

# An ageing population: a crisis?

The rise in life expectancy and fall in mortality at older ages has brought with it a fear of an increased burden of chronic disease to society. Data suggest that these fears are perhaps overly pessimistic and that the proportion of one's life spent in ill health may actually be falling. There are numerous advancements and strategies, medical and non-medical, that are already being implemented to compress morbidity in society. Our ageing population is definitely not a crisis but is a challenge we need to address.

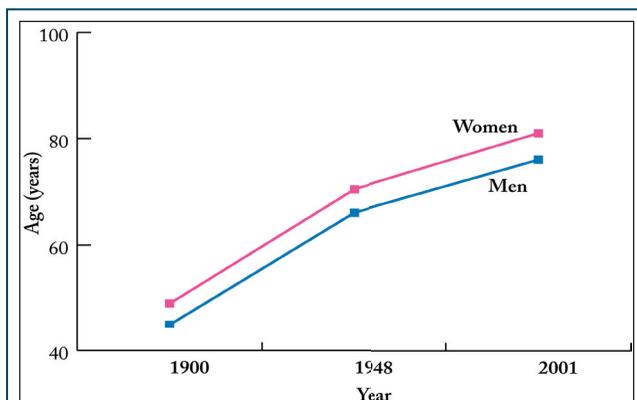
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We are all aware that life expectancy has increased—but by how much and why? Does this increase in life expectancy come with a greater burden of chronic disease? If so, are the aims of geriatric medicine lost in this conflict? A huge challenge clearly faces both medicine and society. This article reviews the relationship between an ageing population and chronic ill-health and disability. The prospects for the future will be examined; in particular, whether doctors should press for small increments in life expectancy regardless of the quality of the extra life-years gained.

## Trends in life expectancy

The increase in life expectancy, in this country, has been almost two-fold over the last century (figure 1). We can therefore expect the median age of the population to rise. Indeed, specific population projections from the UK Office For National Statistics<sup>2</sup> suggest that the number of people aged 60 years or older will increase from 12 million (20% of population) in 2001 to 18.6 million (30% of population) in 2031. What lies behind this increase in the population aged over 60?

Data for the first 50 years of the NHS show that infant



**Figure 1.** Change in life expectancy in the UK.<sup>1</sup>

	Age 60+		Age 80+	
	Men	Women	Men	Women
1980	16.3	20.8	5.8	7.5
2000	19.5	23.0	7.0	8.6

**Table 1:** Change in the number of people (in millions) aged 60 or older and 80 or older over two decades.<sup>3</sup>

mortality has fallen sharply. Indeed, the proportion of deaths of people younger than 65 years in England & Wales has fallen from 40% in 1948 to 7% in 1996. Clearly this reduction in young deaths has played a big part in increasing the amount of people reaching old age, but this effect was greatest in the first half of the 20<sup>th</sup> century. In recent times, a decrease in mortality at older ages is more important. This can be demonstrated by looking at data for life expectancy in later life (table 1).

Better healthcare for the elderly population is therefore fundamental. Pneumonia and tuberculosis are no longer the biggest causes of death in elderly people; death in old-age is now most frequently due to cardiovascular disease and malignancy.

Thus, people are getting older because of improvements in healthcare. However, are these extra years of life added to an 80-year-old passed in ill health? Perhaps these small increments in life expectancy do nothing more than add yet further burden to already stretched health and social security systems.

## Unhealthy ageing?

The use of health care increases with age. Annual hospital discharges per 100 people are 14.2 for those aged 45–64 years of age, compared with 33.7 per 100 for those over 75 years. This is because the incidence of many chronic diseases and prevalence of disability increases with age. In Britain in 1984–85, the estimated prevalence of those with

severe disability was less than 1% in people aged 50–59 years and was 13% in those aged over 80 years.<sup>4</sup>

The chronic diseases that correlate most closely with ageing include: Alzheimer's disease, Parkinson's disease, musculoskeletal disorders (such as osteoporosis and osteoarthritis), cardiovascular disease, cerebrovascular accidents, and malignant neoplasms. For example, data based on incidents of hip fracture in 1983 suggest an increase in incidence of fractured neck of femur from around 65,000 currently to 130,000 in 2051. A similar pattern is also seen for dementia with the number of cases projected to double by 2051.<sup>5</sup> Such data paint a very sick picture for our society. Are things really going to be so bad?

## Estimation of morbidity and disability

A good way of assessing morbidity as a whole is to look at peoples' abilities to carry out common activities of daily living. These include tasks such as eating, using the toilet, dressing one's self, walking, and bathing. The number of people older than 65 years in the UK that are unable to independently perform four activities of daily living can be projected and therefore be used to make estimates of the prevalence of morbidity. They make surprising reading.

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These studies show that the number of people aged over 65 years who are unable to do four activities of daily living independently has, in fact, fallen over the past two decades. On the basis of such findings we can see that disability projections for the future have been overestimated. The 1976 prevalence estimates, for example, suggested that the number of people unable to perform four activities would rise from 1.7 million in 1996 to around 3 million by 2036. However, if we apply the 1991 figures, the number of people unable to do four activities of daily living will rise from about 0.5 million in 1996 to 1 million in 2036.<sup>6</sup> The 1976 study therefore gave a three-fold overestimate of disability!

Recently, more and more studies find that initial estimations of future chronic illness and disability in our ageing society have been overly pessimistic. Data accumulated from the OCSP study<sup>7</sup> between 1981 and 1984 estimated the incidence of stroke in Oxfordshire to rise by 28% by 2004. When data from the OXVASC study was analysed, it was found that the incidence of stroke had

actually fallen by 28% between 2002 and 2004.<sup>8</sup> These data clearly buck the trend of chronic disease and disability but they do suggest that we should perhaps place greater faith in medical and scientific advances.

Another aspect to this debate is not just the effect of an ageing population on national rates of chronic illness, but also whether or not we are delaying the onset of morbidity. An important question is: are people spending a greater proportion of their lives in ill health?

## Healthy life-years

Although clear increases in life expectancy in later life are evident, there are concerns that not all years gained are in good health. James F Fries, a prominent gerontologist, has suggested that the age of onset of ill health might be rising more quickly than the rate at which our lifespan increases resulting in the compression of morbidity. And thus, he proposed that the aim of gerontologists should be to compress morbidity<sup>9,10</sup> rather than to lengthen life regardless. In his 1996 review, he wrote **"a healthy life under the compression of morbidity scenario becomes a life which is vigorous and vital until shortly before its natural close"**.<sup>10</sup>

Is morbidity being compressed and if so, how do we assess this? The US national long-term care study<sup>11</sup> showed that the prevalence of disability in people older than 65 years decreased from 26.2% to 19.7% between 1982 and 1999: this is double the decrease in the mortality rate. If disability prevalence declines faster than the mortality rate then morbidity would indeed be compressed; such a trend in this country would be most encouraging.

One way in which the length and quality of life can be amalgamated is by calculating healthy-life expectancy.

Year	Women		Men	
	1981	2001	1981	2001
Life expectancy (years)	76.8	80.4	70.9	75.7
Healthy-life expectancy (years)	66.7	68.8	64.4	67.0
Proportion of life in good health	86.8%	85.6%	90.1%	88.5%

Table 2: Effect of changes in life expectancy on healthy life

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This can be done by asking a general census question such as: **“Over the last 12 months would you say your health has been... good, fairly good, or not good?”** Levels of reported ill health are then combined with mortality data to estimate the number of years of healthy life an individual will have. Using this method we can see how the proportion of peoples’ lives spent in ill health changes.

According to the data in table 2, healthy-life expectancy has risen over the past two decades but the proportion of people’s lives spent in good health has actually fallen marginally. An interesting point to note from these data is that women live longer but experience proportionally more chronic ill health or disability than men at all ages. However, such data isn’t always reliable: self-reported ill health varies strongly over time and social groups, making comparison difficult. For example, a recent US study found that younger people and those on higher incomes did not report disability until higher levels compared with elderly people and less affluent groups.<sup>12</sup>

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Generally, it seems as though the proportion of people’s lives spent in ill health hasn’t changed much. This is supported by the General Household Survey,<sup>13</sup> which surveyed 3,365 people older than 65 years living in private homes in the UK between 1980 and 2001. Results showed no overall change in proportion of elderly people reporting that their health is good, fairly good, or not good.

**“We want to spend a longer time living and a shorter time dying”<sup>14</sup>** (John Grimley Evans, 1997). Medics and gerontologists should aim to delay the onset of disabling disease to later life—when the body has less reserve. In this way, the average duration of disability before death will be shortened: thus compressing morbidity. Data examined suggest that morbidity is not yet being compressed in the UK, but this should ultimately be the aim of geriatric medicine.

## Geographic variation in age-related chronic disease

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There are great geographical variations in the rates at which old people develop major chronic diseases such as stroke, coronary heart disease, cancer, and cataracts, which suggest that these conditions are not an inevitable part of ageing. For example, data for age-specific mortality from ischaemic heart disease, breast cancer, and prostate cancer

	Men	Women
65–69 years	3·8	8·9
70–74 years	3·7	7·9
75–79 years	3·1	6·1
80–84 years	3·4	5·0
85+ years	3·2	4·9

**Table 3:** Number of years of dependency faced by elderly people by age

between 1992 and 1994 show that Japanese men and women have much lower age-related increases in these conditions than their British counterparts; Spain has intermediate rates.<sup>15</sup> Indeed, life expectancy at the age of 80 is higher in the USA than in England, France, Sweden, or Japan—despite similar overall life expectancy.<sup>16</sup> Are these differences due to genetic factors or are environmental factors most influential? If environmental factors are most important, there is huge potential for lifestyle interventions to prevent age-related disability.

Migration studies show that the primary determinants of cardiovascular-related chronic disease are environmental and not genetic. For example, Japanese people have much lower blood-cholesterol concentrations and lower rates of heart disease than do white Americans, but Japanese migrants in the USA have much higher cholesterol concentrations and rates of heart disease.<sup>17</sup> Members of the Luo tribe in Kenya had low blood pressures when living in rural Kenya, but higher blood pressures that increased with age when they moved to urban Nairobi.<sup>18</sup> Such data do not exist only for cardiovascular disease: Dutch women living in the sunnier islands of The Antilles had higher bone mass and lower rates of fracture than Dutch women of the same age in the Netherlands.<sup>19</sup> In Britain, for example, around 50,000 hip fractures occur annually—projected to increase to 120,000 by 2020, but if age-specific rates returned to those of 1950, the coming epidemic would be averted.

What can we learn from such geographical differences? Perhaps that a great proportion of the chronic diseases associated with ageing can perhaps be prevented, or at least postponed.

## Prospects for the future: preventive treatment?

Is it true that the older the age one attains, the shorter the period of disability and dependency? Professor Sir John Grimley Evans has looked at the period of dependency before dying in various age-groups.

These data suggest that the older the age one attains, the shorter the period of dependency to be expected before death. Interestingly, the data also suggest that women have longer period of dependency prior to death than men do, especially when death occurs at younger ages. Does evidence exist to show this happening? If we once again go back to data comparing stroke incidence in Oxford and compare that of the 1981–84 OCSP trial<sup>7</sup> and the 2002–04 OXVASC trial,<sup>8</sup> then we see that median age of stroke has risen from 74 to 75·5.<sup>4</sup> Obviously this needs further analysis with life-expectancy data, but it does suggest that chronic ill health is being postponed. How can we postpone disability further? Can disability and chronic disease be reversed in the future? Essentially, we want to live longer then die faster.

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### Healthy lifestyles are the responsibility of society, as well as individuals

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The first and most intuitive option would be to postpone disability through preventive medicine. Prevention can be both primary (before ill health) and secondary (in response to illness). Primary prevention can start from youth, such as greater emphasis on improved diets, reduced alcohol consumption, and smoking bans. Secondary prevention for high-risk groups can also play a major role, such as take prevention of cardiovascular disease and osteoporosis.

Trials show that a reduction in blood pressure of 6 mmHg reduces risk of stroke by 40% and that a 10% reduction in blood-cholesterol concentration will reduce risk of coronary events by 30%.<sup>20,21</sup> Dietary prevention also has a vital role: for example, lowering sodium is thought to lower blood pressure in older people more than in younger people. Evidence also suggests that increasing intake of fruit and vegetables by one or two servings daily may decrease cardiovascular risk by 30%. Are sufficient dietary and public-health measures already being taken? The answer, plain and simply, is no. Data suggest that secondary prevention is only done in halves: for example, of the population qualifying for lipid-lowering treatment, approximately half are treated and of them, only half achieve therapeutic dose.<sup>22</sup> Thus, only a quarter of those that need to reduce their cholesterol actually achieve it.

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### Greater individual freedom with regard to disease prevention can only be beneficial and can lessen the burden on an already overstretched healthcare system

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Osteoporosis is a major source of disability and illness through increased risk of hip and vertebral fractures. The incidence of such fractures can be reduced by 30–50% by various treatments including vitamin D, calcium supplementation, and bisphosphonates.<sup>23,24</sup>

In both cardiovascular disease and osteoporosis, and with other chronic diseases, preventive drug treatment for the whole population is debatable because issues of risk versus benefit, but at least all dietary measures can be undertaken! Is diet an issue for health education? Health education increases knowledge but rarely changes behaviour. Healthy lifestyles are the responsibility of society as well as individuals. A second approach to postponing disability is through advances in medicine—both for prevention and reversal of disability.

The preventive benefits from drugs such as statins, diuretics, aspirin,  $\beta$ -blockers, and ACE-inhibitors are much greater than was suggested by their early use in high-risk conditions; and they are now widely underused. Advances in the reduction of cardiovascular risk can be made—perhaps through the introduction of a polypill, an idea proposed by Wald and Law,<sup>25</sup> who presented a statistical model suggesting that widespread use of the polypill (containing various combinations of the drugs mentioned above) could reduce mortality due to heart disease and stroke by up to 80%. Once again, giving them to the entire population would raise issues of risk versus benefit and cost. But if people are free to spend their money on cigarettes, then why not give them greater choice to spend their money on medically sanctioned over-

the-counter preventive drugs such as statins? Greater individual freedom with regard to disease prevention can only be beneficial and can lessen the burden on an already overstretched healthcare system.

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Widespread use of a polypill... could reduce mortality due to heart disease and stroke by up to 80%

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Advances in handling chronic disease itself are also taking place. Specialist stroke units, for example, have improved survival and increased the proportion of patients able to live at home 10 years after their stroke.<sup>26</sup> Furthermore, research into reversing disability and chronic disease, particularly cognitive decline, as well as neurorehabilitation, neuroplasticity, and techniques such as transcranial magnetic stimulation all hold promise.<sup>27</sup> By ameliorating the effects of Parkinson's disease and Alzheimer's disease in later life, morbidity would definitely be compressed.

A third approach is to consider the compression of morbidity as not merely a medical issue. Disability may be the result of an unsuitable environment as much as a person's physical or mental impairment. The elderly are frail and more susceptible to harm from an unfavourable environment. For example, the elderly are more at risk during sudden spells of cold weather because they have weakened homeostatic mechanisms and lower physiological reserves. Better heating and electrical

arrangements for elderly people during winter are just one small way in which an elderly person's environment can be made more suitable. Thus, there should be a greater focus on improving quality of housing and making urban spaces more elderly-friendly.

There are therefore many options available to individuals and to society to delay and compress the morbid period of one's life. Evidence examined suggests that these methods are underused.

## Conclusion

Life expectancy has risen markedly over the past few decades and this has resulted in an ageing population. The incidence of many chronic diseases increases with age and so an increased burden of ill health and disability placed on the shoulders of a proportionally smaller working population is a worry.

This review demonstrates how these fears may be overly pessimistic and that the proportion of one's life spent in ill health might be falling. Although there is doubt as to whether this is happening already, numerous strategies have been outlined through which people can live longer yet die quicker, and so enjoy more years of healthy life. Society and the medical profession need educating on how best to avoid adding meagre increments to the length of one's life, at the expense of good health.

An ageing population is often blamed for the difficulties our health-care system finds itself in. These accusations are perhaps unfounded. If we place greater emphasis on postponing disability, particularly through prevention, then chronic illness will decline. Furthermore, analysis of health expenditure in the UK, shows a smaller increase in per-capita costs for older patients compared with younger age-groups. Indeed, combined NHS and community services for the people aged 85 years or older has decreased in real per-capita costs between 1985–87 and 1996–99. The public are very willing to allow NHS resources to go into hugely expensive cancer drugs, yet are unwilling to realise the huge potential that exists in preventive medicine. Our ageing population is not a crisis, but is clearly a challenge waiting to be addressed by the medical profession and society alike.

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