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# Implications for health services

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## SUMMARY

Health services for older people in the NHS have developed pragmatically, and reflect the nature of disease in later life and the need to agree objectives of care with patients. Although services are likely to be able to cope with the immediate future, the growth of the elderly population anticipated from 2030 calls for long-term planning and research. The issue of funding requires immediate political thought and action. Scientifically the focus needs to be on maximizing the efficiency of services by health services research and reducing the incidence of disability in later life through research on its biological and social determinants. Senescence is a progressive loss of adaptability due to an interaction between intrinsic (genetic) processes with extrinsic factors in environment and lifestyle. There are grounds for postulating that a policy of postponement of the onset of disability, by modifications of lifestyle and environment, could reduce the average duration of disability before death. The new political structures of Europe offer under exploited—unexploited opportunities for the necessary research.

## INTRODUCTION

British medicine has been adapting to the ageing of the population for half a century. In 1948 the first consultant geriatrician in the country (and in the world) was appointed and geriatric medicine is now the second largest specialty of hospital adult medicine in England and Wales. It has had a considerable effect both through the direct care it provides and by its influence on medicine as a whole, particularly through teaching medical students.

In the 1970s the essential features of an efficient health service for older people became defined empirically, but followed logically from the nature and epidemiology of ageing (table 1). The older we are the more diseases we are liable to accumulate and interactions between multiple diseases and their treatments is a pervasive concern of medical care for older people. Ageing is also associated with physiological changes, for example impairment of the inflammatory response, which obscure the conventional signs and symptoms of disease. Older people need more investigation than younger people if the same levels of diagnostic accuracy are to be obtained. High complication rates of disease and treatment call for careful monitoring by appropriately skilled medical and nursing staff. These characteristics of medicine in late life call for older people who fall ill to have immediate access to the best of modern medical technology. In later life recovery from illness may be less spontaneous and rehabilitation needs to form part of the care offered. Given the complexities of community services, doctors, nurses and other health workers expert in matching environments to needs must be available.

At the individual level it is important to ensure that treatments are appropriate in that they are likely to work and that they meet patients' informed wishes. The necessary negotiation, between a doctor who knows what could be done and the patient who is to decide what he or she wants to be done, figures early and prominently in the medical care of older people. It is here in clinical practice that one sees the absurdity of health economists' fantasies about the 'vain pursuit of immortality' (Williams 1997). Older people do not expect to live for ever and would not want to. But they may still have things they want to do and people they wish to see before they die. Medicine is compassion in action and its purpose is as far as possible to enable people to achieve their personal goals.

An important aim of doctors and their older patients is to minimize disability (Verbrugge & Jette 1994) or handicap (World Health Organization 1986). Disability arises because of the *ecological gap* between what a person is capable of doing and what his or her environment demands. This gap can be closed by *therapeutic* interventions to improve the individual's capabilities or *prosthetic* interventions to reduce the demands of the environment. One of the problems in the UK is that therapeutic interventions are mostly paid for from the health budget but prosthetic interventions mostly from personal or social services budgets. There is therefore a danger that care may be distorted by the perverse incentive to transfer responsibility from one budget to another. Money saved on the health budget by not providing coronary artery surgery for an old lady may be spent many times over if she then has to live for months in a nursing home because of her disabling angina.

Table 1. *Characteristics of illness in old age*

calling for rapid access to high-quality medical care:
multiplicity of problems
cryptic or non-specific presentation of disease
rapid deterioration if untreated
high incidence of secondary complications
calling for specialist geriatric expertise:
need for rehabilitation
complexity of resettlement in the community

## 2. WHAT ARE WE TRYING TO DO?

Before we can sensibly consider the impact of ageing on the health services we have to be sure about the objectives of those services. Here science and ethics meet. The aim of public health is to maximize the overall health of the nation by reducing the incidence of disease. The output of the clinical health services is the changes induced in the well-being of individuals. At first glance it might seem that the common end of both services could be sought in lowering the prevalence of disease. Unfortunately death is a complicating element in that it is regarded as an undesirable outcome from clinical medicine although it reduces the prevalence of disease by removing the patient from the numerator of a prevalence rate. In economically developed nations the pattern of disease is such that clinical medicine enhances the survival of someone with a chronic disease more often than it restores an ill person to perfect health. In terms of the overall visible health of the nation, clinical medicine cannot therefore compensate for deficiencies in public health. Moreover, fiscal savings from failure to deal with the origins of disease in poverty, poor education, inadequate housing and unemployment will in part be spent in increased costs of the clinical health services.

For clinical services there is a long-running ethical debate about how health transitions should be valued. The collectivist view is that they should be valued by agents of the State in terms of some derivative of extra life-years obtained. The humanist view is that transitions should be valued by the individuals seeking or receiving them. The debate is particularly intense around the topic of age. In the collectivist view the well-being of old people generates little value because of their relatively short life expectancy, not to mention their enforced economic unproductivity. The humanist view is that it is not possible or permissible to predict what value an individual may put on his or her own life from knowledge of a class of society to which the individual is allocated. Whether an old woman values her remaining years of life more or less than a younger man values his, will depend on their individual circumstances and desires, not directly or predictably on their sex, race, social class or age. In theory, but very rarely in practice, a 'doctor's dilemma' can arise in which two people want a lifesaving treatment that is sufficient only for one. The collectivist will give the treatment to the younger person to gain the larger number of life-years for the State. The humanist will toss a coin on the grounds that the value of life lies not in its length but

in the subjective experience of being alive and this is non-finite for anyone but the person living the life. Because the subjective experiences of different people cannot be brought under the scrutiny of a single observer, individual valuations of lives are formally incommensurable. The notion that it is possible to overcome this incommensurability by the economists' device of willingness-to-pay analysis is illusory since this merely transfers the incommensurability problem from monadic valuations of living to monadic valuations of money. This is, however, no place to rehearse this debate in detail; I will simply declare my position as firmly in the humanist camp on the grounds that it represents what is supposed to be one of the values of our society and therefore should be embodied in our social institutions and pursued by our professions (Grimley Evans 1997). Measurement of outcomes of health-care interventions in terms of individualized objectives is clearly possible (Browne *et al.* 1994) but needs more of the research investment that has hitherto been expended on collectivist models. Something of the importance of obtaining individuals' own assessments of the value of interventions can be seen from the discrepancies revealed in American enquiries into what older people would want from health care compared with what their potential proxies, family members or professional advisers, think they would want (Ouslander *et al.* 1989; Seckler *et al.* 1991). In general, older people value their lives more and are readier to undergo life-enhancing but hazardous treatments than younger people assume.

In their interactions with health and social services old people wish to retain *autonomy*, the ability to live the lives they wish. Governments are more interested in old people retaining *independence*, in not requiring support and care from others. These objectives do not always coincide for in many cases autonomy can only be maintained by a degree of dependence. There is common ground in the prevention of disability in later life, since disability reduces autonomy and increases risk of dependency. Disability was the focus of the recommendation from an Expert Group from the World Health Organization (World Health Organization 1984) that at a population level some form of active life expectancy could provide a measure of the overall success of health and social services. Measurement of active life expectancy requires standardized repeated surveys of population samples over periods of time. We have at present no adequate data source in the UK.

## 3. WHERE DO OLD PEOPLE COME FROM?

The proportion of older people is increasing in virtually all populations of the world. As economic development takes place there comes a point when for reasons that are not always clear and probably differ between nations, infant and child mortality rates fall. There is then a lag, typically of a generation before family sizes also fall. This 'demographic transition' therefore releases into the population a bolus of unprecedented survivors of childhood. Once mortality rates

become stable, fluctuations in the birth rate continue to be a major determinant of the numbers of older people seven or eight decades later. In the UK as in some other countries the impact of ageing of the population will be biphasic. We are now working towards the end of the first phase determined by our demographic transition during the first three decades of this century but must anticipate the arrival in old age of the cohort of postwar 'baby boomers' in the third and fourth decades of the new millennium.

The second cause of ageing of populations is the fall in mortality rates in middle age and later life. This could be because people are living longer because they are fitter, or because unfit and chronically ill people are being kept alive longer. These two processes, which may coexist, obviously have very different implications for the health and social services. Mortality rates of older women have been falling in the UK since the beginning of the century and for older men more recently. We have no adequate information for the UK on whether this is producing more or less fit older people. Recent claims (Dunnell 1997) that increases in active life expectancy are not keeping pace with increases in total life expectancy in Britain are derived from the General Household Survey (GHS). This survey does not include institutionalized people in its sampling frame and will register an increase in disability if improvements in community care services enable more older people to continue living in their own homes rather than moving into institutions. Furthermore the prevalence of disease and disability in the GHS is based on self report. Even where the questions have remained constant over successive surveys there may have been changes in how respondents interpret questions, and changes in expectations of health can alter older people's perceptions of themselves as ill or disabled.

#### 4. VIEWING THE FUTURE

For the time being therefore, predictions of the future have to be based on or around projections of the present situation on to new demographic structures. In broad terms these indicate that if patterns of disease and costs of care remain as at present the main impact of ageing in the UK will fall on the long-term care sector rather than on acute secondary or primary care (Laing & Hall 1991; Nuttall *et al.* 1994). The reason for this is that the usage of primary and secondary care rises much less steeply with age than does the use of the various forms of long-term care. This relationship may partly reflect inappropriate use of prosthetic rather than therapeutic interventions. It may also be changing; acute medical emergency admissions of older people to hospitals have been rising recently far faster than would be expected simply from ageing of the population. Moreover advances in technology will increase the applicability of secondary health care to older people and enhanced expectations will amplify demand.

Three things need to be done. First, we must anticipate that there will need to be a real increase in funding for health and social care. Second, we must

improve the efficiency of services. Third, we must reduce the need for services. The first member of this triad is a matter of politics rather than science although it could be illuminated by comparative studies of the consequences of different funding structures already in place in other countries. The second embraces the field of health services research (HSR) now a blossoming field of active cooperation between medical and social sciences. The gold standard of evaluation remains the randomized controlled trial (RCT), and it is worth noting that with a little ingenuity and rather more determination RCTs can be carried out for social services as well as for medical (Elton & Packer 1986). There are however limitations on the conventional RCT, which may not be solved by the current enthusiasm for overviews and meta-analyses (Grimley Evans 1995). One is the fact that a service that is efficient in one setting under an innovative and enthusiastic team may not work so well elsewhere. Certainly the massive RCT with simple outcome measures is of limited applicability in measuring the efficiency of services as distinct from the efficacy of treatments. A research paradigm aimed at overcoming some of these problems and of particular promise in the field of services for older people is the multicentre factorial design for a preplanned meta-analysis implemented in the FICSIT trials of falls prevention in the USA (Province *et al.* 1995).

We may simply not have time or opportunity to carry out the interventional trials that rigorous science would require. We may have more to learn from systematic comparisons of health services based on different models. The management of elderly patients with acute stroke, for example, differs between the UK and The Netherlands but we have no idea of the cost-effectiveness of the two systems. Much research fostered hitherto at a European level has for political reasons been aimed at solidarity through concerted actions and pooling projects. We have more to learn from our differences than from our supposed or imposed similarities.

HSR evaluation of services should include an economic analysis. The degree of elaboration of the analysis varies with context but can rarely be restricted to simple accountancy of immediate and explicit costs. Again there may be issues of how utilities should be measured and how future benefits and costs should be discounted. For the public health it seems logical from both the collectivist and humanist standpoints to discount costs but not health benefits. Option appraisals by individual users of services may involve discounting of both. We need to know more about the ways doctors and patients make up their minds about options for treatment. Relevant current approaches range from formal decision analysis to interactive computer programmes.

A pervasive problem, identified and condemned by the Medical Research Council (1994) is that older people have often been excluded from trials of treatments for diseases to which they are liable. This has occurred for a variety of reasons including simple prejudice (the assumption that it does not matter whether or not treatments work in old age), technical

issues related to greater variances in response at later ages and the consequent impact on sample size requirements and misplaced kindness in not wanting to trouble old people with research. The last overlooks the significance of the gift relationship in human motivation and self-esteem. Many older people are glad of an opportunity to contribute to society by taking part in medical research. Another relevant issue has been the widespread assumption that treatments will necessarily be less effective in older people than in younger. In practice, older people can have more to gain from treatment. In some clinical situations the absolute benefit of treatment, in terms of the number of patients benefiting per thousand treated, will rise with prior risk. The risk of death after myocardial infarction increases with age. For both thrombolytic therapy in acute myocardial infarction (ISIS-2 Collaborative Group 1988) and beta-blockade following myocardial infarction (Hawkins *et al.* 1983), more lives are 'saved' ('prolonged' would be of course a more precise word), by treating older patients than by treating younger. Patients' individual assessments of benefit from treatment may also have a favourable effect on cost-benefit ratios at later ages. The effect of ambulatory peritoneal dialysis on quality of life in end stage renal failure is better, on average, for older patients than for younger (Winearls *et al.* 1992). The reasons are probably a combination of the physiological and the social. On average there seems to be an age-associated reduction in the pain sensitivity of the peritoneum so reducing the discomfort of the procedure. In addition the inconvenience of dialysis may impinge less on the lifestyle aspirations of older people than of younger.

The third item of our agenda, reducing the need for services, falls in the area of medical geratology. The study of human ageing begins in the differences between young and old people but processes other than ageing are relevant. *Selective survival*, is one example that is being actively studied in comparisons of centenarians with younger people from the same population group. Simple comparison may be sufficient to detect genes linked with survival since these are comparatively invariant features of populations and individuals. Longitudinal studies are necessary to confirm the survival benefit of lifestyle or psychological factors including intelligence and personality type, which may vary between generations and over lifetimes. In addition to genes linked with specific conditions such as diabetes or coronary heart disease that kill in middle age, the study of centenarians aims at identifying longevity assurance genes that affect fundamental ageing processes at cellular and molecular levels. It is here that the long hoped for link between medical and biological gerontology may be formed. *Cohort effects* are also liable to be mistaken for ageing but arise from lifelong habits or other qualities reflecting early life experience including education. There are interesting technical problems in identifying cohort effects in population data. The three parameters of age, cohort and secular trends cannot be uniquely estimated from a two-dimension age/time matrix and the analysis is often confounded by a pattern of change, which has been called 'drift' in which cohort and secular components cannot be distinguished

(Clayton & Schifflers 1987). Interpretation of mathematical models can also be uncertain; an analysis of the recent increase in incidence of proximal femoral fractures (Grimley Evans *et al.* 1997) revealed a statistically powerful secular component and a smaller but biologically more plausible cohort effect. The reasons for these changes are not yet clear. The epidemiology of fractures of the proximal femur reflects three groups of causes. One group represents the causes of bone weakness, osteoporosis being the commonest; the second is composed of the environmental and individual factors causing falls; the third comprises the factors which determine whether a fall causes a fracture. This third group includes active responses to falling such as throwing out an arm but also passive factors such as body height (the taller one is the further and harder one falls) and the padding effect of subcutaneous fat and floor coverings (Grimley Evans 1996).

A third source of differences between young and old that are not due to ageing is *differential challenge*. In some ways society presents older people with more severe challenges than face the young and then too readily attributes their poorer outcomes to ageing. The classic example of this used to be housing policy that placed older people with their impaired ability to maintain body temperature and consequent risk of hypothermia in the coldest houses. Today the problem is more apparent in the poorer quality of health care offered to older people. Although as noted above older people have more to gain from thrombolytic therapy after myocardial infarction they are less likely to be offered it (Dudley & Burns 1992; Hannaford *et al.* 1994). In some parts of the UK acutely ill people above an arbitrary age are not allowed into hospital general medical services but have to be admitted to geriatric units with poorer standards of staffing and facilities. In all such instances, because older people are expected to do less well than the young it is not registered that they are doing worse than they need because of the poorer care they receive.

True ageing differences between young and old come about because the older people have changed since they were themselves young. In biological terms, ageing or senescence is a progressive loss of adaptability of an individual organism as time passes. This is manifested in a rise with age in the risk of death. In the human, senescence first becomes manifest around the age of 12, and apart from perturbations in early adult life, due largely to violent and accidental deaths, mortality rates are a continuous and broadly exponential function of age thereafter. The prevalence rates of chronic disease and of disability also rise continuously and broadly exponentially with age. Traditionally, clinical medicine tried to separate undesirable age-associated phenomena into those to be labelled 'disease', which were the responsibility of doctors, and others to be called 'normal' and dismissed as the responsibility of social workers. This held back medical geratology for many years because of confusion between different meanings of the word 'normal'. It can be a synonym for 'healthy' or it can mean 'common', and there was further confusion with 'normal' in the sense of 'Gaussian'. Generations of medical students were therefore taught to correct blood

pressure for age using age-specific means and standard deviations. In terms of preventing stroke and coronary heart disease this was dangerous nonsense. Moreover, it was not until the 'normal' process of 'senile dementia' became relabelled as 'Alzheimer's disease' that medical scientists took proper interest in one of the most feared hazards of growing old.

A more heuristic model of ageing is to regard age-associated phenomena as the products of interactions of extrinsic factors in lifestyle and environment with intrinsic, genetically determined factors. Extrinsic effects are detected by the conventional approaches of epidemiological study of the ageing of populations living under different conditions. This approach has shown that a number of age-associated phenomena that were at one time thought to represent inevitable intrinsic ageing are under extrinsic influence. These include the rise with age in blood pressure, partly due to the effects of dietary sodium in the genetically susceptible. Age-associated phenomena such as most adult cancers, cardiovascular disease, high tone hearing loss and osteoporotic fractures all vary widely with time and place. Identifying and changing the environmental factors responsible could provide the most rapid means of modifying ageing. Improving lifestyle is likely to be more difficult since the conventional approach of health education has been found to improve knowledge but to have little effect in changing behaviour. There is a research agenda here for the social sciences in identifying the *opportunities* and *incentives* for lifestyle improvement that should be built into an ageing society. There is strong suggestive evidence for example that disability in later life could be reduced by increasing physical exercise at all ages. This might be better achieved not by providing vouchers for fitness centres but by making our urban environments safer and pleasanter for walkers and cyclists.

A specific mechanism of extrinsic influences on the ageing trajectories of individuals has been postulated by Barker (1992). He suggests that susceptibility to some forms of disease in middle age can arise *in utero* as a result of nutritional deprivation of the mother triggering metabolic switches (Grimley Evans 1993*a*) in the foetus that prepare the foetus for a life of similar deprivation. The child may later be susceptible to diseases of over-nutrition if life turns out to be better than it had been for the mother.

The intrinsic genetic determinants of ageing have several origins. Some will be genes universal in most metazoan phyla and related to the control of damage by prevention, detection and repair as suggested by Kirkwood & Rose (1991). These genes will also determine the rate of deterioration of epigenetic control, which may be an important mechanism of age-associated loss of adaptability (Fairweather & Grimley Evans 1990). Others will be universal within our species and selected by our evolutionary history. The female menopause probably reflects the survival value of having grandmothers in societies with a family social structure and a cumulative culture but a high maternal mortality rate. Our evolution from a primate ancestor with a harem form of social structure explains why women are generally smaller than men and have less

muscle strength (Harcourt *et al.* 1981). The greater longevity of females may also be partly due to our origins in a primate harem where greater selective pressure towards a longer reproductive career will fall on the female as she has less opportunity for reproduction than the male. The primacy of the warrior caste in protecting the crops and herds of post-neolithic cultures placed females at low priority in food distribution and so adaptations to protect against infectious diseases (as a major hazard to underfed children) would have been selected for. When the sexes came to live on more equal terms in later centuries the essential biological superiority of the female emerged. In the twentieth century we have seen the impact of extrinsic factors in a dramatic increase in male/female mortality ratios in young adult and late middle life (Grimley Evans 1978).

A third contributor to the pattern of ageing experienced by individuals lies in genetic polymorphisms, such as those determining the blood pressure response to dietary sodium and the metabolism of tobacco smoke into carcinogens. Populations that have been winnowed by repeated famines may have a relatively high prevalence of 'thrifty genes' that in conditions of affluence predispose to diabetes and vascular disease in middle life (Neel 1962). In the short term the public health approach attempts to adjust the environment and lifestyle of a nation to produce the best overall outcome given the genetic propensities of the population. In the long term we might learn how to modify the action of genes or, perhaps, look to citizens living to a personal prescription for a lifestyle matching their individual genotype. Ethicists might worry over whether we will receive this prescription from our general practitioner or our insurance broker. Whether by modifying the action of our genes, or by teaching us how to live with them, basic and biological research offers real hope of reducing the need for health care by older people of the future.

## 5. BUT DO WE WANT TO MODIFY AGEING?

Governments may be concerned that reducing the impact of ageing may raise health-care costs by increasing the numbers of older disabled people. Two lines of evidence suggest that it may be possible to improve the experience of ageing and increase lifespan without lengthening periods of disability. An early study of active life expectancy at later ages (Katz *et al.* 1983), since broadly confirmed by others (van de Water *et al.* 1996), showed two significant features relevant to the future of ageing populations. As table 2 shows, although women outlive men by an average of six years or so, the extra years represent years of disability. One should also note that because of sex differences in longevity and age at marriage those years of disability are often spent without the support of a husband. The prevention of disability in older women is therefore an important research priority. One major factor is lack of physical strength. Women begin adult life with less muscle than men and so although the sexes lose muscle and strength at the same rate, by the time women reach

Table 2. *Life expectancy in years (Massachusetts, 1974)*  
(Calculated from Katz *et al.* (1983).)

age	men		women	
	active	dependent	active	dependent
65–69	9.3	3.8	10.6	8.9
70–74	8.2	3.7	8.0	7.9
75–79	6.5	3.1	7.1	6.1
80–84	4.8	3.4	4.8	5.0
85–	3.3	3.2	2.8	4.9

the eighth decade of life most are functioning at the limits of their physical strength in even basic activities of daily living (Young 1992).

The second point of significance in table 2 is more apparent in women, on whom the major burden of disability falls, than in men. It is that the older the age one attains without becoming disabled, the shorter the period of dependency to be expected before death. This suggests that for disability in later life postponement of age of onset would result in prevention of suffering. There is now some encouraging evidence to support the exploration of 'postponement as prevention' as a research theme for ageing populations. Recent data from the USA show that the prevalence of disability at later ages has been falling while average lifespan has been increasing (Manton *et al.* 1997). The data suggest that this has come about not because of improvements in medical care, nor because of increased mortality among the disabled, but because successive generations of older people are showing a healthier pattern of ageing. This is what one would expect from a successful policy of postponement as prevention.

Politicians must not be allowed to use these American findings to imply that the threat of increased costs for health and social care for ageing populations will disappear spontaneously. There are three reasons for this. First, the rate of fall in disability prevalence in the USA has not been fast enough to compensate for the ageing of the population and so the total numbers of disabled older people in the USA have continued to rise. Second, the causes of disability and the costs associated with them vary with age. The costs of caring for a patient with a stroke at age 75 might be less than those of a shorter period of care for a patient who has survived to 85 and developed Alzheimer's disease. This is the problem of substitute morbidity, which a Dutch team has recently identified as an important but widely overlooked research issue (van de Water *et al.* 1995). Third, what has been happening among the older people of the USA may or may not happen spontaneously elsewhere. Middle aged and older people in America may be more motivated to adopt healthier lifestyles than are people in other countries.

## 6. TIME FOR A RESEARCH POLICY

If we are to be ready for the 'second wave' of population ageing in the 2030s we need a research strategy in place now. We need to monitor healthy active life

expectancy in the British population (Grimley Evans 1993*b*) in order to gain a better idea of future patterns of need for health and social care. The search for modifiable extrinsic influences on ageing should be pursued within our own population but also through coordinated studies at a European level. Such work will need to bear in mind the possibility of significant clines in genetic polymorphisms in Europe.

Health services research needs to be encouraged but the use of comparative studies, particularly between European countries should supplement the traditional randomized controlled trials that may be of lower cost-effectiveness than has been appreciated. The feasibility of multicentre factorial intervention trials should be explored, again within a European context. We have to acknowledge tension between the standards of academic science and the need of policy makers for information that is timely even if it is less than rigorous. The present system of university funding and promotion that puts low value on cooperative research into practical problems discourages scientists from providing for policy makers' needs.

Genetic, biological and medical research need to be brought closer together in the identification of intrinsic ageing processes. The social sciences should provide a focus for study of the opportunities and incentives for lifestyle improvement in the general population. Such a strategic approach to ageing research seems more feasible now than at any previous time. The Office of Science and Technology has identified ageing as an area of major concern over the next decade. A recent conference in The Netherlands focused on the research needs and opportunities provided by a European framework.

As Laslett (1991) has emphasized the new demography is here to stay and societies have to adapt their structures to serve new needs and profit from new opportunities. This was recognized in the recommendations of the Carnegie Enquiry into the Third Age (1993), which were ignored by ideologically unsympathetic politicians. But times have changed, and the suggestions of the enquiry should be reviewed. In research on measuring outcomes in health care we can now hope for an ideological shift from economists' models, in which human lives and well-being are treated as a marketable commodities, towards a focus on the hopes, desires and values of individuals. We should view the future with constructive optimism; the ageing of populations is a stimulus not a threat.

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