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POLICY BRIEF 10

How can health systems respond to population ageing?

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How can health systems respond to population ageing?

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Key messages

Policy context

- All countries in Europe are experiencing an ageing of their populations, with a decrease in the number of people of working age per retiree.
- Health trends among the elderly are mixed: severe disability is declining in some countries but increasing in others, while mild disability and chronic disease are generally increasing.
- A declining working-age population will generate less income for health and pension systems.
- While expenditure on long-term care is certain to increase with the ageing of the population, the effects on health care expenditure are disputed. It is clear that if appropriate measures are implemented in time, population ageing does not inevitably lead to significantly higher health care expenditure.

Policy options

Ensuring an adequate response from health systems

- A better coordination of care across health and social services, as well as across different levels of health care is seen as crucial.
- As many older people remain in hospital inappropriately, a number of measures can be applied to allow for more treatments out of hospital.
- Measures that reduce the risk of disease and promote the maintenance of function, confidence and engagement can support healthy ageing and ease the pressure on health care systems. Most notable are health promotion and disease prevention programmes that target the main causes of morbidity and premature mortality, in particular obesity and hypertension, as well as mental health.
- These measures should include physical exercise and social involvement. The period from middle age onwards is particularly important for these activities and interventions.

Building adequate systems of long-term care

Ensuring an appropriate combination of settings for long-term care that includes both formal and informal care is regarded as crucial.

Supporting economic and social integration

- The decline in the share of the population of working age that will have to finance the health system can be addressed by measures that enable more older people to remain in the labour force.
- Policies in support of healthy ageing also need to address the need for the continued social engagement of elderly people.

Executive summary

All countries in Europe are experiencing an ageing of their populations, a trend that is projected to continue until at least the middle of the twenty-first century. This process is often regarded as a major cause of upward pressure on health care costs. However, analyses of health care expenditure show that other factors, especially the increasing complexity of technology, carry greater impact. Furthermore, although population ageing will bring some additional costs, these can be reduced by the application of appropriate and well coordinated health and social policies that slow the rate of health decline associated with ageing and thus the amount of health care services required.

Health trends among elderly people are complex. In some countries there is less severe disability than in the past, but generally an increase in mild disability and functional impairment can be observed. There is limited ability to treat effectively one of the most disabling common disorders, cognitive decline, and the accumulating burden of disease due to the obesity epidemic. The ability of older people to remain healthy and independent requires the provision of a supportive environment, including well-designed living conditions, access to economic resources, and appropriate health care. Health and social policies will thus need to deliver appropriate systems to respond to the needs of ageing populations. Given the important long-term implications, this remains relevant even in the current period of financial and economic turbulence.

Policy options

Appropriate health policy decisions today can help to ensure that tomorrow's elderly people will enjoy a better health status, have less need of health and long-term care services, and be supported by a balanced and integrated provision of care.

Ensuring an adequate response from health systems

With an increasing number of chronic conditions and co-morbidities, elderly patients are often seeing a number of different providers of both social and health care services. This makes the coordination of care across health and social services, as well as across different levels of health care, particularly important.

A number of measures can be taken to reduce the inappropriate use of hospital services, including early transfer to people's own homes or to other appropriate types of accommodation (such as nursing homes or sheltered dwellings), demanding closer integration with the long-term care sector.

Effective health interventions, particularly health promotion and disease prevention programmes that target the main causes of morbidity and mortality,

can help to minimize the cost pressures associated with ageing by ensuring that people stay healthy in old age. These include interventions to tackle obesity and hypertension, immunizations, and fall prevention programmes. Exercise in mid-life may also have the potential to reduce cognitive decline in old age, for example by reducing vascular damage to the brain. Such interventions may also bring wider economic benefits, as people who can expect to live a long and healthy life have a strong incentive to invest in developing their skills when younger and to extend their working lives.

Building adequate systems of long-term care

The impact of increases in the older old population with disabilities will fall predominantly on the long-term care sector rather than the acute health sector. This necessitates an appropriate balance of settings for long-term care, including supported self-care and home-based services. Appropriate services for older people with chronic diseases are essential, requiring the integration and coordination of care across different service providers and between health and social care.

Supporting economic and social integration

One way of dealing with the declining share of the working-age population that will have to finance the health and pension system is to increase the age at which pensions are paid, especially in those countries with early retirement ages, while at the same time providing incentives to remain in paid work. This requires consequent changes in the nature of work at older ages, for example by enabling flexible, portfolio and part-time working and by measures that take account of changes in physical capacity with ageing. In the European Union, while increases in labour force participation by older workers are envisaged under the "Lisbon Strategy", a further step may be to increase retirement ages (as is already happening in some countries). Not only will such reforms need to take account of the differing healthy life expectancies across EU member states, but pension reforms should not exacerbate inequities related to gender, different levels of education and types of employment. There are likely to be lessons here for other countries of the European Region as well.

As the lack of social interaction is now recognized as a risk factor not only for depression, but also for cognitive decline – both serious and costly disabling conditions in older age – continued social engagement is seen as a priority. Elderly people contribute to society; while some are recipients of care, much of that care is provided by other older people, even if their informal contributions, as spouses, relatives, or friends, are often unrecognized. Improving the health of older people will reduce the number of elderly people who are precluded from providing care to a spouse, or parent, because of their own health limitations, thus effectively enlarging the pool of potential carers.

Policy brief

One of the most important demographic trends facing Europe is the ageing of its population. This policy brief considers the implications of this process for health and long-term care, including the funds available for health care and the expenditure required. It discusses a series of policy options that can be considered when responding to the challenge of an ageing population. Without making specific recommendations, it is noted that on the basis of the available research evidence, a promising option is to promote healthy ageing. When elderly people are in good health, it is shown that they will need fewer health care resources and are also more likely to remain in the labour force. Policies that allow a healthy ageing of the population include a better coordination of health and long-term care services and enhanced prevention services.

The policy context

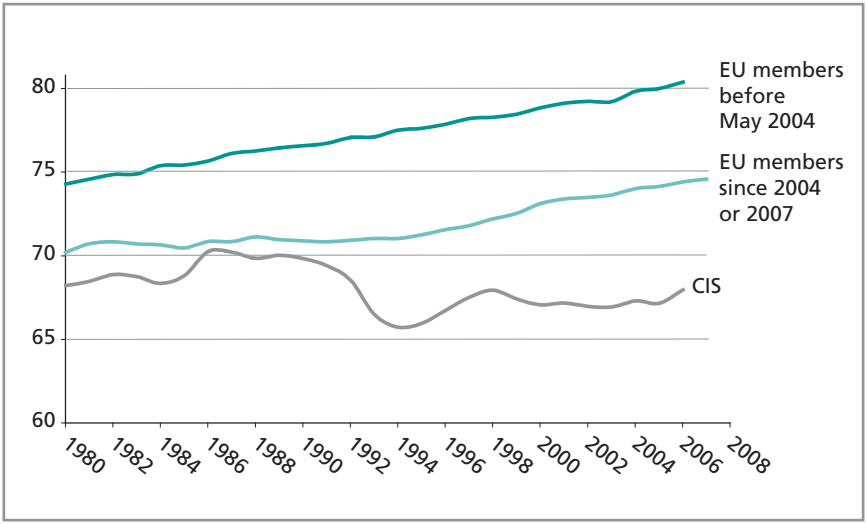
All countries in Europe face ageing populations. This section considers current and future demographic trends, and then explores the health levels of elderly people and the implications population ageing has for health care revenues, health care expenditure, the organization of health systems and long-term care.

An ageing population

The ageing of Europe's population reflects a combination of declining birth rates, leading to fewer young people, and increasing life expectancy, so that more people live into old age. Superimposed on these contemporary developments, at least in some countries, are the long-term effects of the post-war baby boom, which created peaks in births initially in the late 1940s and again in the late 1960s and early 1970s, when those born during the first peak reached reproductive age. There have been sustained improvements in life expectancy in much of Europe in recent decades (Figure 1), yet substantial regional differences remain *(1–3)*. Most progress is seen in the 15 countries that were members of the European Union (EU) before May 2004 (EU15), where life expectancy at birth increased by 6.1 years on average, from 74.2 years in 1980 to 80.3 in 2006. In the countries that joined the EU in 2004 or 2007 (EU10), life expectancy at birth increased by only 4.4 years, and from a lower level of 70.1 years in 1980, reaching 74.5 years in 2007. However, even these countries outpaced the Commonwealth of Independent States (CIS), comprising most countries of the former Soviet Union, where life expectancy at birth actually declined from 68.1 years in 1980 to 67.9 years in 2006 *(4)*.

Historically, major improvements in life expectancy were driven by falls in deaths in infancy and childhood, in particular, as a result of progress in fighting

Figure 1. Life expectancy at birth in Europe, 1980–2007



Note: CIS = Commonwealth of Independent States

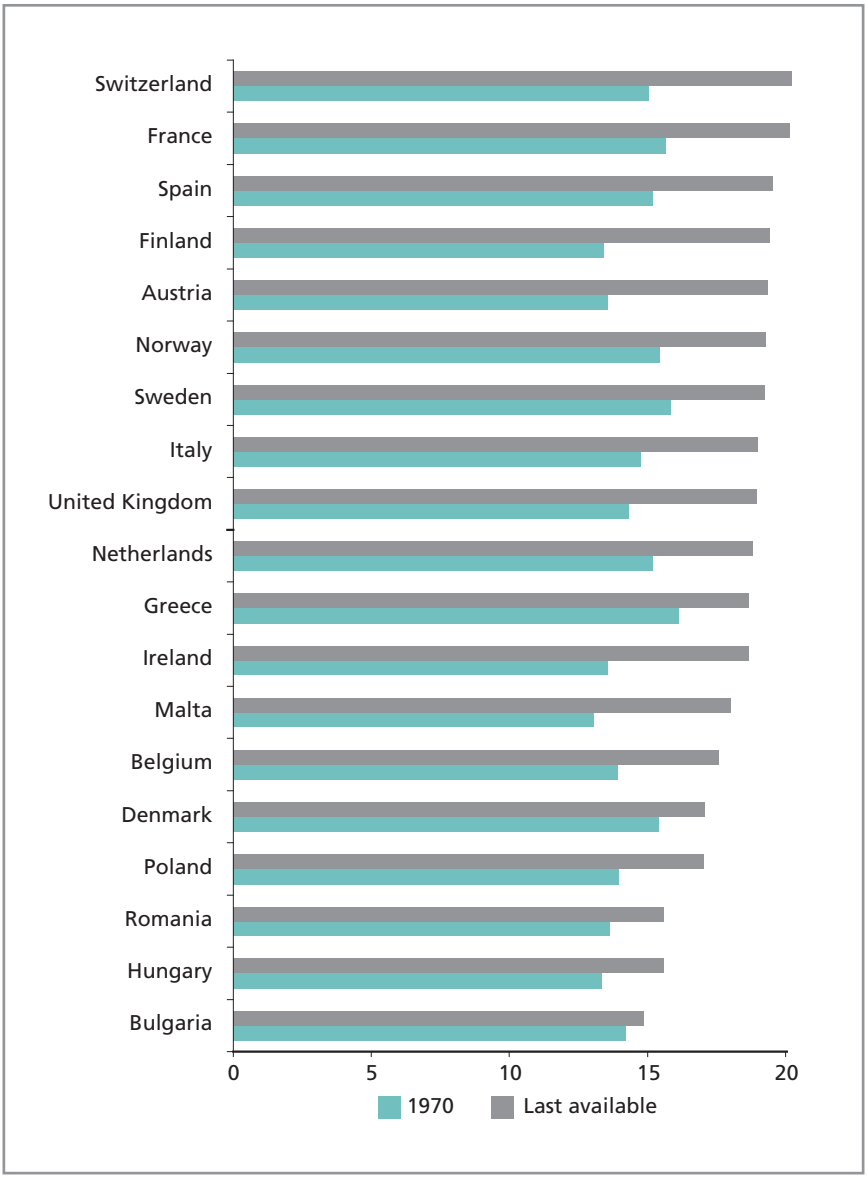
Source: WHO *(4)*

common infections. However, over the past four decades improvements have been driven mainly by substantial improvements in survival at older ages (as rates of infant and child mortality are so low in most cases that even quite large proportionate changes have limited demographic impact). As Figure 2 shows, many European countries have seen substantial gains in life expectancy at age 65, although the picture is far from uniform.

In contrast, birth rates have declined markedly since the 1960s, so that levels in much of Europe are now below those required to maintain an even population. There are considerable differences among countries, with rates generally lower in southern and eastern Europe than in northern and western Europe *(5)*. These factors have combined to increase the percentage of the population aged over 65 years, although to varying degrees in the different parts of Europe (Figure 3).

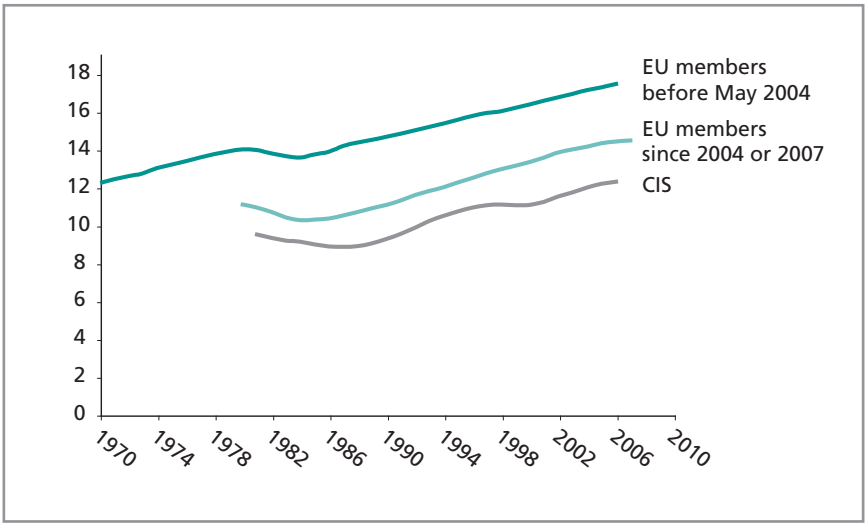
Prediction is inevitably inexact and published estimates vary, but there is now a consensus that life expectancy will increase further, so that Europe's population will continue to age in the coming decades. It is expected that there will be a considerable increase in the share of the population that is elderly, especially those aged over 85 years. The percentage of the population in OECD countries aged 65 or over increased from 8.5% in 1960 to 13.8% in 2005, and is

Figure 2. Life expectancy at age 65 in selected European countries, 1970 and last available year



Source: WHO *(4)*

Figure 3. Percentage of population aged 65+ years in Europe, 1970–2006



Note: CIS = Commonwealth of Independent States

Source: WHO *(4)*

projected to increase to 25.2% by 2050. People aged 85 years accounted for less than 0.5% of the population in OECD countries in 1960. By 2005 this proportion had tripled, and by 2050 those over 85 are projected to make up 5% of the population *(6)*.

Health trends among the elderly

A crucial question is whether projected gains in longevity will be accompanied by increases in illness, disability, vulnerability and thus higher use of services. Research findings on changing patterns of health and disability are, at times, conflicting and their interpretation is controversial. To a large extent this debate arises from measurement problems and the difficulties involved in making comparisons between health indicators derived in different ways *(7, 8)*.

Compression of morbidity?

A key question relates to the quality of life at older age. While, at least in western and central Europe, it is apparent that life expectancy is increasing, is this due to people living longer in poor health (a prolongation of the process of dying) *(9, 10)*? Or are they benefiting from healthier lifestyles and effective

treatments, so that they enjoy longer periods of good health, with postponement of a now shortened final period of disability *(11)*? The latter view has been described as the "compression of morbidity" where the average age at which illness and disability strike is delayed to a greater extent than the average age at death *(12)*. All else being equal, this should, at least in theory, lead to a reduced demand on health services *(11, 13)*. An opposing hypothesis, the "expansion of morbidity", postulates that some of the decline in mortality is due to more people now surviving serious illness but then living longer with the consequences. In this scenario, an ageing population requires more health services. And a third hypothesis, termed "dynamic equilibrium" *(14, 15)*, views increasing longevity as being linked with a reduction in severe morbidity and an expansion of light morbidity. Overall, the proportion of life spent in ill health would remain constant, with neutral cost consequences. The same proportion of a longer life in good health translates into an absolute increase in years lived with disability when life expectancy is increasing (with implications for health care costs).

Conflicting health trends

The uncertainty is due, in part, to the existence of research evidence supporting some aspects of all of these scenarios, with a number of different trends identifiable, sometimes pushing in different directions:

(a) reductions in the rates of severe disability in a number of European countries, but increases in others;

(b) increases in the observed prevalence of chronic disease and mild disability;

(c) growing numbers of obese and overweight people, and an increasing prevalence of diabetes;

(d) significant differences in healthy life expectancy across and within countries.

These different trends indicate a clear need to look beyond the broad concepts of morbidity and to distinguish those conditions that will be most affected by ageing *(16)*. Only by understanding the differential impact of ageing on costs of providing care in different clinical settings will it be possible to plan appropriate health services *(17)*.

(a) Severe disability

Reductions in the prevalence of disability, and especially severe disability, have been reported in the United States, Japan, Spain and a number of other European countries, in line with the "compression of morbidity" scenario *(18–22)*. In the United States, for example, national surveys of the need for long-term care report a prevalence of disability that is 3.6% lower in 1994 than in

1981 *(15)*. Crucially, among those with few behavioural health risks, the onset of disability was postponed by up to 12 years. A study using Medicare Current Beneficiary Surveys (based on representative samples of more than 10 000 Medicare beneficiaries per year) for 1992–2003 found increases in active life expectancy beyond 65 years of age and decreases in years of life spent with severe disability *(*13, 23–25).

The situation varies among countries. An OECD study on health and disability in older people found only moderate reductions in the prevalence of serious disability between 1980 and 1996 in Austria, the Netherlands and the United Kingdom. Canada, Sweden, and particularly Germany, France, Japan and the United States experienced much greater declines *(26)*. A more recent study undertaken among the population aged 65 and over in 12 OECD countries found clear evidence of a decline in disability among elderly people in only five of the twelve countries (Denmark, Finland, Italy, Netherlands, United States). Three countries (Belgium, Japan, Sweden) reported an increasing prevalence of severe disability, and in two countries (Australia, Canada) the prevalence remained stable. No clear trends could be discerned in the two remaining countries (France, United Kingdom) *(6)*. Results from some Scandinavian countries (which have high quality data) show either no improvement or even an increase in disability rates *(27, 28)*.

(b) Mild disability

The situation seems rather clearer with respect to mild disability. Many European countries have seen an increase in mild disability and morbidity, as well as in functional impairment *(16, 29, 30)*. This may be because improvements in treatment and secondary prevention have reduced the risk of severe disability, allowing more people with illness to function well for longer. This, however, requires expenditure on the necessary treatment *(31–33)*. Thus, a Swedish study showed how older people are better able to function, but are doing so with increasing numbers of illnesses controlled with medical therapy *(16)*. These findings are also consistent with a study from New Zealand, undertaken between 1981 and 1996, that found a shift from major to moderate limitations on mobility *(34)*.

(c) Obesity and diabetes

The growing number of obese and overweight people in many western countries is leading to increasing burdens of disability and associated health and social care costs. This also affects elderly people and may neutralize the reductions in the prevalence of severe disability that have occurred in many countries *(6, 35–37)*. Diabetes, much of whose growth has been due to increasing levels of obesity, is already the most costly chronic disease among elderly people in the United States, making up 25% of all Medicare

expenditures, while hypertension and related diseases account for about 11% *(38)*.

(d) Differences between and within countries

An analysis of healthy life expectancy across the 25 EU countries in 2005 found substantial inequalities: a 50-year-old man could expect 9.1 healthy life years in Estonia, but 23.6 healthy life years in Denmark; for women the respective figures were 10.4 and 24.1 years *(39)*. The probability of remaining alive and healthy declines faster in the Russian Federation than in western Europe, with the gap even between eastern Europe and the Russian Federation widening at older ages *(1)*. However, in all cases the comparisons need to be treated with care because of data limitations.

National averages may conceal considerable inequalities in old age, related to the lifetime experiences of those with different levels of education, types of employment, and gender. In surveys, older women typically bear a large burden of morbidity, so that their longer life expectancy is accompanied by a poorer quality of life. Women live on average 3.9 years longer than men, but lose the equivalent of 1.9 extra years of good health to non-fatal consequences of disease *(40)*. A high proportion of the additional morbidity experienced by women compared with men, in societies as diverse as the United States and Russia, relates to chronic, disabling disease; they are also more likely to have depression *(1, 41, 42)*.

The overall picture

Noting the limited research evidence available, the difficulty in making predictions, and known differences among countries, some broad conclusions are nonetheless possible. In all EU countries people are generally living longer (although in some years and some countries there have been short-lived reversals). In many countries the extra years of life are being lived free from major disability. In some cases this may be because conditions that would in the past have caused severe disability now cause only mild or moderate disability. These changes are accompanied by an increased prevalence of disease, much of which can be controlled, in line with the "dynamic equilibrium" scenario. The obvious challenge is to learn how to identify, understand and emulate successes.

Implications for health care revenues

The ageing of the population creates two potentially major pressures on health care finances: increased utilization of health services (discussed below) and decreased revenues (as a declining share of the population is economically active). According to Eurostat projections, the "working-age" population (15–

64 years) in the EU will decrease by 48 million by 2050. Old-age dependency ratios (the number of persons aged 65 years and over divided by the number of persons aged 15–64 years, multiplied by 100) are projected to increase in the EU25, from four people of working age for every elderly person (old-age dependency ratio of 25) to two (old-age dependency ratio of 50) by 2050 *(43, 44)*. The reduction in the working-age population was projected to cause a decline in the average annual GDP growth rate for the EU25 from 2.4% over the period 2004–2010 to only 1.2% between 2030 and 2050, although these projections could not take account of more recent events *(44)*. Furthermore, and subject to the same limitations, age-related public spending related to pensions, health and services for elderly people is projected to rise in the EU by 3–4 GDP points between 2004 and 2050 *(44)*.

It is, however, important to remember that the ageing of European populations is the consequence of success: an increased life expectancy, often in good health, and better choice over whether and when to have children *(44)*. Moreover, the ratio of "economically active" to "dependent" groups is driven by policies on retirement, rather than by immutable ageing processes and recent increases in the economic participation of older people in the United States have been achieved following policy and legal changes. There is a danger that current economic pressures may prompt a return to the exclusion of older people from the labour force, and decision-makers will need to be sensitive to the fact that such shifts may take a long time to reverse.

Elderly people are not just recipients of pensions or health and long-term care. They also provide a large proportion of care for other elderly people (including spouses). Improvements in their health status may thus mean that more are able to provide such care to a spouse or parent, so effectively enlarging the pool of potential carers *(45)*. Additionally, a significant number of older people in many countries engage in volunteer work or help to look after their grandchildren, providing an important input into society that would otherwise have to be purchased in the marketplace *(46)*.

Implications for health care expenditure

Given the uncertainties noted, the implications of ageing for health care expenditure are very difficult to establish. Much will depend on how people age. Successful promotion of healthy ageing may mitigate the impact of ageing on health care expenditure.

The concern that ageing will lead to an increased utilization of health services is based on the observation that older people are responsible for a significant share of health care utilization. As older people typically account for about half of the hospital workload, when measured in terms of bed-days *(47)*, it is often

assumed that an ageing population will increase the demand for hospital care. Per capita consumption of health services by elderly people is 3–5 times higher than for younger people *(48)*. One study in eight OECD countries found that between one third and one half of total health expenditure was spent on health care for older people *(49)*. In England, people older than 65 years account for nearly two-thirds of hospital bed-days *(50)*. However, predictions of a rapid increase in demand for hospital care may be exaggerated *(51)*.

Although ageing is often regarded as a major cause of upward pressure on health care costs, both analyses of past expenditure and projections of future trends find that other factors, especially the increasing complexity of technology, have a much larger impact on health care costs *(52)*. This conclusion is supported by cross-national comparisons where, for example, health care expenditure in the United States is far higher than in other industrialized countries despite it having a younger population *(53)*. An analysis using OECD population and expenditure data for the period 1965–1995 found hardly any statistically significant relationship between ageing and health care expenditure *(54)*, while a projection of health care expenditure up to 2050 in OECD countries found that non-demographic factors (in particular technological developments) were the most important driver of the anticipated increase in health care expenditure *(37)*.

In a study on the Finnish population, among individuals not in long-term care, a clear positive relationship between health expenditure and age was only found for care provided in health centres and inpatient psychiatric facilities, but not for somatic care and prescribed drugs, expenditure on which decreased with age *(55)*. Sick older people who are not close to death do not appear to require more costly care than younger people with the same disease *(56)*. This has raised the question of whether there is a subgroup of older people who can be predicted to consume disproportionate health care resources. It is suggested that certain characteristics augur poorly for high hospital utilization *(57)*. These include difficulty with walking and bathing, diabetes and hospitalization in the previous year. Recent hospitalization at any age is a consistent predictor of likely further admission, although the predictive power wanes after two years *(58)*. It is also clear that the effects of ageing on expenditure can be mitigated. It has been calculated that improvements in the health status of the French population between 1992 and 2000 reduced health expenditure by 8.6%, although other cost pressures, such as technological progress, more than cancelled out this gain. The costs of ageing were estimated to have increased expenditure by 3.2% *(59)*.

There is a growing consensus that ageing does not have to be an inevitable drain on health care resources *(60)*. Two strands of research point to the possibility that ageing can be associated with stagnating or even falling health

care expenditure in older age groups:

- the "costs of dying"
- the health care utilization rates of elderly people.

However, this research needs to be seen in the context of overall lifetime expenditure. Evidence that health care expenditure is falling in older age groups is not inconsistent with an increase in overall lifetime expenditure. Furthermore, it is essential to differentiate costs of health care from those of social services and long-term care.

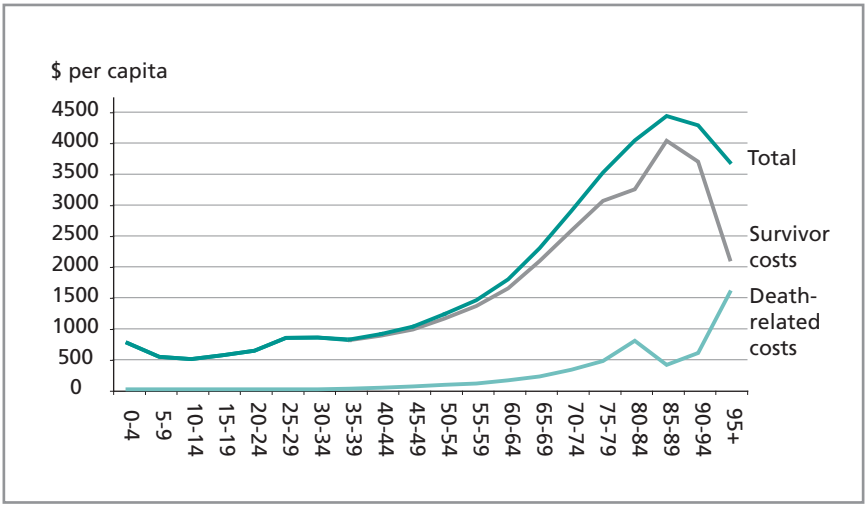
Costs of dying

Research on the so-called "costs of dying" shows that proximity of death is a more important predictor of health care expenditure than ageing itself *(61)*. A large share of health care costs over the lifetime of an individual falls in the last year of life, particularly the last few weeks before death *(62)*. The "costs of dying", however, are lower in the oldest age groups *(63)*. For example, consumption of resources in English hospitals, measured as bed-days, is highest in those dying at the age of 45 years *(64)*, and declines with each advancing decade over 65 years. In Australia it has been observed that those dying before the age of 75 consume more health care than those aged over 85 years *(65)*. Older people tend to receive less intensive treatment than their younger counterparts at the end of their life *(66)*, instead receiving more nursing and social care *(56, 67)*. There may be a number of reasons for this, including the view among some older people that they have already had a "good run" *(68)*. However, there is also accumulating evidence of discrimination in allocation of more costly interventions based on age *(69)*.

Despite this evidence, the costs of dying are often inappropriately attributed to ageing *(70, 71)*. The high annual health care cost associated with older people is in large part the consequence of the fact that they are more likely to die within a year, that is, they are more likely to be close to dying than younger people. This is illustrated in Figure 4 which, using data from Finland, shows that the effect of dying accounts for an ever-increasing share of average costs by age, that is, around one third of total costs for persons aged over 95 are attributable to death-related costs.

This suggests that ageing may actually be associated with lower costs of dying. Furthermore, people who have been healthier in earlier life seem to consume fewer resources when they die *(72, 73)*. However, a study using data from the United States Medicare Current Beneficiary Survey for the years 1992–1998 showed that while there are savings in postponing the last year of life, a longer lifespan also increases the probability of new and costly diseases arising, for example, Alzheimer's or cancer. The resulting expenditure may be greater than

Figure 4. Health care expenditure per capita in each age group in Finland, separating the costs of dying from overall health care costs



Source: Martins *(37)*

the savings incurred through postponing the last year of life *(38)*. Hence, the costs of dying have to be seen in the context of overall lifetime expenditure on health care.

Utilization rates

Research on utilization of health services at old age has found that this peaks at about 80 years of age, falling in those who are older. If the current age-specific rates continue, an increase in the number of very elderly people might therefore result in lower, not higher health care costs for these age groups. Acknowledging that it is often difficult to extrapolate findings from individual studies, a few examples are worth noting. A study of people aged over 70 years in Gothenburg, Sweden, found that the oldest use the fewest hospital days *(74)*, and a similar study from New South Wales in Australia found that hospital costs fell with age, with people aged 95 years or over incurring less than half the average costs per person for those who died aged 65–74 years *(62)*. These findings were confirmed in the Survey of Health, Ageing and Retirement in Europe (SHARE), which surveyed 20 000 Europeans older than 50. The survey found that the use of health services peaks at ages 75–79, levels off at 80 years and falls among those older than 85 years *(75)*. Given that the findings cited above may in part reflect age discrimination, it is plausible that future changes

in social attitudes may increase the intensity of treatment of the oldest people, continuing a long-standing trend. Furthermore, it should be remembered that nursing and social care (both official and unofficial) costs are rising with old age.

Lifetime health costs

As the previous sections have highlighted, the costs of health care need to be considered over the whole life of an individual, not just at single points. Here, the evidence is limited and at times contradictory *(76)*, but a growing number of studies are suggesting that the promotion of so-called "healthy ageing" reduces lifetime health care expenditure, while a failure to do so increases them. Findings from the United States suggest that lifetime medical costs for those who are obese will be substantially higher than for those for people with normal weight *(77)*. The same seems to be the case with smokers *(78)*.

Perhaps unsurprisingly, those who enter old age healthily tend to do better. Among participants in the 1992–1998 Medicare Current Beneficiary Survey in the United States, persons with no functional limitations at 70 years of age had a higher life expectancy and a slightly lower cumulative health care expenditure than those with at least one limitation *(79)*. Using data from the same survey for the years 1992–1999, another study found that cumulative health spending was higher for those with chronic diseases *(80)*. These are important findings because they indicate that the costs of treatment outweigh any reductions due to premature deaths of those in poor health. Overall, however, it is difficult to gauge what impact the conflicting health trends outlined above will have on lifetime health costs.

Implications for the organization of health systems

What do the current and future demographic changes mean for the organization of health services in Europe? Ageing populations will have different health care needs, with more people affected by cancer, fractured hips, strokes and dementia. Furthermore, the complexity of health problems will increase as populations age, with more people suffering from multiple co-morbidities and chronic diseases receiving a wide range of treatments that potentially interact with each other *(81–83)*. Health systems need to be adequately equipped to deal with the health needs of elderly people.

Implications for long-term care

Unlike the somewhat complex and often uncertain situation with health care, expenditure on long-term care is certain to increase with the ageing of the population. Both the utilization and cost of long-term care for older people have grown dramatically across the European Union, and are projected to grow

substantially in the future. A study of the Finnish population found that although only 7% of the population over 65 years was receiving long-term care, they accounted for 55% of total expenditure *(55)*. An estimate of future expenditure on long-term care provision in Germany, Italy, Spain and the United Kingdom also projected dramatic increases in the use and costs of long-term care *(84)* (Table 1).

Table 1. Projected percentage increases in the numbers of old people, service recipients and expenditure between 2000 and 2050 under a common core set of assumptions (central base case)

	Germany	Italy	Spain	United Kingdom
Number aged 65 years and over (% increase)	64	56	76	67
Number aged 85 years and over (% increase)	168	168	194	152
Number with dependence[a] (% increase)	121	107	102	87
Number of recipients of informal care only (% increase)	119	109	100	72
Number of recipients of home-based care (% increase)	119	119	99	92
Number of recipients of institutional care (% increase)	127	81	120	111
Total expenditure (% increase)	437	378	509	392
Total expenditure as a % of GDP (% increase)	168	138	149	112
Total expenditure as a % of GDP in 2050	3.32	2.36	1.62	2.89

Notes: [a] Dependence is defined in relation to the ability to perform activities of daily living and/or instrumental activities of daily living; GDP: gross domestic product.

Source: Comas-Herrera *(84)*

The overwhelming majority of care received by older people is informal and usually provided without financial compensation. One favourable short-term trend in many European countries is a decrease in the proportion of older people who lack close relatives (spouse or children). In many European countries, the proportion of women who never married was much higher among cohorts born in the late nineteenth and early twentieth centuries than in cohorts born later, with those born in the 1930s and 1940s having something of a marriage boom *(85, 86*) (although the rise of cohabitation has made marriage statistics increasingly unreliable indicators of family support). Moreover, the recent narrowing of gender differences in mortality seen in several European countries, due in part to a slowing of gains in life expectancy among women as a consequence of the smoking epidemic *(87*), has served to postpone widowhood. Partly as a consequence of these marriage trends, levels of fertility were also higher, and levels of childlessness lower, among women born in the 1930s and 1940s than in earlier (or later) cohorts. However, informal care is expected to decline, and the workforce of paid and unpaid carers is diminishing *(88*). There is a growing trend throughout much of Europe towards measures designed to reduce institutional care and promote care provided in the home or a home environment *(88*) (although the reverse is true in some countries in southern Europe where the level of institutional care was traditionally very low). These policies have, in some cases, demanded more input from family members, with possible implications for their participation in the workforce *(89*).

Policy options

The challenges around the ageing of Europe's population will necessitate policy actions that promote good health in old age. Here the available research suggests that policies that support healthy ageing not only improve the well-being of a growing proportion of the population, but also mitigate the potential cost pressures related to health and long-term care. Relevant policies include:

- ensuring an adequate response from health systems
- building adequate systems of long-term care
- supporting economic and social integration.

Ensuring an adequate response from health systems

Ageing populations require an adequate response from health systems. Effective health interventions can improve mental and physical well-being and hence help people stay healthy in old age. However, few of the interventions proposed to promote healthy ageing have been subject to economic

evaluation, and there is concern that some may actually increase cost and worsen health *(90)*. While their impact on direct health care costs is uncertain *(91)*, healthy ageing can be expected to have wider economic benefits, as people who can expect to live a long and healthy life have a strong incentive to invest in developing their skills knowing that they will reap lifelong benefits *(92)*. They may also be more inclined to stay in the labour force.

The issues facing ageing populations demand measures that combine support for elderly people with policies addressed to younger generations who will benefit subsequently from early intervention. Policy options include better coordination of care, improved management of hospital admissions, enhancing prevention and encouraging healthy lifestyles, for example by maintaining physical activity or promoting healthy eating.

Better coordination of care

Ageing brings an increasing number of chronic conditions and co-morbidities such that elderly patients often see many different providers of both social and health care services. This makes the coordination of care across health and social services, as well as across different levels of health care, particularly important. There is now a growing body of evidence on how best to manage complex chronic conditions *(93)*. Key issues relate to the coordination of care across settings and sectors, promotion of self-management, the development of an appropriately trained workforce (and, in particular, the optimal mix of skills), supportive information systems and financing mechanisms that encourage integration rather than fragmentation *(90)*.

The increase in chronic disease also necessitates upstream interventions to prevent people with such diseases from deteriorating and needing institutional care *(88)*. The importance of improved coordination is seen in a study of the underlying reasons for rising numbers of emergency admissions among elderly people in Scotland, which concluded that growing numbers of older people and reduced availability of informal care actually played a minor role. The main contributory factor was an inappropriate emphasis on crisis management because of inadequately coordinated preventive care *(94)*.

There is a clear need to concentrate, at least initially, on those conditions contributing most to the burden of disease among the elderly. For example, much more can be done in many countries to diagnose and control hypertension, the main risk factor for stroke, as well as to improve the care for those who suffer strokes, in particular by the greater use of early differentiation of strokes due to bleeds and blood clots, and specialized stroke units that can provide optimal rehabilitation *(95)*. The other major priority is dementia, whether due to multiple infarcts (and so also prevented by effective control of hypertension), or Alzheimer's disease. Again, this requires coordination of a

wide variety of social and health care interventions. There is now growing interest in the scope for early detection of dementia and the timely provision of support programmes that allow affected patients to live in the community for as long as possible *(96)*.

Improving the management of hospital admissions

Deterioration in function in older people is often not gradual, but proceeds in a stepwise manner with declines precipitated by an acute episode of illness, or injury, or similar event. As a result, admissions to institutions are often from hospital, rather than from home. In some cases, better rehabilitative services might enable older people to recover sufficient function to return home. It has been shown that assessment by specialist geriatric teams, coupled with post-discharge interventions at home, is associated with shorter hospitals stays, fewer readmissions and fewer nursing home placements *(97)*. There is considerable scope for extending such approaches, especially in countries with poorly developed geriatric services, and for providing more enabling interventions such as physiotherapy and podiatry, rather than prosthetic interventions such as home delivered meals (in this example, improving function might enable some disabled older people to do their own cooking) *(98)*. Better coordination and a greater emphasis on preventive services have also been advocated as a way of reducing emergency admissions *(94)*. There is now considerable evidence that hospital admission and length of stay can be reduced by a number of social care interventions, including early transfer to nursing homes or own homes with support from community-based health and social care services. Reductions in expensive hospital admissions also require attention to nutrition, hygiene, mobility support, help with medication, reduction of environmental hazards and regular medical check-ups *(50, 99)*.

Encouraging better self-care

Increased health literacy and better access to technology, such as computers and internet, may help to improve understanding and management of specific conditions and enable patients to engage more in self-care *(90)*. Not all disabilities lead to handicaps; a handicap arises as a consequence of the interaction between the disability and the environment in which someone lives. Hence, much can often be achieved by relatively simple interventions, such as those that ease mobility. In many countries there is considerable scope for greater use of assistive technology *(100)*.

Enhancing prevention

Population-based interventions to promote health and prevent disease assume a particular importance among elderly people. The most promising approach is to prevent or postpone disability through primary prevention *(24, 38, 72, 73)*.

Randomized controlled trials of health promotion programmes for elderly people in the United States have reported substantial health improvements, in particular when using complex "tailored print interventions" that are specific to the participants. These have been found to reduce health risks and thus medical care utilization by about 10% per year *(24)*. Such findings have led to the creation of a number of health policy initiatives aimed explicitly at postponing illness and frailty among the elderly *(24).*

Interventions to prevent, postpone and treat heart disease and stroke are especially important, as these are leading causes of mortality and long-term disability and become more common with advancing age *(24, 95)*. Although the benefits of treating hypertension have been known since the 1960s, in many countries there is significant under-diagnosis and inadequate control *(101, 102)*. A study in the United States predicted that, among the 100 million elderly people becoming eligible for Medicare over the next 25 years, effective control of hypertension could reduce overall health care spending by $890 million, while reducing obesity to levels seen in the 1980s could reduce health care spending by more than $1 billion *(103)*.

In order to yield maximum benefit, prevention programmes for elderly people should not be based on single disease models, which may simply lead to a substitution of one cause of death for another. Rather, they should consider the overall disease burden over the entire remaining life of those targeted by preventive interventions *(104)*. It is also important to include this broad perspective in economic evaluations *(38)*.

Although widely advocated, the effectiveness of influenza immunization programmes targeted at the elderly population has recently been questioned *(105)* because of evidence of reduced efficacy of the vaccine in older people *(106)*. The most recent Cochrane Review concluded that many of the subjects were non-randomized, leaving open the possibility of bias. It found that immunization was most effective when administered to those in long-term care facilities where vaccines prevented about 45% of pneumonia cases, hospital admissions and influenza-related deaths. This compared to about 25% vaccine efficacy in preventing hospitalization from influenza or respiratory illness in open community settings *(107)*. These findings have led some to suggest, drawing on evidence of a successful model in Ontario, Canada, that greater benefits may be achieved with universal immunization, so as to interrupt the spread of disease *(108)*.

Smoking remains among the most important causes of premature death and disability in the European Region and the benefits of quitting can be achieved at all ages. Smoking cessation programmes should be key elements of any programme to support healthy ageing. They should be part of an overall policy

to reduce tobacco consumption in the population, including cost-effective anti-tobacco actions such as price increases and enforcement of clean indoor air laws *(90)*.

Excessive alcohol consumption is an often ignored but common problem among many elderly people. It can interact with prescription drugs and make falls more likely. In many countries, prevention efforts in this area are underdeveloped *(90)*.

Injuries from falls are an important preventable cause of death and disability in older people *(109)*. Effective measures to prevent them include multidisciplinary, multifactorial interventions to screen for environmental risk factors (for both those with a history of falls and the general population of older people), individual programmes of muscle strengthening and balance retraining, withdrawal of psychotropic medication and Tai Chi group exercises *(110)*.

Good quality housing and well-designed living environments are an important element of health promotion in old age. Many interventions to improve the quality of life of older people benefit all age groups. Examples include safety measures, such as safe crossings on busy roads, good public transport, and accessible green spaces for exercise and relaxation *(41)*. Violence towards older people is also of concern, both in family environments and in institutions *(90)*.

Physical activity in middle and old age is associated with a lower risk of dementia and depression, as well as making joints less prone to degenerative disease, curtailing obesity, and reducing the risk of diabetes and hypertension *(90)*. A recent Swedish study has reported that men who by the age of 50 were taking little activity but then increased it achieved the same level of mortality after 10 years as those who had been very active throughout life *(111)*. One Cochrane Review has found evidence that aerobic physical activities which improve cardiorespiratory fitness are beneficial for cognitive function in healthy older adults, with effects observed for motor function, cognitive speed, auditory and visual attention. It also noted, however, that most comparisons yielded no significant results *(112)*. Another Cochrane Review looked at programmes to promote physical activity in people who have already developed dementia but, mainly because of a lack of well-conducted research, found that there is insufficient evidence at present to recommend physical activity programmes to manage or improve cognition, function, behaviour, depression and mortality in people with dementia *(113)*. Finally, physical rehabilitation interventions have been found to be very successful in improving a range of health outcomes among elderly people in long-term care *(114)*. Opportunities for physical activity and socializing include a wide range of activities, from yoga to swimming and organized walks *(41, 115)*. Such opportunities should be affordable, accessible and attractive *(90)*.

As with the rest of the population, the promotion of healthy diet and adequate nutrition is beneficial for the health of elderly people. Eating habits have been related to bone density and osteoporosis *(90)*. Moreover, just as with other age groups, there is a trend towards pre-packaged and processed foods and obesity is becoming more common among elderly people *(90)*. Hospitalized older people who are malnourished face an increased risk of mortality *(116)*. It is possible to identify through screening those who are at greatest risk *(117)*. There is some evidence that nutritional supplements may reduce mortality in older people at risk of malnutrition *(118)*.

Inappropriate use of pharmaceutical drugs is a common cause of visits to accident and emergency units. Many older people are taking more than four or five different medications. In Finland, an estimated 40–50% of hospitalizations among older people results from the improper use of medicines *(90)*. It is exceptional for drugs to be tested in combination with others that are likely to be taken simultaneously by older patients, many of whom will also have impaired capacity to metabolize some or all of them. Better coordination between different health care providers, including pharmacies, as well as more appropriate patient information, could help to reduce inappropriate medication and resulting hospitalizations *(41)*.

Strengthening data systems

There is a clear need to strengthen the collection and comparability of data on the effects of ageing in the European Region. Much of the available research on the impacts of ageing on health care expenditure is from the United States and cannot easily be transferred to European health systems. It will be essential to invest in more extensive European research into these questions, especially that employing cohort or panel data sets *(76)*. Furthermore, much of the available research involves estimates based on models rather than empirical observations. There are also major barriers to comparing different sources of data on long-term care and health care, as data are not collected and reported consistently and uniformly. Some countries combine and others separate data on long-term care services and health service utilization by older people with long-term chronic conditions *(88)*. It is also often difficult to assess the relationship between health care expenditure and ageing, owing to differences in age structure, population projection methods, assumptions on the development of longevity, different methodologies of data gathering, calculation and coverage of costs, with the last of these often excluding long-term care expenditure *(55)*. Many national survey data do not use standardized definitions, for example, in the way that disability is measured *(119)*; and there is a lack of consensus on how to measure the duration of life gained from the increased expectancy *(120, 121)*. Systematic research is also needed into the cost–effectiveness of primary prevention interventions that target the elderly *(24)*.

Endeavours to overcome the paucity of data include SHARE. This multi-disciplinary longitudinal survey has collected baseline data of about 22 000 individuals in eleven European countries in 2004, and is being harmonized with the US Health and Retirement Study (HRS) and the English Longitudinal Study of Ageing (ELSA). An increasing number of countries are joining the next rounds of data collection *(46)*.

Building adequate systems of long-term care

The ageing of the population will have major implications for the long-term care sector, necessitating adequate capacity to address the health and residential needs of the elderly population. There is substantial scope for the better organization and coordination of services *(94)*.

Combining formal and informal care

There are a number of options to strengthen systems of long-term care. Among the most important are supported self-care and home-based services that enable older people to remain in their own homes or a home-like environment. Systems of long-term care can provide support to relatives, enabling them to continue to provide help and support to elderly people without jeopardizing their own health or economic status.

A crucial question here is whether providing more formal support services "crowds out" family care or, conversely, whether the provision of support to family carers enables more to care for longer. An investigation into this question, based on an analysis of data from a Commonwealth Fund survey, found that Germany had a strong level of family support and a relatively generous provision of formal assistance (as does Austria), while in the United States both were relatively weak *(122)*. The authors concluded that there was no evidence of "crowding out". In another review it was again concluded that formal and informal caregivers worked in partnership, without formal care displacing family help *(123)*. An analysis of data from the US Long Term Care Surveys found that use of formal services increased between 1982 and 1994, which was attributed to changes in available funding, but this was not associated with displacement of informal services. Rather, it was the combined use of both formal and informal care that expanded *(124)*. Similarly, the introduction of free personal care in Scotland (but not in the rest of the United Kingdom) has led to families changing the type of support they provide, rather than withdrawing help *(125)*. Research would appear to show that in societies that provide more generous home care, such as Denmark or Norway, older people prefer formal to informal support for personal care needs, and this preference seems to have strengthened over time *(126)*. However, an analysis of variations in intergenerational help in a number of countries of the European

Region concluded that while easier access to welfare services had not "crowded out" family care, it may have contributed to changing how families relate and enabled elderly people to maintain more independent relationships with their families *(127)*.

There may be disadvantages in relying on families to provide personal care (rather than help with instrumental activities of daily living, which perhaps should be viewed as a normal part of intergenerational exchange). First, it may have negative consequences for the health and well-being of family caregivers, particularly women, who tend to bear the greatest burden and who may have other conflicting aspirations and commitments *(128)*. Second, it may have negative psychological consequences for those older people who attach a high value to autonomy and "not being a burden" *(129)*.

Ensuring appropriate settings of care

Life satisfaction and social support have been found, independently, to place fewer demands on the health system *(58)*. Interventions are needed that help to maintain the activities of daily living of elderly people, aid ageing at home and prevent long-term institutional care *(55)*. Appropriate services for older people with chronic diseases are essential, with a particular focus on care settings, such as home care and day care. It is important to integrate long-term care throughout different levels of provision and across the social and long-term care sectors *(88)*.

The United Kingdom Royal Commission on Long-term Care noted that there was now a consensus internationally that long-stay wards in general hospitals were not the most appropriate or efficient settings for long-term care. Consequently, over recent decades, much of the burden of providing social support and end-of-life care for elderly people in Europe has shifted from hospitals to the long-term care sector and this trend is likely to continue *(62)*.

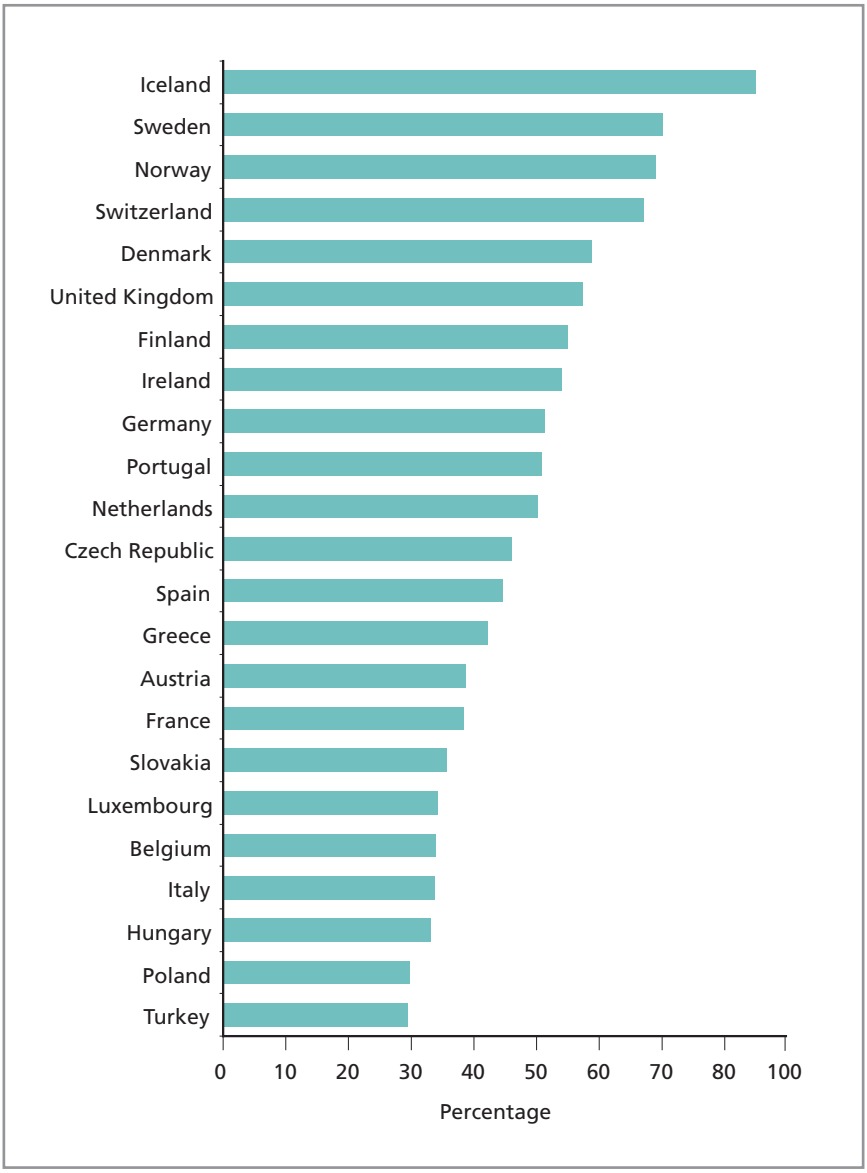
Supporting economic and social integration

Employment and retirement policies can contribute to the active engagement of elderly people in society. Not only can this help to sustain funding for the health and pension systems, but it also contributes to successful and healthy ageing *(130)*. The workplace helps to maintain social integration and self-esteem *(90)*.

Increasing labour force participation

Given the ageing of the population, participation in the labour force by older workers who have not yet reached retirement age will become more important *(75)*. At present, many workers in the EU leave the workforce early (due to early retirement or invalidity), although this varies greatly among countries (Figure 5).

Figure 5. Labour force participation rates age 55–64 (2007)



Source: OECD Labour Market Statistics

The Lisbon Strategy for Growth and Jobs launched by the EU in 2000, and re-launched in 2005, envisages increasing the labour force participation by workers between the ages of 55 and 64 years to 50% by 2010. Systems that allow flexible work arrangements and lifelong learning may be particularly important in achieving this aim *(44, 131, 132)*. Many countries in Europe have begun to remove incentives for early retirement and now pursue policies to encourage the employment of senior citizens *(44, 48)*. However, as a recent review has noted, evidence on the effectiveness of the many policies being pursued is still limited *(133)*.

Increasing the retirement age

Increasing labour force participation below retirement age may not be enough. A further option is to increase the retirement age in line with increases in healthy life expectancy *(41)*. The Lisbon Strategy envisages raising the average retirement age by five years to 65 by 2010. According to some calculations, increasing working age by 1.2 years every 10 years, in line with expected increases in longevity, would stabilize the size of the working population in relation to the economically inactive *(131)*. Several European countries have now embarked on pension reforms that extend working lives, based on assumptions about longer life expectancy and decreasing disability in old age *(39)*. Changing current age limits will challenge the peculiarity of an almost complete disappearance of people aged over 65 years from the workforce, despite labour shortages and the potential desire of some people to continue to work past retirement age. However, this will also require changes in the nature of work at older ages, for example by enabling a gradual withdrawal from the workforce and a combination of income from work and from pensions, and by measures that take account of changes in physical capacity with ageing. It must also be recognized that extending working lives presents a major political challenge, and there has been considerable opposition to such changes in some countries. As mentioned, healthy life expectancies differ widely across EU member states. These differences must be taken into account in policies to raise the average retirement age. It will also be important to not exacerbate inequalities related to gender, different levels of education and types of employment, and to take account of the overall state of the economy. Ideally, employment and pension reforms should not only address the potential negative effects of ageing on public budgets and economic growth, but also promote choice and improve job prospects for older workers *(44, 132)*.

Supporting social engagement

Policies in support of healthy ageing also need to address the need for the continued social engagement of elderly people. There is evidence that a lack of social interaction is a risk factor not only for depression, but also for cognitive

decline, both of which are serious and very costly disabling conditions in older age groups *(134)*. Better integration into society can be achieved through participation in communal activities, such as involvement in charitable or community organizations *(90)*. It will also be important to improve public awareness of age discrimination *(135)*.

Summary

As this review has shown, the impact of ageing populations on health systems will give rise to a number of challenges. Much will depend on whether elderly people can be enabled to remain in good health. At present, trends are mixed. While severe disability is declining in some countries, it is increasing in others and mild disability and chronic disease are generally showing an increasing trend. Furthermore, rising levels of obesity are threatening to undermine the health of the elderly.

While expenditure on long-term care is certain to increase with the ageing of the population, it is far from clear what the effects on health care expenditure will be. Technology has been found to be a more important driver of health care expenditure than ageing and there is some evidence to suggest that health care expenditure may be falling in older age groups, although this may still result in higher lifetime health costs. While the overall effect on health care expenditure remains unclear, there is no reason to subscribe to doomsday scenarios.

Instead, there are various policy options to attenuate the potential impact of an ageing population. One of the most promising ways appears to be the promotion of healthy ageing. When elderly people are in good health, they will need fewer health care resources and are also more likely to remain in the labour force. Policies that allow a healthy ageing of the population include a better coordination of health and long-term care services and enhanced prevention services to tackle obesity, smoking and mental illnesses. When these policies are implemented in good time, they are not only likely to allow more people to age healthily, but they will also help to make sure that health systems are properly equipped to accommodate population ageing.

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