formal retirement ages for both men and women is partially dependent on increasing healthy life expectancies.

In broad order of magnitude terms, if it were possible (because of both better health and evolving working conditions) to move the age group aged 65-75 from what was once seen as the 'economically in-active' part of the community to the 'economically active' category, this would be equivalent to increasing the workforce available to countries like the UK by over 10 per cent. Such gains might in future be achieved without incurring major additional infrastructural, socialisation, educational and/or training costs.

This is not to say that a rigidly defined shift in the permissible retirement age should be imposed. But such illustrative figures are an indicator of the scale of the advantages that a positive and flexible approach to active ageing could in time confer on European society, and ultimately on the entire global community.

As well as participating more actively in the formal workforce, a healthier (and wealthier) older population ought to be able actively to participate in other ways. For instance, people aged over 65 already account for a third of all carers providing more than 50 hours of care per week. At the same time the value of informal child care given by grandparents may be almost £4 billion a year in England (ONS estimate). It has also been noted that many older people are already contributing inter-generationally by, for instance, sharing their homes and by directly transferring capital resources to their adult children.

In total, adults aged over 65 were estimated to have made a positive net contribution to the British economy of some £40 billion in 2010, after the deduction of pension, welfare and health service costs. As the 'baby boomers' retire net inputs will increase, probably to approaching £80 billion by 2030. Well focused policy approaches to further increasing the health of older people could lead to even higher 'pay backs' (Bazalgette et al., 2011).

The caricature of older people selfishly depriving their families of resources that in earlier generations would have been inherited earlier may be no more than ill informed prejudice, or a form of victim blaming (Thane, 2012a). It could also serve to obscure more genuine social concerns, such as the plight of disadvantaged families that are 'locked out' of access to wealth in every successive generation (Bury, 2012; Giles & Neville, 2012).

Age-related negative stereotyping can lead to older people being seen, and experiencing themselves as being, 'pointless' (Neuberger, 2008). There is also evidence that in the UK and elsewhere age related discrimination re-enforces such injustices through deprivation of opportunity (Select Committee on Economic Affairs - House of Lords, 2003; Sweiry & Willitts, 2012). Despite the achievements of the NHS, this is apparent in the health service along with other parts of British and wider European society.

For example, it was observed that only four percent of people aged 75 and over under the care of a stroke unit between 2004 and 2006 were given an MRI scan, in contrast to 26 per cent of those under 75 (Age UK, 2011). Similarly, recently released evidence indicates that up to half of all care home residents are currently denied good quality care (Care Quality Commission, 2012). No less seriously, it is also estimated that up to a quarter of hospital patients, the majority of whom are older people, could be better supported in their own homes or other more appropriate community settings if better community based services were available. Achieving this last is a challenge for all the stakeholders in twenty first century health and social care, including pharmacy and pharmacists.

⁵ It should be noted that seeking to ensure that longer life expectancy is not accompanied by an increase in poor health for older people has already been the target of UK government strategies, in particular Standard Eight of the National Services Framework for Older People (DOH, 2001b). But this falls short of establishing comprehensive evidence based life-long approaches to better health in later life.

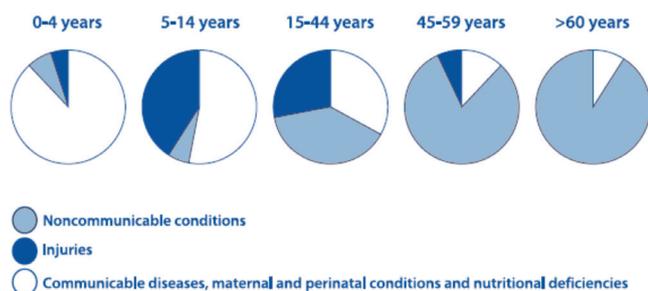
Disease and disability in 21st century Britain

Strictly speaking, virtually all forms of experienced illness are of mixed aetiology. However, for the purposes of this analysis the predominant causes of morbidity and disability may be broadly divided into three main categories:

- exogenous environmental factors such as infections, traumatic injuries and limitations imposed by potentially avoidable external (social and physical) barriers to the maintenance of satisfactory personal independence;
- endogenous variables, as in the case of diseases of 'pure' genetic origin like (arguably) sickle cell anaemia and cystic fibrosis (Box 3); and
- combinations of environmental and endogenous factors. These are most apparent in cases such as coronary heart disease and type 2 diabetes, and are also involved in a wide range of other instances. The latter range from Parkinson's disease to sustained depressive illness.

As Figure 2 (page 5) outlines, individuals who survive exposures to infection in early life and are free of major single gene and related disorders normally experience accumulating 'health insults' as their lives progress. From middle age onwards the mixed origin (life style plus multiple gene influenced) non-communicable diseases (NCDs) are responsible for the great majority of morbidity and mortality (WHO, 2002).

Figure 11 Leading causes of burden of disease, both sexes, 1998, low- and middle- income countries by age



Source: World Health Report 1999 Database

Figure 11 illustrates the fact that this pattern now exists in all countries, whatever their stage of demographic development. Some 60 per cent of all deaths globally are now due to NCDs. The reason for this being more apparent in regions such as Europe than in Africa is in large part due to it being 'laid bare' by the reductions that have been achieved in earlier life ill-health. However, the increasing wealth which, along with vaccines and medicines, has driven reductions in infectious disease burdens has also led to an increased consumption of many forms of 'luxury good'. These include not only harmful fats, sugars and tobacco products, but also the use powered transport and increased levels of domestic heating. 'Prosperity' has

Box 3 Genetics and health

Some commentators have suggested that, because of advances in genetics-based technologies such as tissue regeneration, the first person who will live to 1000 years has already been born. But this is probably an example of an unrealistic claim, which overstates the speed of genetic science advance and its capacity to change the human situation. In the coming decade a more likely forecast is that genetics linked research findings will complement existing knowledge and established diagnostics. This will allow the risks of developing non-communicable diseases (NCDs) such as coronary heart disease, cancer and rheumatoid and other forms of arthritis to be better defined, and to enhance preventive and early stage intervention.

Advances in genome-wide association studies and whole-genome sequencing are rapidly increasing knowledge of genetic variants associated, causally or otherwise, with disease states. NCDs seem typically to be linked with tens or hundreds of gene variants that interact with environmental and acquired behavioural and biological characteristics in various complex ways. Incorporating such information into existing risk-models (such as, say, the Framingham risk score for cardiovascular disease, or existing models of cancer causation) could be used to better target diagnostic, preventive and therapeutic activities.

Relevant testing could take place in settings such as pharmacies, as well as in doctors' consulting rooms and hospital clinics. For example, community pharmacies might offer genetic risk factor analyses to support the vascular and diabetes related health checks already offered in various settings. These could perhaps be linked to effective, personalised, health behaviour change and medicines use programmes. In this context pharmacogenetic knowledge should be able increasingly to inform prescribing and perhaps other activities, such as using vitamins and dietary supplements, to ensure greater benefit and enhanced contributions to healthy life expectancy.

However, critics of such approaches to health improvement warn of dangers such as 'medicalising' normal life, and of 'luring' people who are told that they are at low risk of developing NCDs into undue complacency. The position taken here is that such views should not be permitted to stand in the way of innovative service developments – see main text. But they deserve informed attention, as do concerns that wider access to genetic science informed care could, at least for a period, serve to widen rather than narrow social class related health inequalities.

as a result led to a complex mix of positive and negative health effects. Examples include increased levels of obesity, coupled with reduced levels of spinal and arthritic problems associated with lifting at work.

Changed ways of life have also altered the expression, recognition and experience of mental illness, albeit that important aspects of mental health care improve as societies progress through 'care transition' (Box 4). The key point here is that preventing or delaying for as long as possible the onset of disabling illness in later life is central to extending not only individual survival, but also active life expectancy for entire populations.

Box 4 Care transition

Care transition is a term that can be used to describe the social and economic changes that follow demographic and epidemiological transition. These vary between cultural settings, with the availability of new technologies and with the influence of particular events and individuals. But as societies move from high to low infant and other age specific mortality rates and from young to old population structures they tend to undergo common shifts in their values, attitudes, priorities and relationship structures. For instance, the social standing and accepted rights of women tend to become more equal to those of men in the later stages of 'development'.

At the same time health and social care provision characteristically moves in the direction of being publicly funded and universally available, as opposed to privately purchased and unequally available. Other types of change that seem systematically linked to societies becoming more secure, and the people within them being able to expect with confidence to enjoy long lives and have babies who will also survive and grow into able adults, range from shifts in sexually linked mores to population level differences in expressed intelligence and the perceived nature of professionalism (Taylor, 2011).

In pre-transitional societies homosexual behaviour, for instance, is often regarded as a crime. Yet in less pro-natalist, post-transition, value structures it tends to be respected as a normal life style choice. In the health care context the social distance between professionals and service users tends to reduce as the educational status of populations rise, and the focus shifts from saving acutely ill patients to prevention and helping people live well with chronic illnesses. The extended roles for pharmacists identified in this report on active ageing can be linked to such trends.

Against this background the remainder of this section of this UCL School of Pharmacy report presents a brief overview of the main types of chronic disease and disability occurring in modern Britain and their underlying causes. It is offered as a prelude to discussing how the extent, quality and (cost) effectiveness of life-long preventive, curative and disease moderating pharmaceutical and other forms of care provision can be increased. But before that two introductory points are worth highlighting.

First, responding to diagnosed biomedical conditions is of course important. Yet helping people to retain their ability to cope with and enjoy life may – as argued above – be regarded as the most important single goal of health and social care in ageing societies. Failures to appreciate this might sometimes have led to too little NHS and other health care system effort being put into addressing apparently 'minor' illnesses at an early stage, and systematically alleviating 'disability co-factors' such as pain and ill-defined mental distress. More investment has been made in the episodic treatment of defined diseases as and when their severity has reached a threshold level sufficient for it be judged medically 'serious' (see Gill et al., 2012).

Second, most people aged 65 and over are, despite being in later life, neither frail nor more vulnerable than other adults. Many prefer to be treated as normal every-day citizens, rather than having a special age-defined status. Further, when they encounter significant challenges in their ongoing biographies the contribution of professional services to their resolution is often brief and limited, as compared to the adaptive efforts of older individuals themselves and others central to their lives (Bury, 2012).

Adequately respecting this fact can be difficult. Even charitable and other well meaning groups may – through seeking to defend the interests of groups of older people in particular need – contribute to maintaining a situation in which older people are at risk of negative labelling and social exclusion. This can lead on to self confidence losses and avoidable reductions in their self care potential.

Long term illnesses

Long-term conditions can be defined as lasting for six months or more. They often involve a degree of functional impairment and disability and are often (by definition) incurable, despite the pharmaceutical and other advances of the twentieth century. Although current figures suggest that under a quarter of all NHS resources are spent on long term condition related outlays,⁶ the total costs imposed on society in the form of lost productive potential and formal and informal social care are considerably greater. In total, the economic burden of long term illnesses and disability occurring in people living in European Union societies can be realistically estimated at 10 per cent of GDP (authors' guideline estimate).

Coronary heart disease

CHD is primarily associated with the build up of plaque in the walls of heart arteries. It causes symptoms like angina and events such as myocardial infarctions, or 'heart attacks'. CHD incidence is associated with smoking, raised (LDL) cholesterol levels and high blood pressure, together with diabetes and factors indicative of inflammatory states. There is evidence that approaching one in ten adult men and about half that proportion of women currently alive in the UK have survived a heart attack. About a third of the population still have (notwithstanding the importance of aggregating vascular disease risks, because of their synergistic relationships) what may be regarded as inadequately controlled blood pressures – see, for instance, McMunn et al., 2004.

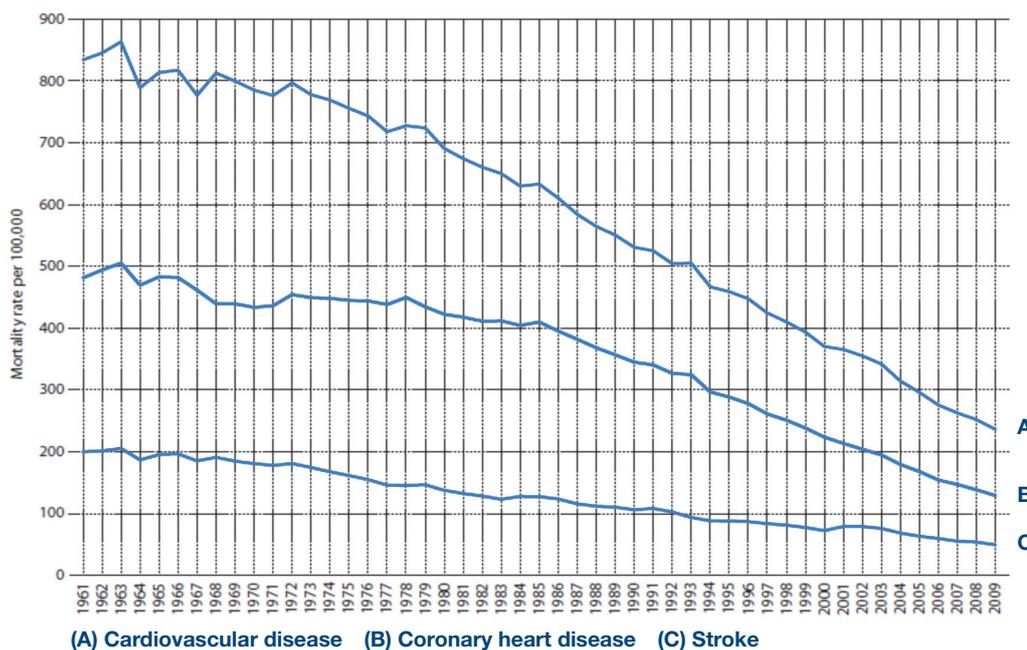
⁶ The methods best used for making such calculations are debatable. Other estimates are as high as 75/80 per cent. For instance, the extent to which the costs of acute interventions amongst patients affected by long term conditions should be included in the long term care category is not clear cut. The definition and allocation of end of life care costs is also disputable, albeit that they are likely to be relatively independent of variables such as life expectancy at 65.

Mortality due to both CHD and stroke has been falling in the UK for several decades (Figure 12). Deaths associated with heart attacks halved in England between 2002 and 2010 (Smolina et al., 2012). There have also been other positive trends. It has been observed that, for example, the long term prevalence of heart murmurs in people aged 60-74 reduced from 39 per cent in 1900 to 2 per cent towards the end of the twentieth century (Costa, 2002). Recently, age specific rates of vascular disease mortality have fallen in people diagnosed with diabetes, due to better treatment of both the primary condition and its consequences.

However, despite (or in some ways because of) this positive picture the prevalence of CVD and allied morbidity (including that caused by heart failure) in the older population remains high. This may be taken to mean that achieving a more effective use of medicines to prevent or slow the development of atherosclerosis and CHD should continue to be seen as an important public health priority in the decade ahead, alongside further support for protective life style changes.

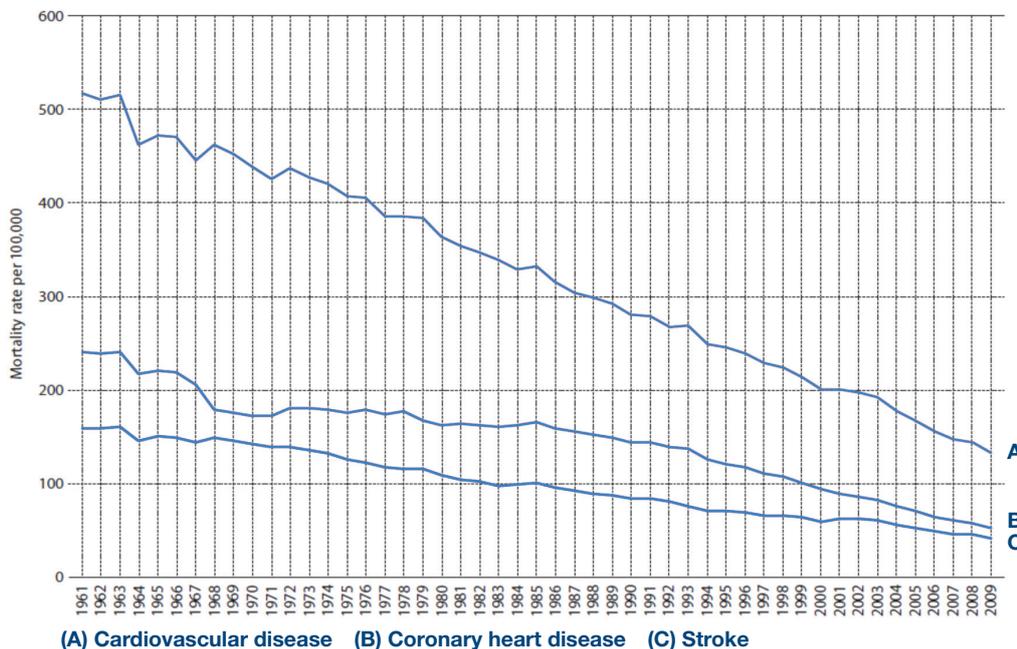
Figure 12 Age-standardised mortality rates for cardiovascular diseases 1961-2009 Great Britain

Male:



Note: Cardiovascular disease is the collective term for all diseases affecting the circulatory system (heart and blood vessels) whilst coronary heart disease is the collective term for diseases that occur when the walls of the coronary arteries become narrowed due to fatty deposits. The main manifestations of coronary heart disease are heart attacks (myocardial infarction) and angina.

Female:



Source: British Heart Foundation Trends in coronary heart disease 1961-2011

Stroke

Strokes are, as is widely understood, caused by blood flow blockages or by the rupturing of blood vessels within the brain. Risk factors include raised blood pressure, smoking (which is also the major cause of COPD) and age. Hence the prevalence of stroke related disability tends to increase as populations age, notwithstanding any offsetting social trends. Almost 4 per cent of men aged 55-64 have suffered a stroke, compared to 11 per cent of those aged 80 and over (Klijs et al., 2011). Overall, about one older adult in every ten in Britain has experienced such an event (McMunn et al., 2004).

The overall incidence of premature death from stroke is lower in England than in many other comparable countries (HM Government, 2009). However, sections of the British population (like men of Bangladeshi ethnicity) are at unusually high risk. Stroke remains one of the most important causes of avoidable major disability in the UK (WHO, 2004).

Without discounting the achievements of the NHS to date, the available data suggests that providing easier, earlier and 'normalised' access to means of reducing blood pressure remains a cost effective way of helping to enhance health expectancy in modern Britain, and in other parts of Europe. It might also lower the age specific incidence and prevalence rates for vascular dementias. There is also reason to believe that the further nationwide improvement of not only acute treatment but also rehabilitative care for stroke patients of all ages could cut residual disability levels.

Diabetes

The incidence and prevalence of both the main forms of diabetes is increasing across Europe. For the purposes of this paper trends in type 2 (age and obesity related) diabetes, are the most important. Over ten percent of men aged 75 and over in England now have a diagnosed form of this condition. Despite better treatment standards, type 2 diabetes remains linked to morbidities such as coronary heart disease and disabling strokes, visual impairment, renal failure and lower limb amputations.

The primary prevention of type 2 diabetes in part demands the success of population level programmes and policies such as those put forward in the 2010 (English) public health White Paper *Healthy Lives, Healthy People*. The latter (which arguably both built on and to a degree challenged the analysis previously offered in *Fair Society, Healthy Lives*) described an evolutionary approach to creating a less obesogenic and diabetogenic environment, in part via involving industrial partners in facilitating dietary and related changes.

Some commentators have questioned whether or not the strategy proposed will prove sufficiently robust in the regulatory context, and with respect to the use of price based interventions to influence consumer behaviour. However, the interpretation offered here is that from an extending healthy life expectancy perspective current policies may – although in many respects desirable – in future need to be more assertively combined with

interventions aimed at building greater complementarity between 'traditional' public health measures and medicines-use based population health improvement programmes.

Musculoskeletal disorders

The musculoskeletal disorders collectively represent the most common cause of severe long term pain and disability in communities that have undergone demographic transition. In addition to conditions affecting the spinal column, they include the various forms of rheumatoid arthritis and osteoarthritis and the consequences of inadequately treated osteoporosis.

It would be outside the scope of this report to attempt to offer a detailed review of this area. But it is worth stressing that:

- evidence based analyses suggest that conventional approaches to evaluating disease burdens and treatment utilities tend systematically to underestimate the relative importance of the rheumatic diseases. This implies that the value of therapies used to moderate their impacts (and co-factors such as pain alleviation) are also understated, in terms of not only their impact on healthy life expectancy but also overall life expectancy (see, for example, Jagger et al, 2007); and
- it is sometimes assumed that problems like joint deterioration must be fatalistically accepted, at least to the point where surgically based 'tertiary prevention' solutions are required. But this is not the case (Ellis, 2012). There is growing evidence throughout the field of arthritis care in favour of more pro-active approaches to MSK disability prevention – see Box 5. It provides an instance of a field in which the extended use of pharmacy services could enhance access to care relevant to extending health expectancies in a cost effective, and potentially cost saving, manner.

Neurological conditions

The two most widely recognised causes of neurological disability associated with ageing are Parkinson's Disease (which has an average age of onset of around 60 years and affects over a million Europeans, around 100,000 of whom live in the UK) and Alzheimer's Disease (AD). This last is the most common form of dementia. It currently affects approaching half a million individuals in the UK alone (Age UK, 2011). The incidence of AD doubles for every four to five year increase in age after 65. Hence it is a condition which to an exceptional degree will become more prevalent as the average age of the population rises, unless new preventive treatments are developed.

The scale of the health and social care challenges that currently predicted increases in the number of people with dementias across Europe will bring demands serious attention. At present it seems unlikely that – despite increasing public and private investment – fundamentally more effective new technologies for preventing or delaying the development of Alzheimer's

Box 5 Preventing and reducing the harm caused by arthritic disorders

The most important opportunities for the primary prevention of osteoarthritis (OA) lie in weight control. Knee and hip joint problems are around five times more common in people who are obese than those who are in 'healthy' ranges. While care needs to be taken in areas such as lifting weights and in competitive sports, exercise can also be beneficial. Studies show that people who are physically active typically appear to have, when imaged, more damaged joints than those who are inactive. But they often experience lower rates of pain, which is central to diagnosing OA, and disability (Ellis, 2012).

Sports injuries need careful attention because they can cause difficulties in later life. Yet people living with conditions such as lower back pain are normally advised to keep moving because undue resting significantly increases the risk of long term distress and functional limitations.

For people with rheumatoid (auto-immune response mediated) arthritis (RA), the greatest avoidable risk factor is smoking. This particularly affects the manifestation of some more aggressive forms of the condition. Many rheumatologists believe that individuals who smoke also respond less well to disease modifying anti-rheumatic drugs (DMARDs) such as (low dose) methotrexate and the anti-TNF drugs now available. As in OA, obesity and physical inactivity may accelerate deterioration and increase the degree of disability caused by RA. Better access to community pharmacy based and other services designed to improve pain management and promote smoking cessation and weight loss could therefore help reduce the burdens imposed by rheumatic disease in ageing populations.

There is evidence in the case of inflammatory arthritis that treatment within the first three months after symptom onset is advantageous. However, the early detection of such

disorders is often problematic, in part because it may be accepted by many of those affected (and by some health professionals) as part of 'natural ageing'. Community pharmacists could play an extended role in correcting this situation and helping to ensure more timely care in relevant cases of OA and RA. This would also be desirable in the context of other rheumatic disorders common in older populations, such as tendon and ligament abnormalities. The latter can if recognised early often be remedied, but may if uncorrected lead on to significant disability.

The early detection of osteoporosis is also important. Using a system called FRAX, ten year fracture risks can be calculated (there is also evidence that bone mineral density can be accurately assessed in suitably equipped community pharmacies – see Box 9, page 29) and preventive measures initiated. These include undertaking weight-bearing exercises, ensuring sufficient vitamin D and calcium levels, smoking cessation and reducing alcohol intake.

For those taking either self-purchased over-the-counter or prescribed medicines for arthritic diseases, pharmacists can also help facilitate safe and effective self-management and appropriate medicines taking through offering, for example, targeted Medicines Use Reviews alongside dispensing services. If and when more effective medicines become available for indications such as preventing cartilage loss there may well be an increasing need to combine better pain management with better arthritic disease management, aimed at further extending musculoskeletal health expectancy in ageing communities.

Note: the material in this Box is based on information provided by Dr Benjamin Ellis. Dr Ellis is a rheumatologist with a special interest in pain at Kings College Hospital and senior clinical adviser at ArthritisResearchUK.

Disease will become available in the current decade. However, even in this field it should not be assumed that morbidity compression will not in time prove possible. Relevant considerations include:

- about a third of all diagnosed dementias are vascular in origin. In this context improved population level risk factor control should have positive effects on age specific disease onset and progression rates; and
- the early detection of Alzheimer's disease and the provision of pro-active non-pharmaceutical support via memory clinics and other facilities could (provided that interventions are made with due sensitivity) help to delay losses of independence, and/or reduce the burdens placed on both family and professional carers. Better use of existing and (to the extent that they are effective) new medicines could prove beneficial in a proportion of cases. Established trends towards raised educational attainment in new cohorts of older people might also delay the mean age of dementia onset, although it is not as yet certain that such effects will be significant.

The cancers

In the UK age standardised cancer mortality rates remained roughly constant throughout the twentieth century. This reflects the fact that, notwithstanding the effects of carcinogens such as tobacco smoke and some forms of infection, cancer is predominately an acquired genetic condition associated with ageing. Reducing age specific mortality and morbidity rates will therefore in large part depend on earlier detection rates, coupled with more effective therapies.

An increasing proportion of cancers is now curable, or at least treatable in ways which are extending survival durations. This may now be contributing to extensions in (later) life expectancy in parts of Europe, albeit that presently the main drivers of progress in this field are smoking rate reductions. There are concerns that in the UK cancer mortality is not declining amongst older people in the same way as it is in Scandinavian and some other EU Member States. This implies an impaired access to services in this country.

Improvements in cancer prevention and therapies should ultimately extend HLE. But in the short term there is a possibility of increased numbers of people who have or have had cancer living on with disabilities that are part of iatrogenic origin. This will offset the individual and societal benefits of reduced age specific cancer mortality levels, unless more effective means of avoiding or modifying the unwanted consequences of treatment are found and applied.

Modifying environmental and lifestyle risks

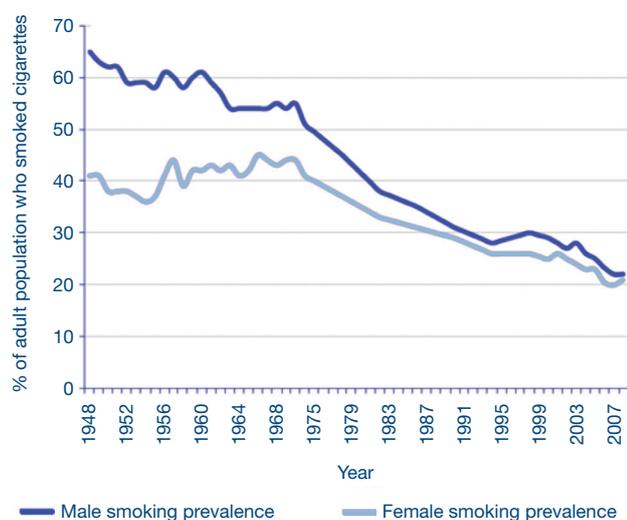
The four most widely recognised behavioural risk factors for conditions such as coronary heart disease, stroke, type 2 diabetes and the main musculoskeletal disorders are tobacco smoking, poor diet (including excessive calorific intake), frequent and high volume alcohol use and lack of exercise. Their impacts contribute to intermediate problems such as obesity and to physical impairments such as, for instance, macular degeneration (and hence loss of vision), along with the incidence of liver and kidney disorders and various forms of cancer. For example, raised lipid levels increase both breast and prostate cancer rates. Smoking, in addition to causing conditions like COPD and other lung and vascular system pathologies causes bladder cancer. COPD is presently the fourth largest cause of disability worldwide.

Although modern medicine and medicines are modifying the severity of many forms of life style related disease, and can be expected to become progressively more effective, there is a powerful case in favour of primary prevention (Box 6) whenever this is affordable and consistent with informed public preferences.

Tobacco use

Smoking rates in the UK have reduced significantly in the past 50 years (Figure 13). This has been to a degree

Figure 13 Smoking trends in Great Britain, by sex, 1948-2008



Source: GHS and ONS

Note: Data weighted after 1998

Box 6. Primary, secondary and tertiary prevention

Primary prevention can be defined as stopping disease processes before they start, or at least before they can be diagnosed. Vaccination and smoking cessation provide examples. Secondary prevention involves early stage detection and treatment designed to eliminate, or retard the progress of, identified disorders. Instances of tertiary prevention range from orthopaedic surgery to replace badly damaged hips in order to relieve pain and restore normal mobility to the treatment of established disorders such as Parkinson's Disease.

The prevention of non-communicable diseases is key to facilitating morbidity and disability compression. Prevention which reduces risk factor prevalence is often seen as the most cost effective approach, albeit that logically this is not necessarily the case. Tertiary prevention is normally expensive on a 'per case' basis. Yet the 'number needed to treat' is normally much lower than is so with other preventive interventions. In overall terms increasing cost effectiveness involves improving the ratio of (affordable) expenditure to quantified outcome gains. Less common diseases for which there are cheap and reliable cures may be best left to occur and then remedied.

Smoking remains the single most important modifiable risk factor for NCDs in adults of all ages. Conventional public health protection methods include – in addition to generally informing people about its hazards – increasing taxation to raise prices and so lower consumption, stopping smoking in public, curbing tobacco product supply to younger people (even if in some circumstances this type of intervention can have paradoxical consequences), placing highly visible health warnings on cigarette and other tobacco product packets and banning advertising. Similar sets of measures can be employed in areas ranging from reducing alcohol usage to encouraging healthier dietary habits.

Much political debate on public health policy centres on the extent to which it is appropriate to interfere with free choice, and impose controls such as, say, seat belt laws. However, other important areas for discussion include the extent to which drug products (such as 'safe' nicotine presentations for long term use by tobacco addicts, or other medicines designed for mass use in ways comparable to taking vitamins) will in future be central to extending healthy life expectancies beyond 'natural' limits.

The extent to which services provided by professionals such as pharmacists and organisations like pharmacies should be used to augment conventional public health programmes is questioned in some circles. Some critics regard such activities as 'cheap' and undesirable forms of medical care. Extended pharmacy service proponents may, by contrast, see them as innovative forms of public health care, which can in post transitional communities offer health improvement opportunities outside the established boundaries of 'the medical model'.

because of pharmacy based cessation support coupled with the availability of NRT (nicotine replacement therapy) and other medicines. Such products can double the impacts of attempts to stop smoking, and also facilitate reductions in tobacco usage. Nevertheless, some 20 per cent of British people still smoke, and average rates are higher in many other EU countries. Because smoking cessation has been notably successful in more advantaged sections of the UK community it has contributed to increased health inequalities.

Many members of the public believe that the major risk from using cigarettes is lung cancer. But far more smokers develop cardiovascular diseases and COPD. Tobacco use causes a fifth of all heart disease worldwide. It tends to decline with age, in part because of high rates of early mortality in the heaviest smokers. The English Longitudinal Study of Ageing (ELSA) found relatively high rates of smoking in the 50-54 age group and the lowest in people aged over 80 (McMunn et al., 2004).

The available data on tobacco use may have mixed implications regarding future trends in the ratio between LE and HLE. But they nevertheless imply that the sooner before the start of later life that tobacco users quit smoking the better their chances of living for longer and more healthily than would otherwise be possible.

Alcohol

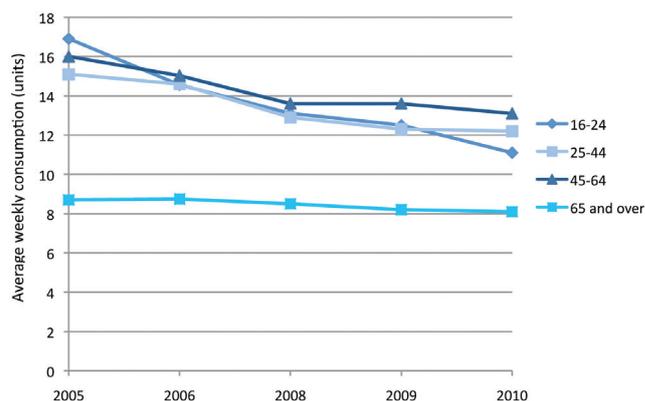
Alcohol consumption, which is higher per capita in Europe than any other world region, has been estimated to be the root cause of almost five percent of the global burden of disease (Rehm et al., 2009). However, unlike the situation with tobacco, there are health advantages associated with moderate alcohol use. In overall terms alcohol intake amongst older people is (despite problems such as binge drinking amongst younger groups) positively rather than negatively associated with social class.⁷

Reported alcohol consumption by older people appears in the main to be relatively modest. The ELSA study data, for instance, indicate that 6 per cent of men aged over 65 and 3 per cent of women drink more than twice a day (McMunn et al., 2004) (Figure 14). Against this, the risks of regular high volume alcohol use should not be ignored, not least in the contexts of obesity, hypertension and vascular disease.

Population wide reductions in current alcohol intake (as distinct from more targeted individual and group interventions, into which recent minimum unit pricing reforms introduced in Scotland and elsewhere may in practice fall) would probably generate health benefits in excess of the total benefits foregone for all age groups. However, the data supporting this judgement is less conclusive than may sometimes be assumed. As in many other health promotion related areas, unduly intrusive, rigid or prescriptive approaches could well prove counter-productive, particularly if they were to label older drinkers as a section of the community in need of special protection.

⁷ In the nineteenth and early twentieth centuries was also true for tobacco use, until the more advantaged sections of the population became informed of its dis-benefits and motivated to act on this knowledge.

Figure 14 Average weekly alcohol consumption (units) by age 2005-2010



Source: General Lifestyle Survey, ONS

Note: Figures from 2005 include the last quarter of data from 2004/5 due to survey change from financial year to calendar year. Figures for 2009 and 2010 were produced using an updated method for calculating units of alcohol.

Nutrition

Dietary quality and factors such as variations between food cultures influence the health status of individuals and populations in a wide variety of ways. Most obviously, excessive food intake relative to the amount of physical activity undertaken causes obesity. This in turn increases vulnerability to long term illnesses such as diabetes and arthritis in later life. Joint disorders affecting the hips and knees are some five times more common in obese individuals than in those with Body Mass Indices judged to be 'healthy' (Ellis, 2012). Likewise raised rates of vascular disease may – at least on the basis of past experience – cause severely obese people to lose up to 20 years of life expectancy (Olshansky et al., 2005).

When exposed to the eating habits and life styles of the modern British population, people with south Asian genetic heritages appear to be at particular risk of developing type 2 diabetes. Other illustrations of the associations between nutrition and health and illness range from the well established links between saturated fat intake and vascular diseases and sodium chloride (salt) intake and raised blood pressure (especially amongst some groups of people with an African genetic origin). There are in addition observed correlations between low fresh fruit consumption and low vitamin C and D blood plasma levels and a range of other conditions.

The message of such evidence is that at all life stages reducing the proportion of people who are obese will increase both life expectancy and healthy life expectancy. Success in this context should improve the quality of many older individuals' lives. However, as in most other areas of public health improvement, a degree of caution is needed in pursuing progress. For example, for many people in later life eating (and weighing) too little is in fact more of a problem than eating too much. Being underweight has been associated with functional decline (Stuck et al., 1999), while being overweight in later life (as

measured by having a body mass index of between 25-30) has by contrast been linked with lower than average disability and mortality rates (Manton, 2008; Christensen et al., 2009).

There are also significant uncertainties relating to claims such as those to the effect that eating more portions of fruit and vegetables (over and above current averages) will significantly improve the health of children or adults. Observed correlations are not necessarily indicative of causality. For the purposes of this report the most important conclusion to draw is that evidence based approaches are needed throughout the health policy field. There is no doubt, for instance, that vitamin and other dietary supplements can protect the health of older (and other) adults in some circumstances. But this cannot justify their unscientific usage.

Physical exercise

Similar points apply to the relationships between physical exercise and health. It is clearly the case that taking appropriate physical exercise is for most people a desirable and enjoyable aspect of active ageing. Amongst adults inactive people have a 20-30 per cent higher all-cause mortality compared with those who take 30 minutes of moderate exercise on five days each week (Lee & Skerrett, 2001). Lack of physical activity has also been associated with an increased risk of functional decline in older people (Stuck et al., 1999). There is also evidence that people with arthritic conditions such as lower back and joint problems benefit from remaining active, not least in terms of experiencing reduced pain.

Yet the mechanisms associated with such linkages are complex. Criticising or blaming older (or other) people who choose not to take part in physical activities might well be as counter-productive as denying others the 'normal life opportunities' that engagement in exercise may bring.⁸ It is also true that inadequately treated sports injuries and the unwanted after-effects of activities such as weight lifting and competitive running can contribute to conditions such as arthritis in later life.

Addressing the challenges of longer life

According to the WHO, effective support for 'active ageing' should seek to optimise '*opportunities for health participation and security in order to enhance quality of life as people age*'. For the purposes of this UCL School of Pharmacy policy analysis, achieving this end in not only the UK and Europe but in time world-wide will require three fundamental forms of development. They are:

- 1. Broadly defined public health, medical, nursing and pharmaceutical interventions, aimed at continuing to enhance life and healthy life expectancies.** In some past contexts too little public attention was perhaps paid to the former, as compared to pro-actively seeking to extend healthy life. Welfare policies may as a result have been distorted regarding fields such as the amount of spending on activities like rehabilitative and 'maintenance' community based care. However, it would be inappropriate to suggest that improving the HLE/LE ratio could desirably be achieved at the expense of life saving services for any section of the population. Appropriate national and regional performance metrics should encompass not only measures of disability free survival duration, but also the absolute length of life.
- 2. The removal of discriminatory barriers to older people – whether or not they are pension holders – being able, if they wish, to take part in normal economic and social life with the same rights and responsibilities as other citizens.** In transitional stages such a social change may threaten to have deleterious impacts on younger members of the community in much the same way that increased employment and other rights for women could in the past have been thought to disadvantage working men. Any resultant inter-generational tensions ought, as and when they emerge, to be fairly addressed. However, there would be relatively little long term social benefit derived from extending HLE if this is not expressed in terms of greater personal choice, and significantly improved aggregate (formal and informal) productivity amongst the older population.
- 3. The further establishment of efficient and effective support for people who are, at any stage in their lives, facing disabilities and problems such as reduced incomes and lost independent living skills.** Relevant provisions include equitable and affordable funding arrangements for long term care (Box 7), coupled with the availability of well integrated (effectively co-ordinated) health and social services to support independent community living. In the UK the NHS has offered universally available medical care, and served the needs of most 'working age' individuals well. But for both politically and professionally mediated reasons the British record on social/long-term care for older people with disabilities that limit their independence has been relatively disappointing. It may in some respects reflect facets of the Victorian Poor Law that the creators of the welfare state had hoped to expunge.

⁸ Likewise in the case of children and exercise there is some evidence that, for example, increased levels of exercise in schools will to a degree be counter-balanced by decreased activity levels in other settings (Taylor et al, 2006). The impacts of being overweight in childhood on later life health are less certain than is sometimes suggested. However, cardiovascular and muscular fitness are arguably desirable at all ages, while frank obesity is potentially harmful at any age.

Box 7 Social care funding

Unlike health care, social care is not free to all at the point of use. There is a means tested system whereby people with assets over £23,250 (including any property) receive no state financial support and are responsible for funding their own long term care. As a result about one person in every ten of those currently reaching aged 65 has to pay £100,000 or more in social care costs before they die. Individuals and families affected by illnesses such as dementia and similarly disabling disorders are particularly likely to be significantly disadvantaged.

The Dilnot Report (Commission on Funding of Care and Support, 2011) was tasked with investigating alternatives. Its recommendations centre on creating a lifetime payment cap of £35,000 on social care contributions, with any additional costs to be covered by the State. Its other proposals involve new deferred payment arrangements (to allow costs to be recouped from the sale of properties after the deaths of their owners), an increase in the asset threshold for receipt of 'free' residential care to £100,000 and more consistent and fair national eligibility criteria for access to publicly supported social care. Andrew Dilnot concluded that the scheme would cost an additional £1.7 billion in England (Scotland already affords reformed arrangements) and would protect anyone from losing more than 30 per cent of their assets.

Parliament's Health Select Committee is presently concerned with this topic, and a government White Paper is due for publication in the first half of 2012. It has been suggested that this may propose a relatively high social care payment cap of £50-60,000 (Donnelly, 2012). Sources close to the Dilnot report appear to feel that this would be viable in terms of achieving the key social justice related goals of the proposed reforms, but that going much beyond this level would negate their effectiveness (Tolley, 2012).

In the context of population ageing the original architects of the NHS arguably under-estimated the importance of universal and equitable access to long term care associated with chronic health conditions and the sequelae of events such as strokes. Continued investment in pharmaceutical and other innovations capable of extending health expectancies may well be judged vital. The past impact of, for instance, new medicines for tuberculosis (which at the time of the NHS' original establishment was threatening to overload the new service because of the growing prevalence of disabled TB survivors) illustrates what more effective treatments might in future achieve in the context of, most notably, Alzheimer's disease. But this should not undermine awareness of the need for a robust and fair social care system.

To put the costs of the proposed improvements into perspective, current outlays on long term care for older people stand at about £20 billion annually including both residential and community support (Laing 2012). This is rather less than 1.5 per cent of GDP. Despite the current pressures on the UK economy, it seems unduly negative to suggest that a 10 per cent or even greater increase in the costs of caring better for the minority for whom living longer may presently seem more like a curse than a blessing should be rejected as unaffordable.

Many aspects of social and industrial policy could influence the degree of success achieved in such fields. One important task is that of communicating effectively to political decision makers and the public the fact that as people live longer they tend in age specific terms to be healthier than their predecessors. This means that population ageing is not the negative development or 'problem' it is sometimes portrayed to be.

Another relates to computer literacy. There is evidence that older people can benefit from educational investments aimed at enhancing public abilities to use information and communications technology (ICT). As European societies become more reliant on the internet and ICT the 'digital divide' between generations could increase, unless positive measures are taken to prevent such an inter-generational pattern of disadvantage (The Futurage Group: European Commission, 2011).

Many initiatives have been introduced with the intention of protecting the interests of older individuals who are at risk of being isolated from the wider community. One example that is relevant across Europe is the provision of free public transport for 'the elderly', albeit that in terms of inter-generational equity it may in this instance become increasingly debateable as to whether or not such benefits should be available to everyone above a specific age, regardless of their employment status and income.

There are also examples of European initiatives designed to prevent the social exclusion of older people (which in some circumstances directly impacts on their health status as well as their psychological wellbeing – see, for instance, Iliffe et al., 2007) through promoting increased levels of contact with younger individuals (Box 8). At the governmental level a specifically British illustration of an attempt to further enhance support for older people was the establishment of the 'LinkAge Plus' programme in 1997. It sought to forge better links between different parts of central government, local authorities and the voluntary sector. The aim was to engage with older people in order to understand their needs and expectations better and improve the available support.

Additional policy and service improvement opportunities range from the desirability of building increasing flexibility into State pension arrangements (in order to allow for more variation in retirement ages and strategies – Thane, 2012a; Thane, 2012b) through to measures designed to reduce the rates of crime which undermine the security of all citizens, and can particularly affect older people.

There is also an arguable need for more comprehensive later life vaccination programmes across much, if not all, of Europe (Michel et al., 2009). These could enhance the protection of individuals and populations from preventable causes of (often long term) morbidity and mortality such as pneumonia and shingles, and shelter older populations from the effects of declining immunological defences.

As explored again later in this policy briefing on active ageing, there are also significant and – although affordable – as yet not fully exploited opportunities for

Box 8. EU approaches to supporting active ageing

Alongside resources such as day care centres for older people where individuals can, if they wish, socialise with contemporaries, and may utilise services such as having washing done and meals served, there are many examples of EU Member State programmes aimed at fostering greater social inclusion and intergenerational contact and solidarity. For example, there are initiatives in France that encourage and support older people who want to holiday with their children and grandchildren. In Austria, another type of initiative enables students to live with older individuals and to take part in helping with household tasks and other activities of daily living. There is a comparable UK programme called *Homeshare*.

Other reported instances of measures intended to reduce the risk of age-based social isolation and exclusion and to promote better communication between age groups include 'adopt an older person' schemes in countries such as Poland. One illustration provided there links young single mothers with older women living in institutions. Cyprus, in contrast, has a 'Parliament for the elderly', while in Ireland there are examples of schemes designed to involve older people in running services they use (Hoff, 2008).

Many more instances of positively intended initiatives to improve older person's care and support and reduce the threat of isolation from their wider communities are available. However, as populations continue to age and societies adjust to this reality, perhaps the most important cultural task is to improve the every-day situation of older people. The ultimate aim is to engender progressively less need for special measures to enhance otherwise unsatisfactory existences. With regard to this end, Scandinavian nations such as Sweden and Denmark offer important examples of communities which, because of development in a multiplicity of fields, are relatively well placed to provide environments in which active ageing is a normally shared expectation at every stage of the average person's life.

preventing or delaying the onset of conditions such as symptomatic vascular disease (Wald and Misselbrook, 2011) and type 2 diabetes. (See, for example, Brennan et al., 2012; Narayan et al., 2012; Zhuo et al., 2012). An important element of such strategies involves extending pharmacy and pharmaceutical care delivery that is aimed simultaneously at changing life styles and using medicines more effectively. However, the remainder of this section focuses on issues relating to supporting self care and improving the integration of services for older service users who have either lost elements of their ability to live independently, or may be close to doing so.

Encouraging self-care

There is an extensive literature relating to various aspects of self care and self management facilitation (see, for instance, Newbould et al, 2006). Although there is no universally agreed nomenclature, 'self-management' can be taken to refer to those actions that individuals take to manage conditions (like, say, diabetes or anxiety

and depression) that affect them, in order to as far as possible maintain their quality of life. Clinicians often approach self care from this perspective. Many are concerned to impart condition specific knowledge and competencies to 'patients'.

The term self-care may be used to encompass a wider set of autonomous behaviours which people of all ages and in all states of health undertake to prevent the onset of illness or disability and to promote their own, and in some contexts their families', wellbeing. In respect of this second definition, many researchers have emphasised the importance of raising self-efficacy (that is, context specific self confidence) in relation to dealing with health related matters.

Rather than imparting specific forms of knowledge and expertise, proponents of this approach are typically more concerned to offer people with long term conditions role models that exemplify an ability to live well with conditions like, for instance, arthritis. They also seek to provide 'mastery experiences'. These involve successfully achieving agreed personal goals in areas such as independent living and the normal enjoyment of life.

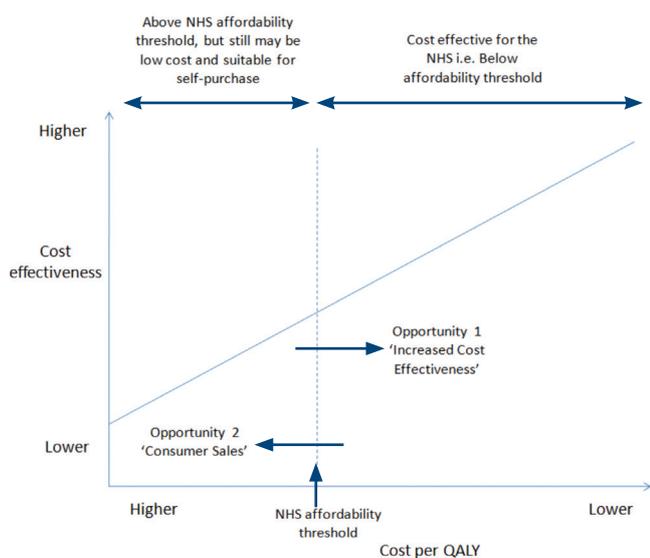
It is possible to pursue these differing types of self-management and self-care approach in combination, provided they are adequately understood and that 'instructive didacticism' (which can on occasions be found in pharmacy, as well as other, settings) is not permitted to inhibit the development of self reliance and assurance. Supporting self-care and self-management are important health policy and service delivery ends. For example, in England documents such the National Services Framework for Older People (DOH, 2001b) placed emphasis on the benefits of individuals, their families and as appropriate their informal carers taking an increased personal responsibility for maintaining their health to the best possible level.

A central tenet of much modern health care is that it seeks to promote full public engagement in health improvement, through emphasising that '*individuals are ultimately responsible for their own health*' (Wanless, 2004). However, there is evidence that the majority of older people are already seeking to be responsible and live as independently as possible (Parsons et al., 2010).

Without greater community-wide internalisation of health improvement imperatives many forms of professionally delivered care, including not only conventional public health programmes but medicines based treatments, will inevitably have sub-optimal outcomes. Promoting self care competencies can also reduce health service costs. (DOH, 2005). Nevertheless, there are also circumstances in which greater service user 'empowerment' can drive up costs, because of increased service utilisation. There is in addition a danger that if health and social care professionals and service users come to believe that self care (including self medication) is being advocated simply because it transfers costs on to people seeking to cope with illnesses as best they can, then potentially beneficial social trends could well be slowed.

Pharmacies and pharmacists throughout Europe can reasonably be expected to in future play a greater role in supporting self-care and self-management than is presently so. In the UK this might, as Figure 15 illustrates, involve them in supplying NHS funded services more cost effectively than has to date been possible, or entail their offering for consumer purchase interventions that – although generally affordable on an item by item basis – are considered outside publicly resourced supply criteria. But if moves in such a direction were perceived to be a threat to the NHS and valued institutions such as GP care, or alternatively as an abdication of responsibility on the part of health care commissioners/funders, they would at best be unpopular and very probably unsustainable.

Figure 15 The economics of extending pharmaceutical care



A more integrated future?

Regardless of the age they happen to be, as most people near the end of their lives they experience increasing frailty and declining abilities. As discussed earlier, they also tend to develop complex comorbidity related medical and pharmaceutical care requirements. These present a challenge for medical and other professionals, and to older people themselves. For example, people living alone may be at particular risk of having difficulties with taking their prescribed medicines in the right combinations at the right times of day.

Depending on the health care and wider social environment in which they live, individuals in the later stages of life are at raised risk of hospital admission⁹ and/or being admitted to nursing or care homes. As

9 There are several discrete phenomena involved in this context. The most important is arguably that relating to avoidable unplanned 'crisis' admissions, which better integrated services could help to prevent. Another relates to end of life care, the costs of which may vary with the financial incentives influencing its providers. Claims that in the order of a half of the typical individual's life time health care costs are incurred in the last year of life are questionable in the UK. Twenty-five per cent is probably a more realistic estimate. But what is indisputable is that good quality palliative and terminal care delivered in the setting the dying person prefers is an essential part of any satisfactory health care system.

with self-care, part of the objective of seeking to extend healthy – disability and handicap free – life expectancy and improve the quality of community support is to minimise avoidable institutional costs.

The positive achievements of health and social service staff in England and elsewhere deserve recognition. Yet at the same time there are concerns about many aspects of the community and institutional care available to older people (Farrar, 2012; Goodwin, 2012). In the community setting, for instance, there is evidence of fragmentation of effort, and limited communication between GPs, community nurses, community matrons, social workers and other NHS and local authority staff. Consequent discontinuities can result in people with complex or urgent care needs falling through the 'cracks' that divide primary and secondary care, and NHS and social care (Donnelly, 2012).

As individuals' support needs tend over time to increase, the capacity of GPs and their practice based staff to act as care co-ordinators may become over-stretched. Avoidable crises can result in needless admissions to long term care, in part because alternative solutions are not organised in a timely manner. Resource shortages of all types exacerbate such problems. So too do the existence of unduly rigid functional (and linked budgetary) boundaries between care providers, and inflexible task oriented rather than patient/client centred approaches to managing services (Gill and Taylor, 2011). These risk putting 'middle-management' priorities ahead of those of service users, and disempowering those who work directly with them.

The term 'integrated care' can mean many different things. For example, it may be applied to systematically mapping and co-ordinating (via IT based means) the progress of a population of service users along diagnostic and care pathways within secondary and tertiary care environments, or from and back into primary care and self-care. It may also be used to refer to 'structural' integration defined in terms of combining services into larger hierarchically organised systems, or to co-ordinating over time each person's care and support in an individually tailored manner. This last approach can involve as many discrete providers as may be judged necessary and is typically more personal relationship than 'system' based.

There are overlaps between these different cost and quality related strategies, which can (again if well understood) be employed in complementary ways. In the UK the managed pathway approach is arguably more typical of external commissioning by bodies such as PCTs and their successors and large Trust management systems. Personal relationship based care co-ordination has been characteristic of GPs working in the NHS.

It would be beyond the scope of this study to seek to analyse the challenge of improving health and social care integration in depth. However, there are a number of observations that are particularly relevant to answering questions like 'how might community pharmacy

contribute more to the care of older people who are particularly vulnerable, and to promoting active ageing and increased health expectancy for all?’ They include:

- there is no satisfactory evidence that structural integration alone is likely to enhance care quality for older people with complex needs, or any other group of service users;
- merging functional budgets, creating more opportunities for co-locational and team working and forming supportive alliances between service provider groups (which may be seen as virtual integration – Ham & Curry, 2011) has more potential for service improvement (Xyrichis & Lowton, 2008). This has been exemplified in instances such as the formation of the Torbay Care Trust. However, the retention of performance gains may in such cases be more dependent on key personal relationships and championships than is sometimes realised;
- there is relatively strong evidence that named patient case management systems involving the delegation of care quality responsibilities to specific individuals who are in direct contact with the people being cared for and in a position to make substantive decisions can improve care co-ordination and outcomes (Low et al., 2011); and
- there is also evidence that in Britain many older people prefer GP-led care to other models of health and social care provision (see Parson’s et al, 2010). At the same time it also appears to be the case that GPs are, when acting without the support of colleagues such as community nurses, not always able adequately to co-ordinate the support of older people for whom they believe themselves to be responsible (Colin-Thomé, 2011). It is possible that service users’ views

would change were they to experience alternative satisfactory patterns of care. But very old people in particular are likely to have relatively little time left to them to develop new preferences.

It may be concluded that better care-coordination for frail and other older people with long term care needs who are living in the community is in the UK most likely to be achieved by building on the strengths of the existing GP systems, principally in ways that permit specialist and multi-disciplinary nurses and nursing teams (Goodwin, 2012) to contribute to general practice based care in evolving, and progressively more effective, ways.

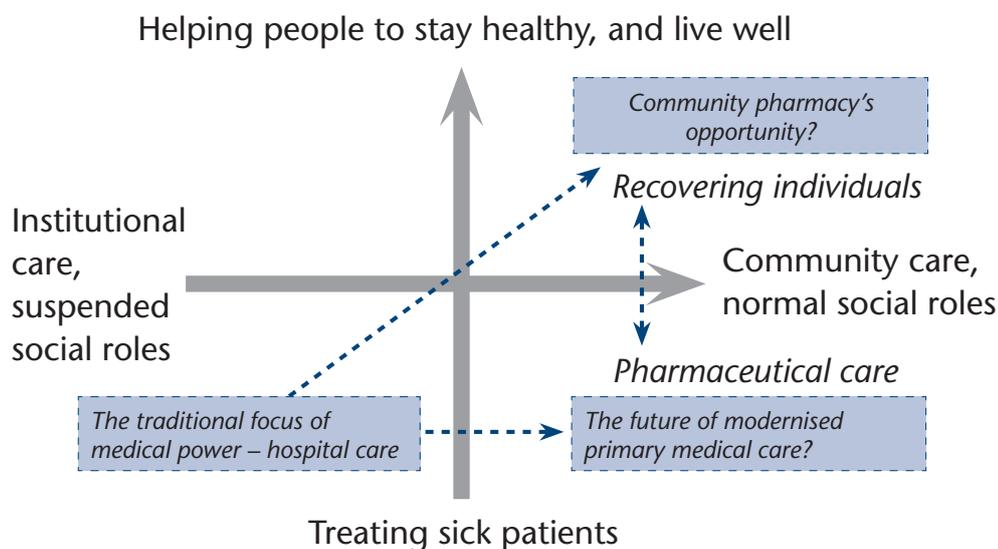
Extending pharmaceutical care

Pharmaceutical service providers seeking to strengthen their support for active ageing and to promote increased healthy life expectancy have a range of opportunities. Figure 16 describes them diagrammatically.

For the majority of people in middle and later life, perhaps the most vital promise of extended pharmaceutical care is that it will help delay or prevent the onset of disabling long term illnesses. For those who develop chronic or acute conditions it offers their convenient and cost effective management.

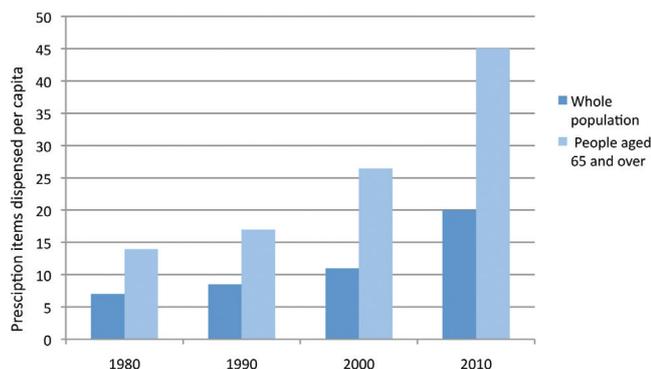
For the minority of people living with complex needs and more severe forms of illness and disability in their own homes and other settings, better pharmaceutical care could, when delivered alongside appropriate medical and nursing support, contribute to improved outcomes. There is evidence (not only from the UK but from countries such as The Netherlands – Bouvy et al, 2011) that good quality pharmaceutical services and enhanced care at home services also moderate hospital workloads.

Figure 16 Opportunities for enhanced pharmaceutical care



Prescription medicine use is rising more rapidly amongst people aged over 60 than in the rest of the community (Figure 17). One recent study found that in England only 12 per cent of older individuals were not taking any prescription medication at any one time. By contrast, 32 per cent had taken between one and four different types of drug during the preceding year and 23 per cent had taken ten or more (Hippisley-Cox et al., 2004).

Figure 17 Number of prescription items dispensed per capita for the whole population and for those aged 65 and over, 1980-2010 (England)



Source: Department of Health

Note: Data for 2010 is projected from trend lines.

Given such trends, the role of community pharmacy will throughout the foreseeable future remain in large part centred on the safe and reliable dispensing of medicines. Notwithstanding the computerisation of prescribing and other aspects of pharmaceutical supply, and the possibilities this creates for new models such as centrally preparing prescriptions and delivering them 'ready packaged' to pharmacies or other destinations, many older (and other) medicines users will continue to value, and benefit from, local access to their pharmacists. Despite the growth of home delivery and to a lesser degree internet pharmacy, pharmaceutical care is often provided when prescriptions are collected.

As individuals age their reactions to treatments change, even when they remain vigorous and free of significant disability. This raises adverse drug reaction risks (Spinewine et al., 2007). The need for well informed and individualised approaches to medicines management is therefore increased as populations age, and as an increasing proportion of people with complex needs lives independently in the community.¹⁰

Non-adherence in medicines taking also impairs health outcomes. Many older people go to considerable lengths to ensure they use prescribed pharmaceuticals correctly. It would be wrong to suggest that either volitional or non-deliberative non-adherence is necessarily more

prevalent amongst older people than other sections of the community. Yet a minority of older individuals clearly have special support needs. Appropriately targeted home and pharmacy delivered Medicines Use Reviews by pharmacists can, together with offering other benefits, help to find and resolve problems with medicines taking (Wynne & Blagburn, 2010). Additional initiatives, such as in England the recently introduced New Medicines Service, should help pro-actively to prevent other medicines taking related difficulties from occurring – Box 9.

Adding greater value to medicines supply

As Box 9 also outlines, many community pharmacists have in the last decade sought to offer what may be termed 'public health' services. Payments for advanced and enhanced services of all types still account for less than 5 per cent of total NHS pharmacy revenues in England. Yet their development is an important priority for community pharmacy throughout the UK, and in some other European countries. In Scotland, for instance, initiatives such as the Chronic Medication, Minor Ailments and Public Health services introduced there are increasing opportunities to share care with GPs and their practice colleagues, and to build clinical pharmacy capacity in the community. Examples like that provided by the Scottish Chronic Medication service have potentially important implications for the future of pharmaceutical care elsewhere.

The establishment of Healthy Living Pharmacies (HLPs), of which there are now over 100 in England, is also of interest in contexts such as extending health expectancies. Initially, their focus has been on improving premises quality and existing service provision, and strengthening the health gain and customer welfare focus of pharmacy staff teams. Over time HLPs may also lead to a wider range of screening, diagnostic and case finding services being available in pharmacy settings.

In (health) economic and allied primary care policy terms there are strong arguments in favour of moving 'risk management' activities out of medically managed settings, in order to help ensure that highly trained doctors' time is used as productively as possible (Starfield et al, 2008). Extending pharmaceutical care could permit GP practice based primary care teams to deliver more complex care outside hospitals and specialist out patient clinics, and so to free capacity in those settings.

However, the challenges that may have to be faced before this is can be achieved include:

Overcoming the consequences of the European economic crisis

The financial austerity now affecting most European Union countries is impacting on many health and welfare services. In the pharmaceutical supply chain the actors affected range from research based and generic medicine manufacturers to pharmaceutical wholesalers and retail pharmacists. Product and service prices and profit margins (which in the case of community pharmacy have also been affected by the genericisation of much medicines use

¹⁰ Pharmacists' professional work in this arena has been guided by resources such as the Department of Health NSF linked report *Implementing Medicines-related Aspects of the NSF for Older People*. This described a number of ways in which the use of medicines for and by older people can be improved (DOH, 2001a). The management of repeat dispensing by pharmacists has worked well in England in some localities. However, the nationwide uptake of such arrangements has been limited.

Box 9. Community pharmacy and increased health expectancies

In order to add extra value to their dispensing and related medicines supply services, community pharmacists are pioneering innovations in many parts of Europe. The examples below focus on those offered by Boots pharmacies in England. But they are representative of the types of extended role pharmacists working in many settings in many parts of the Union are today aspiring to develop. (A detailed review of EU pharmacy development is being prepared by the PGEU, the Pharmacy Group of the European Union.)

Medicines Use Reviews (MURs) and the New Medicine Service (NMS) are already nationally funded in England. They build upon pharmacists' established expertise in understanding medicines' actions and supporting medicines users, and have some parallels in countries such as The Netherlands. The benefits of targeted MURs and the NMS (which enables pharmacists to provide special support to people starting new long term treatments) have yet to be fully evaluated. But they should include improving medicines taking and so decreasing the risk of medical crises and unplanned hospital admissions, along with gains such as reductions in medicines wastage and improved adverse drug reaction reporting.

Boots pharmacies also offer services such as smoking cessation on a locally supported basis. Boots is Europe's largest provider of nicotine replacement therapy and is investing in further enhancing the effectiveness of the psychological support provided to smokers who wish to quit. Across the country Boots pharmacies are also providing publicly and privately funded services ranging from chlamydia screening, anti-coagulation testing and contraceptive and sexual health care provision to phlebotomy, dietetics advice, acute back pain clinics, dermatology, children's ophthalmology, pain management, physiotherapy, podiatry and bone density screening (Newbould & Taylor, 2008; Taylor & Newbould, 2009; Taylor & Davies, 2010).

A number of Boots pharmacies also offer a service for people with BMIs over 30. It involves pharmacist led consultations, the supervised use of the medicine orlistat, behaviour change support and access to the successful Tony Ferguson weight loss programme. The initial goal is to facilitate a five percent body weight reduction in the first three months.

Like other NHS and privately funded pharmacy service providers, Boots pharmacies today offer accessible 'health checks on the high street'. These to varying degrees involve gathering family history and health behaviour information plus specific measurements of blood pressure, body mass and waist circumferences, lipid levels and blood glucose levels. In some localities such checks have been available to Boots customers since 2004. The company is presently able to offer NHS health risk checks to people aged between 40 and 75 and service user-funded checks for people below the 40 year old threshold and those who want more regular checks than the health service funds.

outside hospitals) are under pressure, in part because of intensifying competition (Kanavos et al, 2011).

At first sight some people may think this desirable. But there are dangers of undermining the integrity of the EU medicines supply chain, and of limiting investment in public health promoting and/or health care cost reducing forms of innovation.

The impact of the Liberating the NHS reforms in England.

Despite criticisms made during the 2011/12 passage of the Health and Social Care Bill, the resultant legislation should benefit many older and other service users. For example, from the care integration perspective presented above the formation of Clinical Commissioning Groups could facilitate local quality improvements. Implementation of the Act ought also, for instance, to enhance further the involvement of people living with long term conditions in health and social care planning and delivery (National Voices, 2012).

However, against this there remain uncertainties in areas such as assuring the full contributions of local authority based public health specialists to improving healthy life expectancies and the effective support of older people with disabilities. In the context of community pharmacy there could also, failing new provisions, be considerable variability in local funding levels for 'public health' and related services.

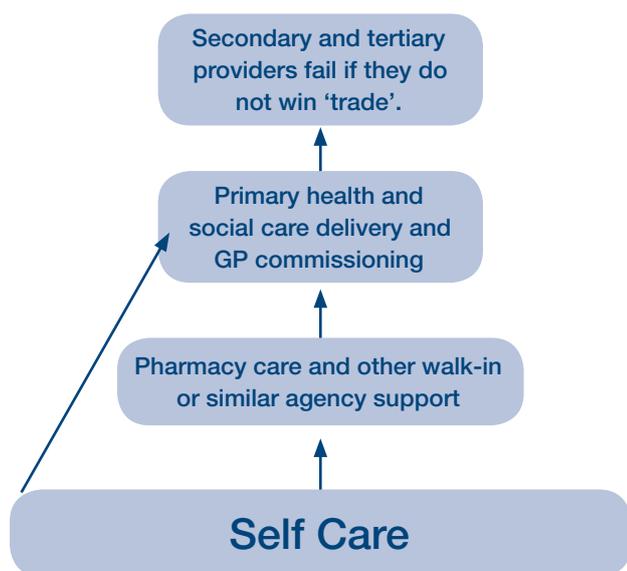
It would probably be in the public's interest to extend existing arrangements for the financing of advanced, nationally specified, pharmacy services to cover activities such as smoking cessation support. The latter have (in England) to date been subject to discretionary PCT specification and funding. There is in addition an arguable need for bodies such as the new National Commissioning Board to establish a robust long term vision of how new patterns of community pharmacy service and self care support could help transform preventive and 'maintenance' health and social care for older and other service users.

Figure 18 is indicative of the new pattern of relationships that could evolve. Without an informed forward looking national level vision, changes that could in time generate considerable benefit for health and other service users might well be foregone.

Pharmacy interests and attitudes

Any service provider group will understandably be wary of 'business model' changes. Yet on occasions pharmacists have been accused of being unduly risk averse, and unwilling to adapt pharmacies and pharmacy practices in ways that might meet fresh health challenges more cost effectively and/or to a higher standard than is presently possible. In the context of population ageing there is a continuing requirement to move on from approaches that originally evolved to support populations predominately affected by self limiting (or quite swiftly fatal) acute disorders, towards models of care better able to address the prevention,

Figure 18 An extended role for community pharmacy in an integrated health and social care 'market'



control and alleviation of non-communicable illnesses and their disabling sequelae.

Public expectations

There is evidence that a significant (and probably growing) proportion of the public is already happy to accept health related advice from pharmacists, and to receive risk factor and disease monitoring services in pharmacies (Eades et al., 2011). Interventions involving pharmacists have been demonstrated to improve lipid (Tsuyuki et al., 2002) and blood pressure (Morgado et al., 2011) management.

But there is also evidence that public expectations of community pharmacy often remain relatively low outside the immediate context of medicines supply, and giving requested advice about medicines taking. It may be suggested that in future initiatives should be taken to raise the profile of pharmacy competencies, especially with regard to extending healthy life expectancy. Pharmacists could, for instance, accept an increased responsibility for communicating the fact that 'living longer' should not mean spending a greater proportion of life in a state of disability and lost independence. The experience of countries like Japan and more advantaged communities in Britain indicates as people live longer they can – with some confidence – also aspire to staying healthier.

Twenty first century pharmaceutical care could play an increasingly important part in achieving this, while at the same time supporting medical and nursing efforts to relieve suffering and extend overall life spans. However, fulfilling this role may well entail challenging widely perceived 'rules' to the effect that health professionals '*should not be bothered with minor problems*'. Pharmacists might also put increased effort into communicating the alternative view that tolerating 'minor' health problems can in the long term be a prescription for developing major ones.

As previously described, extended pharmacy services aimed at preserving fitness and independence could be made economically viable either by offering publicly funded services in more cost effective ways, or by supplying more products and services for every-day consumer purchase. This could include providing – as affordably as possible – vaccines and risk assessment and diagnostic tests not otherwise available to sections of the community without more privileged privately insured access, and evidence based 'packages' for purposes such as vascular disease, type II diabetes and cancer prevention or early stage detection.

Problems relating to pharmacy access to medication and other patient records

The extent to which community pharmacists should have access to health records in order to support prescribers and dispense medicines safely is debateable. But logically the case for a more integrated system is powerful from a public interest perspective. This is similarly the case with pharmacy service providers' abilities to promote healthy life expectancy extensions in the ways suggested in this UCL School of Pharmacy report.

There is a relatively strong argument for saying that at minimum summary medication and medicines safety related information (for example, allergic reaction or other drug abreaction) should be available to prescription and pharmacy medicine providers. Progress in such contexts has already taken place in countries such as Sweden and France (Besancon, 2012). Some commentators suggest that summary diagnostic records should also be available electronically when service users wish their pharmacists to be able to access them.

It would be reasonable to conclude that throughout the European Union each individual's health information should be regarded as their property, to exercise control over as they judge appropriate. Health care systems such as the NHS may be judged to have been unduly slow to in practice accept such thinking, not least in the face of evidence that sharing electronic records can actively facilitate service integration. However, it should also be recognised that better care will not be delivered if tensions between primary care doctors and community pharmacists were to be exacerbated by overly robust attempts to accelerate progress in the direction of health record sharing

Working relationships with GPs

Some GPs and practice teams work exceptionally well with local community pharmacists and their staff. This can demonstrably benefit the individuals and communities they serve. But in other instances less has been achieved. Factors that promote good working relationships range from individuals' inter-personal competencies through to location related and other variables that can, through increased human contact, foster constructive links and attitudes. At a system quality level relevant variables include the extent to which there are medical manpower shortages or excesses, and the existence or otherwise of economic incentives for sharing care.

No attempt to increase efficiency and promote additional health gain by 'cascading down' activity from higher marginal cost to lower marginal cost settings – such as from secondary care to primary medical care, and from medical care to pharmacy and nursing care or to alternative self-care support providers – will work well if those providing current services are actively unwilling to adapt their behaviours, and/or do not believe that investing in change will advantage the public. From the viewpoint of this report improving the working relationships between community pharmacists and doctors working in primary care is a vital priority.

In the context of population ageing and the potential for new patterns of primary care (including not only revisions in the balance of community pharmacy and GP services but, as described earlier, the closer attachment of community and specialist nursing and social work teams to practices) to improve outcomes, there is a continuing need for qualitative and quantitative evidence of the benefits of new service configurations.

With respect to innovations such as, for example, the Department of Health's New Medicines Service there is good reason to believe that such data will continue to emerge. Key service goals include improving adherence in medicines taking and reducing the numbers of avoidable adverse events such as 'crisis' hospital admissions. But as it does so all stakeholder groups will need strong and committed leadership to defend desirable aspects of existing services while simultaneously overcoming sectional resistance to developments that could add further long term value in relation to strategic ends like extending healthy life expectancy.

Continuing pharmaceutical and diagnostic innovation

The business of research based and generic pharmaceutical companies and their academic and other partners is, with those working in areas such as diagnostics, to develop innovations that create new therapeutic opportunities, while at the same time maintaining the supply of older products as cost effectively as possible. Because the marginal cost of producing medicines is typically low compared with the fixed or 'sunk' costs of developing them, pharmaceuticals are in the long term often very much more affordable than data generated during the time they enjoy intellectual property protection may suggest.¹¹

The cost of labour in any established area of health and social care tends to rise over time, in constant price as well as current cash terms. But as the genericisation of medicines use across Europe and globally has shown in recent decades, the reverse is often true for care based principally on the effective use of pharmaceutical

products. This from a health service funder viewpoint differentiates medicines based treatments from virtually all others.

An additional advantage of pharmaceutically based care is that when medicines are first introduced they are normally employed in more specialised medical settings for narrowly defined (and in contexts such as cancer care, late stage) indications. Yet as their safety and their value in preventive and early stage disease treatment becomes better understood they tend to become available for safe provision in lower cost environments, often for a broader range of purposes. The proposed supply via community pharmacies or internet based care of anti-hypertensive and lipid lowering combination 'polypills' for the primary prevention of cardio-vascular diseases (Wald and Wald, 2010; Taylor; 2011) may be taken to illustrate such potentially important opportunities.

In future other effective pharmaceutically based approaches to improving public health will almost certainly become available in areas ranging from cancer chemo-prevention to the prevention, delay or active treatment of conditions ranging from of type II diabetes and Alzheimer's disease through to strokes and their consequences, and to degenerative disorders like osteoarthritis.¹² Medicines also have applications in fields such as weight management and smoking cessation. In the next one to two decades those currently available may be joined by additional products aimed at, for instance, further reducing obesity rates and controlling addictive behaviours. For example, it might in future be possible to support alcohol use moderation via such a strategy.

Some commentators seem to fear that encouraging the wider use of medicines to promote health at a population level would undermine and/or inappropriately 'medicalise' attempts to improve life styles. But there is little or no evidence that this will necessarily be the case. It is more rational to argue that if pharmacy based and other services support the synergistic use of established and new 'life style' and ageing related disease medicines together with behavioural/life-style change encouragement, this would very probably offer efficient and effective ways of increasing healthy life expectancy.

Other observers believe that 'personalised medicine', based on the tailoring of individual treatments to fit specific genetic and phenotypic profiles, will dominate twenty first century health care. This would entail an increased use of precise diagnostic tests to safely target therapies, and address relatively small patient groups'

¹² See Box 5 page 20. It might, for instance, in theory be that methods of preventing cartilage loss will be developed that in some respects mirror the actions of drugs already used to prevent osteoporosis. In the case of weight management the possibility of developing pharmaceuticals that affect the balance between the hormones Ghrelin and Leptin, and hence that of hunger and satiation, exemplifies the types of intervention that could one day help counter obesogenic environments. The opportunities available for developing medicines to significantly extend overall life expectancy in highly developed world settings presently appear limited. But even if this proves to be so it should be possible to extend healthy life expectancy via pharmaceutical innovations.

¹¹ Intellectual property protection (IPP) for medicines is most commonly thought of as being conferred by patents. But it can also take the form of exclusive rights to use information for purposes such as formulation and indication licensing. Commercial property rights such as those associated with the use of trade-marks and brand identities may supplement IPP.

needs. But against this, enhanced ways of affecting the fundamental biology of chronic illnesses in later life might alternatively open the way to an extended use of drugs and in some instances vaccines for mass application as instruments of health protection in ageing populations.

Depending on the numbers needed to prevent cases of long term illness or disability, the latter could prove considerably more cost effective than developing highly personalised care strategies. But the main point to highlight here is that regardless of whether or not either or both of the above scenarios are correct, there will be a growing need for effective medicines management linked to individual and community behavioural change support skills in both hospitals and the community.

To date pharmacists have been important because of their special knowledge of medicines in the acute context. But with the ageing of humanity and an increasing requirement for anticipatory care and long term disease management there is now a greater need for pharmacists to be expert about the people and communities who use medicines.

Conclusion

Population ageing has affected the countries of Europe for much of the last century. It is now a global phenomenon. As it continues, and the numbers of people aged in their 80s and 90s continue to rise, significant new demands will be placed on health and social care providers and funders. Societies will also have to accommodate increased individual longevity and the impacts it will in time have in contexts such as career durations, and the formation of four and even five generational family structures.

Yet there is no reason to believe that the challenges these and allied developments represent will prove insurmountable, or impose unsustainable financial burdens. The fact that as people live longer they tend to become, through both biological and social mechanisms, fitter in age specific terms provides an important example of compensatory adjustment. Rates of positive morbidity and disability compression could be strengthened by regulatory and health policies targeted at extending 'health expectancies', and enabling health professionals such as community pharmacists to contribute more cost effectively to this end.

The analysis offered in this report also suggests that – macro-economic conditions permitting – the social and economic benefits likely to accompany more active ageing amongst people in their 60s and 70s and beyond could generate productivity gains sufficient to broadly balance the additional welfare service related costs associated with people living longer. This will, however, require healthy life expectancy at age 65 to be increased at a rate comparable to or greater than overall life expectancy. The latter is presently rising at around one year per decade at age 65.

The structural impacts associated with lowered fertility will also have to be absorbed, albeit that in much of the European Union these have already been in large part accommodated. They may well in future decades have more significant consequences in the currently emerging economies of the world. In the case of the UK this particular aspect of population ageing will in any case have a moderated effect because of higher than expected birth rates in recent years.

Depending on the volume of investment and the extent of support for sustainable biomedical progress, innovative pharmaceutical treatments will in time have an important global part to play in extending healthy life expectancy. Age related conditions where further advances in pharmaceutical and other forms of therapy are needed include the dementias and other neurological diseases, strokes, heart disorders, COPD, diabetes and the disabling and/or painful effects of osteoarthritis and other musculoskeletal disorders.

In the UK and other parts of Europe enhanced pharmacy care should be able to offer an extended range of preventive and allied services for people at every stage of their lives. These ought to function as integrated components of broader public health programmes, which rationally combine bio-science and social science based intervention opportunities. Pharmacies and pharmacists will also be required to provide effective support for older people and others taking medicines to control otherwise disabling or life threatening conditions, either in patients' own homes or in alternative community and institutional settings.

To permit such developments sustainably, appropriate financial arrangements will have to be put in place. This is so with every form of professionally provided service. But funding alone is unlikely to be the most important problem to be overcome in enabling regions like Europe and societies such as Great Britain to face effectively the challenges of ageing. Rather, there is a fundamental need for positive and well informed public and professional engagement in extending healthy life expectancy and compressing to a minimum the proportion of the average adult span spent in a state of unwanted dependence.

This will require greater insight into the reality that for most people living longer is to be celebrated because it is likely, given appropriate policies and focused self care and supportive professional efforts, to be associated with not only better health but also increased prosperity for all. In the final analysis it will in addition demand values that do not allow people approaching the end of their lives to be dismissed as 'pointless' and neglected. Older societies need to develop in the direction of being wiser and kinder than those which preceded them.

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