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Transformations of Health and Health Care in Ageing Societies

Abstract

In the recent past, gerontological and geriatric research evidence has transformed our perception of the consequences of individual and population ageing. Four propositions assist in useful conjectures about the future of individual and population ageing:

1. Modern societies have accommodated ageing populations well and most individuals have aged well.

2. Older adults remain highly differentiated over the course of later life.

3. Some ageing processes are modifiable.

4. The future of ageing societies, therefore, will be determined substantially by public policies regarding resource distribution over the life course.

While these propositions provide a prologue to the future of ageing, the contingencies of social forecasting are stressed. Societies are large natural experiments in how different social arrangements affect the future of ageing individuals and populations.

Social policies have shaped and are shaping the future of ageing populations. The first revolution in public health and welfare was initially a triumph but has proved to be bittersweet. Increasingly adequate sanitation, stable food supplies, and medical care in the nineteenth and early twentieth century, helped ensure long life as the current expectation of the average person in developed societies. As a well-known consequence, demographically the age composition of modern technological societies has been transformed. The average age of populations has increased, the proportion of the population of 65 years of age and upward has escalated predictably and, most importantly, the oldest and most impaired segment of the population (85 years of age and older) has shown a steady increase. Epidemiologically, the predominant pattern of diseases and impairments has also changed. As populations have aged and the capacity to sustain very impaired individuals has improved, chronic diseases and conditions have come to be the dominant concern of health care systems. Health care planners and providers are required to consider the prevalence and distribution of functional disability (not just of disease) and to focus on long-term care (not just on acute care).

Societally, population ageing has forced into public consciousness an awareness both of alternative ways societal institutions allocate resources over the life-course and of how, in the process of allocating, societal institutions themselves are changed. Over the past 50 years, gerontology and geriatrics have been in the forefront of consciousness- raising about the personal and social implications of individual and population ageing. This paper will highlight some insights from these disciplines regarding what has been learned about the ageing of populations and related transformations in health and health care and what these observed changes forecast for the future.

To some extent the past is always a prologue. A review of the recent past identifies some observed transformations in health and health care in response to population ageing which invite inferences about the near future. Conjecture about the longer-term future of health and health care

in ageing societies however, must be evaluated with great care and caution, because multiple contingencies are involved. At least three contingencies must be kept in mind in any forecasting:

1. the size and age composition of the population anticipated.

2. rates of impairments and related disabilities.

3. the organization, financing and utilization of health care services.

These are formidable contingencies even in the near term of the next twenty-five years (NCHS 1986) and two of the three contingencies are demonstrably modifiable by purposive personal and societal action. Consequently, our forecasting of transformations in health and health care in ageing societies even for the near term will be done with care and caution. Alternative futures for ageing populations can be invented and constructed.

Four propositions in current gerontology and geriatrics will be used to summarise some important basic information about ageing individuals and ageing societies as alternative futures for ageing populations are considered. These propositions provide a point of departure for conjectures about transformations of health and health care in the proximate future.

A gerontological view of health and health care stresses the usefulness of multidimensional and multidisciplinary perspectives. Therefore, in our assessment of the present and conjectures about the future of health and health care of older populations, we will feature in our analysis such behaviourial and social variables as socio-economic status, education, lifestyle, social integration, social support, societal values, and the dynamics of political processes in democratic societies. This paper is not systematically comparative. However, illustrations from the recent experience of the United States will probably have a recognizable counterpart in other developed countries.

Four propositions

Proposition 1:
Modern industrial societies have proved to be both willing and able to accommodate to individual and population ageing

Rapid social change always produces some pessimistic prophets. A half a century ago gerontologists produced some very pessimistic forecasts of the dire implications of modernisation for older persons. Older people in modern societies were forecast to experience a loss of family support, social isolation, low status, and deteriorating welfare. All of these outcomes occur to some degree in modernising societies, but they did not occur primarily or only among older adults or among more than a minority of older adults. And if they occurred, they did not persist as the modern welfare states matured (Maddox and Wiley 1976; Maddox and Campbell 1985). To contemporary gerontologists in Africa and Latin America, this optimistic interpretation of social change probably appears far too facile. They still tend to see societal development as it was seen by some gerontologists in Europe and the United States a half century ago. In pre-modern and modernising states, older adults, among others, are vulnerable in the absence of resources and established mechanisms for social welfare. The issue and contingency of importance however, is the development of the welfare state, not population ageing per se. A vivid illustration of different perceptions of the social implications of ageing over a continuum of societies is illustrated by a recent international symposium on ageing around the world. Although in the minority, pessimistic prophets are still heard (Silverstone 1989). In the symposium, the view of ageing from both Africa and Latin

America is decidedly and predictably pessimistic. The view from Singapore is optimistic. The view from Europe is confident that difficult problems of ageing in post-industrial societies can be managed.

Societies are large-scale natural experiments in the life course effects of the differential allocation of social and economic resources. In the United States, where ageing issues have had rather high public and professional visibility for a long time, the evidence is clear. Older adults are socially integrated to a substantial degree. Currently, young children are unexpectedly at greater risk for poverty than older adults. There is no pleasure in that observation, but it does make the point that in the politics of resource allocation, ageing per se does not appear to be a special handicap. In fact, studies of welfare and health consistently demonstrate that gender, race and the socio-economic position of individuals produce as important or more important gradients of illness, disabling impairments and service utilisation than does age alone (Berkman 1988).

The point is that, while age matters, age per se is not the overriding determinative factor for welfare and health care as the United States, and probably modern societies generally, allocate resources. Moreover, while gerontologists earlier tended to be concerned primarily with the effects of societal institutions on older people, contemporary thinking in gerontology is more likely to turn the question around. What is the effect of population ageing on societal institutions, particularly societal allocations of health care, income and welfare services? This new question provides a better balance of issues in the discussion of the interaction of persons and societal institutions. An illustration will be useful.

Consider, for example, the schematic proposed by Hernes for conceptualising social change in general (fig. 1). On the left side of the scheme, the focus is on individual characteristics; on the right side, the focus is on population characteristics, resources, and institutional arrangements which embody social values and incentives. Contemporary gerontological research is now distinctly interactive in its emphasis in just the way this scheme suggests. Individual capabilities, preferences, and choices are affected by and, in turn, affect societal arrangements for allocating societal resources. This is in contrast to a decade ago when most gerontologists, particularly those with clinical interests, focused on ageing adults rather than on the effects of older adults on the social institutions of societies with ageing populations. Debates about Disengagement Theory tended to focus on individuals, not on social contexts. Debates about Modernisation Theory tended to concentrate on societies, not on individuals. Contemporary research in gerontology tends to concentrate on the interaction of persons with social contexts (Maddox and Campbell 1985). A particularly good illustration of this interactionist perspective is research on cognitive performance and interventions to improve cognitive performance in later life (Standinger et al. 1989). The intellectual performance of adults reflects experience in the workplace. Work experience that is high in opportunity for self-direction and for alternative responses is positively associated with high cognitive performance in later life.

Proposition 2:
Older adult populations are and remain substantially differentiated in terms of a number of individual and social characteristics

Individuals age differently. The persistence of references to *the* elderly in both popular and professional communication, is interesting precisely because it is so strikingly at variance with the evidence. Current comparisons of older adults across and within societies document important variations. Observations of older populations over time document change in composition as well as size. One can depend on it: any current cohort of older adults is not as it was a decade ago or as it will be a decade hence. Evidence of

Fig. 1:
The dynamic relationship between microlevel and macrolevel variables in the study of human ageing.

MICROLEVEL		MACROLEVEL
Properties of Actors		Collective Level
1. Preferences	incentives,	1. Institutions
2. Capacities	constraints,	2. Reward structure
3. Expectations	<----------	
	alternatives	
		Material Conditions
Behaviourial Assumptions		Aggregations
1. Optimizing	actions,	1. Frequencies
2. Result-controlled	---------->	2. Averages
action	choices	3. Variance
		4. Distributions

Source:
Hernes 1985 in: G. Maddox & R. Campbell. "Scope, Concepts, and Methods in the Study of Ageing." R. Binstock & E. Shanas (eds.) *Handbook of Ageing and the Social Sciences*. Van Nostrand Reinhold, New York.

differentiation among older adults in personal and social characteristics has both theoretical and practical significance.

Theoretically, observed differentiation provides strong evidence of the modifiability of some ageing processes and of the experience of ageing. Ageing as observed and experienced is not simply the inevitable outcome of biological processes. Explanation of differentiation requires specific attention to both behaviourial and social factors which mediate the expression of biological determinants of ageing.

Theoretical explanations of differentiation among older adults also have important practical application. Program developers may wish to identify and target specific sub-populations of older adults; for example, the frail and dependent at high risk for institutionalisation. Planners are appropriately warned that simple extrapolation of information of future older adults from current cohorts of older adults is highly risky. This is why in contemporary gerontology so much attention is given to cohort analysis and to the implications of cohort succession as populations age. In all developed societies, successive cohorts of older adults tend to be better educated, to be in better health, and to have more secure retirement incomes.

Some years ago, Bernice Neugarten made a practical distinction among the "young old," the "old," and the "oldest old". She added the observation that the young old (65-74) were more like adults generally than they were like the oldest old (85 and older); she drew an obvious practical conclusion. The personal interests and service requirements of various categories of older adults are demonstrably very different. Consider these basic demographic and epidemiological illustrations. The first (see table 1) is about the age-distribution of disabling impairment. The data are adapted from the *U.S. National-*

Table 1:
Disability, status, and institutional & vital status outcomes (since 1982) by age categories among older adults, United States, 1984, National Long-Term Care Survey

% Functional, Institutional and Vital Status

Age (% older)	Not disabled	Moderate or mild disability	Severe disability	Institu-tionalided	Deceased
65-74 (7.2%)	77.1	11.5	1.7	2.1	7.6
75-84 (4.2%)	53.4	19.3	3.4	7.8	16.1
85+ (1.3%)	19.9	22.1	6.4	20.1	31.5

Source:
Adapted from Manton, "Planning Long-Term Care for Heterogeneous Older Populations", 1988. In: G. Maddox and P. Lawton (eds.) *Annual Review of Gerontology and Geriatrics*, Vol. 8, Springer Publishing Co., New York.

Long Term Care Survey which estimated, in 1982-84, disabling impairments by age among those of 65 and older (Manton 1988). This longitudinal data set is technically and substantively one of the best sources of information about functional status of an older population currently available. The reported distribution of functional impairment is a benchmark for comparison with other populations across societies and across time. In Europe, for example, populations are typically older. Whether these older populations display different patterns of age-related disability remains to be demonstrated.

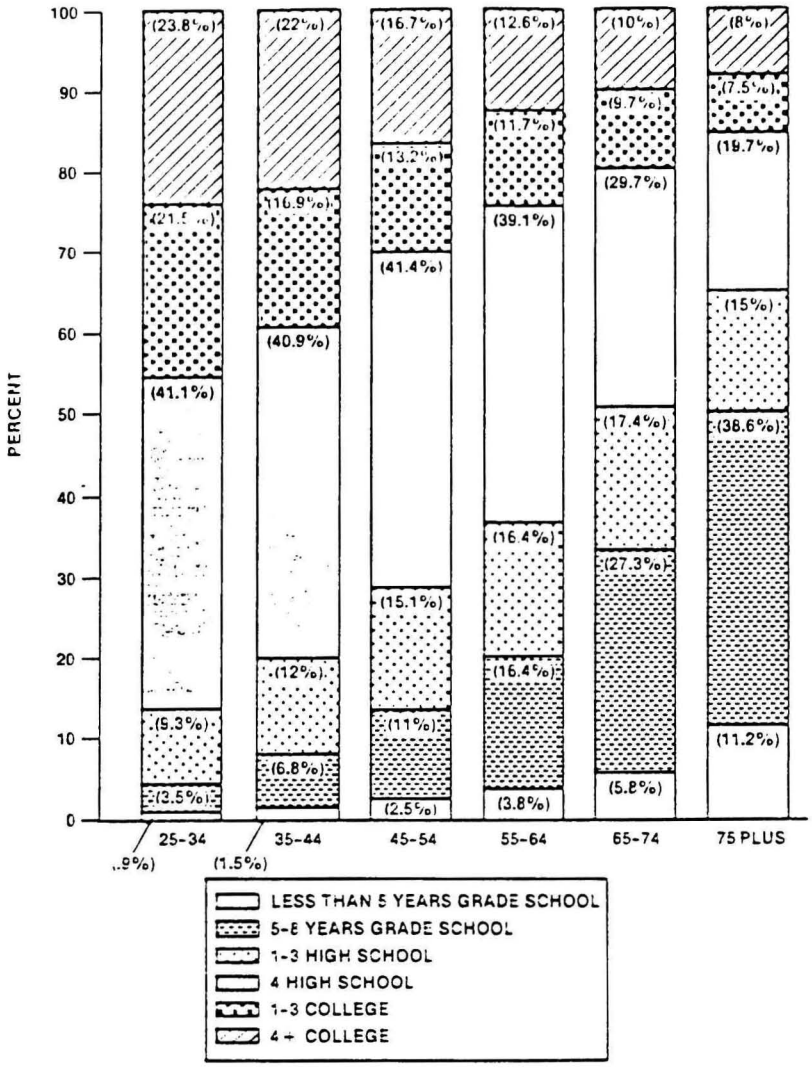
To put table 1 in demographic perspective, one notes that about 12.7% of the U.S. population is 65 and older; the sub-distributions within this broad age category estimated for 1990 are 7.3% for those 65-74, 4.1% for those age 75-84 and 1.3% for those age 85 and older. By the year 2020 the total older population in the U.S. is forecast to rise to 17.3%, with the oldest old almost doubling to 2.4%. It is imperative that the contingencies in such estimates be kept in mind. For example, in the 25 years between 1978 and 2003, the alternative assumptions about whether death rates among those 65 and older remain stable or continue to decline at the rate of the previous decade generate estimates of the number of 85 year olds that vary by 70%. Or, if one simply extrapolates prevalence of disability in 1975 to year 2003, limitations in activities increase by 64%, physician visits increase by 58%, and nursing home placement by 213%. The magnitude of the numbers command attention, but they are based on modifiable contingencies.

In table 1, the age gradient of disability status is significantly steep, as is the risk of both institutionalisation and death. The oldest old (85 and older) in the United States were more likely than those age 65-74 to be disabled by a factor of almost 4; were more likely to be institutionalised in the subsequent two years by a factor of 10 and were more likely to die by a factor of 4.

Similarly, Sidney Katz and colleagues (1983) have illustrated the age gradient in active life expectancy (or active remaining years of life in which adequate self-care outside institutions is possible) decreases after 65 monotonically to the point where at age 85, the expectancy of remaining years of life being disability-free is 50/50. While these data on impairment and functioning are from the United States, my general impression is that the estimates from most developed nations would be comparable (e.g. Heikkenen et al. 1983; Fillenbaum 1984; Brody and Maddox 1988).

The economic differentiation among older

Table 2:
Educational attainment by age (1981)



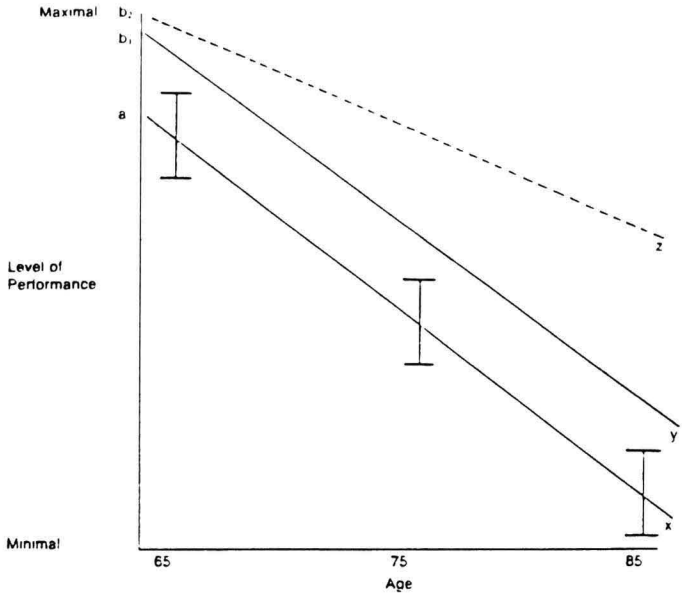
SOURCE: U.S. Bureau of the Census, Current Population Survey, March 1982, unpublished

adults has also been documented longitudinally in great detail for over a decade in the United States (e.g. Moon 1988). The older stereotype of "old equals poor" in the United States is being replaced by evidence of extraordinary differentiation and of bifurcation. The proportion of older adults in poverty was halved between 1969 to 1986 (from 25% to 12.4%). The average income of elderly households in 1984 was substantially in the direction of the national average. We will have occasion later to note the potential importance of this change as income gradients of health, health risks, and care utilisation are reviewed.

The changing distribution of educational attainment among older adults is also particularly worth noting. There is a dramatically changing age gradient in education in the United States. Currently older adults have a lower attainment but the age differential will decrease as current cohorts of older adults are successively replaced by better-educated cohorts (see table 2). Since final educational attainment changes little for persons beyond age 22, one can imagine moving any of the age-related distributions of educational attainment in the table to the right to approximate the effects of cohort succession.

Cohort succession in educational attainment is a reminder that older adults are not only not alike, they are also not as they were or will be in the future. Educational attainment is particularly important in thinking about the future of health and health care for two specific reasons. First, in epidemiology, the education gradient is as powerful as the income gradient as a positive factor in health (Maddox 1987). The powerful income gradient in health and health care utilisation is too common world-wide to require illustration (Bunker et al. 1989). Socio-economic status is a broad index of how societies allocate social and economic resources. As one moves toward the lower

Fig. 2:
Observed and Hypothetical Decline of Performance Level Following Intervention



Slope a . . . x: Observed decline, with variance noted.
Slope b_1 . . . y: Hypothetical intercept is higher, slope is parallel to a . . . x.
Slope b_2 . . . y: Hypothetical intercept is higher, slope is less than a . . . x.

end of that continuum, morbidity and mortality indicators rise predictably. Why they are predictable is less clear and not an issue which can be resolved here. There is, however, one connection which warrants close scrutiny. This is the positive relationship among income, educational attainment, and adoption of healthful behaviour and lifestyle (e.g. Berkman and Breslow 1983; Bunker et al. 1989). Second, education has a positive association with cognitive strategies of environmental scanning, effective coping strategies, a favourable self-concept, and the perception of personal control of events - all of which have a positive association with health (e.g. Standinger 1989; and Rodin 1989).

Proposition 3:
Some ageing processes and experiences of ageing are modifiable

On first hearing or reading, this proposition may be dismissed as too obvious to require statement. Optimism about modifying ageing processes was evident in the 1950s, but was less evident in the 1960s and 70s as biomedicine began to document the negative slope of the regression line for every human biological function measured (see fig. 2). In Fig. 2 the regression line a...x represents the classic illustration of expected age-related decline in functioning and reserve capacity. The provision of the variance indicators is an addition since explicit interest in variance in gerontological research is relatively recent, particularly among biological and biomedical scientists. Dr. Nathan Shock, the intellectual godfather of the definition of ageing as the age-related progressive loss of reserve capacity, has told me he regrets having paid so little attention to variance in ageing processes documented in his own research. This neglect accentuated the incorrect impression of uniform age-related rates of individual decline in functioning. The impression of inevitable uniform age-related decline in physical functioning was often generalised to intellectual and social role functioning. The evidence is quite contrary.

Individuals do not become less differentiated physically, behaviourially or socially over the life course and this documented differentiation is one of the most powerful arguments for expecting that some ageing processes are modifiable. In fig. 2, hypothetical regression line b1 ...x represents a possibility that at any age, on average, the intercept of performance might be raised. Regression line b2 ...z represents the possibility that the slope of the regression might also be changed. Research investigators in gerontology and geriatrics are likely to believe both types of modifications are possible and, therefore, to test research hypotheses about modifiability.

Change in functional status in later life is more than a hypothetical possibility. In the *U.S. National Long-Term Care Survey* which provided longitudinal data on the distribution of functional disability presented earlier in table 1, irreversible decline was contradicted by substantial improvement for some older adults. Of those who were most disabled, over a period of two years, 22% improved. Of those with moderate disability, 24% improved. These systematic data, which are relatively rare because longitudinal research on age-related disability is uncommon, show us how little is known about the dynamics of disability in later life (e.g. Manton 1988).

Two perceptions of the modifiability of ageing processes and the experience of ageing have changed dramatically in this decade. The first has been the documentation through research of the grand maxim of experimental and clinical sciences: if you want to understand something, try to change it. Acting on this maxim, investigators have documented the potential for substantial change in various areas of functioning in later life. The second changed perception is reflected in the attention given to the modifiability of the behaviourial and social characteristics of older adults and their functional capacity, not just biological functioning and disease.

Gerontological and geriatric perspectives on beneficial modifiability of ageing processes and the experience of ageing have been transformed in a revolutionary way. The evidence illustrating this revolution and its attendant controversies are nicely illustrated by three recent publications (Riley and Riley 1989; Chernoff and Lipschitz 1988; Fries 1988). In an edited volume by Riley and Riley, the transformations in our thinking required by research evidence about the perception and activation of a sense of self-control over events is convincingly documented by Yale University psychologist Judith Rodin (1989) ("Sense of Control: Potential for Intervention"). While perceiving oneself as appropriately in control is not an unalloyed good, in general, an appropriate sense of control over essential aspects of one's life predicts better health and greater personal satisfaction. And the perception of being in control and, in fact, behaving as though one is in control, can be increased beneficially even in very old, very debilitated populations through known behaviourial intervention technology.

Also reported in the Riley and Riley volume are beneficial interventions to improve cognitive functioning in later life from investigators at the Max Planck Institute for Human Development and Education, Free University of Berlin (Standinger, Cornelius and Baltes 1989, "The Ageing of Intelligence: Potential and Limits"). The article summarises the best cumulative research in Europe and the United States and documents differential cognitive functioning among older adults, a complex pattern of cognitive change with age, and mobilisable reserve intellectual capacity. Available research does not document ageing free of cognitive decline. It does, however, document the experimental demonstration of interventions which, with reference to fig. 2, can raise the intercept of cognitive functioning significantly and perhaps change the slope of decline. The change of slope, however, has not been demonstrated. To give only one hint of what these findings suggest, cognitive functioning can be raised for some individuals, whose history of intellectual functioning is known, to levels recorded 14-17 years earlier for them.

In geriatrics, an edited volume by Chernoff and Lipschitz (1988) documents the basis for realistic therapeutic optimism about health promotion and disease prevention in later life which has emerged and is here to stay (see also Ory and Williams 1989). While it is premature to conclude that primary prevention of disease is routinely possible in later life, secondary prevention (reduction of disabling consequences) and tertiary prevention (reversal of disabling consequences) demonstrably are possible. Rubenstein and Josephson (in Chernoff and Lipschitz 1988) review the strong evidence from randomised clinical trials regarding the beneficial effects of comprehensive geriatric assessment and case management. They document improvements associated with adequate assessment and management in diagnostic accuracy, appropriate care placement, functional status, positive affect; appropriate use of medication, use of non-hospital care services, lower total cost of care, and survival. Ory and Williams (in Riley and Riley 1989) note the persistence but nevertheless the reduction of ageism (age-based prejudice and discrimination) in rehabilitative services in the United States. They review convincing evidence of the positive benefits of rehabilitative interventions with older adults, with particular attention to the management of stroke, hip fracture, and urinary incontinence. They also make an impressive case for conceptualising rehabilitative success in terms of effectiveness in coping, rather than in cure. In discussing the objectives of rehabilitative interventions generally, they propose setting modest but achievable goals. These hopeful observations from contemporary geriatrics about beneficial modification of ageing processes are, however, only a prelude to one of the most contentious debates in gerontology and geriatrics in the United States - the Fries/anti-Fries debate about the

compression of morbidity.

In 1980 when James Fries published in *The New England Journal of Medicine* his article on "compression of morbidity," he meant to provoke and he did. The substance of his argument can be neatly illustrated with reference to the three probability curves in fig. 3. The curve (C) on the far right is familiar to demographers, epidemiologists and gerontologists who have been documenting and commenting for a long time on the "rectangularisation" of the survival curve. More and more individuals are surviving to upper levels of age so that, currently in a more developed society, about 75% of individuals ever born can expect to live to age 65; 50% to age 75 and 25% to age 85.

In the first of two basic propositions, Fries argued that curve C will not continue moving to the right. Age 85 may more nearly approximate Nature's intended biological limit than we wish to imagine. This is not the time to argue this point but it is fair to say demographers have rather uniformly taken a contrary position. So much for what I call Fries' optimistic view that Nature is on society's side in limiting the years in late life which are at highest risk for disability.

The second optimistic assumption of Fries was that onset of chronic disease or impairment (curve A) may be delayed (moved to the right) and that the onset and level of disability (curve B) may be delayed or moderated. These propositions have not been tested and found wanting. We do not yet have the population statistics for a definitive test. In the absence of definitive evidence, strong opinions and personal preferences flourish. In a recent paper Fries (1988) cites the kind of evidence of modifiability of ageing processes reviewed above in his paper as relevant to his argument. In the United States, Fries believes, beneficial lifestyle modifications have been occurring over the past decade which will eventually be revealed in the delay of chronic disease or impairment (curve A) and moderation of the level of disability associated with chronic disease or impairment (curve B). Also early therapeutic intervention (secondary prevention) and effective rehabilitation (tertiary intervention) can reasonably be expected to the delay onset of disabling impairments (curve B); and certainly therapeutic interventions can reduce the level of disablement experienced. This last point, in my estimation, is particularly critical and has not been adequately addressed with evidence in the Fries/anti-Fries debate. The issue is: Quality of Life.

In the dominant biomedical thoughtstyle in gerontology earlier, it was possible to conceptualise issues in binary terms: one is or is not diagnosed as having cancer, or cardiovascular disease or whatever. Diagnosticians were not inclined to ask about the timing of the disease onset in the life course, much less whether the risk of potentially disabling consequences might be modifiable. If one can accept the possibility of an acceptable Quality of Life because one can function in spite of the presence of disease or impairment, one asks a different question. With reference to fig. 3, that different question is: can the degree of disablement in later life be delayed or moderated through purposive biomedical, behaviourial and social intervention? The answer is *yes*, but the limits of our capacity for beneficial interventions remain to be tested.

In noting the potential importance of focusing on the Quality of Life in late adulthood, I note in passing a brief relevant and readable monograph by Antonovsky (1987) which makes a case for focusing on health rather than disease and on the prevention of "breakdown", even if disease or impairment is present. His concepts of *coherence, resistance resources* and *breakdown* (briefly explained in Exhibit 1[1]) capture the

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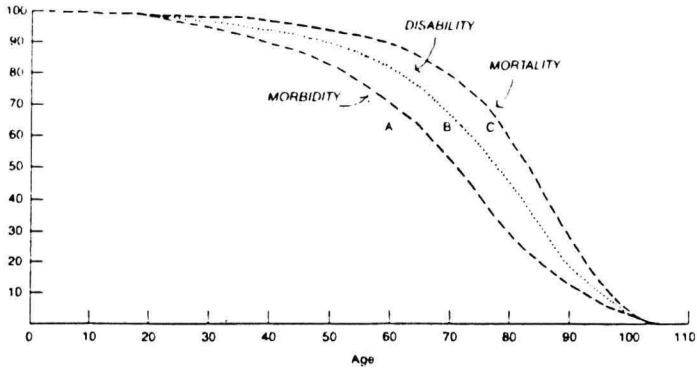
[1] *Exhibit 1*

The sense of coherence is a global orientation that expresses the extent

Fig. 3:
Factors in the Fries-Anti-Fries Debate about "Rectangularization" of Morbidity/Disability/Mortality Curves



essence of the points made by the gerontological interventionists described briefly above. Disease, impairments and stressful events do not have automatic outcomes in later life. The breakdown of individual defenses requires explanation, particularly the differential risk of breakdown among individuals facing similar challenges. Satisfactory explanations clearly must include multiple factors, prominently I would argue, cognitive capacity and also resources as variable as mobilizable social support, adequate income, knowledgeable caregivers, environments capable of compensating for limited personal capacities, and effective coping strategies. This leads to my fourth and last proposition.

Proposition 4:
The future of ageing, of ageing individuals, and of ageing societies will be determined by the alternative allocations of social resources that can be imagined and implemented effectively through consensus-based social policy.

The evidence from contemporary modern societies with ageing populations is that we have produced current circumstances and will inherit a future substantially of our own making. Until now, societies have not appeared particularly eager to specify what kind of age composition of the population or what kind of life course resource allocation strategy they prefer. Recently in gerontology, popular biologising of ageing stressed unmodifiable processes and neglected an interventionist perspective emphasising the modifiability of ageing processes. This fatalistic perspective is largely behind us. We can now address realistically a broad range of issues related to constructing alternative futures of ageing processes and the experience of ageing.

Consider three of the powerful sociological risk factors - income, education,

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to which one has a pervasive, enduring though dynamic feeling of confidence that (1) stimuli deriving from one's internal and external environments in the course of living are structured, predictable, and explicable; (2) the resources are available to meet the demands posed by these stimuli; and (3) these demands are challenges, worthy of investment and engagement. (p.19)

Source: Aaron Antonovsky, *Unravelling the Mystery of Health: How People Manage Stress and Stay Well.* San Francisco: Jossey-Bass 1987.

and social integration - which epidemiology has demonstrably related to outcomes such as well-being, morbidity and mortality. How a society distributes income, education, and the experience of social integration over the life course has much to do with social values and social policy and little to do with the biology of ageing. Can contemporary modern societies maintain income adequately in the increasingly numerous years post-retirement from the work-force? The answer has been demonstrably *yes* in all modern industrial countries. In the United States, a relative laggard in income maintenance post-retirement, policy adjustments in social security and in payment for medical care resulted in dramatic improvement in the economic situations of older adults in a single decade (Clark, et al. 1984; see also Moon 1988). Successive cohorts of older adults are also better-educated in all developed societies. And, building on a large and tenacious reservoir of social support for dependent older adults, the issue is not whether essential social support is available, but how to maintain it, complement it, and mobilise it wisely. Social integration of older adults continues to be experienced in all modern societies.

Recent discussions in the United States regarding "age equity" in the distribution of societal resources may appear to be an exception. In any case, they are curious enough to warrant at least brief comment. While no one knows exactly what an equitable distribution of societal resources over the life course would be, Americans have been startled to learn that the risk of poverty is greater for young children than for older adults. However, enthusiasm for promoting generational conflict related to this observation has been small and most observers believe that the problem is at best misstated and unlikely to sustain interest. Resource allocation to children or to older adults is not a zero-sum game. The issue certainly does not appear to be a genuine threat to the social integration of older adults.

Health care systems in modern societies have not been easily moved to respond to population ageing, but they have moved and substantial challenges are yet to come. Comparative analysis of how population ageing has contributed to the transformation of health care organisation and financing in more developed societies is not possible here. We noted at the outset that population ageing shifted attention of health professionals generally from acute to chronic disease and impairment. Interest in functional disability as distinct from disease followed. Subsequently attention has been given to the merits of alternative organisation and financing of geriatric care and to special training of health personnel serving older adults.

For the sake of simplicity, further discussion here will focus on the United States, not just because it is more familiar to me, but also because it is perceived by many as the "odd man out" among developed nations, the only one without a national scheme of health care or health insurance. Even here, I will argue, the impact of population ageing on health care has been palpable and worth highlighting. The effects on health care organisation and financing have already been dramatic in the United States and in the near future may produce fundamental structural change. The power of population ageing to affect social institutions should not be underestimated.

The U.S. health care system, if it is, as I believe, a test case, has exhibited radical transformations over the past quarter century partially in response to population ageing. For example, geriatrics has been recognised as a sub-discipline. In 1988, board examinations for certification in geriatrics drew over 4,000 applicants, and some 80% successfully qualified. Geriatrics appears in the curriculum of most medical schools, although in many instances the penetration is shallow. Geriatrics has provided a needed and beneficial multi disciplinary perspective in American health care which recognizes the significance of behaviourial and social factors

in maintenance of health and the quality of life.

The Veterans Administration Hospital system, the United States' single adventure in nationalised health care, is de facto largely a geriatric system. Medicare is this nation's only experiment with national health insurance. Both these ventures constitute substantial commitments of public dollars and therefore increase public concentration of interest in the outcome of those expenditures. Medicare, and particularly its companion Medicaid, literally financed a new private sector institutional form: the nursing home. From the beginning, policy analysts have agonised over quality assurance in long term care and have been convinced that there must be a more desirable, cost efficient and care effective alternative, hopefully in the community (Maddox 1980). This search for alternatives has generated endless demonstrations, which have generated consistently two relatively unpalatable conclusions in the United States. First, the only sure way to achieve economies in health care is by capping budgets. Having capped budgets, then one's worries can shift to quality of care and access to care. Second, if access and quality are assured, then alternatives to institutionalisation can achieve, at best, not cost reductions, but possibly better care at no greater cost (that is, quality with cost containment). The major lesson that has been learned is that alternative technical solutions to the provision of adequate geriatric health care are possible. The key issue then becomes finding a technical solution that is politically feasible.

Policy analysts too frequently continue to use crude extrapolations of the size of older populations, to conclude that all societies will eventually be overrun by hordes of disabled older adults who require high cost services. This is possible but not probable. Recall my initial advice about care and caution in extrapolations of current evidence into the future. Genuine contingencies regarding future death rates, disability rates and the effectiveness of health care exist.

The demonstrable age-gradient in impairment, morbidity and the associated use of health care resources has generated some instructive evidence on the epidemiology of ageing populations (Brody and Maddox 1988; Maddox and Glass 1989). Since morbidity is associated with age, and morbidity is the major determinant of health services utilisation, policy analysts are always anxious as they project the implications of population ageing for health care expenditures. Research findings make clear that this way of conceptualising the issue is too crude to be useful. The average older adult does, in fact, increase utilisation of care services over time. The most costly care, however, is primarily and necessarily in three sub-populations: those institutionalised in nursing homes (5%); those in the last year of life (about 5%) and those in the community who are severely disabled, poor, and/or alone (about 1.5-2%). About 88% of the elderly population in the United States are not notably high users of health and public welfare services. The most urgent challenge to policy analysts in the United States is not "the elderly" but more likely a targeted 2% of that population. If there is a genuine crisis of care in the United States currently, it is a crisis of values as much as a financial crisis. Dominant opinion in the United States persists in asserting the primacy of individual responsibility for health care generally and long-term care in particular. Consequently, national health insurance and long-term care insurance are not serious options in public policy. The existence of 37 million uninsured or underinsured persons, many of them children, is now beginning to be recognised as unacceptable if not scandalous. Similarly for older adults, the high probability of impoverishment through personal economic responsibility for long-term care is increasingly getting attention.

About half the multibillion dollar cost of nursing home care in the United States is paid by Medicaid for the impoverished, most of the rest out of pocket. Although policy analysts are more or less agreed that private financing of long-term care is not feasible for

probably 7 of 10 individuals, no serious movement toward publicly assured financing is observed even on the near horizon (Rivlin et al. 1988). Long-term care is the single remaining contingency in life which remains uninsured for most older adults in the United States. This fact is very likely to be a major public policy issue over the next decade as the implications of this for the average middle-class elderly person is understood. A high level of affluence among older adults and health insurance provided by employers, continue to forestall a genuine sense of crisis.

The recent history of the Prospective Payment System (PPS) and the related Diagnosis Related Groupings (DRGs) is also instructive about American values and attitudes regarding regulatory interventions into health care organization and financing. The prospective payment system illustrated by DRGs was directed initially solely to medicare expenditures, but has subsequently suffused into private sector financing. The strategy was a decided break in the previous federal regulatory strategy in the United States and its implications should not be underestimated. The new strategy was acceptable, in part presumably because it did not propose to tamper with how physicians and hospitals did their professional work. Rather the strategy focused on capping payment for hospital episodes using reasonable cost associated with some 470 disease classifications. The practical problems associated with the full application are well known (not resolved, or likely to be finally resolved) and the effects on access and quality of care have not been clearly identified (Maddox and Manton 1989). We do know that average length of hospital stays for geriatric patients has decreased, although whether system cost has decreased is less clear and so is whether quality of care has suffered (that is "discharged quicker and sicker"). We do know that both public and private health care providers have become interested in vertical and horizontal integration of services to explore whether rational case management within a complex integrated care system could achieve economies of cost without loss of quality or reduced access. Most importantly, the DRGs experience is a powerful reminder that the organising and financing of health care is certainly not an exact science. There is considerable room for political negotiation and alternative solutions to the organisation and financing of geriatric health care.

In sum, population ageing has stimulated critical attention to, and changes in, health care organisation and financing that are, by U.S. standards, revolutionary. And more revolutionary moves are visible in the wings. One source of potentially dramatic change is a reassessment of the differential pay for health specialists and a related interest in a DRGs strategy for paying physicians. The other potentially dramatic development is the first serious discussion in a decade about the feasibility and desirability of national health insurance. Geriatric health care alone does not explain the current sense of needed change. But it is a prominent part of the explanation.

New England Journal of Medicine (NEJM) editor Arnold Relman has recently focused attention on national health insurance for the United States with a two-part review of Allan Enthoven's seminal proposal in 1980 for a consumer's choice system of care designed to fit a really competitive market environment (Enthoven 1980; Enthoven and Kronick 1989). The re-statement in these articles, presumably intended to make medical markets more politically acceptable, makes it appear to this observer too complex to grasp politically.

Nevertheless, the case for fundamental change in the organisation and financing of health care has been restated. Further, a statement of 1,200 concerned physicians in the NEJM argues for national health insurance (Hummelstein et al. 1989), although critical details are missing which would permit assessment of its political feasibility. Finally, Canadian economist Robert Evans and colleagues (1989) have

restated the virtues of Canadian national health insurance with apparent approval of Dr. Relman (1989) who himself concluded editorially: "Universal health insurance: Its time has come." The proof of that pudding will be in the eating. Yet on the surface, Canadian NHI appears relatively compatible with U.S. values and preferences since physicians are self-employed and hospitals are privately owned. Canada insures long-term care. The governmental regulation of both physicians and hospitals appears relatively benign and, perhaps, increasingly ineffective, particularly in Canada's most populous province, Ontario. Population ageing has stirred the intellectual pot of health care leadership in the United States and moved the future of health care more clearly in the arena of public interest and perhaps of serious consideration of public solutions.

Unfortunately, the U.S. situation may only illustrate Robert Alford's concept of "dynamics without change" (1975). At the moment, the U.S. appears to be satisfied with complaining about the cost of health care, in which geriatric care is obviously implicated, and to make only marginal adjustments like fine tuning DRGs reimbursement or reformulating physician payment schedules. However, the issue of financing long-term care is being seriously considered, as is the very large number of uninsured and underinsured persons in the United States. The increasing uneasiness with the uninsured may prove to be important. In the case of the estimated 37 million Americans who are uninsured or underinsured, older adults do not figure prominently, but planners with a cohort perspective will not be fooled. Poor health among children and young adults today produces older adults with poor health tomorrow.

In summary, gerontology and geriatrics have made an enormous advance in demonstrating the beneficial potential modifying age processes. They have demonstrated that some of the most serious problems in later life are less the biological problems of ageing and more the political problems of achieving consensus about the future of ageing we wish to construct. Health care that is adequate for older adults may prove to benefit everyone.

References

Alford, R. 1975; *Health Care Politics*, University of Chicago Press, Chicago, IL.

Antonovsky, A. 1987; *Unravelling the Mystery of Health: How People Manage Stress and Stay Well*, Jossey-Bass, San Francisco, CA.

Berkman, L. 1988; "The Changing and Heterogeneous Nature of Ageing and Longevity: A Social and Biomedical Perspective." In: G. Maddox and P. Lawton (eds.) *Varieties of Ageing: Annual Review of Gerontology and Geriatrics*, 8: 37-70. Springer Publishing Company, New York.

Berkman, L. and Breslow, L. 1983; *Health and Ways of Living: The Alameda County Study*, Oxford University Press, New York.

Brody, J. and Maddox, G. 1988; *Epidemiology and Ageing*, Springer Publishing Company, New York.

Bunker, J.; Gomby, D. and Kehrer, B. (eds.) 1989; *Pathways to Health: The Role of Social Factors*, The Henry J. Kaiser Foundation, Menlo Park, CA.

Chernoff, R. and Lipschitz, D. 1988; "Health Promotions and Disease Prevention." In: *The Elderly*, Raven Press, New York.

Clark, R.; Maddox, G.; Schrimper, R. and Sumner, D. 1984; *Inflation and the Economic Well-Being of the Elderly*, The Johns Hopkins University Press, Baltimore, MD.

Enthoven, A. 1980; *Health Plan*, Addison Wesley, Reading, MA.

Enthoven, A. and Kronick, R. 1989; "A Consumer-Choice Health Plan for the 1990s" (Parts 1 and 2). In: *New England Journal of Medicine* 320/1: 29-37, and 320/2: 94-108.

Evans, R. et al. 1989; "Controlling Health

Expenditures - The Canadian Reality." In: *New England Journal of Medicine* 320/9: 571-577.

Fillenbaum, G. 1984; *The Well-Being of the Elderly: Approaches to Multidimensional Assessment*, World Health Organization, Geneva.

Fries, J. 1980; "Ageing, Natural Death, and the Compression of Morbidity." In: *New England Journal of Medicine* 303: 130-135.

Fries, J. 1988; "Ageing, Illness and Health Policy: Implications of the Compression of Morbidity." In: *Perspectives in Biology and Medicine* 31/3: 407-428.

Heikkenen, E.; Waters, W. and Brezezinki, Z. (eds.) 1983; *The Elderly in Eleven Countries: Public Health in Europe*, 21. World Health Organization, Copenhagen.

Hernes, G. 1985; In: G. Maddox and R. Campbell "Scope, Concepts and Methods in the Study of Ageing." In: R. Binstock and E. Shanas (eds.) *Handbook of Ageing and the Social Sciences*, Van Nostrand Reinhold, New York.

Hummelstein, D. et al. 1989; "A National Health Program for the United States: A Physician's Proposal." In: *New England Journal of Medicine* 320/2: 102-108.

Katz, S. et al. 1983; "Active Life Expectancy." In: *New England Journal of Medicine* 309/20: 1218-24.

Maddox, G. L. 1980; "The Continuum of Care: Movement toward the Community." In: E. Busse and D. Blazer (eds.) *Handbook of Geriatric Psychiatry* (501-520), Van Nostrand Reinhold, New York.

Maddox, G. L. 1987; "Ageing Differently." In: *The Gerontologist* 27/5: 557-564.

Maddox, G. and Wiley, J. 1976; "Scope, Concepts and Methods in the Study of Ageing." In: R. Binstock and E. Shanas (eds.) *Handbook of Ageing and the Social Sciences* (3-34), Van Nostrand Reinhold, New York.

Maddox, G. and Campbell, R. 1985; "Scope, Concepts and Methods in the Study of Ageing." In: R. Binstock and E. Shanas (eds.) *Handbook of Ageing and the Social Sciences*, 2nd Edition (3-31), Van Nostrand Reinhold, New York.

Maddox G., and Glass, T. 1989; "Care of the Chronically Ill." In: H. Freeman and S. Levine (eds.) *Handbook of Medical Sociology*, 4th Edition (236-261), Prentice Hall, New York.

Maddox, G. and Manton, K. 1989; "Hospitals: The DRG System." In: C. Eisdorfer, D. Kessler, and A. Spector (eds.), *Caring for the Elderly: Reshaping Health Policy* (71-87). The Johns Hopkins University Press, Baltimore, MD.

Manton, K. 1988; "Planning Long Term Care for Heterogeneous Older Populations." In: G. Maddox and P. Lawton (eds.) *Annual Review of Gerontology and Geriatrics* 8: 217-255, Springer Publishing Company, New York.

Moon, M. 1988; "The Economic Situation of Older Americans: Emerging Wealth and Continuing Hardship." In: G. Maddox and P. Lawton (eds.) *Varieties of Ageing: Annual Review of Gerontology and Geriatrics* 8: 102-131, Springer Publishing Company, New York.

National Center for Health Statistics (NCHS) 1986; *Changing Mortality Patterns, Health Service Utilization, and Health Care Expenditures* 1978-2003. Series 3:23. U.S. Public Health Service, Washington, D.C.

Ory, M. and Williams, F. 1989; "Small Goals, Sustained Interventions." In: M. Riley and J. Riley (eds.) *The Quality of Ageing*, The Annals of the American Academy of Political and Social Science, 503. Whole issue.

Relman, A. 1989; "Universal Health Insurance: Its Time Has Come." In: *New England Journal of Medicine* 320/2: 117-118.

Riley, M. and Riley, J. (eds.) 1989; *The Quality of Ageing: Strategies for Intervention*, The Annals of the American Academy of Political and Social Science, 503, Whole issue.

Rivlin, A.; Wiener, J. and Spence, D. 1988; "Insuring Long Term Care." In: G. Maddox and P. Lawton (eds.) *Annual Re-*

view of Gerontology and Geriatrics 8: 256-282. Springer Publishing Company, New York.

Rodin, J. 1989; "Sense of Control: Potential for Intervention." In: M. Riley and J. Riley (eds.) *The Annals of the American Academy of Political and Social Science* 503: 29-42.

Rubenstein, L. and Josephson, K. 1988; "Geriatric Assessment: An Effective Preventive Medicine Approach for Frail Older Persons." In: R. Chernoff and D. Lipschitz (eds.) *Health Promotion and Disease Prevention in the Elderly*, Raven Press, New York.

Silverstone, B. (ed.) 1989; *Ageing Around the World: Tomorrow's World in International Perspective*, Gerontological Society of America, Washington, D.C.

Standinger, U.; Cornelius, S. and Baltes, P. 1989; "The Ageing of Intelligence: Potential and Limits." In: M. Riley and J. Riley (eds.) *The Annals of the American Academy of Political and Social Science* 503: 43-59.