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AGE, HEALTH AND MEDICAL EXPENDITURE

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Abstract

Ageing populations in developed countries have placed increasing demands on health care services and drawn attention to how age is related to medical expenditure. The effect of ageing on health involves a mixture of biological and social factors that ideally requires an interdisciplinary approach if it is to be properly understood. Expenditure decisions connected to age add further complexity by raising difficult ethical problems. The current paper aims to bring out the intricacy of the age-medical expenditure relation and highlight the biological, social and ethical background that has often been overlooked in the economic literature.

Chapter in:

J.B. Davis (ed.), *The Social Economics of Health Care*, London: Routledge, 2001, pp. 195-218.

Introduction

Ageing poses problems for health economists. It affects everybody and has important consequences for health, yet it remains poorly understood and apparently beyond human control. Somehow, it manages to be both an obvious fact of life in its physical manifestations and an almost complete mystery in its underlying causality. The huge gap in our knowledge is perplexing for anyone hoping to organise efficient health care and promote human welfare. Under the circumstances, policy analysts will be tempted to abstract from ageing and regard it as outside the domain of health economics. Such abstractions are unwise, since ageing is intertwined with health and broaches fundamental questions about how health care fits into the wider social context.

Population ageing, a trend common to virtually all developed countries, has brought old age to greater prominence than ever before. Prior to the twentieth century, age patterns were stable, with only a tiny proportion of people in the upper age ranges; the rising proportion of old people seen during the twentieth century (and forecast to persist into the twenty-first century) is unprecedented and leads to novel policy issues. As populations age, the pressure on health care services seems likely to increase, forcing sensitive policy decisions. If current services are to be maintained or enhanced, then taxes and other payments may have to be raised. Alternatively, spending on services could be curtailed in order to hold taxes down. At the heart of these decisions lies the relation between age, health and medical expenditure.

The relation seems at first glance to be obvious: people grow older, their health worsens through biological ageing, and they make greater demands on the health care system. Old age should, it seems, be positively related to medical expenditures, in all times and places. Economists, especially those in the neoclassical mainstream, are usually happy to accept a simple, positive link between age and health care. People do not choose to grow old, so ageing does not fit comfortably into the neoclassical world of rational choice with fixed, well-defined preferences. Standard neoclassical models (even when 'intertemporal') ignore human ageing and thereby delegate its study to the other social and natural sciences. Where ageing cannot be avoided, it is kept at arm's length by using atheoretical, purely empirical methods centred on correlations between age and other variables. The narrowness of such

methods can give a misleading impression of how age interacts with health care and medical expenditure.

This paper points out the depth, richness and complexity of the age-medical expenditure relation and argues for a broader treatment. Ageing is a prime example of an interdisciplinary topic requiring contributions from natural as well as social sciences. As a result, the economics of ageing cannot be handled satisfactorily by economic theory alone, even if this were to be expanded beyond the neoclassical frame. Nor can ageing be dealt with in a value-free ethical vacuum, since age differences and the ageing process will always invoke ethical problems. The following discussion highlights the biological, social and ethical background that often goes unnoticed in economic commentary on ageing and health care.

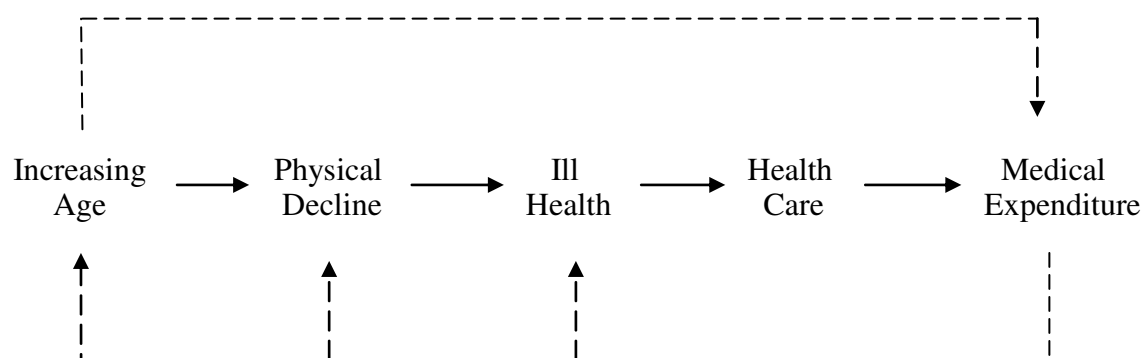
The age-medical expenditure relation

Old age does not in itself incur medical expenditure. Many people live through a lengthy retirement without receiving expensive medical treatments. Old age will eventually reduce people's physical capabilities and make them more vulnerable to disease, but the link with medical expenditure is far from immediate: increasing age reduces a person's physical capacities, which undermines health, which calls forth health care, which brings higher medical expenditure (see Figure 1). Age has no direct relation with spending, but the stages in the indirect relation are often assumed to be self-evident and universal. The logic of the age-medical expenditure relation, driven by apparent biological necessity, seems compelling. Other matters may intrude, though, and the several stages of Figure 1 merit more detailed consideration.

The first link, between age and physical decline, is less obvious than it may seem. Physiological ageing (senescence) can be distinguished from age-related disease. Old people may have no diagnosed diseases yet still have disabilities from their diminished physical strength and adaptability. In this case, old age is closely tied to disability, but not to any

disease. On the other hand, old people may suffer from diseases that are age-related without being unique to them: major causes of death such as heart disease and cancer fall into this category. What is often described simply as ageing is a complex process involving the twin, interwoven elements of senescence and age-related disease. Moreover, physical decline in old age has always been related to a person's income and social background. The age-physical decline connection is by no means universal, natural and preordained.

Figure 1 Causal links between age and medical expenditure



The link between physical decline and ill health faces the prior difficulty of defining and assessing health. No single, observable yardstick exists whereby one can gauge the impact of ageing on a person's health and well-being. Health is a multidimensional entity, with qualitative aspects that cannot easily be captured on a quantitative scale. Attempts by health economists to produce output measures for health care have been fraught with problems and remain controversial, especially when used to guide health policy decisions. If health is a relative concept, then what we understand by 'full health' will vary among societies. Health as a policy target will embody value judgements (explicitly or implicitly) and require policy makers to take a stance on medical ethics. One cannot speak of health without summoning

up many other social and ethical factors. Age may be unidimensional and easily measured, but health is not.

The next stage in Figure 1 links ill health with health care, on the assumption that those with illnesses will receive treatment. In a well-functioning health care system this should be true, although many obstacles can obstruct access to care. Some minor medical problems may go unreported and never get any treatment. Where patients bear part of the costs, financial hardship will limit access to medical care. Private health care will be biased towards people with greater ability to pay and may exclude retired and unemployed older people without reliable pension incomes. Even when health care is publicly subsidised and provided, access still tends to be slanted towards the higher socioeconomic groups with superior information and greater willingness to claim their entitlements (Le Grand, 1982). Health care will not be perfectly correlated with ill health, and other social and economic circumstances will play a part.

The last stage of Figure 1 links health care to medical expenditure. Once formal health care has been offered, it will bring expenditures, the size of which depend on how the health care system is organised. Large expenditures could indicate either plentiful, high-quality medical treatments or ineffective, superfluous ones. This last stage therefore relies upon health care efficiency, at both the micro level of individual treatments and the macro level of the whole health care system. Any connection between old age and medical spending must reflect the organisation of health care. Especially relevant to older people is the division between formal and informal activities. Much non-specialised care of old people is provided informally, without payment, by relatives and neighbours; specialised medical care is nearly always provided formally by professionals. In some cases, the formal/informal boundary will be flexible, and any transfer of care from formal to informal sectors will reduce financial costs, while having a more ambiguous effect on real economic costs (Williams, 1985). Governments keen to cut public expenditure have an incentive to replace formal care services with informal 'community care', whether or not this is the best option in a wider economic sense. The health care-medical expenditure link cannot be isolated from the various social and political factors underlying the health care system.

Figure 1 assumes that age stimulates medical expenditure via ill health and the provision of health care. This is the normal causal sequence, rooted in biological ageing, but it is not the sole possibility. Because health and disability cannot be easily defined and monitored, policy-makers will find it convenient to use old age as a proxy for ill health and medical needs. Subsidised treatments and services may be triggered by old age alone, without the requirement for diagnosed medical complaints or disabilities. Age-related payments and services may also have a redistributive aim, given that older people on average have lower incomes than the younger, working-age groups. When policies are age-based, the middle stages in Figure 1 become redundant and age will act directly on medical expenditure (as shown by the top dotted line). Such links are institutional rather than biological; they serve as another reminder of the social aspects of ageing.

So far causality has been taken to work from left to right in Figure 1, from increasing age to medical expenditure. In practice, matters are not so simple, as causality could be reversed: medical expenditure and health care may influence health, which in turn should influence life expectancy. Population ageing is not an exogenous event to which health care must react; successful health care sustains population ageing, so that ageing becomes at least partly an endogenous variable (and causality in Figure 1 may go from right to left, as in the lower dotted arrow). Paradoxes can arise here. People cured of life-threatening diseases early in their life cycles may live on into old age and die from chronic diseases of affluence after prolonged and expensive treatment: medical successes may, as a result, bring higher morbidity rates and greater medical expenditure per head (Gruenberg, 1977; Verbrugge, 1984). If this circular causality holds, high medical expenditure will be self-reinforcing, via a strengthening of the ageing trend. An alternative possibility is that much medical expenditure on curative care is wasteful and inefficient; shifting expenditure towards preventive care might combine population ageing with lower medical expenditures, offsetting the usual assumption of a positive age-medical expenditure connection. The causality behind ageing and health care is complex, and the dominant influences may be hard to discern.

At the core of Figure 1 lies biological ageing, but the economic consequences of ageing depend heavily on social and ethical factors as well. To get a fuller view of how ageing interacts with health care, it is worth looking more closely at biological ageing, before moving on to social and ethical matters.

Biological factors

Our knowledge of biological ageing remains surprisingly sparse. So far, all efforts to discover the elixir of life and the fountain of youth (or their modern equivalents) have proved fruitless. The incentives to explain ageing could hardly be stronger, yet the causal mechanisms have resisted explanation. What does seem clear is that biological ageing is complex and emerges from our genetic make-up: it seems to derive from several parallel and interrelated processes that permit variability within an overall, predetermined scheme. Theories of biological ageing distinguish two main ways in which organisms age: programmed ageing, centred on genetic background, and unprogrammed ageing, centred on random lifetime events (for general discussions, see Hendricks and Hendricks, 1977, Chapter 4; Bond, Briggs and Coleman, 1993). The two strands are not mutually exclusive and may coexist and interact.

Theories of programmed ageing look towards the reproductive strategy of complex organisms, which have a finite life span and must replace themselves with new members of the species if the species is to survive. The new members are similar but not identical to the old ones, giving scope for evolution and natural selection. Crucial to this account of ageing is the programmed development of an organism until it has reached its full reproductive capacity and produced offspring that survive and perpetuate the species. Once reproduction has been achieved, the further development of the organism has little evolutionary purpose. The growth programme runs out, and the organism's internal cells find it increasingly difficult to replicate themselves. Mistakes in cellular reproduction cause what is outwardly perceived as the natural process of biological ageing. All of this happens internally to the organism, at the genetic and cellular levels, although the genetics of ageing are as yet only imperfectly understood. The argument for programmed ageing rests chiefly on the evolutionary interpretation of why ageing occurs and what it involves. Since the evolutionary motive is the survival of the species, the genetic programme hinges on growth and reproduction, rather than ageing as such. Ageing is merely the decline that sets in after an organism has fulfilled its reproductive purpose and no longer needs to grow and develop. If ageing has a function, it is only the negative one of enfeebling and removing the older members of a species, so that they can be replaced by younger, more vigorous members.

Theories of unprogrammed ageing give greater weight to random events. Ageing is seen as a process of error accumulation, as against a programmed decline. Much of the damage to cell structures and functioning in an ageing organism seems to follow a random, unprogrammed pattern, not a fixed timetable. This applies to events within the organism, at the genetic, cellular and molecular levels, and, more generally, to the external life events facing the organism. Individuals who age relatively quickly will have been exposed to a higher level of internally generated toxins and externally generated diseases and pressures. Actual damage to an organism will be largely random, even if vulnerability to damage has a genetic component. This opens up the prospect that ageing could be slowed down if some of the random damage to the organism could be avoided or delayed. If aging is not entirely programmed, then hope persists of extending human life spans without having to rewrite the genetic programme.

Programmed and unprogrammed ageing, despite appearances, need not be contradictory and can be brought together as parts of a larger whole. Unprogrammed errors in reproduction provide the variety on which evolution depends. Perfect programming would eliminate errors and harm a species' ability to adapt - in the long term it could threaten the species' survival. Too many errors would also be counterproductive, by spoiling a well-adapted species' ability to reproduce. The ageing process, combining programmed and unprogrammed elements, can be viewed as a compromise between programmed and unprogrammed extremes. Ageing and eventual death mean that organisms are replaced by near-but-imperfect replicas of themselves and that most replication errors are concentrated innocuously among organisms who have already reproduced. Such a functionalist, evolutionary account of ageing finds a place for both programmed and unprogrammed ageing. Importantly for health care and social policy, the unprogrammed elements in ageing provide an entry point for social and ethical factors. Unprogrammed ageing precludes a genetic reductionism whereby human ageing is genetically predetermined regardless of its social context.

Another theoretical distinction sometimes made is between intrinsic and extrinsic ageing (Finch, 1990, Chapter 12). Intrinsic ageing refers to the hypothetical life course of an organism (or other entity) as determined by its own internal constitution, undisturbed by outside events. Extrinsic ageing refers to the external influences that act upon the organism

and cause the actual life course to differ from the internal template. Observed ageing will consist of extrinsic factors superimposed on an intrinsic process governed by an organism's own internal make-up. Intrinsic ageing might seem to equate with genetic programming and extrinsic ageing with unprogrammed, random events, but this would be misleading. At the level of an organism, many intrinsic factors will be unprogrammed, for example the random errors in cellular reproduction. Intrinsic ageing can be said to embody genetic programming but it is not exhausted by it. Likewise, extrinsic ageing cannot be restricted only to random, unprogrammed events: some external influences on people will not be entirely random if one accepts that ageing is in part institutionalised and socially programmed. Consequently, the intrinsic/extrinsic and programmed/unprogrammed distinctions do not coincide, and can complement each other.

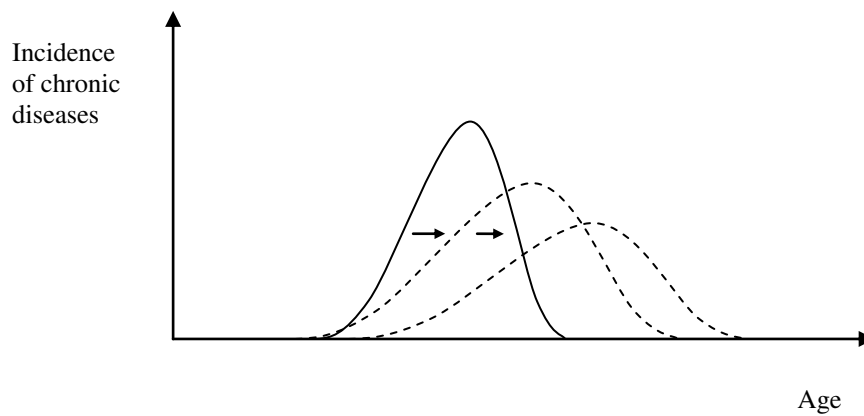
The intrinsic/extrinsic distinction suggests a stratified account of ageing. Usually applied at the level of the organism, it can also be applied at lower levels (genes, cells, organs) or higher levels (social groups or whole societies). This stratified account helps to draw out the complexity of ageing and the fact that it occurs simultaneously at several levels. A comprehensive study of ageing focused on any given level should include both intrinsic factors below that level and extrinsic factors above that level. Biological ageing cannot therefore be sealed off from its higher-level social context.

Social influences loom large in discussions of how health varies with old age. The traditional view is that the age-health relationship in developed countries has evolved during the twentieth century alongside changes in morbidity patterns and the causes of death. These changes, usually termed the 'epidemiological transition', involved a shift from infectious diseases as the main causes of death to the diseases of civilisation, such as cancer and heart disease (Omran, 1971). Success in preventing and curing infectious diseases has raised life expectancy but at the same time exposed people to a new range of degenerative diseases during an old age they would not previously have reached. Degenerative illnesses are less curable than infectious diseases and may result in chronic disabilities requiring long periods of treatment and care. Although morbidity is now being delayed, it may be spread out over longer periods, as shown in Figure 2(a). Greater longevity may be combined with high demands placed by old people on the health care system. As the population ages, other things being equal, medical expenditure is liable to increase on both a total and per capita basis.

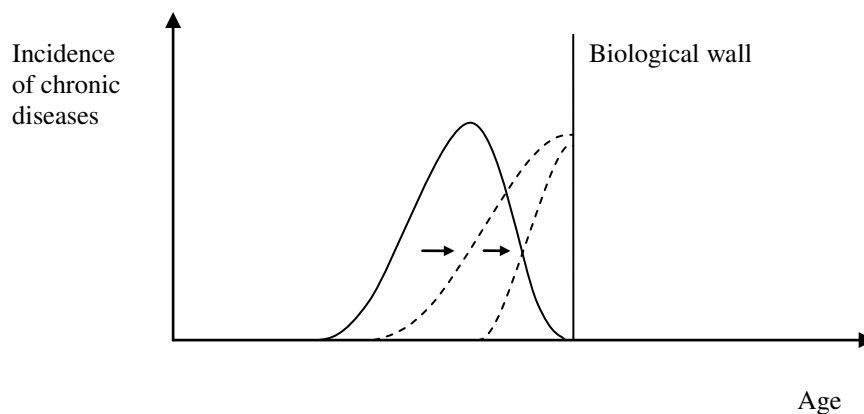
Most commentators on population ageing and health care have adopted this cautious, pessimistic line (examples are Manton, 1982; Schneider and Brody, 1983; Brody, 1985; Bebbington, 1988). In this view, the price of greater longevity is an old age where one is vulnerable to chronic disease and heavily reliant on medical and social care.

Figure 2 Morbidity patterns by age

(a) Delayed and prolonged



(b) Compressed



Others have painted a more optimistic picture (Fries, 1980, 1989; Fries and Crapo, 1981). The diseases of civilisation have as yet proved resistant to cures, but they may be preventable by changes in lifestyle, dietary adjustments, screening programmes and other measures. If so, then people might eventually live almost disease-free lives and die from natural causes rather than disease; the morbidity pattern would then be as shown in Figure 2(b). Since people would now be less prone to chronic, degenerative diseases, they would more often live through their full life span and die from natural causes ('natural death') or after a brief but severe period of illness in advanced old age. Morbidity would be concentrated into a shorter and shorter period at the end of people's lives; effectively, as in Figure 2(b), it would be compressed against the biological wall of natural death. The biological constraints on life span would become more visible, and most people would be able to live normal, active lives until their biological clock ran out.

With morbidity reduced and compressed, the effect of population ageing on medical spending would have diminished accordingly. As prevention replaced cure, many of the largest medical expenditures could be reduced or even avoided - health-promoting activity would be decentralised away from professional medical care to self-help, preventive activities (Fries et al., 1993). Arguments of this type have aroused controversy, on empirical and policy grounds. So far, there is little empirical evidence for compressed morbidity - chronic diseases are, if anything, becoming more prevalent among the elderly than previously. Given the empirical doubts, it could be dangerous to play down curative medicine and underestimate the effect of population ageing on health care. The optimistic view is a hypothetical portrait of what might happen if preventive care could be greatly expanded and developed.

Both the pessimistic and optimistic versions of the age-health relation rely heavily on the social environment. For the pessimists, the diseases of civilisation will linger into the foreseeable future and so will the links between these diseases and modern lifestyles. Biological ageing will continue to work in tandem with chronic, age-related diseases. For the optimists, the diseases of civilisation will ultimately be conquered, to reveal biological ageing in a purer form. This may seem to weaken the social influences on ageing, yet the outcome is attained through preventive social action. The optimists are not envisaging an exogenous,

biologically based miracle cure but a programme of preventive health care; they differ from the optimists in their expectation of success and their decentralized vision of health care, but their approach is nevertheless socially grounded. Conceivably, future developments may take a biological turn if geneticists learn how to reprogramme the biological clock towards greatly extended life spans or even immortality. As yet (fortunately, perhaps) the biological clock has not been tampered with and remains a constant - the major variations in 'biological' ageing are non-biologically determined.

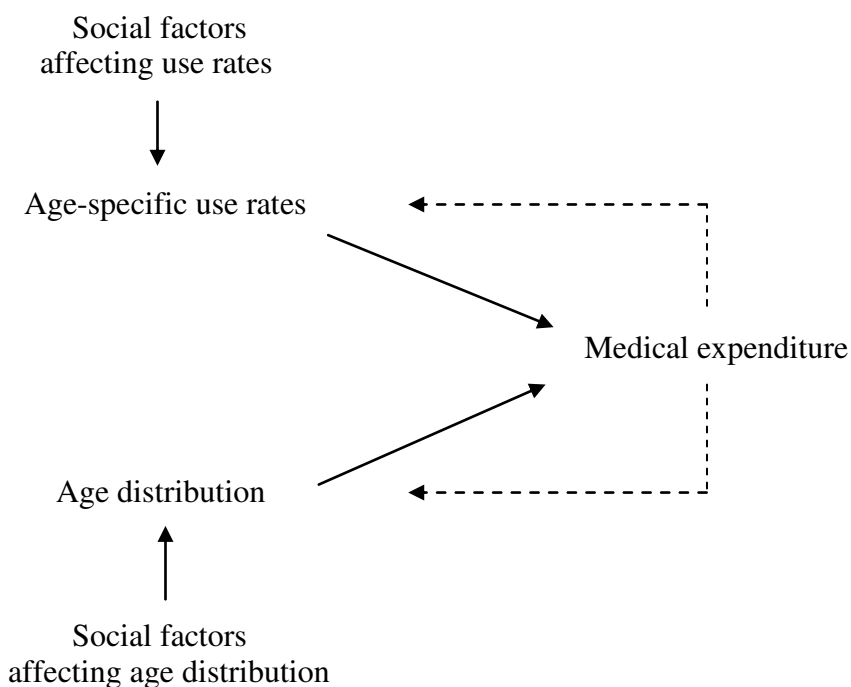
Social factors

Social factors come increasingly to the fore as one moves from the ageing of an individual to the ageing of a population. At the aggregate level, the age-medical expenditure relation will depend on the age distribution of the population, as well as on the age-specific use of medical care, creating a second avenue by which social factors can come into play (as in Figure 3). Together, age-specific use rates and the age distribution will govern how medical expenditure evolves within an ageing population, although in neither case is causality unidirectional; medical expenditures can react backwards on to both use rates and the age distribution (as shown by the dotted line in Figure 3). The switch from individual to population ageing retains all the social factors present in individual ageing but adds extra ones working at the aggregate level on the age distribution. In particular, a population may be ageing for reasons other than the increased longevity of its members: a falling birth rate or outward migration of younger people can produce similar demographic changes. It is pertinent, therefore, to consider the social determinants of population ageing.

The standard pattern of demographic change in developed countries is summarised by the 'demographic transition'. Initially, in a pre-industrial society, mortality and fertility are constant and roughly equal; the age distribution is stable, with only a tiny proportion of people in the higher age groups. As economic development proceeds, mortality falls below fertility, causing rapid population growth at an accelerating rate. Later, however, the fall in mortality peters out and fertility begins to fall, so that population growth decelerates. Finally,

fertility stabilises and the population reaches a new steady state where mortality and fertility are again constant and roughly equal but the population now has a higher average age and a greater proportion of old people. The fall in mortality and fertility will both contribute to an ageing of the population that had never previously occurred. Net migration, because it is small relative to the total population, is generally assumed to have a negligible influence on the age distribution in most countries. This leaves mortality and fertility as the twin determinants of population ageing and its consequences.

Figure 3 Population ageing and medical expenditure



Explanations of falling mortality can opt either for a socially based account, emphasising improved social conditions and growing material wealth, or a more technological/biological account, emphasising medical advances such as vaccination and cures for infectious diseases.

Although the reduced mortality was linked with the decline in major infectious diseases (the epidemiological transition), the decline need not have resulted from curative medicine. Indeed, most demographers and other writers on mortality have pointed to improved nutrition and better living conditions as a more immediate cause of mortality decline: immunisation campaigns postdated the fall in mortality for countries that were early to industrialise such as the UK (McKeown and Record, 1962; McKeown, Record and Turner, 1975). Modern opinion sees increased longevity as having several causes, including improved nutrition, public health measures, and advances in medical technology (Livi-Bacci, 1983). The mixture of causal influences is likely to vary among countries, according to when and how their decline in mortality took place. Within any given country, the social and economic causes of improved longevity lead to income and class biases, so that the rich end up living longer on average than the poor. There may be some forces acting against the rich (if, say, they smoke more than the poor, or undertake risky leisure pursuits), but on the whole the richer social groups will have lower mortality than the poorer ones. This shows up clearly in empirical studies of how mortality varies with social class (Marmot and McDowall, 1986; Wilkinson, 1986, 1992). The selection bias among elderly survivors means that the oldest age groups are disproportionately drawn from the wealthier social classes.

Perhaps counter-intuitively, fertility changes generally have a larger effect than mortality changes on a society's age distribution. Much of the current population ageing in developed countries is due to the general decline in fertility during the twentieth century (with the postwar baby boom as a temporary interruption of the long-run trend). As with mortality changes, the chief causes of fertility decline seem to be socioeconomic developments rather than more technological matters such as improved birth control methods. Of key importance is the evolving economic role of women, as their greater participation in work and education has discouraged the raising of large families. These social trends are prominent even in economic theories of fertility based on utility maximisation (Willis, 1973). Alternative approaches give greater credence to normalised and socialised behaviour in explaining fertility, thus enhancing the social dimension (Easterlin, Pollak and Wachter, 1980; Donaldson, 1991). Reduced fertility affects the age distribution through smaller birth cohorts and fewer children. The lower demand for health care and education services for children will at least partly counterbalance the higher demands on public services from the larger

cohorts of old people. Fertility decline should offset the growing 'burdens' imposed by the elderly, dampening the effects of population ageing on medical expenditures.

The social background of the demographic transition shows that population ageing belongs to a larger process of economic development and is not merely an exogenous, random 'event' or 'shock' to which governments must react. Populations have begun to age in the twentieth century (after many thousands of years without ageing) because of fundamental social changes associated with industrialisation and economic growth. Ageing and its attendant difficulties cannot be hived off from the broader trends towards economic development. The demographic transition suggests that economic growth will be correlated with population ageing, and that the countries with the fastest ageing populations will have the greatest capacity to support large numbers of retired elderly. Placing demographic change within its economic environment should temper exaggerated concerns over a special crisis coming apparently from nowhere to afflict the developed countries.

On top of the age distribution effects, social factors will have many other effects working through the individual life cycle. One such effect, discussed in the previous section, is the way that biological ageing is mediated through its social context and never appears in an undiluted, 'natural' form. Beyond the physical side of ageing, social factors will influence how old people are perceived and treated by other members of society. The very idea of old age is a social artefact. Any dividing line between 'old' and 'young' must be a somewhat arbitrary, artificial concept with little justification in human biology. Individual ageing, as a smooth, continuous process, does not divide the human life cycle into discrete, well-defined periods. The divisions within most people's life cycles - education, work, retirement - are socially constructed. This man-made periodisation of ageing both reflects and reinforces social attitudes to the elderly; the retired are seen as being dependent on younger age groups even when physically capable and receiving no public pensions or health care. The low social status of older people may sap their self-esteem and render them less independent than they could be. Sometimes ageing becomes formally institutionalised, as when people become eligible for public benefits and social entitlements through their age alone, not their health or social circumstances. These social norms surrounding old age create an institutionalised ageing to be set alongside the physical processes of biological ageing.

The institutions defining old age have been discussed extensively in social gerontology, which adopts an interdisciplinary approach to ageing (for general introductions, see Hendricks and Hendricks, 1977; McPherson, 1983; Bond, Coleman and Peace, 1993; Binstock and George, 1996). Writers on social gerontology have differed in the relative importance they attach to biological and institutional factors. Earlier work portrayed institutions as a means of accommodating biological ageing: the prime example is 'disengagement theory', where institutions disengage the elderly painlessly from their earlier working and social life, before they become physically incapable (Cumming and Henry, 1961). More recent work has given institutions greater prominence and independence, so that they are no longer just responses to biological ageing and bring about their own normalised pattern of ageing. The strongest versions of this argument refer to the 'social construction of old age' and the 'structured dependency' of the elderly (Walker, 1980; Townsend, 1981; Phillipson, 1982; Estes, Swan and Gerard, 1982). From this perspective, institutions define the elderly as a group and assign them a lower, dependent status relative to younger age groups. Formal retirement is the most obvious case of such an institution; the statutory retirement age creates an artificial barrier between young and old, implying that older people are incapable of working or participating fully in society. Other institutions carry a similar message, notably centralised social care and the placement of old people in residential homes. Measures that supposedly help the elderly - pensions, formal care, and so forth - may reinforce their image as a dependent social group and damage their capacity or willingness to undertake a full range of social activities. The downgrading of older people can also be observed in the private sector, where corporate hierarchies push many employees into 'career failure' and premature retirement (Dugger, 1999). Institutionalised ageing will have its own detrimental effects, only loosely connected with the physical consequences of old age.

Most of the literature on structured dependency concentrates on retirement policies and social care, rather than health care; the main reason seems to be that health care is highly institutionalised for both young and old alike, so that the contrast between them is less clear cut. Health care may, nonetheless, reflect and contribute to the socialisation of old age. The status of the elderly within the health care system has two main sources: how they are admitted into the system, and how they are treated once within the system.

If old people are admitted prematurely into hospitals or other institutions, then this could reinforce their dependent status and add to the social construction of old age. Superfluous medical care for the elderly would be inefficient and possibly deny care to others in greater need. It is therefore important to compare specialist medical care in hospitals with other options such as residential or domiciliary care. The 'balance of care', as this comparison is often termed, could be decided either informally by the judgement of those with prior experience (say, social policy professionals or public-sector managers) or formally by economic appraisal techniques such as cost-benefit analysis. Applying cost-benefit analysis will be difficult, because the informal care alternative is notoriously hard to evaluate and yet crucial to the comparison (Mooney, 1978; Wright, Cairns and Snell, 1981; Smith and Wright, 1994). Recent policy reforms in several countries have appointed case (or care) managers to make this decision on behalf of old people, with the hope of finding the right balance of care and hence promoting efficiency and equity (Means and Smith, 1994, Chapter 5). Case management creates the administrative framework for more consistent balance-of-care assessments, but leaves open the role of formal economic appraisal as compared with less formal decision-making methods.

Once within the medical system, the fate of old people hangs on whether their age determines the way they are treated. One strand of medical thinking has argued that they are best treated separately from other age groups, in geriatric wards (Hall, 1988). The intention is to improve their treatment by catering for their special needs, but this might also foster a structured dependency of old people within the health care system. More generally, the prime question is whether a person's age should play a part in the allocation of health care. This raises some awkward issues in medical ethics.

Ethical factors

It might be argued that age is merely a personal characteristic, like gender or race, and not a legitimate basis on which to discriminate between people. Age differs from gender or race, however, in that it changes as people move through their life cycles: nobody is permanently

attached to any particular age group. In a developed country, where life expectancies are high, most people will live through all the stages of the typical life cycle, and age discrimination need not entail a permanent bias against certain people. For this reason, age discrimination might be thought more tolerable than other forms of discrimination by personal characteristics. Age has special significance for health care, as it can make a big difference to the success and future benefits of medical treatments. A successful treatment of any given illness adds less to future life expectancy for an older person than for a younger person. If the aim of medical care is to preserve life, then this will imply giving scarce medical resources to the young before the old. A government wishing to maximise the total number of life years in a population should give priority to younger patients over older ones. The comparison becomes even less favourable to the elderly if one allows for the future offspring of younger patients (Broome, 1992). Policy-makers face a dilemma: they can either reject age discrimination and fail to maximise life expectancy, or maximise life expectancy and discriminate systematically against old people. The conflict between life preservation and an anti-discriminatory stance lies at the core of ethical debates over medical care for old people.

Ethical discussion of age discrimination often distinguishes between morally relevant and morally irrelevant discrimination (Daniels, 1985, Chapter 5). Empty age distinctions, unfounded on health or anything else, would be seen as morally irrelevant and thus unethical. Age discrimination would be rejected unless it could be justified as having moral relevance to the pursuit of some ethical objective. With health care, a person's age does have a bearing on whether they can undergo a certain treatment, the likely success of the treatment, and the quantity and quality of future life after the treatment. Raising the effectiveness of health care might require rationing schemes that favour younger people over older ones, other things being equal. Moral relevance means that age discrimination should not be written off as 'ageism' and might at times be ethically warranted.

Once moral relevance is recognised as possible, there are three main alternative ethical positions: to rule out age discrimination in health care, to allow partial discrimination at some stages of the life cycle, or to allow complete age discrimination throughout the life cycle. Ruling out age discrimination in health care would be consistent with an anti-ageism argument applied everywhere in public policy. Anti-ageism is frequently defended on the

basis that all people, regardless of their ages, have an equal desire to complete the rest of their life (Harris, 1985, Chapter 5). In this sense, the value of life would not vary with age, and age discrimination would be inappropriate. Anti-ageism can also be defended by considering the unsavoury consequences of discriminatory policies. An example of this is the 'double jeopardy' argument: old and sick people already suffer one major misfortune and to then discriminate against them in providing health care would be piling injury upon injury. Hence, there may be ethical reasons to deny the moral relevance of age discrimination and allocate health care in an even-handed way, irrespective of age.

The case for partial age discrimination usually revolves around the idea of a normal or reasonable life span - a 'fair innings', as Harris (1985) terms it. By this argument, everyone is entitled to the normal life expectancy at birth for the society they live in (seventy-odd years in most developed countries), but anything beyond the norm is a bonus. Prevention of premature deaths will, as a result, have a higher weighting than preservation of life among the very old. Age discrimination will be marked out by a threshold set at the normal life expectancy: anyone below the threshold will not experience age discrimination but anyone above it will receive a lower weighting in the allocation of health care. The aim is to avoid premature deaths and give everybody the best possible chance of experiencing a full life cycle, including all the major stages of life. This would endorse partial age discrimination around the threshold age but not a generalised preference for younger over older patients. The argument can be augmented to allow for living standards as well as life expectancy - the aim would then be to ensure that as many people as possible experience the normal life expectancy at an acceptable minimum living standard. Prolonging later life would have a low value, especially if this brings declining quality of life. Setting minimum living standards would give a further reason to concentrate health care below the threshold of normal life expectancy.

The case for complete age discrimination usually stems from simple maximisation criteria. If health care seeks to maximise the future life expectancy of patients (as life preservation would suggest), then it will be better to treat younger before older patients, as they bring a greater return in future life years. This holds true throughout the life cycle, so it is not restricted to comparisons between 'young' and 'old' people - even for people separated by only days or weeks in age, it would be better on average to give medical priority to the younger

person. Similar conclusions follow from using quality-adjusted life years (QALYs), the most common output measures adopted by health economists. Maximising future QALYs will yield decisions even less favourable to old people than with the life years approach, because the quality weights for later life will be relatively low. Old people have a double disadvantage compared with the young: the quantity of their future expected life is smaller, and the quality will be lower, given their greater vulnerability to chronic illnesses and incapacity. Although complete age discrimination is more thoroughgoing than the partial version, it does not make the same dichotomy between young and old groups and its effects would be spread out more smoothly over the full life cycle.

Each of these ethical rules, if it informs policy decisions, will have implications for the age-medical expenditure relation. An anti-ageist rule would give doctors no freedom to hold back on medical treatments and expenditures devoted to the very old, whose future life expectancy and quality of life might be severely limited. Medical expenditure would be skewed towards older people, with their higher incidence of severe and chronic illness. Partial age discrimination would give special significance to the threshold age, above which discrimination occurs. Those past the threshold age, despite their vulnerability to age-related diseases, would be subject to rationing and denied the full treatments and expenditures normally associated with their ailments. The threshold age would become a prime focus of policy debates, akin to the role played by the statutory retirement age in pensions policy. Complete age discrimination would skew medical expenditure towards the young for any complaint suffered by both younger and older age groups. The old would still be receiving high medical expenditures because of their high incidence of disease, but their low priority in health care rationing would curb their share of medical expenditure. As older people are literally at the back of the queue under a complete discriminatory rule, many illnesses among the elderly might go untreated. The age-medical expenditure relation will be flatter than under anti-ageism or partial discrimination, though still likely to remain upward sloping.

Strict ethical rules may prove too strict to be valuable guides to policy. Any such rules can only rest on existing medical technology and life expectancies. Complete age discrimination, for example, appeals to experience with current medical technologies, where older people offer disappointing outcomes compared with their younger counterparts. Yet a lower quality of life among older people gives them more to gain from advances in medical technology;

younger people, by contrast, are already troubled little with pain or disability and have lesser prospects for improved quality of life. Reluctance to dedicate medical resources to older people could discourage innovation and hamper medical progress in the areas where it is most needed. A similar result might also ensue from partial age discrimination, since an age threshold at current life expectancy would deter medical research on raising longevity; the long-term effect might be a satisficing strategy aimed at obtaining a fixed, universal life cycle. These problems reflect the general conservative bias inherent in static output measurement models founded on current technology. Age discrimination rules may impose a short-term outlook with a high discount rate inhibiting research on ageing and age-related disease. The results of future medical research are unknowable, but short-term gains from age discrimination might be bought at the expense of long-term costs from slower technical change.

Another drawback of age-discrimination rules is that they tend to be narrowly based on simplified equity criteria and take little notice of the wider context of health care policy. What seems in principle to be morally relevant age discrimination can spill over into a less worthy, 'morally irrelevant' discrimination. It is hard to see how systematic, publicly known rules discriminating against old people can avoid lowering their social status. Age discrimination rules, whether or not they are openly declared as such, will always potentially add to the social construction of old age. Unwittingly or not, they may be ratifying existing ageist attitudes: 'disinterested' ethical positions (based on, say, social contracts, individual preferences, or social welfare assessments) may be contaminated by the prevailing values of their society of origin. The quest for equity through morally relevant age discrimination could end up widening social divisions and increasing hardship among older age groups. Alternative policy objectives, founded on social solidarity, would be less willing to tolerate age discrimination.

Whatever position one takes about age discrimination in health care, one cannot escape ethics: if they are not made explicit, then they will be implicit in medical and policy decisions. But, while ethics are unavoidable, formal ethical rules can be avoided. Traditional approaches to health care rationing operate informally through the uncoordinated clinical decisions made by doctors. This hidden rationing, without formal rules, has the advantage of flexibility and a low-key, decentralised handling of sensitive decisions. Ethics are still

present, but they are not trumpeted or formalised. Health economists have sought to promote consistency and efficiency by having quantitative output measures and formal rules for health care allocation. Formal methods, when implemented, will encourage a higher-key, more managerial style of health care, with codified rules, top-down monitoring of employees and less freedom for manoeuvre. The formality forces hard choices over age discrimination, as it must be either officially blessed or outlawed. Rigid, centralised rules may endanger the subtlety that might be possible in a less formal, more decentralised approach. Besides the nature of ethical principles, it should remain an active policy question whether one should have formal contractual rules, as against informal, decentralised arrangements that leave room for trust and a common ethical culture.

Medical ethics are not the sole ethical factor involved in the age-medical expenditure relation. Decision making in health care is embedded within a wider set of policy decisions as to how many resources should be devoted to health care compared with other public services or private consumption.

Policy questions

Any government deciding its policy will have to assess both the internal organisation of health care and the size of the total health care budget. These two items may be interdependent (if, say, a reorganisation of health care leads to higher or lower total spending), though much economic discussion avoids the macro budgetary issue by considering economic efficiency within a fixed total budget. Setting the health care budget is a further area where numerous social and ethical factors will intrude. Ideally, perhaps, a government would have some overall normative goal and allocate its public spending accordingly. Likewise, the tax level, which determines the division between public and private activities, would be aimed at the same normative goal. In practice, of course, public decision making is exposed to a vast range of external pressures and sectional interests arguing simultaneously for general tax cuts and raised public spending in health care and elsewhere. Public decisions will depend on the political power of the competing interest

groups and are unlikely to reflect a single, easily discernible welfare goal. Health care spending on the elderly is only a subset of total health care spending, which is itself only a subset of the larger budgetary decisions made by the government.

Discussions of ageing invoke another budgetary distinction, between spending devoted to younger age groups and spending devoted to the elderly. With pensions policy, the young/old division occurs visibly at the retirement age, even if this has little connection with people's genuine capacity to work. Retirement becomes the badge of old age and discriminates between 'productive' and 'unproductive' groups within society. Health care, compared with pensions policy, makes less drastic age distinctions - there will not in general be a separate 'old-age health budget' and, unlike pensions, health care spending is not exclusively devoted older people. Human ageing is a continuous, variable process that will not yield an obvious, discrete division between homogeneous 'young' and 'old' groups. Attempts to make a division, whether or not they have official backing, will always be somewhat arbitrary.

A step beyond the young/old dichotomy would be to try to construct generational accounts for all government activities. This involves estimating the net public expenditure, in present value terms, received over the life cycle by a typical member of each generation (Kotlikoff, 1992; Auerbach, Gokhale and Kotlikoff, 1994). The aim is to make transparent the generational pattern of public spending and thereby permit easier assessment of equity between generations. All public accounts could in theory be disaggregated by age (i.e. generation) as well as on more traditional, functional lines. Despite the superficial allure of intergenerational equity, there are serious difficulties here, including the likelihood of errors and omissions, the sensitivity to the choice of discount rates, and the neglect of private consumption and informal economic activities (Haveman, 1994). Also restrictive is the implicit ethical stance, focused on narrow cross-sectional comparisons among adjacent birth cohorts, as against broader life-cycle and many-generation criteria (Daniels, 1989). The greater stress on age built into generational accounts might bolster age distinctions and encourage intergenerational conflicts where none existed before. Attempting to monitor intergenerational transfers and promote equity might undermine the implicit intergenerational contract on which pay-as-you-go social policies are based. A real danger with generational

accounts is that they be used against the old; it is easier to imagine them being exploited as a pretext for tax cuts than as a case for higher public spending on the elderly.

The foregoing policy questions - the size of the health care budget and the intergenerational allocation of resources - would arise even in societies with steady-state populations and a constant age pattern. When the population is ageing, further issues will arise. Policy involves not just a single allocation decision, but a time path or series of adjustments to accommodate a changing population. Governments are unlikely to be on optimal time paths with preordained adjustments in response to fully accommodated demographic changes - such an optimum would be difficult to establish in stylised theoretical models, let alone in reality. Actual policy will combine policy reforms, motivated by the belief that current policy is suboptimal, with policy adjustments, motivated by the desire to accommodate population ageing. Policy reforms might in some cases coincide with adjustments to accommodate population ageing. An example would be the application of QALY-based output measures in health care: if they concluded that current spending on the elderly is too generous, then this would accord with policies to curtail medical expenditure in an ageing population. If, on the other hand, policy reform was expansive and advocated enhanced services with higher expenditures, then it would be at odds with the policy retrenchments normally envisaged in response to population ageing. Generally speaking, one would not expect policy reforms (often formulated in static, steady-state models) to mesh smoothly with demographic adjustments, and some compromise will be needed.

In health care, as elsewhere, the main policy adjustments recommended in response to population ageing are likely to be retrenchments. Maintaining existing health care services for larger numbers of old people will require greater public spending and higher tax rates. Alternatively, taxes could be held roughly constant and expenditures reduced. Cutbacks in health care spending can take many forms, including efficiency savings, reduced availability, reduced quality, and delays in access. Governments also have the option of protecting health care, at the expense of other areas of public spending. Often there will be no clearly identifiable health budget, nor will there be taxes uniquely linked to health care activities. Although it is straightforward to depict budgetary problems in simplified economic models, the problems are less obvious in practice, where no tax revenue is earmarked for health care, public spending is highly varied, and other influences on public budgets will dilute the effects

of population ageing. The slowness and predictability of demographic change will moderate its role compared with more sudden, less predictable events. Any unpleasant retrenchment supposedly enforced by population ageing is subject to a good deal of leeway and can readily be overstated.

Disquiet over population ageing is provoked in part by neoclassical presuppositions about full employment and balanced budgets. Neoclassical modelling of demographic change usually assumes that the economy will converge on full employment in the long run. Under this assumption, there is no demographic slack in the economy, and the rising needs of an ageing population will force cutbacks to be made somewhere, with labour being diverted from existing activities. A non-neoclassical view, following Keynesian, Kalekian and Marxian arguments, would reject the full employment assumption and maintain that capitalist economies operate with chronic unemployment and excess capacity. Since there is no aggregate shortage of workers, a rising dependency ratio (fewer people of working age relative to the retired) can have only a muted effect on the economy and will not immediately compel cutbacks or stir up intergenerational conflicts (Jackson, 1992). Unemployment is a problem in its own right, of course, but it does insulate labour markets from demographic shifts in the labour force.

The pursuit of balanced budgets - a touchstone of neoclassical economics - will also accentuate the budgetary impact of demographic change. As with full employment assumptions, a budget-balancing objective will portray the aggregate economy as if it had a single, binding resource constraint being disturbed each period by exogenous demographic changes. Again this will exaggerate the significance of population ageing. Non-neoclassical economics, by contrast, is more tolerant about unbalanced budgets. Keynesians would see the expansionary effect of budget deficits as a welcome boost to economic activity during times of recession; budgetary balance will not always and everywhere be the right approach, as a balanced budget or budget surplus could have deflationary consequences that damage capital accumulation and threaten economic prosperity (Wray, 1991; Palley, 1998). Where economic debate is less dominated by balanced budget targets, the potential expansionary effects of budget deficits can encourage a more optimistic picture.

The argument that population ageing will lead to a crisis in health care and public services is open to abuse: proponents of cuts in welfare spending can exploit demographic change as a reason for diminished public services (Jackson, 1994, 1998, Chapter 4). If ageing appears to dictate cuts in social policy, then there is no need to justify the cuts on more controversial social, political or economic grounds. Often the proposed cuts take the form of privatisation, where people are encouraged or compelled to make their own private arrangements for health care and pensions instead of relying on public provision (World Bank, 1994). The ideological content of these ideas is clear enough - an adjustment to changing age patterns is being merged with political reforms towards laissez-faire. Particular economic and social policies are thus being put forward as the unavoidable response to external events, without detailed consideration of whether the response is strictly necessary or whether alternative approaches could be adopted. There is an irony here, because the 'natural' and 'inevitable' effects of demographic change are in large part socially constructed around statutory retirement ages and centralised policy rules. Even biological ageing is thoroughly intertwined with its social context. Both the policy 'problems' caused by ageing and their proposed 'solutions' must always be socially specific and susceptible to prevailing ideological and political currents. One should be wary of those who deny or ignore this and depict demographic change as giving policy makers no alternative.

Conclusion

The age-medical expenditure relation is a long way from being simple, mechanical and biologically predetermined. Ageing has roots in human biology, but it is a complex, variable process contingent on many social and ethical factors. Public policies do not merely respond to an exogenous, biologically driven ageing process; in many cases public policy will mould the social perception of old people and, in this sense, act as a causal influence on ageing. The complex causality makes it hard to identify and disentangle the various factors behind ageing and its social implications. Any academic treatment of ageing should, nevertheless, try to come to terms with its complexity.

The social dimensions of ageing raise doubts about the policy relevance of age. Should policies take for granted the social construction of old age and, in doing so, confirm and reinforce it? Or should they seek to socially deconstruct old age and reduce the impact of arbitrary age boundaries? Health care policy faces a special difficulty on this point, as current ideas of output measurement and economic appraisal, if implemented strictly, would accentuate the role of age in rationing health care. Health care allocation by age-related formulae would strengthen the social construction of old age, not weaken it. Any efficiency gains in maximising health output would be acquired at the cost of confirming the lower social status of the elderly. Different social values, founded on social solidarity, might suggest alternative health care policies, more generous to the elderly and less dependent on age.

Economists all too often see ageing as a non-economic topic to be handled by academics in other disciplines, such as biology or social policy. When age does impinge on economics, as in health care policy, it enters from outside the core theoretical modelling and appears only as an external, empirical characteristic of the person or population under discussion. The analysis scarcely if ever gets beyond theory-free empirical correlations between age and public expenditures. This can shed little light on the social and economic consequences of ageing and how they might develop.

A better approach would be to work towards an interdisciplinary understanding of both ageing and economic policy. To penetrate beneath the surface correlations between age and medical spending, one has to consider biological and social factors. Ageing also calls forth daunting ethical problems concerned with life, death and health. The many facets of ageing can only be adequately perceived by crossing disciplinary boundaries. Neoclassical economists are notoriously reluctant to embrace pluralism and learn from other disciplines; they differ markedly from social gerontologists, who are among the most pluralistic of academics. Similar pluralism is rare in economics, though it does enter the minority, heterodox approaches, such as institutionalism, Post Keynesianism and the Marxian tradition. A more interdisciplinary, less neoclassical outlook would be useful in analysing the age-medical expenditure relation and, more generally, in fostering a richer, broader health economics.

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