Thematic Keynote Highlights
Proceedings of the XVI World Congress of the International Association of Gerontology
Adelaide, Australia, 1997

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Preface

The XVIth Congress of the International Association of Gerontology (IAG) held in Adelaide, Australia, August 19-23 1997, took as its overall theme `Ageing Beyond 2000 - One World One Future' symbolizing the universality of ageing in all societies. Pre-Congress Satellite Meetings held simultaneously in Singapore and Honolulu complemented the main program in Adelaide and an interactive video-conference linking all three sites marked the closure of the satellites and opening of the main event. My remarks as IAG President during the video-conference set the stage for the event:

"We have now come to an end and a beginning. The Satellite Pre-Congress Meetings in Honolulu and Singapore are concluding and the Congress Main Meeting here in Adelaide begins. Already, as we have heard from the Satellite Panels, a great many issues have been explored and debated during their meetings. During the next several days we plan to take the questions they have raised even further, drawing on what has already been presented, to move towards a more comprehensive and integrated perspective on ageing in all of its manifestations."

We are already aware of the critical importance of improving knowledge and understanding of individual and population ageing at all levels. Achieving this and raising the awareness of governments and people everywhere is a major remit of those of us who research, teach and practice gerontology. But more is required. Given greater knowledge and understanding we must strive to apply what is known more effectively. A more convincing dialogue must be achieved between the academics and practitioners in gerontology and the decision makers as well as those responsible for the allocation of resources. We need to present a clearer picture of what the outcomes will be of the known population trends, and what we now know about ageing itself. These insights are critical if governments and others are to effectively meet the challenges ahead and avoid the prospect of a so called `crisis' of population ageing.

Great advances in gerontology have been made in recent times as many of the presentations to this Congress signify. Dr Edit Beregi referred to some of them in her opening ceremony speech and there are many others. We may yet see breakthroughs in identifying the causal factors in Alzheimer's disease and find effective ways of treatment or at least amelioration of the progression of this devastating disease. The prevention of many chronic diseases is already possible and the extension of healthy life expectancy, and not just increased longevity per se, is a realizable aim.

Apart from biomedical achievements, improvements in public policies and in ensuring the rights of all persons as they grow older has potential to impact on the well being and sense of worth of older people, as positive contributors to society and to economic development - not simply a burden on others. Innovative approaches to providing care in the community for older persons, their families and careers can assist in strengthening the capacities of families and communities in their traditional role of supporting older relatives within the community. Advances in quality management and quality of care will improve practice and facilitate the extension and exchange of best practices in all areas of care provision.

While we may tend at times to dwell on the problems and challenges, nonetheless, future prospects, if informed and decisive action is taken now, may not be so bleak. As Susanne and James Paul were quoted from Humanity comes of Age in Ageing in Asia.

"The future need not be a cruel struggle for limited resources as pessimists predict. Greater human dignity and social development are attainable in the years ahead, especially if all can contribute to the process. But that transition will not be easy or automatic. Great population shifts will require new approaches to employment, housing, health care, income support and social services. We need to consider how decent lives can be constructed with and for older persons

under these new conditions, especially in the poorest countries where resources will be scarcest. Long life must be reinvented to overcome illness, poverty, powerlessness, loneliness and isolation, to become an affirmation of human experience."

During this Congress we will, I hope, contribute to achieving these objectives through the effective application of science and in the formulation of a message from all of us gathered here urging the leaders of the world, other researchers, teachers, practitioners and the wider community to act now to apply what we already know, to invest in increasing that knowledge base further and to take the critical decisions that will ensure that the maturation of society will be a triumph and cause for celebration rather than a cause for concern and pessimism. I call on all here to contribute, during the Congress, to the formulation and promulgation of the statement to be known as the `Adelaide Declaration on Ageing' our positive testimony to the future."

Over 2000 delegates from 64 countries took up the challenge and participated in the event which included a broad range of plenary sessions, symposia, round tables, paper and poster sessions and audiovisual presentations. There were 55 organizations which exhibited and financial assistance through sponsorship and other forms of assistance were provided by over 40 private, non-profit and government organizations. Novartis Pharma Inc and the Novartis Foundation for Gerontological Research were the principal sponsors and the Commonwealth Government of Australia was the principal government sponsor. In addition Elderly Citizens Homes (ECH) and the Adelaide Bank Ltd were major sponsors.

120 Invited Symposia provided the core scientific program and a select group of symposium conveners were asked to contribute to a series of thematic plenary presentations summarizing the outcome of their particular symposium, reviewing the state-of-the-art of their topic as well as suggesting future directions in research and practice. The papers reproduced here are from the Thematic Plenary Presentations. Collectively these papers provide some indication of the breadth and depth of the scientific program of the Congress. I am most grateful to the authors who contributed these papers and I look forward to seeing many of the other papers presented during the Congress published in the wider scientific literature.

The Adelaide Declaration on Ageing was endorsed by the IAG Council and delegates to the Congress. It has been printed separately and will be widely distributed as a message for world leaders and for all of those interested and involved in meeting the challenges ahead. As we move closer to the close of the present century the last IAG World Congress of Gerontology has, I believe, laid the foundation for a more imaginative, proactive and positive approach to responding to ageing beyond 2000.

Gary Andrews
IAG President

Opening Address (Abridged)
by Hon Judi Moylan, Minister for Family Services, Australia

Together with many other governments in both developed and developing countries, the Australian Government is only too well aware of the challenges posed by the rate and scale of ageing today. The challenge for governments manifests itself in many ways, for example requiring attention to national savings, service provision, community needs and attitudes to ageing.

Responsible governments need to take action now to address the needs of society as it ages.

In Australia the Federal Government has put in place a number of initiatives, such as the Aged Care Structural Reform Package, which aims to strengthen the provision of services to the aged to ensure greater sustainability for the future; greater financial assistance and support for the many caregivers in our community, and broader initiatives focusing on promoting healthy ageing and positive images of ageing through mechanisms such as the Conference for Older

Australians, an advisory forum on ageing, the Healthy Ageing Task Force and the Healthy Seniors Initiative.

Australia is clearly not alone in putting in place measures to address policy challenges arising from the ageing of the population.

The OECD has identified four fundamental challenges for public policy. These are:

- the fiscal implications associated with an older population;
- the responsiveness of markets to supply and demand changes associated with shifting demographics;
- encouraging active ageing - helping people to stay active, flexible and self-reliant as they age; and,
- the need to find a new balance between collective and individual responsibilities.

As we address our responsibilities, our guiding principle must be to ensure that older people enjoy a good quality of life. This involves your professional contribution, together with better environmental conditions, appropriate housing and good nutrition, to bring people to old age healthier than in the past, to help keep older people well for longer and to maintain their independence longer.

In Australia, the federal, state and territory governments have recognized the importance of ageing. We are working together to develop a National Healthy Ageing Strategy designed to achieve a number of significant outcomes for older people such as addressing attitudes to ageing and older people, improved health and well-being, more opportunities for older people to participate in employment and community activities, better access to transport and housing and appropriate living environments.

You will all be aware that the UN has designated 1999 the International Year of Older Persons. This provides an ideal opportunity for all countries to celebrate the contributions made by our older citizens and for government to articulate a fresh vision for the twenty-first century for older people. The Commonwealth Government's Conference for Older Australians will play a major role in developing Australia's contribution to the International Year.

With the scale of our ageing population, there are many questions that we need answered, and of course, these will vary depending on the circumstances of each country. This Congress has delegates who can share the needs of countries and regions and, most importantly, discuss solutions from which we can all learn.

Friendships made here will link those of you involved in gerontology and span the world. With today's communications, the contacts you make over the next few days can initiate levels of continued dialogue that could not have been imagined, even as recently as your last Congress, only four years ago.

I wish you every success with your important deliberations in the days ahead. I have much pleasure in opening the sixteenth World Congress of Gerontology, Adelaide 1997.

Message to the Congress from the President of the United States

The White House
Washington
July 31, 1997

Warm greetings to everyone participating in the 1997 World Congress of Gerontology.

We all owe an enormous debt of gratitude to our world's older citizens. They make vital contributions to our families, our workplaces and our communities. As we seek to improve our world, we have much to learn from their experience, skill, and wisdom. Older individuals help teach us about our past and provide a positive example for the future.

As we face the challenges of an ageing population, we must reaffirm our commitment to providing older citizens with the support they need to remain healthy, active members of society. This Congress is an important opportunity to address the problems posed by this trend and to encourage international collaboration and exchange in the areas of research, education, and professional practices related to ageing.

I commend the International Association of Gerontology for working to improve the quality of life for older individuals around the world. Your efforts are helping to create a brighter future for us all.

Best wishes for a successful Congress.

Bill Clinton

Address by Professor Edit Beregi, Immediate-Past President, International Association of Gerontology The Future of Gerontology

We are at the threshold of the 21st century. The 20th century was the century when scientific discovery resulted in several basic and practical issues. This century has been beneficial for mankind, for the aged people. The average life expectancy has increased, people live longer and the quality of their additional years has become an important issue. The coming century will be the century of the practical use of high technology and this should solve the above mentioned urgent problem, too.

The link between basic research and applications has been close and interactive throughout the history of science and this tendency should continue.

In the history of science, physics was the first of the natural sciences to become fully modern and highly mathematical. Chemistry followed it but biology was left far behind.

It was not until the late 1940s that this situation changed. At that time a new era of biological research began with the discoveries of antibiotics, steroid hormones, immunochemistry and genetics.

By 1953 the first kidney was transplanted and new possibilities emerged to fight incurable diseases. At that time biology was the fastest growing field of all sciences. This was followed by new discoveries in human molecular biology in the 1980s and 1990s. Advances in molecular biology have led scientists to investigate new types of medical interventions that affect health by altering gene expression. These interventions aim to repair a genetic defect by replacing a missing or mutant DNA sequence, or by deleting a deleterious gene.

During the past years human genes involved in the aetiology of breast cancer, colon cancer and obesity have been identified and isolated. Moreover, DNA sequencers have produced extensive information on the bacteria that cause human diseases, including ulcers and tuberculosis. Finally, there are promising new approaches to the study of ageing, nerve regeneration and the immune system. However most noninfectious diseases - like cancer, stroke and heart disease - involve complex but poorly understood interactions between genetic and environmental factors. There are tremendous benefits to be derived from breakthroughs in genetic research, but there is also major potential for misuse of genetic information. There is an ethical dilemma associated with this new information.

The 21st century is going to be the century in which we come to realize that nature is a vast resource. It is the body of information that we are going to explore in the decades and centuries ahead. Science is indefinitely perfecting human knowledge and will lead to the prolongation of healthy life span.

For this reason we have to improve modern techniques of monitoring health status, investigating and controlling diseases, eliminating environmental hazards, promoting health education and disease prevention.

The scientific resources that we can bring to propagate prevention are greater now than ever in history, through telecommunication technology and the Internet. Progress in gerontology in the 21st century should balance new insights about opportunities, about necessity, with clear eyed analyses of problems.

Ladies and gentlemen, on the threshold of the new century we have every possibility to ensure health for the years gained by technology, by scientific results and by people dedicated to use all these new results for the benefit of mankind and for the benefit of older people.

Address by Senator Daniel Inouye
United States Senator for Hawaii

Your World Congress and this video-conference link across the Pacific comes at a most opportune time. Governments throughout the world have become much more aware of the challenges associated with population ageing and the need to respond effectively to ensure that people everywhere will enjoy not just longer life but also meaningful quality of life.

As a member of the US Senate for nearly 35 years, I play close attention to the growing social and health needs of the ageing. Governments worldwide have had to take stock of their services and support for older people and their families. In some cases this may mean a reduction in the level of services government directly provides. In others it may mean realignment and change in the way services are provided. Decisions made by world governments will depend upon the information available to them over the next several years. We are looking for the expertise of informed organizations such as yours to define the issues and assist in the planning processes to meet these challenges. Here in the US, the 1995 White House Conference on Ageing developed a final report entitled The Road to an Aging Policy for the Twenty First Century. This report has been a valuable resource in our efforts to implement our national ageing policies.

As a group you may not be able to change the future course which lies ahead of us. However, the following issues must be addressed:

- How can people achieve old age without the burden of illness and dependence which has been associated with ageing?
- How may we improve the quality of life for our senior citizens so they may lead longer and productive lives?
- How can we provide additional support to extend the period of independence?

Much of this can come only from you and from your recommendations. Do not underestimate the importance of the task before us. Many governments are already struggling to come to terms with the size of the socio-economic burden of an ageing population. Your World Congress is a critical step to achieve these goals.

I am pleased to acknowledge the US contribution to your scientific discussion through the reports that will be presented from Honolulu. I look forward to receiving the results of your deliberations. Much Aloha.

Address by Dr Aileen Wong
Senior Minister of State for Health and Education, Singapore

The issue of population ageing is of increasing relevance to my country and to the Asia Pacific region in general. This region has some of the most populous nations on earth where rapid population growth has long been recognized as a challenge to economic growth and social development. However, the ageing of these populations that is evident now creates new demands that may be as difficult to satisfy as those posed by rapid population growth.

Singapore has a rapidly ageing population. To meet this challenge we place great reliance on our traditions of family support and respect for the elderly. We have implemented a system which encourages individuals to take personal responsibility for their social and health needs. At the same time we recognize that it is important to provide assistance to older individuals and families so as to enable the elderly to live in their own homes for as long as possible. However there are situations where the elderly sick require long-term institutional care and nursing home care. We therefore have to make sure that a whole range of care facilities and services are available for the elderly.

Over the years my Ministry has implemented several key initiatives. This includes improving the public's perceptions of the elderly; raising the retirement age so as to encourage active economic participation by older workers; establishing community based services and setting up an integrated network among the different health care providers to ensure a seamless web of care for the elderly. These initiatives illustrate the high priority my Ministry gives to the health and well-being of our elderly citizens.

I am happy to note that in addition to health issues your Congress is considering the broader social and economic issues that effect ageing populations. This will greatly enhance the value of your deliberations and their value to the world community. Your Congress comes at a critical time. I am very pleased that Singapore is participating in this important Congress through the reports to be presented under the direction of Dr Mary Ann Tsao of the Tsao Foundation.

I look forward to receiving the outcomes of your international dialogue that will contribute significant action plans for elderly people in both the developing and developed countries in the world. I wish you all a productive and inspiring meeting.

Address by Kofi Annan
Secretary General of United Nations

I am very pleased to greet those of you attending the World Congress of Gerontology.

In two years time we will celebrate the International Year of Older Persons. This will give us an opportunity to focus the world's attention on the question of ageing and on finding ways to make sure that older persons everywhere can live healthy, productive and economically secure lives.

In rich and poor countries alike, life expectancy is on the rise and in all societies it will require enormous adjustments for individuals and families as the population ages. The United Nations works to promote the fullest possible participation of older persons in society and, as a further sign of our commitment, there are representatives of the United Nations family with you at this Congress.

I send you my best wishes for a very successful gathering and I look forward to working with you in the years ahead `towards a society for all ages'.

Supporting Caregivers of Older People: an Overview of Problems and Priorities

By Janet Askham
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Abstract. This paper uses a broad definition of `support' to caregivers and considers how, given the need for support, this can be provided in a variety of ways. It emphasizes issues such as the need for more research on the relative merits of different types of support, for consideration of the social context within which support is given and received, the way in which it is provided, and caregivers' own perceptions of what helps them in their caring activities.

Introduction

Caregiving is one of the most widely researched topics in social gerontology. When such research began, investigators concentrated on describing the nature of caring and the consequences for caregivers, and in particular, the burden and stress of looking after an older person with mental or physical frailty. Although there is still a need for more sensitive understandings of the place and nature of caring within people's wider social lives [1] and for its long-term consequences, more recent research has taken the burdensome nature of the role as given and has been asking how - given that people will continue to want, feel they ought, or be under pressure, to take up the caregiver role - such burdens can be minimized through support.

Assumptions about caregiving (and receiving) are changing - both researchers and policy makers are beginning to incorporate notions which pay at least lip service to supporting or empowering caregivers and receivers through needs-led rather than service-led support, and offering choice and active participation in decision-making. In the UK this view has begun to be institutionalized in legislation. For example, the Carers (Recognition and Services) Act of 1995 aims "to encourage an approach which considers ..... the type of assistance needed by caregivers." However, this is not the case in all countries with large or rapidly growing elderly populations. In the People's Republic of China, for instance, there is still very little research on caregiving and little support available for those involved in caring [2].

More traditional models of caregiving still prevail, however, which perpetuate perceptions of elderly care recipients as passive dependants who have little real choice over their care, and of caregivers who themselves have little control over their situation and are provided with only just enough support to get them to go on caring but not enough to increase their control over the caring situation. Another unhelpful assumption is that caregiving is the paramount role, particularly of elderly carers. For example, not everyone is even content to be identified as a `carer', and even when they are, their notions of what caregiving involves may differ from culture to culture (for instance, in some societies it may be the husband in a caregiving couple who is actually seen as `the carer' though his wife carries out most of the tasks connected with caring).

The concept of `support' needs to be viewed very broadly. It can be taken to mean any action or facility which helps caregivers or potential caregivers to:

- take up, or decide not to take up, a caregiving role;
- continue in a caregiving role, by making that role easier or no more difficult;
- end a caregiving role, either as a consequence of the death of the person cared for, his/her entry to permanent institutional care, or the caregiver withdrawing from home care.

Although it is hard to categorize types of support, the kinds of facility or action which may give such help are:

- training/preparation to improve skills or competence
- equipment or technical support

- information
- empowerment to improve sense of carers' efficacy and entitlement
- emotional support/affirmation/someone to talk to
- direct help with care tasks
- help with other tasks or roles
- respite services (to allow carers leisure, or to fulfill other role obligations)
- financial support
- relaxation services.

For some of these, the support may be particularly relevant in the pre-caring situation, some when caring is on-going and some when it is ending. Some may be provided by formal services or facilities, others by family members, friends or neighbours. Research which omits one or the other leaves the interpretation of its findings open to doubt.

The Need for Support

Research findings show that caregivers undoubtedly need support. For example they often show that, at the very least, people would welcome even some affirmation or acknowledgement of what they do; and of course findings also show that they do not necessarily receive the support which they desire or would find helpful. The main reason is almost certainly underprovision of such services, but there is also the question of inability to access the services which are available. For example, in some societies a caregiver's authority or status within the family affects his/her ability to ask for services (women with low status cannot go against the wishes of other family members who may think they do not need help with caring). Or the relationship between the care recipient and the caregiver may be such as to make it hard for the caregiver to take control of the situation. Sorensen [3], for example, recounted the dilemma facing potential carers whereby, although it has been found to be helpful to them to have talked beforehand to elderly parents about their possible future care needs, this is not welcomed by the elderly parents themselves.

It is only relatively recently that serious examination of the ways in which caregivers and receivers can be given greater control and support has begun, and it is important that the issues concerning such support be investigated in all their complexity.

Actions/Services to Support Caregivers

Most of the research on this subject has concentrated either on informal support provided by members of caregivers' social networks or on particular kinds of formal services, namely those providing information, help with tasks, respite care or emotional support to carers. These latter have usually been evaluated either as single services or as a package of support with no distinction made between the effects of specific parts of the package (but see [4]). Findings are of course very mixed, but generally show that the burdens of caregiving are eased by support [5-8]. The conference symposium on which this paper draws concentrated instead on some of the lesser studied supports: preparation, empowerment and financial support. Both this research, and others, can be used to illustrate some general points about support to caregivers which needs attention.

What helps - and what doesn't? The first point is not a new one but still needs mentioning since much research fails to distinguish between different kinds of support. This is, that some support helps caregivers and some does not. The studies discussed provided evidence of both kinds.

On the more negative side, it is clear that not all social contact with family members and friends helps to support carers. For example, other family members may impede caregivers' sense of control, and be a source of stress or conflict [9]. Financial support may also not directly support

caregivers. There are many ways (both formal and informal) in which financial support can be made available either directly to caregivers or to elderly people to help support their caregivers; and it is important to remember that both the scale and the mode of delivery may well affect the outcome. Thus examination of an Austrian scheme of State financial allowances paid directly to disabled or impaired people [10] presented mixed evidence about how the extra financial resources supported carers. Though a relatively high proportion of the carers questioned (25%) said that the allowance had made it possible for them to give up or cut down on employment, it made no difference to the proportion of elderly people entering long-term institutional care (and many elderly people did not even use the allowance for care or support). This is therefore a clear case where more research is needed.

On the positive side the symposium confirmed the beneficial nature of some aspects of the various types of support (leaving to one side the meaning of the term `beneficial'). For example, preparation for future caregiving - which up to now has received little research attention - can help to reduce stress or to maintain long-term physical or mental health [3]. At the pre-caring stage or later, information on the services available, on symptoms, on what to expect, etc., can empower caregivers or increase their sense of control and lessen their sense of burden [11].

We therefore need to know more about the relative merits of different forms of support, and about the different ways in which they are, or can be, provided. In particular it is important to include aspects of support which so far have received relatively little attention.

Consider the social context. It is very important to consider the social context within which both the caregiving and the support occurs, not merely whether it occurs. For example, people may have many other identities apart from that of caregiver (or indeed care receiver); support which helps them in performing their other roles, or in balancing their various roles, may be just as important to their ability to go on caregiving as direct support for the latter [11]. Indeed it may be for some people that, with such support, they may not even have to consider `carer' as a predominant role, and this may help them to go on caring. The way in which people use support facilities will be influenced not only by the care situation itself but also by other aspects of their lives which may even be remote from care giving or receiving.

The processual nature of caregiving (and receiving) is also important. For example, it has been found that people with similar experiences are particularly helpful to carers in the early stages of caring, but less so as familiarity and expertise in the role grows [9].

Be imaginative. It is important to consider more imaginatively and informatively the way in which the different kinds of support may be provided or the sources of that help. For example, the role of the care recipients in providing support has received less attention than it warrants. Thus, at the preparation stage, "care receivers' willingness to engage in discussion of future care is a crucial factor in support of the caregiver." [3]

Consider the broader picture. It is important to consider what we mean when we talk about support which `helps' or `does not help'. Many measures of course exist: carer burden, stress, physical and mental health, willingness to go on caring; but it is also important to remember the wider aspects of people's lives which may be affected by caregiving such as marital satisfaction, satisfaction with other relationships or with their general sense of meaning and purpose in life. We need to understand and more fully explore people's own perceptions of support; support is whatever people themselves see as supportive.

Conclusion

Within the field of research on support there is a need for conceptual refinement and redefinition. Stale dichotomies such as that between instrumental and emotional support are very crude and may not reflect people's own perceptions of what helps and what does not.

Apart from conceptual inadequacies there are also gaps in our knowledge of caregiving. For example, there are few longitudinal studies examining how caring and support change over time

and how they affect, and are affected by, changes in other aspects of carers' lives, such as their own or the care-recipient's social networks. Such a longitudinal perspective could also usefully approach the topic as a life-span issue, not merely as one which affects people as they reach middle or late age [12].

Another gap in our knowledge is that we know comparatively little about the complexity of support (whether within the life-span or as it relates to caring for an elderly person). There is a good deal of research on specific aspects of support but not on the interrelation between, say, support services and support networks, or services which give respite compared with services which give emotional help.

However the role of caregiver is perceived people usually have other identities - within the family or in the workplace - which need studying in combination with research on caring. Caregiving is a very important topic but it must not be studied in isolation from other equally important areas of people's lives, or in isolation from the perspectives of others, such as care receivers.

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Biology and Genetics of Human Longevity

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Abstract. Human longevity is a multifactorial trait, which includes a network of genes combined with strong environmental factors. Biological and clinical characteristics of human beings are the result of the interaction between genes and the environment. Until about 1950 centenarians were quite rare in low-mortality countries. Since then the number has more than doubled every 10 years and even the number of 105+ year old people is now increasing. This proliferation of centenarians is mainly a result of the decrease in oldest-old mortality and probably due to changes of lifestyle and health care. Although studies of Danish twin pairs seem to indicate that genetic influence on human lifespan is only moderate, several gene loci contribute to longevity. Data are evident from the Italian Centenarian Study for apoproteinB, tyrosine hydroxylase and mitochondrial DNA loci among others studied (superoxide dismutases, ie. SOD1 and SOD2, poly(ADP-ribose)polymerase and thyroid peroxidase). The data from the Danish Centenarian Study confirm the findings from the studies of French and Finnish centenarians on apolipoprotein E genotype with a higher frequency of epsilon-2 and lower frequency of epsilon-4. However, the apoE genotype seems not to be a key determinant of exceptional longevity: in 105+ year olds the epsilon-4 allele was found in 4 out of 19 persons.

Italian centanarians have a paradoxically marked hypercoagulability as demonstrated also by genetic markers. Also the von Willebrand factor was increased independently of the blood group. Studies on such atherosclerosis risk factors as lipoprotein(a) and homocysteine revealed that these two parameters may be high in Italian centenarians, but their genetic control possibly attenuates with age, and environmental factors may play a major role in the oldest-old persons. Also interaction among genes is possible. All these studies suggest that longevity is a phoenomenon depending on multiple genetic and environmental factors. Further studies are needed for a better understanding of the complex interactions which allow people to reach a very old age.

The Proliferation of Centenarians

Until about 1950 centenarians were quite rare. The prevalence of centenarians in Denmark was only 1-2 per million in the last half of the 1800s [1]. The number of reported centenarians before 1850 was most plausibly due to age-exaggeration. It is possible that there were no true centenarians prior to 1800 [2]. In the first half of the 1900s their numbers grew only slowly. Then for cohorts born after 1860 the probability of becoming a centenarian increased substantially. Since 1950 their numbers have more than doubled every 10 years in low-mortality countries, resulting in a prevalence of about 80 per million in 1995 in Denmark [3].

The main proportion of the rate of growth is due to a decrease in oldest-old mortality. Today centenarians also live longer, approximately two years on average. As a result, the number of centenarians reaching age 105 in the Nordic countries has increased since 1970. Mainly non-genetic and probably period effects, like changes in lifestyle and health care, have therefore created a new generation. The average life span has been increasing as a result of non-genetic

factors, but variation in life span within a cohort is influenced by genetics factors. Danish twin studies have estimated the heritability of human life span as approximately. 25%.

The Heritabilty of Lifespan

A study was performed in order to explore the nature (ie. additive versus non-additive) and magnitude (ie. heritability) of genetic influences on inter-individual variation in human lifespan and, furthermore, to evaluate how these genetic influences on lifespan are mediated, specifically to what extent they are mediated through genetic influences on smoking behavior and obesity [4]. Both of these factors have a substantial genetic component and in addition both have a major influence on mortality.

The studies were based on two different subsamples of the Danish Twin Register [5]. The univariate study of lifespan comprised all like-sexed twin pairs born in Denmark in the period 1870-1900, yielding a total of 2,872 pairs. By 1994 all but 0.6% had died, making the sample almost non-censored. The multivariate study was based on a 28-year follow-up of a sample of 1,232 Danish twin pairs born 1890-1920 who answered a questionnaire in 1966. Proportions of covariance due to genetic and environmental factors in common and unique to the three traits were estimated from variance-covariance matrices using the structural equation model approach. Genetic influences on human lifespan were only moderate. The heritability was estimated to be 0.25, slightly higher for males than for females, but constant over birth-cohorts, with genetic factors being non-additive due to gene interaction within loci. Only a small and non-significant fraction (5-9%) of the genetic influences on lifespan was mediated through genetic influences on smoking and obesity.

The Genetics of Longevity

Some possible candidate genes. Other studies of Italian centenarians suggested that human longevity is a multifactorial trait [6]. The hypothesis is that several genes acting as part of a network interact with a strong environmental influence. Therefore their individual contribution is expected to be low. We reasoned that candidate genes for longevity should be involved in pathways responsible for soma integrity, such as the network of cellular defence mechanisms whose efficiency is crucial to repair the continuous damages due to internal and internal agents (genes involved in free radical homeostasis, heat shock proteins, DNA repair, apoptosis) or should play important roles in metabolic pathways (lipid homeostasis, neurotransmitter synthesis).

To test this hypothesis, 200 centenarians and 300 younger people, ranging from 20 to 60 years, were genotyped for polymorphisms located within or close to the following genes: superoxide dismutases (SOD1 and SOD2), mitochondrial DNA haplotypes (mtDNA), poly(ADP-ribose)polymerase (PARP), apolipoprotein B (ApoB) [7], tyrosine hydroxylase (TH) and thyroid peroxydase (TPO). Allelic and genotypic frequency distributions were analysed. ApoB, TH, mtDNA loci showed significant differences when centenarians and younger people were compared. Differences between centenarians of northern and southern Italy were also found at the TH locus.

Our data are in line with the assumption that several loci contribute to longevity. In addition, given that our analysis is performed on the same group of subjects, we expect to obtain data on possible interactions among these genes.

Apolipoprotein E gene and exceptional longevity. Previous studies of French and Finnish centenarians indicate differential mortality among apolipoprotein E (apoE) genotypes at older ages [8]. We have determined the apoE genotypes in 146 out of 207 Danes who were examined just after their 100 year birthday, and in 19 out of the 24 Danes who were 105 years old or older. They were compared with the frequency in a sample of 466 Danes aged 40. The data support the findings from the French and the Finnish centenarians showing a higher frequency of the epsilon-2 allele among Danish centenarians (11.3% at age 100 and 10.5% at age 105+ vs. 8.5% at age 40) and a much lower frequency of the epsilon-4 allele (7.2% at age 100 and 10.5% at age 105+

vs. 17.4% at age 40). However, the data do not support the hypothesis that apoE genotype is a key determinant of exceptional longevity.

As only about 5% of 100 year old Danes survive five years, the frequency of the epsilon-4 allele could be expected to be even lower and the epsilon-2 allele even higher in Danes older than 100 and in those extraordinary people older than 105 years. In fact the opposite was observed and 4 of the 105+ year olds carried the epsilon-4 allele. Although there were no epsilon-4/epsilon-4 genotypes among the 105+ year old Danes, one 100 year old Dane carried the epsilon/epsilon-4 genotypes.

Some Biological Markers and Paradoxes

Studies on haemostasis. Subjects with blood type O have lower concentration of von Willebrand factor (vWF) than those with blood group non-O. Since we recently observed that laboratory signs of marked hypercoagulability and some corresponding genetic marker are compatible with health and longevity in Italian centenarians [9-11], we determined vWF:Ag and blood groups to see if levels of this marker of endothelial damage were altered. We also performed multimeric analysis of vWF. We studied 74 (age range100 to 107 yrs; 18 M and 56 F) and 110 controls (aged from 21 to 86 yrs; 49 M and 61 F).

The levels of vWF:Ag in centenarians were significantly higher than in the controls. No significant difference was observed between vWF:Ag levels in centenarians with blood group O or non-O: 245 (215-279) vs. 285 (251-325) U/dL. The controls with blood group O have lower levels of vWF:Ag than those with blood group non-O: younger controls 77 (67-91) vs. 115 (100-132) U/dL p= 0.0006; older controls 99 (84-117) vs. 152 (133-174) U/dL p= 0.0001. In half of the centenarians there was a reduction in the relative proportion of high molecular weight multimers, calculated by scanning the autoradiographs with a densitometer. Thus, vWF, an independent predictor of atherothrombotic disease, was increased in centenarians, independently of the blood group, confirming the previous results of a paradoxical state of hypercoagulability in healthy centenarians.

Studies on lipoproteins and proinflammatory cytokines. Lp(a) levels, lipoprotein profile, and proinflammatory cytokines (IL-6, TNF-alfa) were measured in 75 centenarians and in control subjects of different ages [12]. The most unexpected findings were:

- 25% of healthy centenarians had Lp(a) > 30 mg/dl ;
- only the centenarians with high Lp(a) levels showed increased values of proinflammatory cytokine IL- 6;
- total and LDL cholesterol levels in centenarians were similar to young controls, but significantly lower than in elderly controls, while HDL cholesterol was lower and triglycerides were higher than in young subjects.

We suggest that genetic control of Lp(a) may attenuate with age and that environmental factors (chronic subclinical inflammatory processes?) may play a major role in determining the blood levels of Lp(a) in the oldest old.

Study on homocysteine. Homocysteine, vitamin B12 and folic acid levels were determined in 47 centenarians. Mean homocysteine levels were 23.5 ± 14.7 micron mol/L vs. 14.6 ± 3.5 in elderly controls, medium grade hyperhomocysteinemia (>30 micron mol/l) was observed in 10 subjects (21.2%); two of these presented macrocytic anemia with low vitamin B12 values, while two showed severe folate deficiency. Homocysteine values were significantly correlated with folates ($r = -0.395$, $p = 0.027$) but not with vitamin B12, while the significant correlation with creatinine observed in other case reports was confirmed ($r = 0.383$, $p = 0.008$). These results suggest that mild hyperhomocysteinemia in very old people may be linked to nutritional deficiencies present in later life, so the impact of this factor on vascular risk may be less pronounced than in younger individuals.

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Symposium on Work, Retirement and Wealth: Current Data and Future Needs: an International Perspective

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Abstract. This symposium brought together a unique set of scholars who are both actively involved in ageing research and in the creation of the new generation of multiperiod social science-based longitudinal datasets for research. The symposium provided a description of the new data and examples of its use with respect to the work, retirement and wealth of older persons. The datasets discussed included: the US Health and Retirement Study, the Netherlands Household Panel Study, the German Socioeconomic Panel, the US Panel Study of Income Dynamics, and several East and Southeast Asian datasets.

Sophisticated multi-period data sets are necessary to understand how socio-economic factors and health influence the decision to leave the labour force, and how this decision impacts on economic well-being. Such data allow researchers to trace a cohort of people through a period of full-time work into full-time retirement, as well as to monitor the activities of those who continue to work beyond the normal retirement age. This symposium brought together a unique set of scholars who are both actively involved in ageing research and in the creation of the new generation of multi-period social science-based longitudinal data sets for such research.

US Research

F. Thomas Juster, the principal investigator of the US Health and Retirement Study (HRS) project, described these data and provided examples of their value in ageing research. The HRS has interviewed a cohort of men and women aged 51 to 61 in 1992 and their household members every other year since 1992. In 1997, three waves of these data were available to all researchers via the Internet. The first wave contained information on approximately 12,000 respondents from 7,700 households. The data include an oversample of blacks and Hispanics. HRS question groups parallel the major thrusts of the new economics and demography of ageing literature: labour force participation and pensions; health conditions and health status; family structure; and economic status. Juster argued that what made the HRS a success was that its design was a multi-disciplinary effort and that its content was determined by its end users (researchers), not by a statistical agency. Decisions about content were model-driven. In a series of tables, Juster provided evidence of the detailed information HRS contains on both wealth and health. He showed a strong correlation between the health and wealth of households and suggested that the HRS will be critical in more fully understanding the relationship between these two key variables.

Dutch and US Cross-National Study

Jules Theeuwes, the principal investigator of the Dutch Household Panel Study (CERRA) project, described these data and provided examples of their value in a cross-national context using data both from CERRA and HRS.

CERRA is a representative sample of the older working age population of the Netherlands in 1993. The first wave of CERRA was conducted in October 1993 and consists of a primary sample of 3,581 households with a head aged 53 to 63, and a secondary sample of 1,145 households with a head aged 43 to 53. The total number of respondents in the primary sample is 4,726, with 2,013 respondents in the secondary sample. The second wave of CERRA was conducted in October 1995 and the total number of respondents re-interviewed was 3,461.

In structure and content the CERRA panel resembles the HRS. The first wave of the panel consists of a household section covering age, sex, nationality, family composition, education, etc.; a labour market section covering job characteristics, earnings, benefit levels, job search behaviour, early retirement, etc.; a health section with self-evaluations of health, epidemiology, health care, use of health care facilities; a housing and housing mobility section; and a financial section covering wealth and debt.

The first wave of data is available for academic researchers through the Steinmetz Archives in Amsterdam. An English language version of the first wave household questionnaire is available from Theeuwes.

Table 1 from [1] demonstrates the power of CERRA and HRS for cross-national research. It shows that while employment rates are similar in the two countries for men aged 51 through 53, they diverge dramatically thereafter. By age 61 only 16.8 percent of Dutch men are still employed while 65.9 percent of US men are working at that age. In the Netherlands, men are much more likely to receive a disability transfer or employer pension benefit between the ages of 51 through 61 than is the case in the US. Hence, `pre-retirement' ages in the US are the same as prime retirement ages in the Netherlands. Theeuwes argued that differences in institutional arrangements - a generous disability system and mandated employer pensions in the Netherlands - rather than differences in health status are most responsible for the differences observed in Table 1.

Table 1.
Prevalence of work and transfer benefits for men by age in the Netherlands and the United States

Age	United States				The Netherlands			
	Workinga	Not Working			Workinga	Not Working		
		Disability Transfersb	Employer Pensionc	Otherd		Disability Transfersb	Employer Pensionc	Otherd
51	82.6	4.1	0.9	12.4	83.3	13.7	0.0	3.0
52	84.9	3.0	2.4	9.9	87.5	8.1	1.9	2.5
53	82.8	3.5	0.5	13.2	81.9	14.1	1.7	2.3
54	84.6	2.9	2.7	9.8	74.6	17.2	1.9	6.2
55	78.5	4.5	1.8	15.3	72.2	16.7	3.5	7.5
56	76.9	5.0	6.3	11.8	59.0	23.9	10.2	6.8
57	80.3	4.6	7.0	8.0	58.7	17.4	15.6	8.3
58	71.5	7.5	9.2	12.0	49.0	25.0	19.0	7.0
59	68.9	6.5	9.3	15.3	44.1	23.2	27.5	5.2
60	67.9	6.1	12.6	13.3	20.9	33.3	42.3	3.5
61	65.9	5.6	16.0	12.5	16.8	26.9	50.5	5.8

aThose who are working at the time of the interview: 1993 in the Netherlands and 1992 in the US.

bThose who are not working and are receiving disability transfers at the time of the interview.

cThose who are not working or receiving disability transfers but who are receiving private pension benefits at the time of interview.

dThose who are not working and receiving neither disability transfers nor private pension benefits at the time of interview.

Source: Data from the Netherlands are weighted values of the 1993 Wave 1 CERRA Household Survey. Data from the US are weighted values of the 1992 Wave 1 Gamma Release of the Health and Retirement Survey.

German and US Cross-National Study

Gert G. Wagner, the principal investigator of the German Socio-Economic Panel (GSOEP) project, and Richard V. Burkhauser, the principal investigator of the German Socio-Economic Panel - US Panel Study of Income Dynamics (GSOEP-PSID) Equivalent File project, described these data sets and their value for cross-national studies of older people. The GSOEP is a nationally representative panel study of households and individuals in the Federal Republic of Germany. The first wave of the panel was conducted in 1984 and consisted of 5,969 households. Of these, 4,554 were headed either by a German or by someone not of a nationality represented in the oversample of guest workers. The remaining 1,415 households make up the oversample of guest worker households, that is, households with a Turkish, Greek, Yugoslavian, Spanish or Italian head. The original household sample contained 16,205 individuals. Data are collected annually.

In 1990 the GSOEP added a subsample of 2,179 Germans living in the formerly communist eastern states. In 1996 the GSOEP added a subsample of immigrant households in which at least one household member had moved to Germany since 1984. In 1997, 12 waves of the GSOEP data were available (1984-1995) including the first six waves of the eastern states.

The GSOEP is similar in design to the PSID. The core content includes variables that are asked virtually every year of the survey. There are two questionnaires. The household questionnaire includes information on household income, transfer income, assets and neighbourhood housing quality. The individual questionnaire includes information on education, employment, income, taxes and satisfaction with life and health. Topical modules covered in the first ten years include: biographical information, marital and family history, family background, wealth, time use, social services, social security and retirement.

Like the PSID, the GSOEP was not intended to be primarily an ageing data set. While the bulk of the sample is concentrated under age 55, some 3,440 individuals in the reunited Germany sample were aged 55 and over in 1992. Over the next decade a very large group (2,231) will move into that age range.

In 1991 Syracuse University, in collaboration with the German Institute for Economic Research (DIW), began to translate all documentation into English and to prepare an English Language Public Use File package for use outside Germany. These data are available for academic researchers through Syracuse University.

The PSID-GSOEP Equivalent File (1980-1994) develops equivalently defined variables from the PSID and GSOEP data sets based on the work of experienced cross-national researchers who have developed comparable variables for their own analysis. The data file currently contains data from 1983 to 1990 on over 25,000 Americans and 17,000 Germans. Future waves of the data will be incorporated into new waves of the Equivalent File.

The PSID and GSOEP collect similar annual information on family composition, income, employment, housing and demographic characteristics. The Equivalent File has developed comparable data from both data sets, including personal and demographic (age, gender, race, marital status, education, disability status), employment, and household income information and its component parts. Also included are household equivalence scales, cross-sectional and longitudinal sample weights, and macroeconomic indicators for both countries. These data are also available through Syracuse University.

As evidence of the power of the GSOEP and PSID data sets for cross-sectional research, Burkhauser presented tables from a paper co-authored with Crews to show that a longitudinal view of older people in the US and Germany yields a more dismal view of how their economic well-being changed over the growth years of the 1980s than does a cross-sectional view.

Asian Research

Albert I. Hermalin, the principal investigator of a research program on population ageing in several East and Southeast Asian countries, presented an overview of the current state of data development and research in these regions. Many countries in this part of the world have been in the forefront among developing and newly-industrialised nations in anticipating the consequences of population ageing, with a large volume of conferences, research projects, books and papers emerging since the early 1980s. He noted that because it has been traditional for older parents in these regions to live with one or more married children in extended or joint households, the major research emphasis to-date has been how sensitive these arrangements are to the smaller family sizes resulting from lower fertility and the rapid ongoing social and economic developments. Less attention has been paid to the topics of work, wealth and retirement as they have been studied in the West. Hermalin briefly described several studies that do address these issues. Using data from a number of East and Southeast Asian countries, he described the distribution of main sources of income of those 60 and over to illustrate the variation across the region and potential directions of change. In Japan and urban China, pensions are the main source, while support from children still dominates in Singapore, Thailand, Taiwan and South Korea, and earnings from work are apparently most important in the Philippines.

Conclusion

The consensus of the symposium summed up by James P. Smith was that the new longitudinal data sets described here are of significantly higher quality than past data sets used by ageing researchers, and that further investment by governments in HRS-style data would yield badly needed information upon which to base policy decisions in countries that do not have such data collection projects underway.

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Exploring the Experience of Ageing: an Overview

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Abstract. This overview represented both psychological and sociological approaches to the study of the experience of ageing from four north western European nations. The psychological presentations emphasised the importance of developing reliable and valid assessment instruments of the way people integrate their various states of awareness. The use of sentence completion stems provided one method. Integrated stories were a further important way in which persons represented their lives, and needed to be studied in terms appropriate to the story. The sociological studies considered both theory making and different uses of the term `experience' in the gerontological literature. The hypotheses of an ageless self underlying an ageing body were disputed from the findings of a large survey. The last presentation emphasised the concept of

learning from experience, and the importance of precedence for gaining a sense of being `experienced'.

Our symposium set out to provide a multidisciplinary perspective on the study of the experience of ageing, and we succeeded in presenting at least a variety of psychological and sociological approaches to the subject. Therefore it is natural for two of us to present this overview, a sociologist together with a psychologist. That could be construed as shying away from attempting a proper integration of the subject. But the task of integrating psychological and sociological perspectives in areas in which they both have strong common interest (like the self and identity) is a difficult one. As gerontologists we need to address ourselves to greater interdisciplinary collaboration. But this is not made any easier in the current climate by research assessment exercises which so far have tended to emphasise, in the UK at least, disciplinary excellence at the expense of cross-disciplinary research.

Psychology and sociology have different strengths, and ideally they should enhance rather than detract from a common effort. Some of psychology's strengths were demonstrated in the first presentation of our symposium by Freya Dittmann-Kohli from the Department of Psychogerontology, University of Nijmegen, The Netherlands. She described the methods she had developed for assessing the experience and understanding of ageing, using sentence completion procedures. What was very evident was her concern with establishing the credentials of a solid instrument whose reliability and validity could be well established, and which made it feasible to imagine collecting data on large numbers. Her intention was to systematically collect data from representative samples, and as a result be able to draw reliable conclusions on diverse social groups and cultures. Solid inferences could then be made on the most frequent categories of thoughts and feelings about the positive and negative components of the ageing process. Individual variations could be interpreted against this background.

So far her research on German populations has shown that biological ageing is the focus of the negative correlates of becoming older. It includes loss of health and psychophysical and cognitive decline. Further research can explore the extent to which biological ageing is seen as controllable and can be compensated for by other factors. On the positive side later life is seen as freer, more self-determined, less demanding, leaving room for self-realisation and enough rest and room for being oneself. Dr Dittmann-Kohli stressed the practical value of this line of research. Knowledge and awareness promote control and change. We are not examining solely inevitable trends in the experience of ageing. Feedback of this knowledge to those becoming middle-aged and old is an important way to initiate self-development; to enlighten people about the possibilities for reconstructing their selves in later life. They can learn from the creative inventions of others.

Freya Dittmann-Kohli also gave explicit consideration to the way we should use the term 'experience'. It is a term which has a variety of uses. But for research purposes we need to be clear what we mean. Fundamental to Dr Dittmann-Kohli's approach is the importance given to the positive/ negative dimension of affective experiences. In this, her approach is consistent with some basic features of modern psychology, which emphasizes pleasure and pain centres in the brain, the nature of positive and negative reinforcement, and approach/avoidance behaviour. According to this view detailed analysis of the content of persons' statements about the positive and negative aspects of becoming older is the best possible way to represent the ordinary components of experience. Whereas we use the term awareness to refer to momentary states, the term experience implies the interpretation and integration of longer sequences of perceptions, feelings, thoughts and actions.

It was the integrative function of story-making about one's own life that was at the centre of the second presentation provided by Peter Coleman from the Departments of Geriatric Medicine and of Psychology at the University of Southampton, England. This took as its focus continuity in the experience of self when ageing, and drew on data from a longitudinal study in which the participants have been studied in detail over 20 years; have been asked to reflect on the answers they had previously given about attitudes to their own selves and lives; and commented on our own conclusions about the major themes in their present lives and their continuity over time.

Within the sample of survivors of this study over the age of 80 years, continuity in experience was more evident than discontinuity. Most took the term `story' with its implication of coherence and connecting threads to be a suitable descriptor of their lives. Within this story they expressed their continuing values and commitments. There was a smaller subgroup - particularly of women - who could not see their lives in terms of story but more as a series of events, associated with a lack of personal choice and control and lack of firm foundation in early childhood. For some of these, ageing was a positive experience, because it had allowed experience of control for the first time.

This study was carried out within a story model of identity, associated with the US personologist Dan McAdams [1]. It reflects the theory driven character of psychological research, which is another of its strengths. Stories are individual constructions which can be objectively studied, even though they are larger units of analysis than the ones typically employed by psychologists. As McAdams argues, such stories constitute human identities. Unlike most other constructs in personality psychology, such as personality traits, identities come in narrative form, fully contextualised in culture. Identities can be measured, but in ways that are appropriate for what they are, namely stories.

Older people's life stories can become or remain unsatisfactory in various ways. The connecting threads may be lost. They may never have been there in the first place. Also older people may interpret themselves into premature 'cul-de-sacs' in which nothing more can happen in their lives. In regard to all of these issues older people can be helped to find more satisfactory ways forward through various forms of reminiscence and life review activities. The making explicit of stories can be a healing activity in itself. Experience is malleable. Again this is a way of emphasising that this is an area of research with practical lessons. We are the authors of our lives. Reality poses limitations on what can be achieved. But in life, as in works of art, creativity depends on working well within the limitations of the material provided.

In the third paper Peter Oberg, from the Department of Sociology at Uppsala University, Sweden, described research that he had undertaken to test two hypotheses that have become popular in social gerontology. One is that older people think of themselves as ageless. The other is that older people think of their bodies as masking their real selves. The evidence from a survey of 2,002 Swedes aged 20 to 85 years does not support these hypotheses. With age, people do not increasingly think of themselves as younger than they are or as younger than they appear. There is no decline with age in the common view that our bodies reflect who we are.

His survey, however, does support the hypothesis that appearance is more important for women than for men - at all ages. But those who are least satisfied and who are least inclined to agree that their bodies reflect who they really are, are younger women. This reflects Freya Dittmann-Kohli's finding that few older women see loss of attractiveness as a problem. Echoing the work of Kathleen Woodward [2], Dr Oberg suggested that this reflects the impact of consumer culture which encourages younger women to be discontented with their bodies and which emphasizes the discrepancy between 'what you are' and 'what you could be if you tried hard enough'.

The concluding paper by Bill Bytheway from the Department of Sociology and Anthropology, University of Wales at Swansea, was less concerned with what people say about themselves and with what this tells us about the experience of ageing. Instead he focused on how people learn from experience and how this contributes to a sense of ageing. Dr Bytheway discussed evidence about the world of therapeutic practice - a world, of course, which often admits people as patients because of their age - and suggested that a sense of ageing develops as experience is accumulated of the same kinds of events, people, problems or whatever. He stressed the importance of precedence: each time practitioners recognize a problem as one that they have tackled before, their sense of being experienced and gaining further experience is sustained and enhanced. He also cited how the maintenance of a full curriculum vitae, demonstrating the extent of practical experience, might also contribute to a sense of ageing.

It seems appropriate to conclude this overview of the papers presented in the symposium `exploring the experience of aging' with a brief comment about the social world of the conference.

We are encouraged to think of this as a break from our real life wherever that happens to be. We are here, not as ageing persons, but as ageless gerontologists and, looking at the program and the abstracts, many of us are here to discuss what we do and what we might do for ageing people, older people, the aged, or whatever term we use to describe them; people who are experiencing and having to cope with the consequences of ageing.

But this social world - the world of the conference - is real and is part of the broader world of gerontology. We are all, in our many different ways, ageing within it. For example, we are talking here - in Adelaide in 1997 - about where we should meet in the year 2005! Some of us can look back over thirty years of participating in this world of social gerontology. Others, conversely, may be looking forward to thirty years. Whatever the case, a sense of age makes a difference. When we allude to our own age, we are inclined to make a joke of it, but it would be a mistake to suppose that there is nothing to learn from our own experience of ageing within this world. In the paper describing his fifteen-year longitudinal project, Peter Coleman provides ample evidence of how his own ageing has become intertwined with that of his subjects.

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Action on Elder Abuse: an Overview

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Abstract. The purpose of the symposium was to provide an international overview of the issues concerning action on elder abuse and neglect. Living longer is both an achievement and a considerable risk. It affects unprecedented opportunities, but it also presents personal and social challenges related to quality of life in old age. Essential questions were raised about dependency, autonomy, frailty and competence, and the controversial relationship between the elderly and those who care and sustain them in the community. Links between national findings and experiences, similarities and differences were discussed and possible ways forward were covered. Recognition of the dimension of what is a dominant societal jeopardy is still difficult and interventions do not always produce satisfactory outcomes. Awareness of the problem and early and planned actions are likely to be successful in limiting the impact of elder abuse.

Since first identified as a social problem twenty years ago, elder abuse has become a world-wide phenomenon.

The 1997 World Congress of Gerontology has given us the opportunity to highlight the issue. The number of contributions has far exceeded those of previous years and included the following: two roundtable discussions, one invited symposium, a keynote lecture, one free paper session with seven actual presentations and three posters.

Speaker's contributions represented North America (including Canada), the South American region, Europe and Oceania.

One of the roundtable sessions established the first international network of national and regional organizations. This is to be a means of promotion of awareness and knowledge of the problem, dissemination of information, education and training, promotion of research and assistance with the development of responses within individual countries.

The main goal of the International Network for Prevention of Elder Abuse is to increase society's ability, through international collaboration, to recognize and respond to the mistreatment of elder people in whatever settings it occurs, so that each individual can achieve an optimal quality of life in keeping with his or her cultural values and traditions.

The Congress has also been an opportunity to firmly place the issue of elder abuse on the agenda and to maximise exposure to international perspectives. This will continue to be effected through future meetings of gerontological societies, of forthcoming Pan-American and Regional Congresses of Gerontology and the 1999 United Nations Year of Older People.

All these events will be advertised through the International Network, whose first elected Chairman is Dr Rosalie Wolf, a US pioneer in the field. Vice-Chairman is Dr Lia S. Daichman from Argentina.

Links between national findings, and experiences, similarities and differences have been discussed and possible ways forward suggested.

Presentations from the UK (G. Bennett) and Canada (C. Patterson) discussed, within their national overviews, the awareness of general practitioners (primary care physicians) to the issue of elder abuse. Both groups obtained high response rates to questionnaires examining GPs' attitudes and knowledge as well as their education needs. In both studies, over 50% of GPs were aware of cases of abuse and a large majority of them requested education and training. The contrast in the UK of child abuse training (70%) with elder abuse training (16%) was fairly marked and pointed.

Education and training programs need to be developed at all levels for professionals in the fields of ageing, health care and adult protective services and for other service providers who work with the elderly. This also includes education for the general public and for seniors to enhance their capacity for the self help, mutual aid, advocacy, leadership and the individual right to self-determination.

Action on Elder Abuse, a UK charitable organisation, proposed a definition which was arrived at by a consensus: "Elder abuse is a single or repeated act or lack of appropriate action, occurring within any relationship where there is an expectation of trust, which causes harm or distress to an older person."

An Australian study [1] highlighted the important role dementia might play in the total understanding of a situation in which elder abuse occurs. In all three of the major Australian studies discussed, a significant proportion of victims and abusers suffered from some kind of dementia.

New Zealand put forward a combined presentation, made by government along with a non-governmental organisation (Age Concern New Zealand), concerning the development of an integrated response to elder abuse and neglect.

One new avenue of research into risk factors for elder abuse and mistreatment was reported by a Dutch team (H. Comijs et al.), who compared victims and non- victims with regard to different coping styles and hostility.

The National Center on Elder Abuse [2] reported on the state of its multicultural study of elders' perceptions about elder mistreatment. A preliminary analysis of the data showed that what would be perceived as abusive behaviour varied greatly from one ethnic group to another and from one culture to another.

Included in the study are African Americans, Hispanic Americans, American Indians, Japanese Americans, Korean Americans, Finns and Japanese.

It was apparent that the meaning of elder mistreatment as socially constructed in western societies may not be always applicable to the developing countries, which are grappling with meeting the needs of their ageing populations and other major social problems, as evidenced in reports from Brazil (L.M. Machado) and India.

By the year 2025, three-quarters of the elderly population will be in the developing world. Most of our elderly people are women, often in not very good health and quite vulnerable, as they are particularly poor and more likely than men to be on their own. Older women are disproportionately represented among the oldest old and the most disadvantaged, as they constitute the backbone of caregiving.

Traditional forms of support are being eroded by means of new demands by the modernisation process. Living longer is both an achievement and a considerable risk. It offers unprecedented opportunities for creative personal and social lives, but also presents individual and societal challenges related to quality of life in old age.

Whatever its future impact, geriatric care will be a proving ground for public policy and social consensus in our society. If care in the community becomes increasingly the norm, the ethical dimensions of this kind of caregiving would call for special attention. This kind of care would raise essential questions about dependency, autonomy, frailty and competence, and the controversial relationship between the elderly and those who care and sustain them in the community.

The development of appropriate responses must take account of the need for differences between elders who have different levels of competency. Interventions for elder abuse and neglect must include families, as well as formal and informal caregivers. For those individuals who do not have relatives, there may be a need for an advocate.

After twenty years and increased world-wide involvement, the causes and consequences of elder abuse are still uncertain and effectiveness of treatment and prevention efforts unknown. Awareness of the problem and early and planned actions are likely to be successful in limiting the impact of elder abuse. Collaboration, as well as private and public partnership, will be the key to an effective prevention policy as the year 2000 approaches.

It is our commitment as gerontologists to go on working on this field during the forthcoming years, at national and regional levels, combining efforts with other international groups sharing similar interests, in the belief that this work will be an important factor in bettering the quality of life for the ageing population of the world.

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Gender and Health Issues in Ageing

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Abstract. There are pronounced gender differences relating to health and ageing, reflecting biological and social differences and transitions and adaption to these. The most obvious biological difference is that women have a finite length of reproductive functioning, the termination of which is marked by menopause. The menopausal life is characterised by increased cardiovascular and osteoporotic risk. Interventions for these disorders have not been adequately evaluated. Men live on average about seven years less than women in most developed countries. Women form the majority of carers. The most common cost of caring is social, a restriction in personal and leisure time, and is directly related to the amount of care provided. The negative health effects of caring are primarily psychological, not physical. Most of the widowed are women. An Australian study found that women widowed in the last 12 months had lower self-rated health and were more likely to report they were stressed about their health. Recently widowed women scored lower on all the subscales of the SF-36 and were also more likely to be taking medication for "nerves" and "medication to help you sleep". Women widowed longer than 12 months did not score significantly differently than married women on these parameters. Widowed women reported more difficulty managing on their income than did married women, regardless of the length of widowhood. Widows also reported more stress with children and other family members than did married women.

Introduction

There are pronounced gender differences relating to health and ageing, reflecting biological and social differences and transitions and adaptation to these. The most obvious biological difference is that women have a finite length of reproductive functioning, the termination of which is marked by menopause. Postmenopausal life is characterised by increased cardiovascular and osteoporotic risk. Men live on average about 7 years less than women in most developed countries.

Women form the majority of carers. Aged men are likely to be cared for by their ageing wives, but aged women are less likely to have a partner available to care for them when they are in ill-health. Most of the widowed are women. Older women living alone are more likely to be poor and anxiety over economic factors may add to grief and the effects of social isolation, to adversely affect wellbeing.

Although men and women suffer from the same categories of illness in later life the patterns of ill-health, the presentation, diagnosis and management may show pronounced gender differences. Men tend to have acute illnesses, followed by a relatively short period of ill health before death. Women tend to have a longer period of ill-health before death and this is characterised by the presence of multiple chronic non-life threatening impairments which can profoundly affect quality of life. Ageing and health occur in a social context characterised by more negative images for ageing women than for ageing men.

The Menopausal Transition

The menopause serves as a prominent biological marker for ageing in women and has been linked to a number of ill-health problems, both during the menopausal transition itself and in the years following final cessation of menstruation.

Population studies are examining the relationship of mood changes and sexual functioning to the menopausal transition and chronological ageing. Results to date indicate that mid-aged women are more likely to report positive moods than negative moods. Factors associated with negative moods include surgical menopause, prior depression, health status, menstrual problems, social and family stressors and negative attitudes to menopause [1]. The Melbourne Women's Midlife Health Project is a population based longitudinal study of 438 mid-aged Australian born women. Analyses of the first four years of data found that wellbeing is significantly lowered during the first two years after the final menstrual period and is affected by menopausal status rather than by chronological ageing. By two years postmenopause wellbeing shows significant spontaneous improvement [2].

Several studies suggest a decline in some aspects of sexual functioning associated with menopausal status. The relationship of sexual functioning to the menopausal transition and ageing were also examined using data from the Melbourne study. Cross-sectional analyses found that sexual interest was significantly adversely affected by menopausal status rather than ageing. Social factors and health status factors are also associated with decreased sexual interest which was reported by nearly one third of the sample [3]. Longitudinal analyses from the first five years of study confirmed that there was a significant decline in sexual interest related to menopausal hormonal change.

Postmenopause

Following the menopause, women become more vulnerable to cardiovascular disease and osteoporosis. These two disorders together with cancer account for the preponderance of death and disability in older women.

Hormone replacement therapy, a low fat dietary pattern, and calcium/vitamin D supplementation can potentially prevent or delay the onset of these diseases. Up to the present these interventions have not been adequately tested, and therefore public health recommendations could not be made with any degree of confidence. It should be noted that the lack of reliable evidence has not stopped various bodies from making recommendations about these therapies.

The Women's Health Initiative, funded by the National Institutes of Health, was designed to test under rigorous clinical trial conditions whether hormone replacement therapy will prevent coronary heart disease, whether a low fat dietary pattern will prevent breast cancer, and whether supplementation with calcium/vitamin D will prevent fractures in women age 50-79. Importantly,

the overall benefit and risk of each of these prevention treatments will be assessed. Recruitment commenced in the fall of 1993 and is scheduled to end in the spring of 1998, by which time the program will have enrolled 27,500 women in the hormone replacement trial, 48,000 in the dietary modification trial, 45,000 in the calcium/vitamin D trial, and 100,000 in the observational study. In all, over 165,000 women (of whom 20% will be minority women) will be enrolled in one or more components of the study at the 40 clinical centers across the US. Outcomes will be monitored annually by an independent Data and Safety Monitoring Board, and unless unexpectedly beneficial (or adverse) trends are discerned at an earlier date, it is anticipated that the results of the trials will be available following close-out of the study in the spring of 2005.

Caregiving

The long-term care of functionally disabled elders is predominantly informal, provided by family and friends. This care is extensive, quite stable and often of long duration [4,5] and has associated costs for the caregiver - health, social, and financial. Yet many caregivers, predominantly women, report few negative effects or costs of providing this care [6].

The Massachusetts Elder Health Project is a longitudinal study (1984-1996) of a population-based sample of older adults, focusing on those with functional disabilities and their caregiving arrangements, both informal and formal. Data from eight waves of interviews with both elders and their primary caregivers were used to identify negative effects (ie. costs) of care as well as their causes or correlates. The most common cost of caring is social, a restriction in personal and leisure time, and is directly related to the amount of care provided [6]. This social cost is most common for women, particularly daughters who reside with the care recipient. The negative health effects of caring are primarily psychological, not physical [Yates et al., unpublished data]. The caregiver's sense of overload and depression is related to problem behaviours associated with elder cognitive impairment and with the amount of care provided, although not with the elder's functional disability. These negative health effects of caregiving are mediated by the quality of the caregiver/recipient relationship and by the caregiver's sense of mastery [Yates et al., unpublished data,7,8]. Turning to the economic costs of care, few caregivers report financial outlays. However, the dollar value of their care far outweighs the cost of formal services used [9]. The vast majority of caregivers and recipients reported satisfaction with the care and confidence in its continuation [10]. Therefore, despite the costs of care, this informal care is likely to continue.

There has been little research about the role of ethnicity in women's experience of ageing or of the needs of older women whose native language is different from that of the country in which they live. Caregivers of Japanese-American elderly men with dementia and a comparison group of potential caregivers of elderly men with normal cognitive functioning were followed in a longitudinal study of dementia in a cohort in Honolulu, Hawaii. All of the demented and non-demented men were between the ages of 75 and 95, and two thirds of the caregivers and potential caregivers were over the age of 70. Almost all of the caregivers were female.

The caregiver and control groups were similar on demographic variables at baseline, including age and education and acculturation. However, the caregiver group was more depressed at baseline and throughout the two years of the study. The caregiver group also became significantly more dissatisfied with their perceived social support over the course of the study. The two groups were similar in emotional support. However, the caregiver group was more dissatisfied with tangible support over the two years of caregiving. Younger women were less dissatisfied with support than older women, although older women perceived less frequent support.

Widows

The current research picture of older women who are widows is limited by the general view that this new phase of life is one categorised only by loss and grief, combined with adverse physical and psychological effects. The findings presented were based on a sub-sample of 12,624

randomly chosen Australian women, aged between 70-74, who are participants in the Australian Longitudinal Study on Women's Health [Byles et al., unpublished data]. The interrelationship between the social, cultural and economic circumstances of widowhood was examined in order to determine the impact of the loss of a spouse on the quality of the health and wellbeing of this group of older Australian women. The study found that compared to married women, women widowed in the last 12 months had the lower self-rated health and were more likely to report they were stressed about their health. Recently widowed women scored lower on all the subscales of the SF-36 and were also more likely to be taking medication for "nerves" and "medication to help you sleep". Women widowed longer than 12 months did not score significantly differently than married women on these parameters. Widowed women reported more difficulty managing on their income than did married women, regardless of the length of widowhood. Widows also reported more stress with children and other family members than did married women.

Conclusion

These findings identify areas for the evaluation of interventions designed to reduce some of the difficulties of later life . Areas for intervention assessment should include the hormonal impact of the menopausal transition on mood and sexuality, and longer term effects on cardiovascular and osteoporotic risk as well as assisting those recently widowed, and carers who have to deal with problem behaviours associated with cognitive impairment or those with poorer relationships with the care recipient.

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Contributions of Longitudinal Studies to Epidemiology and Disease Prevention: an Overview

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Abstract. Longitudinal studies characterise changes with respect to initial levels and rates of changes. They help to identify transitions between normal ageing and disease; to identify persons at risk for age associated diseases and to plan interventions. The future usefulness of longitudinal studies will depend increasingly on the preservation of biological specimens.

Introduction

Nathan Shock, a founder of modern gerontology as well as the International Association of Gerontology, often commented, "...ageing is a very individual matter...". Shock's comment was based on results from longitudinal studies [1] showing that pathways for change are defined by variability in initial level and in rates of change. The heterogeneity of ageing poses a continuing challenge to most scientific characterisations of normal or usual and successful ageing [eg. 2]. Shock's observations relate to the goals of most longitudinal studies: to describe the heterogeneity of ageing; to detect early signs of disease and functional impairments; to understand the relationships among patterns of ageing; and to relate ageing to genetic and environmental factors. The present overview focuses on the first two of these goals.

Deeg [1] states that: "A study is...longitudinal when the same persons are observed...more often than two times and during a period long enough to enable the ascertainment of changes...." Deeg distinguishes longitudinal studies from follow up studies that have two measurements. Deeg's definition requires that there be longitudinal information about ageing prior to the outcome event [eg.3,4]. Follow up studies are often referred to as longitudinal, and many of the studies described in the symposia on longitudinal studies at this International Congress of Gerontology are in fact follow up studies. The present review includes some longitudinal studies that meet Deeg's definition as well as some follow up studies.

Longitudinal Data and Detection of Disease and Functional Decline

Pulmonary function and cardiac death. Pearson et al. [5] reported that the average rate of decline in FEV1 is similar across initial levels in healthy men and women. Tockman et al. [6] evaluated the hypothesis that an accelerated rate of decline in pulmonary function over a period of years would be an independent risk factor for cardiac death. An estimate of rate of change in pulmonary function was made for each of over 800 male participants in the Baltimore Longitudinal Study of Aging (BLSA) and the estimates were then used in a risk factor analysis. At the beginning of the time covered by the risk factor analysis, the men were free of known heart disease and free of pulmonary disease. The important finding was that the odds ratios for cardiac death increased with higher rates of decline in pulmonary function. These studies meet Deeg's definition of longitudinal studies.

Consistent blood pressure levels in childhood and development of adult heart disease. In Bogalusa, Mississippi, USA, blood pressure and other cardiovascular risk factors were measured in about 1,500 children who were 5-14 years of age and again 15 years later [7]. Most children retained the same relative positions in the distributions of blood pressure in young adulthood as in childhood. Over 18% of the 1500+ adults who were in the highest quintile of blood pressure as children developed essential hypertension as opposed to about 5% for those in the lower quintiles. A related study of multiple cardiovascular risk clustering showed that a risk factor cluster

based on the three measures combined had a higher correlation over an eight year period than any of the three alone [8]. Some but not all of these results were based on longitudinal studies as defined by Deeg. Similar descriptions of the developmental aspects of cardiovascular function have been reported from a significant study of childhood development in The Netherlands, the Amsterdam Growth Study [9].

Using Longitudinal Data as a Basis for Potential Interventions

Long-term changes in activity level and mortality. Higher levels of physical activity in everyday activities such as walking are associated with reduced mortality [eg. 10.11]. Paffenbarger et al. [12] studied long-term changes in levels of physical activity in relation to mortality. From responses to questionnaires regarding walking, stair climbing, sports play and recreational activities in 1962 or 1966 and again in 1977, caloric expenditures associated with the reported levels of activity were estimated. Survivorship curves to age 90 or to 1990 were constructed in groups representing decreases to increases in activity between the two questionnaire administrations. A systematic gradient from more to less mortality was found as activity levels increased over time. This research is an example of a follow-up study, but the average changes spanned about 15 years (1962-66 to 1977).

Effects of cognitive training on persons with long-term declines in cognitive test performance. A group of over 200 men and women in the Seattle Longitudinal Study [13,14] with an average age of 73 were classified as having reliably declined over 14 years (2 tests, 7 years apart) in either the inductive reasoning or the spatial orientation subtest of the Primary Mental Abilities Test. They were assigned either to training on the ability in which they had declined or randomly to one if they had declined on both or neither subtest. Those that declined in performance improved back to the level achieved 14 years earlier and those who remained stable in performance performed better after training on one of the tasks. The decline was defined by three measures spread over 14 years.

Modifiable risk factors for age-associated hearing loss. Nicotine and alcohol are known to produce temporary hearing loss in experimental studies in which these agents are used in high doses. Brant et al. [15] examined the effects on hearing thresholds [16, 17] of long term exposure to these agents as they are used in recreational drugs. Participants in the BLSA were assigned to subgroups according to the amount of alcohol and tobacco use they reported. Because high blood pressure may also contribute to age associated hearing loss systolic blood pressure was included in a risk factor analysis. The outcome was a hearing loss in the speech range. Neither alcohol or tobacco use was associated with hearing loss. High systolic blood pressure was a significant predictor of hearing loss in all of four age groups, including levels that were lower than the common clinical cut-off value of 140 mm hg. The number of observations preceding the event varied in this study.

Future Contributions of Longitudinal Studies

The writer's long-term experiences and knowledge about the BLSA, the US Department of Veterans' Affairs Normative Aging Study and the Longitudinal Aging Study of Amsterdam and a general knowledge about several others provide a basis for some predictions about future contributions of longitudinal studies.

Tissue use. A BLSA study of age related changes in prostate specific antigen (PSA) for early detection of prostate cancer [18-20] was possible only because, in addition to clinical information [21], blood serum samples had been taken and stored on all visits of all participants for 35 years. There have been several other requests for stored sera for other studies. In addition to sera, samples of whole blood, urine and, on subsets of participants, samples of saliva and fibroblast cell lines grown from skin samples are stored in the BLSA. All of these have proven to be of considerable value in longitudinal research. Plans for tissue storage should be part of the plan of every longitudinal study.

Genetic studies. In the BLSA, there is now a developing DNA bank using the blood cells collected during the participant's visit. The need for genetic material is rapidly increasing. Studies of genetic factors in dementia, adult onset diabetes, prostate cancer, benign prostatic hyperplasia, muscle mass, personality differences and pancreatic cancer are in place or in development, all initiated since 1991.

Autopsy studies. Autopsy is part of the BLSA procedure with over 400 BLSA participants having taken steps to maximise the likelihood that an autopsy will be performed on their bodies after death. In addition to the clinical autopsy, tissue from the brain and the prostate are saved. A project to preserve the temporal bones of deceased participants is in a planning stage.

Future Directions

The two major purposes of this paper were to describe the usefulness of longitudinal studies in early detection of age associated disease, and to show how longitudinal data can be used in intervention studies. The key to both applications is the ability to quantitatively model individual differences in the patterns of age-related changes in the variables being studied. The ability to study many parameters simultaneously tremendously increases the usefulness of any longitudinal study [eg. 22].

Future refinements of the usefulness of longitudinal studies will include a better characterisation of rates of change in transitions prior to the endpoint and `endpoints'. A critical feature of the research on the increase in PSA concerned the point where the rate of increase in serum PSA changes from linear to exponential [23]. It is this transition that is most useful for distinguishing between prostate cancer and benign prostatic hyperplasia (BPH). For the transition between ageing and disease, the example of rate of change in pulmonary function and cardiac death indicated that the overall estimate of the rate of change over a period of many years was necessary to make the distinction. In a study of age related changes in upper body strength, Metter et al. [24] showed that important transitions in the rate of change in loss of strength occurs in early adulthood and middle age. The authors argue that the relative importance of different mechanisms involved in strength loss are changing and the change in ageing rate reflects this fact. The point about this and other examples [eg. 4,25] is that the definition of when transitions in functioning occur over the adult life span provides important tools for applications of longitudinal information.

The concept of endpoint in the examples used in this report has been death or a morbid event as is common in epidemiological studies. More typically, the relationship between ageing and disease is one of health to disease and recovery or health to disease and adaptation to the limitations imposed by a chronic disease. Relating long term changes with age in physiological and behavioural systems in fact has helped us redefine some disease processes. The uniqueness of the experience of ageing and its consequences for different people is a central fact about ageing. The endpoints of a longitudinal study may be multifaceted. No single concept such as successful ageing is adequate to describe endpoints. Certainly the task of constructing a framework of endpoints that accommodates the heterogeneity of ageing is a major challenge for those who try to document the multiple paths of ageing. The major advance in recent years toward this goal is an ever-improving ability to describe individual differences in these pathways.

Acknowledgment

I am indebted to my colleagues who work with the Baltimore Longitudinal Study of Aging for many stimulating discussions on the use and usefulness of longitudinal studies of ageing, and especially Drs Larry Brant, Jeffrey Metter and Jay Pearson who have played leadership roles in developing the concepts described here. Dr Dorly Deeg, Director of the Longitudinal Aging Study of Amsterdam also has contributed much to my thinking about the uses and usefulness of longitudinal studies of ageing.

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Nursing Research Improving Practice: a Review

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Abstract. This paper offers a review of the papers presented during the Nursing Research Improving Practice symposium and a synopsis of the issues that arose from the discussion following the symposium. Some of these will have an impact on future directions for nursing research in aged care, and seem to be applicable world wide. The idea for the symposium came from the knowledge that there is an increasing need to articulate the research base for nursing practice, to explain what nurses do and to advance the discipline as a major contributor to health care delivery. Unfortunately the research-practice gap seems to be still alive and well in Australia and feedback from colleagues from other countries indicates they have the same problem.

Introduction

In Australia the education of nurses at both undergraduate and post-graduate levels in universities has increased the preparedness of graduates to both undertake research and to be research consumers. However, the application of new research findings to clinical practice appears to still have a time lag of some years. The symposium demonstrated that the same problem occurs in many countries. In some instances this delay may be due to the lack of publication of the research in ways that practitioners can easily access, the controversial nature of the findings precluding immediate adoption of the results, or the focus of the studies rendering them interesting but not easily applicable to practice.

Nursing is a practice-focused profession that requires research programs to be undertaken that will improve practice outcomes, offer alternative ways of improving the delivery of care, and that will build the knowledge base of the discipline.

Symposium Presentations

The six papers presented during the symposium all addressed care outcomes, were nursing focused and used different methodologies. The scope of practice-focused research described in the studies was clearly very wide and illustrated the need to adopt varying approaches and methods to address current care issues.

The first paper was delivered by Professor Mary Ann Matteson [1], who described the outcomes of a three year study designed to test the efficacy of using a theoretical model based on Piaget's cognitive developmental stages for consistent behavioural and environmental interventions for persons at all stages of Alzheimer's disease and related disorders in nursing home and special care units (SCU). The study used a quasi-experimental design with a treatment and control group and interventions designed to reduce the use of psychotropic medication and to moderate challenging behaviours. The effects of the interventions were measured by various tools and observation schedules.

This study clearly demonstrated that the interventions delivered changed the behavioural patterns toward positive outcomes and reduced the use of psychotropic medications in the treatment group compared to the control group.

The controlled trial has provided evidence that the individualised care plans based on Piaget's levels to implement behavioural interventions works and the new model of care that has resulted has been maintained by the staff in the treatment nursing home SCU. The staff have been offered considerable education and positive reinforcement to continue the new practices that make the difference in care. By matching the level of cognitive development with the competency of the person, the strategies for care can be tailored to meet the developmental needs of the person with dementia. The Linton Piaget Test was developed for the study to determine the Piaget levels of the older adults and the Nursing Home Behaviour Problem Scale was used to monitor behaviours. This study has many ramifications for developing models of care for the residential sector that is struggling with ways to improve the care outcomes for older people with dementia.

The second paper described the processes and strategies necessary to maintain medical care at home for elderly Japanese women living alone [2]. Associate Professor Hitomi Matsuda gave an insight into the relationships that develop between elderly women in the community and their community health nurse. The study used a grounded theory approach to reveal the elderly women are far more resourceful in managing their lives and taking charge of their role as dominant players in the relationship than previous studies have considered. The interviews conducted in the participants' homes indicated that the women allowed the nurse into their lives to gain a supportive basis for care that they could not obtain from anyone else. The women instructed the nurses in what they needed and over time the nurse and the recipient set the limitations for care that ensured self-esteem and dignity. A strategy named the `leading part' ensures the women are the main actors in the play and they cast the roles for others in their lives.

By understanding the role of the community health nurse and the cultural interpretation of this role by the older women, nurses can improve the manner in which care is delivered and challenge the stereotypical beliefs that older women are dependent and reliant on others for self-determination.

The third paper delivered by Professor Heather Gibb examined the effect of tai chi as part of a memory work program for dementia sufferers [3]. This study was a pilot to investigate the parameters of introducing a program combining tai chi movement with structured reminiscence for people with moderate dementia. The Multidimensional Observation Scale for Elderly People (MOSES) was used to assess changes in self-care, orientation, depressed and anxious mood, irritability and sociability. The second aim of the study was to determine the appropriateness of combining a structured memory program with tai chi with this population. The study group was ten attendees at a day care program attached to a nursing home. The sessions were conducted twice weekly over seven weeks. Qualitative data were collected via audiotape during focus group sessions.

The tai chi movements were gentle stepping and moving the arms and the body in a rhythmic breathing pattern. Reminiscence followed the tai chi work and took place in one group, pairs or small groups in quiet locations. Surprisingly the body movements of the tai chi were remembered by the group and they were often seen using the movements on their own after the group work. The results of the program were encouraging and the behavioural changes noted as positive with improved scores on the MOSES instrument for both orientation and sociability.

This pilot study requires a larger sample to gain stronger results, however, the study enabled the approach to reminiscence group work to be refined and a program of suitable tai chi exercises to be developed. This combined therapeutic program may provide a way to focus cognitive thought and act as a method whereby participants can easily see their achievements and hence feel happier within themselves.

Professor Rhonda Nay discussed the results of an action research approach to developing policy on sexual health for long-term care facilities [4]. This problem is one which cannot be easily dealt with in terms of written policy guidelines for staff, hence an action research approach was adopted to enable the processes of change to be guided by the participants themselves and therefore owned as relevant to their workplace. The data-gathering phase for the study is still in progress as there have been unexpected delays in accessing families to participate in the discussion.

So far residents have contributed rich data that can be thematically identified as defining sexuality, talking about sex, accepting it's over, feeling and acting sexual, lacking privacy and feeling powerless. The voices of the staff are heard as defining sexuality, lacking skills, lacking privacy, too old for sex, staff talking, supporting sexuality and accepting individuality. The voices of the family are still being collected but so far the themes are talking about guilt, worrying about parents, responding negatively, responding positively, letting go and lacking time. These themes require further analysis and refining before a draft policy can be offered to the staff for consideration. This will be widely circulated for comment from all participants and the facility management.

There is no doubt that sexuality is an issue in long term care and the research has provided some signposts for progressing the development of policy. Without guidelines the staff feel vulnerable and find themselves in a no-win situation when residents, families and management have differing ideas and expect different outcomes. The discussion generated by the study has created polarised views and the recognition that the issue is complex and needs to be addressed, and that with continued debate and goodwill the policy will be extremely useful for other facilities as they grapple with the issue.

The fifth paper was presented by Dr Jenny Abbey, who discussed the results of a study into palliative care in nursing homes with reference to residents with end stage dementia [5]. The

differences between palliation for cancer patients and end-stage care for people with dementia were highlighted.

The study was completed in South Australia in 1996 and demonstrated that nursing home residents with dementia are likely to have a less supported and more painful death than any other person in the population. Decisions that are required to be made about pain relief, getting people out of bed, turning when in bed, aggressive treatment of infection, feeding and wound management are made on the basis of routine care and staff workloads. There was a lack of knowledge about palliative care techniques found among both nursing and medical staff. There were also large discrepancies found between assessment of the distress levels of a resident by the visiting medical staff and attending nurses. Conflicts arose mainly about pain relief and the use of medications. Clearly there is much education to be done for staff in aged care facilities and further research into the staffing mix, care needs and care outcomes for these residents is urgently needed.

In the final paper of the symposium, Professor Astrid Norberg reported on a study into communication with people with severe dementia [6]. This study used hermeneutical phenomenology to provide the framework to examine the caring practices of caregivers through interviews, observations and video recordings of interactions between patients and carers. The six studies undertaken by researchers at the Department of Advanced Nursing at Umea University demonstrate there are carers with exceptional ability to understand people with severe dementia and also make themselves understood by the patients.

The major themes advanced by the studies are forming a theory of communication based on ingression, or turning in, rather than regression or going backwards; communion or deeper human contact expressed as non-verbal love, affect attunement, or shared affective state, filling in gaps, and disclosing competence. These themes are related and emphasise that emotional communication is primary, and that carers understand and affect people with severe dementia by means of affect attunement that creates a kind of communion with the patient and presupposes a process of dignity.

These studies are identifying the processes that occur in successful communication/interactions between carers and patients with severe dementia. The outcomes will lead to an invaluable insight into the world of relationships and provide a theoretical base to understand the nature of successful caring outcomes through the communication process.

Issues Raised

These six papers raise the following points for discussion.

The complex nature of nursing practice requires a variety of methodologies to address the problems and issues of concern. This is evident by the different approaches used by each presenter to deal with the question of the study. Nursing research requires both quantitative and qualitative approaches and, because of the complexity of human concerns, often multiple approaches in the one study are useful to triangulate data analysis.

Nursing research must be practice-focused and relevant to the issues of concern for the nurse to adopt in the workplace. Clinical trials, action for change, examination of new approaches and exploration of current practice are needed to improve care outcomes.

The current concerns of nurses who work in aged care centre around residential care, acute care and community based care and include the following.

Palliative care. The needs of terminally ill older people are of utmost importance as residential services become more hospice-like facilities with highly dependent residents and more complex decisions are made about quality of life. The care of such older people is supportive and the maintenance of a pain free existence is paramount. The skills of staff to deliver such care need to

be at a high level of clinical competence. Decisions should be able to be made without danger and ill-informed ethical confrontations avoided. Clinical nurse specialists can provide expert guidance for other staff and research needs to be undertaken to establish the differences in care outcomes when such staff are employed. Pain management strategies and nutrition management in palliative care require advanced level skill for satisfactory outcomes.

Dementia care. The most often raised issue in aged care nursing is the identification of appropriate strategies for understanding behaviour and providing a meaningful life for older people with dementia. There is a move away from the notion of controlling and managing behaviour towards generating an understanding of the person and his/her particular unique expression of the dementing process. Research that aids this quest is needed and dissemination of results to practitioners in ways that are useful for practice is required. Research into causation of behavioural symptoms and disease processes in the brain is obviously also needed, however, practitioners need help in day to day caring issues that are practice-focused and relevant to improving care outcomes quickly. The staff burnout and turnover in aged care facilities is high and the sector bears the highest work cover costs of any work area.

Workforce issues. High industrial insurance premiums are indicative of an industry that needs to examine its work practices. Research is needed to examine the skills required and the numbers of staff necessary to deliver high quality care in residential settings. Resolving work practice-related catastrophes by civil litigation and high insurance premiums seems to be a rather shortsighted approach. There is a need to provide data that clearly identify differences in care outcomes related to the skill mix of staff.

During this conference there have been several papers that have identified problems related to unskilled staff in care settings. In Sweden there are concerns regarding the 88% of medication being delivered by enrolled nurses. These nurses have one year of educational preparation and are undertaking most of the care management in practice. The delegation of medication tasks to these nurses has resulted in a problem of delegation and clinical decision making by registered nurses. Sixty percent of respondents to a survey of enrolled nurses and auxiliaries (n=234) considered that delegation generated a risk of malpractice [7].

Poor staffing levels and poor knowledge of pain management affect the delivery of pain management narcotics to residents by enrolled nurses in the US. Wound management is also an area requiring skilled assessment and management beyond the level of one year prepared practitioners. In aged care residential facilities in the US the staffing levels for a 120 bed facility on the morning shift are one director of nursing who is a registered nurse, two enrolled nurses who act as team leaders for 60 beds each and unskilled staff at a ratio of 1 to 10 or 12 residents. The care is poor, the staff turnover is high and the residents pay up to $3,000 per month for their care. The other shifts have fewer staff. Market economics have not closed this nursing home, nor has litigation, of which it has had two recent court cases for negligence of care, which were settled out of court [8]. Research into quality outcomes related to staffing is urgently needed.

Conclusion

In conclusion I have attempted to provide an overview of the varied research papers presented and the need to continue to publish and disseminate results for practitioners in easily accessible forms. The approaches to nursing research are as varied as the complexity of human care and the need to understand the nature of nursing work continues to be an urgent priority. Aged care nursing has its own practice issues, some of which I have raised as in need of urgent study.

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Biology of Ageing: a Review

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Abstract. We interpreted our finding that normal human and animal cells have a finite proliferative capacity to be the expression of ageing and longevity determination at the cell level. This finding implied the existence of a counting mechanism which, after a 35 year search, has now been found to be governed by diminished telomere length at each round of DNA replication. I suggest the name `replicometer' for this mechanism because replications are metered and not time, thus precluding calling this a clock or chronometer. Immortal abnormal cells, like cancer cells, can express the reverse transcriptase `telomerase' which maintains telomere length constant, thus providing immortality to this class of cells.

Background

It is, of course, presumptuous if not arrogant, to assume that anyone can provide a review of the biology of ageing in my assigned 1,500 words. Consequently, my intention is to give an overview of one narrow area of cell biology which is generating enormous excitement for two reasons - it is the first molecular counting mechanism discovered and it relates closely to both ageing and cancer.

This story has its historical roots in the discovery of cell culture techniques at the turn of this century. Until 1960, it was believed that cultured normal cells, given optimum environmental conditions, had an unlimited capacity to replicate and, by extrapolation, to function. Consequently, ageing was thought to have little to do with intracellular events and the research focus on determinants of ageing was extracellular events. In the early 1960s we overthrew this dogma after finding that normal cells do have a finite replicative capacity and we interpreted this phenomenon to be ageing at the cellular level [1,2,3].

This limit on cell replication and functional capacity, and our observation that cryogenically preserved cells `remember' at what population doubling level they were preserved [3], implied the existence of a putative counting mechanism. This counting mechanism has been sought for the last 35 years.

The Telomere Replicometer

Because cell mortality and immortality are inextricably linked to ageing and cancer, the importance of identifying the counter would be difficult to exaggerate.

The sought-after mechanism should not be called a clock or chronometer because these are devices that measure the passage of time. Because the replicative limit of normal cells is only indirectly related to the passage of time but directly related to the number of DNA replications, the putative mechanism should be more properly referred to as an event counter. A device that counts events is called a meter, which would justify the suggestion that the term `replicometer' be used to designate the putative molecular event counter.

In efforts to determine the location of the replicometer, early experiments, in which we fused the nuclei of old and young cultured cells to the enucleated cytoplasm of opposite aged cytoplasts, revealed that the replicometer was located in the nucleus [4,5].

But, more progress has been made in locating and describing the replicometer in the last five years than was made in the previous thirty years, thanks to a remarkable confluence of observations made in several diverse fields.

The recent observations of telomere shortening as normal cells divide, provides the first evidence for the putative replicometer. This, in combination with the discovery of the enzyme, telomerase has gone very far in explaining why most normal somatic cells have a finite capacity to replicate in vivo and in vitro and how immortal cancer cells might circumvent this inevitability.

Telomeres are structures found at the ends of linear chromosomes and consist of repetitive DNA sequences. Telomeres apparently prevent recombination and allow the attachment of chromosome ends to the nuclear envelope.

In the early 1970s it was observed that the properties of DNA polymerase prevent it from fully replicating the linear ends of DNA [6-8]. This has been called the `end-replication problem'. The problem is the inability of DNA polymerase to completely replicate the 3' end of linear duplex DNA. The puzzle has been solved by the discovery in the cells of all higher animal species that their telomeres contain repeats of the highly conserved sequence TTAGGG [9].

Many unicellular organisms and viruses have evolved a special mechanism to circumvent this problem. In these organisms, the chromosomes are circular, or the genome produces circular replicative intermediates that simply lack ends so that the problem encountered in linear chromosomes does not exist.

In 1971, Olovnikov suggested, on theoretical grounds, that a cell might become senescent through the loss of repetitive DNA sequences [6,7]. Watson also made a similar suggestion in 1972 [8]. However, the notion that repetitive copies of functional genes might govern, or trigger, the ageing process had been suggested earlier by Medvedev [10]. It was not until recently, however, that Olovnikov's remarkably insightful speculation was proven to be correct experimentally. For recent reviews of this rapidly developing field see [11-15].

In brief, it has been found that eukaryotic cells have evolved a novel solution to the end replication problem in which the specialised chromosome end structures, or telomeres, contain repetitive sequences, some of which are lost at each round of replication. The loss of these sequences, which lack the information contained in downstream genes, acts as a buffer protecting those genes from loss during each round of DNA replication.

The telomeres in human cells consist of thousands of repeats of the sequence TTAGGG. This sequence is remarkably conserved from primitive organisms like most invertebrates and in some trypanosomes and slime molds [16-18].

Harley et al. [19] observed that the mean telomere length decreased by 2 to 3 kilobase pairs (kbp) during the serial passage of several strains of normal human diploid fibroblasts. The decrease was found to be progressive and averaged 50 base pairs for each population doubling [20]. The telomere shortening seen in ageing normal human fibroblasts also occurs in vivo in skin epidermal cells [21], peripheral blood leukocytes and colon mucosa epithelia [22].

Allsopp et al. [22] have reported that after analysing the cultured normal fibroblasts from 31 human donors, aged 0 to 93 years, a striking correlation, valid over the entire age range, was found between replicative capacity and initial telomere length. Thus, cell strains with shorter telomeres underwent significantly fewer doublings than those with longer telomeres. The authors suggest that telomere length is a biomarker of somatic cell ageing in humans and that this is consistent with a causal role for telomere loss in ageing. They also reported that fibroblasts from Hutchinson-Gilford progeria donors had short telomeres consistent with their reduced division potential in vitro. Telomeres from sperm DNA did not decrease with donor age suggesting that a mechanism for maintaining telomere length such as telomerase expression, may be active in the germ line.

In a report by Vaziri et al. [23] studies are described in an effort to determine whether accelerated telomere loss is associated with the premature immunosenescence of lymphocytes in individuals with Down's syndrome (DS) and whether telomeric DNA is also lost during ageing of lymphocytes in vitro. Genomic DNA was isolated from peripheral blood lymphocytes of 140 individuals ranging in age from 0 to 107 years including 21 DS patients. The DS patients showed a significantly higher rate of telomere loss with donor age (133 +/- 15 bp/year) compared with age-matched controls (41 +/- 7.7 bp/year) suggesting that telomere loss may be a biomarker for premature immunosenescence in DS patients and that it may play a role in this process.

Telomere loss during ageing in vitro was calculated for lymphocytes from four normal individuals grown in culture for 10-30 population doublings. The rate of telomere loss was approximately 120 bp/population doubling comparable to that seen in other somatic cells. Also, telomere lengths of lymphocytes from centenarians and from older DS patients were similar to those of senescent lymphocytes in culture, which suggests that replicative senescence could partially account for ageing of the immune system in DS patients and in elderly individuals.

Telomeric shortening, which occurs in several classes of dividing normal somatic cells, may be the replicometer that determines the number of times that a normal cell is able to divide. Once a critical or threshold number of telomeric (TTAGGG)n repeats is reached, cells will then be unable to divide. An alternative explanation of how telomere shortening acts as a biological clock has been offered by Wright and Shay [24]. Their telomere positional effect explanation of cell senescence is based on a novel two-stage model.

Achieving Immortality

The essential remaining question in this fascinating story is this: How do the cells composing immortal populations avoid telomere shortening that, if it occurs, would lead to their demise?

The answer to this critical question originated in studies in Tetrahymena by Greider and Blackburn who discovered the ribonucleoprotein enzyme terminal transferase called telomerase [25]. They found that telomeres are synthesised de novo by telomerase, a ribonucleoprotein enzyme that extends the 3' end of telomeres and thus elongates them. This ribonucleoprotein complex contains a reverse transcriptase and RNA template for the synthesis of the repeated sequence [26]. Telomerase was later found to occur in extracts of immortal human cells [27,28] and in about 90% of all human tumors studied [15].

Unlike normal mortal cultured cell strains, immortal cultured abnormal cell lines that do not senesce, produce telomerase. Thus, the telomeres of immortal cells do not shorten with serial passage in vitro [19].

In recent years telomerase has also been found to be expressed in some classes of normal cells. These include fetal tissue, normal bone marrow stem cells, testes, peripheral blood lymphocytes, skin epidermis and intestinal crypt cells [For references, see 15]. All of these cells have high turnover rates or are in a continuously replicating pool of differentiating cells. It is important to note that the level of telomerase activity found in these normal cell populations is significantly less per cell than that found in cancer cell populations [15].

Ageing and Longevity Determination

I would like to suggest an alternative hypothesis for the role of telomeres in ageing. I propose that the shortening of telomeres in normal dividing cells is not an expression of ageing, but rather an expression of longevity determination. The distinction between longevity determination and ageing is significant.

Species survival depends on a sufficient number of members of that species living long enough to reproduce and raise progeny to independence. This fundamental premise leads to the belief that the best way to insure that this occurs is for natural selection to favor those animals having greater physiological capacity in vital organs. Greater, or redundant, physiological capacity increases the likelihood for animals of surviving long enough to achieve reproductive success, just as redundant vital systems in complex machines like space vehicles better insures that they will achieve their goals. Once animals achieve reproductive success, the excess physiological capacity, like that engineered into a space vehicle, allows each to continue beyond the vital goal. Further survival of the animal or the space craft is determined by the level of excess capacity present at the time the goal was reached [29].

Thus, the forces of natural selection diminish after animals achieve the age of reproductive success because survival beyond that event has diminished value for the survival of the species. Energy is better spent on guaranteeing reproductive success than it is for increasing individual longevity. Thus, after reproductive success the forces of natural selection do not favor increased longevity. However, after reproductive success an animal has the potential to survive for a period of time determined by the level of excess physiological capacity reached at sexual maturation [29].

Clearly, the events that occurred leading up to the survival of animals to reproductive success are determined genetically. Therefore, the survival of animals beyond that point is determined only indirectly by the genome. The state of survival beyond reproductive success can be regarded as a period of `coasting' or `free-wheeling'; that is, developmental processes have ended and the ability to maintain those systems declines. The length of this post reproductive period plus the time taken to reach sexual maturation can be viewed as the two components of an animal's longevity [29].

The crucial suggestion is that the events that occur after reproductive success that fail to maintain the system and increase the likelihood of dying are called age changes. That is, there is an increase in molecular disorder for which repair processes increasingly fail to correct. The second law of thermodynamics applies; that is, entropy increases.

It is because of these considerations that I propose that telomere shortening may be the molecular equivalent of longevity determination, not ageing, and that the increasing molecular disorder that is known to occur in normal cells as telomeres shorten is equivalent to age changes. As indicated earlier, hundreds of biological changes occur in normal cells as they age in vitro, representing increasing molecular disorder and all compromise the internal milieu that ultimately leads to loss of function. Thus, the number of population doublings that a normal cell is capable of

undergoing may be the in vitro demonstration of maximum potential longevity. The molecular disorders that herald the approaching loss of replicative capacity are age changes. When they occur in vivo, these age changes lead to an increase in vulnerability to disease or pathology which results in death well before maximum longevity is reached.

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Pain in the Elderly

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Abstract. Pain increases in prevalence from early adult years to approximately 60 years. Thereafter it seems likely that pain complaint reaches a plateau and may even decline in extreme old age. Pain in older people is demonstrably different to that experienced in younger adults, but if all the dimensions of the pain are recognized, it can be treated as effectively.

Introduction

A review of the medical literature quickly reveals an increasing number of publications focusing on the issue of pain in older people. Here only some of the more controversial similarities and differences between young and old in their experience of pain are discussed.

The major thesis is that pain in older people is demonstrably different to that experienced in young and middle-aged adults, but if all the different dimensions of the pain are recognized it can be treated as effectively. This view contrasts with that expressed in the past [1,2], where the similarities between young and old were emphasised as the reason for regarding treatment options as equal in application and outcome at all ages. However the underlying message has not changed; pain in older people who complain of it, and indeed in some who don't, must be acknowledged and can be treated.

Pain, of course, is a complex experience with sensory discriminative, affective motivational and cognitive interpretive domains [3]. At a minimum, the sensory description requires documentation of the site, severity, quality and timing of pain, as well as aggravating and relieving factors. The affective and cognitive domains require an equally time consuming evaluation in most cases. Clinical signs that need to be elicited beside those due to underlying diseases are changes in primary sensation, hyperalgesia, allodynia and hyperpathia. Once this has occurred the pain can usually be ascribed to one of three causal pathogenetic categories, namely nociceptor, neuropathic or psychologic, although the usual chronic pain patient has elements of all three types.

Epidemiology

Is pain common among older people? The population prevalence and characteristics of pain is extremely difficult to ascertain. Most studies cannot take into account many pain problems which

are common, seriously afflict the person involved, but which are so shortlived because of rapid resolution or high mortality, that they do not show up in cross-sectional prevalence studies. For example, the pain and suffering associated with fractures and cancer are usually not apparent in such studies. Even chronic conditions well known to increase with age, such as central post stroke pain [4] and postherpetic neuralgia [5] rarely feature because of their low incidence compared to the overwhelming frequency and chronicity of degenerative joint disease.

There are, however, several community based studies of pain prevalence which support the notion that pain increases in prevalence from the early adult years up to approximately 60 years of age [6]. Thereafter it seems likely that pain complaint reaches a plateau and may even decline in extreme old age [7]. This last data is supported by our own prevalence study in Melbourne, Australia, where 56% of a randomised sample of community dwelling older people between 65 and 95 had a pain complaint over the previous year which was persistent, bothersome or limited activities [8].

Studies of pain prevalence in institutional settings have largely been undertaken in North American nursing homes and independent but supervised living accommodation for the frail aged [9-13]. Although the methods of pain measurement are not always clear and vary between studies, all showed pain prevalence to be high, ranging between 70 and 83%, with severity reported between mild and severe. This notion of equivalent reports of pain in the community and institutionalized older people has not been examined by any large scale study that has used the same measures in both samples, It should also be noted that dementia, a common co-morbidity in institutions, may have reduced the frequency of pain report in this setting [12].

The Pain Experience

Is pain experienced by older people different? This question can be approached in both the clinic and the laboratory. One of the reasons for the decline in pain complaint after the age of 65 in the face of increasing morbidity from pain-associated diseases may be that sensory-discriminative, and possibly affective-motivational and cognitive-interpretive, pathways are less efficient in older people. Findings from laboratory based psychophysical studies have shown increased, decreased and unchanged thresholds for pain in older people. The studies all vary considerably in regard to the number and selection criteria for the subjects involved (especially with respect to age range), psychophysical measures and instructions, and the type and duration of noxious stimulus used.

However an apparent decline in thermal pain sensitivity appears to be present after the age of 60, and may be more apparent in the distal extremities. It may also be influenced by pre-existing pain states, as data from our laboratory suggest that pain clinic patients with osteoarthritis and postherpetic neuralgia also have elevated thermal pain thresholds of between 10 and 20% [7,14].

Nevertheless a word of caution is needed before these experimental results are over-interpreted. It is not the case that older people feel less pain when they report it in the experimental laboratory, rather it is the threshold for pain report that is elevated. Even if changes are seen with supra-threshold stimulation it does not mean that they occur right through the stimulus response relationship up to and including pain tolerance. Indeed, several studies have shown decreased tolerance to high intensity noxious stimuli with age, especially in men [15].

In summary, psychophysical investigations, some physiological studies, reports on procedural pain and age variations in disease presentation, all suggest alterations in pain perception with advancing age. These changes are likely to influence the clinical experience of pain, such that in the older person a report of even mild pain could represent major pathology. However, the clinical relevance of reduced pain report is still a subject of considerable debate [eg. 16] and more definitive studies on functional changes in nociceptive pathways are needed in order to fully resolve this issue.

Is clinical pain in older people different? Sorkin et al. [2] have argued that the differences appear less important than the similarities. Data from our own studies of 297 pain clinic patients ranging in age from 18 to over 90 years are consistent with this view. There was no apparent age related difference in pain by sensory or affective descriptors, or in depressed mood, although there were some differences in anxiety level, pain impact and coping style with age [17].

Despite the many similarities across the age range there appears to be a reluctance on the part of primary care physicians to refer older patients to multidisciplinary pain clinics [1,18]. This reluctance may arise from a perception that the pain is different (perhaps more manageable in primary care) or that pain clinics don't work for older patients (leaving aside the effects of ageism on patient and physician).

It is of interest to examine whether the phenomenology of the pain experience varies as a function of age. Recently Klapow et al. [19] have described three empirically derived groups based on the outcomes of pain, impact of pain and mood state. The three groups were described as `chronic pain syndrome' patients with high pain, functional impact and mood disturbance, `good pain control' patients with relatively low pain, functional impact and mood disturbance, and a group called `positive adaptors' with relatively high pain but low functional impact and mood disturbance.

We have recently undertaken a cluster analysis of similar data obtained from patients in our pain clinic for the elderly and a general pain clinic in Melbourne which treats fewer old patients. When the total sample was analysed, comprising individuals aged from 17-93 years of age, a four rather than three cluster solution became apparent. This included the 3 groups previously identified by Klapow et al. [19], as well as a `high impact' cluster that had emerged during the analysis of the oldest cohort. On the basis of these findings it would appear that at least one group of older patients present with a unique profile of clinical symptoms, and that this profile is not typically identified in young adult-middle aged chronic pain patients.

Management

It is essential to consider any age differences in the efficacy of treatment programs for chronic pain patients. Here the literature gives us some cause for optimism [20,21]. More than a dozen studies have reported a generally positive outcome for older people referred to multidisciplinary clinics [22]. Indeed, Puder [23] has reported an even better outcome for older people in cognitive-behavioural programs. It is important to note, however, that none of these studies have employed controlled outcome trials using appropriate and age-validated outcome measures. The outcomes for our fully assessed patients who successfully completed a program involving geriatric medical care, physiotherapy, as well as a cognitive-behavioural program, demonstrate that over 95% of patients can be considered to have improved by discharge if improvement in one of the three main parameters (pain, mood or activity) is considered a good outcome. This improvement has been shown to be maintained for at least 10 months in a follow up of one subgroup [24].

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Multi-Country Perspectives on Healthy Ageing: a Review

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Abstract. The invited symposium Multi-Country Perspectives in Healthy Ageing had two parts: Part I. Epidemiological Evidence of Healthy Ageing, presented in Honolulu; Part II. Epidemiological Implications for Healthy Ageing Policies, presented in Adelaide. The presentations in Honolulu highlighted the fact that routinely collected data are of greatest value (census data; demographics; health and social statistics) in comparing younger and older adult groups, contribute with data on selected mortality and enable international comparisons. Epidemiological data on health and function, lifestyles, living arrangements and use of services provide important sources of complementary information. These data help in designing and justifying special medicosocial services for older persons (eg. comprehensive geriatric assessments, hypertension clinics), and confirm the importance of environmental factors in the ageing process and the pay-off of preventive approaches later in life.

Introduction

The invited symposium Multi-Country Perspectives on Healthy Ageing had two parts: Part I: Epidemiological evidence of healthy ageing, presented in Honolulu; and Part II: Epidemiological implications for healthy ageing policies, presented in Adelaide.

The framework of the two events considered the input of epidemiological research, both biomedically and medico-socially oriented, which developed, collected and disseminated new knowledge on possible predictors of `successfully, healthy ageing'. It also considered evidence of ageing with diseases/disabilities in semi-dependence or dependence with corresponding poor quality of life, and evidence of ageing in poverty, inadequate housing and inadequate social environments.

Results of WHO-supported studies, and other multi-country cross-sectional and longitudinal studies on medico-social conditions of the elderly, made a considerable contribution to better understanding the common basic determinants of healthy ageing in the context of health and function, lifestyles, and physical, cultural and socioeconomic environments. Cohort studies have helped in understanding why current generations of persons aged 70 and over are healthier and more adaptable than same age cohorts ten and twenty years ago.

The policy part of the symposium considered how epidemiological knowledge has helped in the preparation of effective measures of health promotion, disease/disability prevention, early multisectoral intervention in critical situations, design of services for older persons, formulation of health and social policies and legislation for older persons, and in global planning of well-being of the elderly.

Part I: Epidemiological Evidence of Healthy Ageing

The discussions in Honolulu addressed four main questions:

- Q1: What was the impact of epidemiology of ageing on creating policies in healthy ageing?
- Q2: Which data, way of interpretation, and dissemination were most useful?
- Q3: What are the negative experiences and obsolete components in the epidemiology of ageing?
- Q4: What should the epidemiology of ageing strategies be in the 21st century, to become a recognized counterpart in healthy ageing policy making?

Summary of Discussion

Q1: Epidemiology has been, and still is, essential for better understanding manifestations of ageing separately from symptoms of diseases at ages when morbidity or polymorbidity become common. Although most epidemiological studies have not been primarily designed for purposes of policy making, epidemiological data are more and more used as background information.

Q2: Routinely collected data are of greatest value - census data, demography, health and social statistics in particular. They are necessary in comparing younger and older adult groups, contribute with data on selected mortality, and enable international comparisons. Data on health and function, lifestyles, living arrangements and use of services collected by epidemiologists, provide important sources of complementary information on medico-social conditions of older generations. Epidemiological data were found very useful in designing and justifying special medico-social and clinical services for older persons (comprehensive geriatric assessments and hypertension clinics are examples).

Q3: Data could be `hidden' or manipulated, ie. interpreted in preselected contexts, usually for political purposes. Information on routinely collected data is not always available. There continues to be an information gap in the field of disabilities. The available international classifications (ICD, ICIDH) are not utilised and revised; concepts and terminologies are obsolete. Physical environments are not assessed adequately to provide a full picture of an older person functioning in his/her own environment.

Q4: Epidemiology will more and more involve working with demography, statistics and families of international classifications. The epidemiological information will be more important for businesses and industries who wish to serve the growing populations of older persons in the 21st century, eg. gerotechnology and communication technology have potential in promoting healthy ageing. We know now, at the end of the 20th century, that:

- genetic influence on different conditions related to ageing decreases with advancing age, as environmental factors become more important;
- education level has an impact on healthy life expectancy;
- preventive approaches pay off later in life.

All these facts will be reflected in design of future epidemiological studies with the goal of contributing to the creation of modern healthy ageing policies.

Part II: Epidemiological Implications for Healthy Ageing Policies

Issues

Healthy ageing emerged as a concept in Adelaide, addressed by different disciplines, including the epidemiology of ageing. New knowledge created new strategies for healthy ageing, reflected in new policies. Determining policies, in more and more countries, has become a fiscal and political act, reacting to public and media pressures - and the elderly are generally a low priority. Following the developments after the UN World Assembly on Ageing (1982), healthy ageing policies, focusing on active ageing, ageing in good health, older people contributing to developmental processes and thus consuming less cure and care, became common in most countries. Healthy ageing policies have started looking more at practical proposals for interventions in health promotion in particular, and at cost benefit analysis and the functioning of health and social services.

Messages

- Health promotion remains the focus of healthy ageing policies. Health promotion strategies are those related to lifestyle - personal choices made in socioeconomic contexts that influence the health prospects.
- Preventive approaches have to be implemented at different periods of life span. Even small investments into health pay off later in life.
- Educational and community-based programs can address lifestyles and behaviours conducive to health in a crosscutting way. These should be strengthened in the future.
- Community support networks help older people to function independently in their own environments.
- Primary care providers can identify individuals at risk of losing independence, supply information and provide referral to available services, if adequately trained.
- The roles of physical and social environmental factors in maintaining independence of older persons have been underestimated. In the future, healthy ageing policies have to address issues of housing, transportation, pensions/income security.
- There is an enormous variety of healthy ageing policies at local, regional, national and international levels. In spite of the variety, there is a global consensus on the goal of healthy ageing policies: to maintain the wellbeing of older persons through maintaining their independence.
- `Healthy ageing' has become somewhat mystical. The concept has to be demystified and seen as a normal part of everyday life in everyday settings, and addressed as such. Healthy ageing policies have to be based on sound evidence of benefits of healthy lifestyles. The epidemiology of ageing provides the arguments.
- Some major international policy documents work with terminology and concepts 20 to 25 years old, which do not quite match the new developments and expectations of younger scientists, service providers, new cohorts of older persons and new technological developments.
- There was a strong plea from the UN side to strengthen the international aspects of ageing in the future and consider opportunities for dialogue on new healthy ageing policies and evaluation of effectiveness of such policies in different parts of the world.

Conclusions

It has become obvious that we need to change. We need to translate our knowledge and research findings into new strategies, changing healthy ageing policies, regulations and legislation. For this purpose, we need to define the outcomes we want to see. This time, the end of the 20th century and beginning of the 21st century and third millennium, is the time of new visions, new perspectives, new plans in healthy ageing. Our question is: are we prepared?

Positive Contributions of the Elderly to Society: a Multidisciplinary Perspective

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Abstract. The primary aim of this paper is to provide an overview and integration of the papers presented as part of an invited symposium titled, Positive Contributions of the Elderly to Society, at the 1997 World Congress of Gerontology. One of the main points of this symposium was to suggest that issues of costs and contributions to society for any targeted age group are best conceptualised from a multi-dimensional and life-long perspective. The paper by Greene reported that costs are best understood in relation to current and life-long contributions in the economic sphere. The paper by Wells illustrated the worth of the positive contributions of older adults as caregivers. Another main point was the suggestion that the assessment of cognitive and personality dimensions in later life indicates continued growth and the emergence of unique and effective cognitive and adaptive skills. The papers by Smith, Hoyer and White, and Schaie and Willis described the positive nature of the cognitive contributions of older individuals in everyday settings. These papers emphasised the mutual benefits that accrue for society and for older individuals when meaningful roles are maintained in later life. These papers were illustrative of successful ageing, but also addressed the limits and age-related constraints on effective functioning in later life. The findings of the papers in this symposium provide a basis for developing a more balanced discourse regarding the positive contributions and burdens of an ageing population, and for developing new multi-disciplinary and multi-cultural perspectives in gerontology.

The primary aim of this paper is to provide an overview and integration of the papers presented as part of an invited symposium titled, Positive Contributions of the Elderly to Society. One reason for calling attention to the positive contributions of older adults is in response to the emphasis that is usually given to the costs or burden of the elderly for society. Issues associated with the economic and interpersonal burdens of caring for older persons dominate not only the popular media in many countries but also pervade current discourse in the gerontological research literature on policy and practice.

Unfortunately, the emphasis on costs and burden has diverted attention away from the identification and assessment of the variety and extent of positive contributions of the elderly to society. In each of the papers in this symposium, positive contributions as well as burdens of the elderly to society were identified for selected domains (eg. spousal caregiving within families, work skills). In addition, each panelist considered new methods and measures for assessing the contributions of older individuals, and the implications for policy and practice of a balanced view of the roles and contributions of older adults in society.

The issue of burden is especially poignant in the economic sphere. Older adults are seen as contributing little, and as being largely dependent on the finances of others. In the US especially, this view has been reinforced by a tendency for the public policy debate to focus on transfers that occur through the Federal Budget, where funding disbursements to the older population have grown disproportionately in recent decades. The result has been a popular traducing of these

programs as uncontrolled `welfare transfers'. Older people are viewed as `greedy geezers' who use political power to extract unfair and imprudent levels of benefits for themselves, far in excess of their contributions, at the expense of the vital interests of younger cohorts, and indeed of the social good in general.

Greene [1] re-evaluated issues of generational fairness and burden from a costs-benefits perspective, and reported that older cohorts have made financial contributions in excess of their burden when assessed in the long-term. The `greedy geezer' view is an illusion. It arises largely from two analytical defects in typical arguments along those lines. First, by considering only budgets at the Federal level, and neglecting state, local and special jurisdictional budgets, it presents a wildly distorted view of the net transfers that occur cross-sectionally, even in the public sector. Second, and most fundamentally, it typically makes use of short term accounting periods (typically one to several fiscal years) that are inappropriate for a social accounting cycle for cross-generational transfers.

Indeed, Greene showed that when a fuller range of transfer mechanisms is taken into account, and a life-cycle accounting period that captures intergenerational investments in human capital is employed, it appears that generations now retired still provide a large economic subsidy to the generation behind them, not the converse.

Wells [2] described the interpersonal contributions of older people as care-providers. Increasingly, in many societies, older adults contribute significantly as care-providers in families; yet, the frequency and the worth of this kind of contribution are generally overlooked and under-estimated.

Wells examined the extent of caregiving among older Australians, and the consequences of care-provision for the health, health behaviours, and well-being of older people. Participants were drawn from the Health Status of Older People (HSOP) Project, a survey conducted in 1994 and 1996 by the Lincoln Gerontology Centre at La Trobe University. The representative sample included 1,000 people aged 65 years and over living in the community in metropolitan Melbourne. Current caregivers were compared with their peers who were not caregiving. People who had taken up the caregiving role within the previous two years were compared with people who had been providing care for a longer period, to determine the immediate and longer-term consequences of care-provision. Caring for a spouse was by far the most common kind of caregiving undertaken by older people. Caregiving entailed few undesirable consequences, and in some respects caregivers were more positive about their health and well-being than non-caregiving peers. Unlike previous studies which have relied on convenience samples and focused on dementia care, Wells found that the impacts of providing care are not uniformly deleterious for older people [eg. see 3].

The presentation by Schaie and Willis [4] was a re-examination and update of Schaie's earlier [5] neo-Piagetian stage model of adult cognitive development. In Schaie's early model [5], the highest level of cognitive functioning in late middle age and early old age was characterised as an Executive Stage. In the Executive Stage, the individual goes beyond achievements designed to meet his/her own needs to accomplish objectives that serve the needs of larger social systems. For example, the individual assumes responsibility not only for a nuclear family but exerts leadership roles in societal institutions. In the final stage of adult cognitive development, individuals divest themselves of these roles and redirect their attention to integrating their life experiences.

Schaie and Willis [4] explored how recent cognitive ageing research contributes to a new understanding of these stages. Particular attention was given to the role of prior experience and the ways in which older individuals apply their prior experience to contemporary problems of society and of their own lives. Schaie and Willis considered the cognitive demands of roles often held by individuals during these life stages. As example domains, they considered the cognitive demands of being a catalyst, a synthesiser, a negotiator, and an ethicist. Schaie and Willis suggested that successful execution of these roles required cognitive skills such as the ability to

identify the gist or essence of problem situations, setting priories for self and institutions, and perspective taking.

The presentation by Hoyer and White [6] addressed the question of how older adults compensate for age-related losses so as to function effectively in complex situations. Although performance in the workplace and other kinds of everyday settings appears effortless, in practice frequently the situation is complex and demanding of limited memory and processing resources. Of particular interest to ageing researchers is the question of how experienced older adults can efficiently perform complex cognitive tasks despite the abundant evidence indicating substantial age-related deficits in the speed and efficiency of memory and information processing abilities. In some domains, it has been reported that older adults use domain-specific knowledge as a way of compensating for age-related losses [eg. 7]. The results of several new experiments examining the interactive effects of age and domain-specific knowledge in skill acquisition and in the maintenance of skilled cognitive performance were presented. Results of these experiments suggested that the acquisition and maintenance of skilled cognitive performance across age depend on the availability and use of domain-relevant information.

Smith [8] began her presentation by pointing out that many studies of ageing and personality present a negative picture of functioning in late adulthood. Specifically, growing older is associated with increased dependence, loss of self-control, social isolation and disengagement from life. New studies of the young-old emphasise active and productive involvement, and the maintenance of autonomy and self-fulfilment. Drawing on data from the Berlin Aging Study, Smith described the different developmental tasks and the different strategies of positive well-being in two age groups, the young-old and the old-old. Findings from the Berlin Aging Study (BASE), a heterogeneous sample of 516 persons, indicated that positive profiles of intellectual, social and self-regulatory functioning characterised individuals in their 70s, 80s and 90s. Whereas profiles of the young-old reflected models of successful ageing, the profiles of individuals aged 85 years and older indicated the models of coping with multiple impairment and chronic life strains.

Although the papers that were presented as part of this symposium represented a wide range of topics and disciplines, they shared the theme that older adults do indeed make important and valuable contributions to society. The papers differed in terms of the kind or domain of contribution, ranging from assessment of long-term or life-long financial and economic contributions, to contributions to work and family.

One of the main points of this symposium was to suggest that issues of costs and contributions to society for any targeted age group are best conceptualised from a multi-dimensional and life-long perspective. Greene [1] reported that costs are best understood in relation to current and life-long contributions in the economic sphere, and Wells [2] illustrated the worth of the positive contributions of older adults as caregivers.

Another main point was to suggest that the assessment of cognitive and personality dimensions in later life indicates continued growth, and the emergence of unique and effective cognitive and adaptive skills. Hoyer and White [6] and Schaie and Willis [4] described the nature of the positive contributions of older individuals in everyday settings, and emphasised the mutual benefits that accrue for society and for older individuals when meaningful roles are maintained in later life. These papers were illustrative of successful ageing, but also addressed the limits and age-related constraints on effective functioning in later life.

In conclusion, the papers in this symposium provided a basis for balanced discourse regarding the positive contributions and burdens of an ageing population. The findings reported in this symposium have implications for developing new multi-disciplinary and multi-cultural perspectives in gerontology.

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Comparative National Policies on Care and Support of Older Persons

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Abstract. This symposium focused on four developed nations: the US, Australia, Canada and Germany. Activities in each country were analysed along the following lines: What is the official policy with regard to income guarantees (national pension programs), medical care and/or medical insurance, long-term care and housing? How well are the policy goals expressed in legislation being met? What is the extent of variation in services across the country? What factors are associated with high and low levels of service? To what extent are these services viewed as universal entitlements vs. linked to welfare status? How are economic and demographic forecasts affecting discussions about the future of these programs?

This symposium addressed the programs that have emerged in four developed nations: the United States, Australia, Canada and Germany. The first three share a common language and heritage. The last has made a recent commitment to universal coverage for long-term as well as acute care that may provide valuable lessons for other countries.

A series of questions was posed about activities in each country to contrast official policies with operational programs:

- What is the official policy with regard to income guarantees (national pension programs), medical care and/or medical insurance, long-term care and housing?

- To what extent are these services viewed as universal entitlements vs. linked to welfare status?

- How well are the policy goals expressed in legislation being met?
- What is the extent of variation in services across the country?
- What factors are associated with high and low levels of service?
- How are economic and demographic forecasts affecting discussions about the future of these programs?

Programs

Table 1 summarises the official policies of the four countries addressed across the four basic policy domains. All four countries make provisions for retirement and take steps to assure that virtually all retirees are covered with at least a minimal pension. The US and Germany have more generous universal programs. Canada and Australia place more reliance on individual retirement programs. The Australian system includes a provision for mandatory private retirement programs. Only the German social security arrangement is designed to provide an adequate retirement income on its own. All of the others, to varying degrees, expect either individual private pension arrangements or some form of means tested income supplementation.

Table 1: Official policies

	United States	Canada	Australia	Germany
Income guarantees/pensions	Social security strong basic protections; not intended to provide full retirement coverage.	Modest national pension plan; guaranteed minimal income; individual retirement plans expected.	Means tested old age pension; compulsory superannuation.	Universal; aimed at 70% of working wage.
Medical care/medical insurance	Universal coverage for seniors.	Universal across all ages; primarily a provincial program.	Universal across all ages.	Universal for all ages; funded from multiple sources; covers long illnesses.
Long-term care	Welfare-based; heavily weighted to institutional care.	Varies by province; universal based on dependency levels (but client contribution).	Residential: predominantly federal + co-payment. Community: federal/state +co-payment+local (to a limited extent).	Universal for all ages; pays for institutional care and for caregivers (including pension). Opportunity to receive cash in lieu of services; financial support based on degree of frailty; about half of NH residents also receive social aid (welfare).
Housing	Heavy private ownership; experimenting with	Housing subsidised for low income	Grant funded by federal and federal+state.	Housing subsidised for low income.

	new housing configurations that combine housing & services for those needing assistance; housing subsidised for minimal levels of poor; subsidy easier if disabled.	elderly.	Means tested rental allowance. "Hostels" covered under LTC include housing & services. Broad public ownership.	

All four countries provide universal health insurance for older persons. In the US, those over age 65 are singled out as the only part of the population eligible for universal coverage, whereas in the other three countries health care insurance is universal for all.

The actual operation of the program varies. The Canadian system is primarily operated by the provinces with limited support from the federal government and a series of general principles applied to assure uniformity with minimum standards nationally. The American system is federally run through a series of contracted fiscal intermediaries. Although the benefits are constant across the nation, there is wide variation is costs from one location to another. The Australian health coverage is primarily the responsibility of the federal government but state governments play an important role, especially around long-term care services. The German system mandates universal coverage but allows for membership in one of several systems, including one operated by the government and designed for those without salaried employment.

By isolating the elderly segment of society as the only one covered by universal health insurance, the US Medicare program has in effect stigmatised this uniquely benefited group. Programs that might otherwise be viewed as national efforts to help everyone are seen as special efforts on behalf of older persons. Many of the younger part of the population who do not receive health insurance through their employment must resort to welfare or go uninsured.

There is greater disparity in the approach to long-term care in the four countries.

Although the Canadian system relies on individual programs established in each province, most provinces have broad and generous long-term care coverage for both institutional and community-based care. Although long-term care is free, many provinces require the residents of nursing homes to pay a co-payment that is designed to cover the room and board costs, thus rendering the coverage for institutional and community care more comparable.

The American approach relies primarily on the Medicaid program, a means-tested welfare system operated by states with matching federal funding. However, the mandate of Medicare, a program designed to cover acute care, has been gradually increasing into long-term care, especially home health care and nursing home care. Those eligible for Medicaid receive broad coverage, but those with incomes above the eligibility criteria must exhaust their own funds. A number of states have an eligibility provision that allows persons to spend down their income and assets to become eligible for Medicaid coverage. Such a process tends to favour those in institutions where the monthly costs of long-term care can be more readily estimated.

The Australian system for long-term care coverage also relies on a mixed state and federal approach. In this case institutional care is predominantly paid for by federal programs that require a co-payment roughly equivalent to the costs of room and board. Community care is paid for by a mixture of federal and state funds. A co-payment is also required. Local government may also provide support for community care.

Housing policies are more difficult to summarise. In the US private ownership is common. For many older Americans, a house is their most valuable asset. Although the nursing home has

played a dominant role in long-term care, various forms of sheltered residences (ie. old age homes) which provide housing and some meal services but few other services, have also survived. Housing programs provide subsidised housing for low income elderly but the supply of such housing is limited. Newer approaches are seeking to combine housing and services in different ways. The goal is to maintain the client's autonomy by providing a place where he/she can live in an environment he/she can control while bringing in services as needed. In effect, this approach combines home care and congregate housing, but by integrating the services from the two sectors some economies may be possible.

Most Canadian provinces and the federal government provide various types of housing subsidies for poor older persons that assist with rent payments as well as providing subsidised housing per se. The Australian federal and state governments provide means tested rental allowances. Hostel-type residences that also provide some services are covered under the long-term care program. Germany relies on federal and local funding to subsidise housing for low income persons.

Table 2: Governmental level of responsibility for programs for older persons

	United States	Canada	Australia	Germany
Income guarantee	Federal, state	Federal, provincial	Federal	Federal
Health insurance	Federal, state	Provincial/federal	Federal/private	Federal
Long-term Care	State/federal	Provincial	Federal/state	Federal
Housing	Federal, local, state	Federal, local, provincial	Federal/state/local	Federal, local

Table 2 summarises the role of various levels of government in each country in supporting each type of care. In the US, with its mixture of Medicare and Medicaid entitlements and welfare, almost all programs rely on a combination of federal and state funding, with the federal government being the dominant partner. The Canadian profile reflects a similar partnership but the provinces bear the greatest burden. Indeed, for long-term care they bear the full cost. The Australian pattern resembles a hybrid of the first two, with heavy reliance on the federal programs but a substantial state role as well. Germany's programs are primarily based at the federal level.

Policy Climate

The policies around care for older people in each of these countries reflects different political forces. The different patterns are outlined in Table 3. The US sits at one end of the political spectrum, with programs heavily based on a market model that emphasizes competition and envisions a strong role for the private sector in both the financing and delivery of care. Whereas health care (at least for older persons) is viewed as an entitlement, social services are linked to welfare status. Long-term care financing is either paid for by the recipient or from a welfare program after the person has exhausted his/her own funds.

Table 3: Major influences on health & social policy

United States	Canada	Australia	Germany
Market model.	Government as insurer model.	Strong government role.	Compulsory insurance financing.

Variation in coverage (better for health than social services). LTC coverage based on welfare model.	Universal health coverage. Welfare model for social services. Mixed pattern for LTC.	Mixed financing model. Universal coverage for health. LTC coverage mixed.	Universal coverage for health and LTC.

The Canadian approach envisions a substantially larger role for government. Provincial governments (with modest federal support) serve as insurance companies using primarily tax funds to provide universal health coverage. Social services are provided under a welfare program that uses incomes as an eligibility criterion. Long-term care has emerged under both flags. In most provinces it is universally available but there remains a tradition of welfare based services as well. In some instances the two are offered side by side. As economic pressures become severe, having the welfare model also available may offer a temptation to rescind the established commitment to supporting long-term care as an entitlement. Thus far, however, despite economic downturns, there is no evidence that Canadians are prepared to abandon their commitment to universal coverage or especially favourable treatment for older persons.

Australia represents a strong government role with responsibility for financing shared between the federal and state governments. Reliance on government is matched by an expectation that people will look after themselves as well. In contrast to the American system where people are first required to impoverish themselves to become eligible for public support, Australians can expect to receive some level of front-end support for long-term care but are then expected to cover the rest whenever feasible.

Germany has taken a major step to expand its universal health coverage to include long-term care as well, especially at a time when the costs of unification are making heavily demands on public funds. The new long-term insurance is being phased in. Its provisions favour community care. The allowance for eligible persons to accept a cash payment valued considerably less than the presumptive value of the services covered raises a series of interesting questions about both the fair price for these services and the extent to which they are ultimately necessary. The German experience should provide useful insights for other countries. Policy makers in the US, for example, are replicating the cashing out of long-term care benefits in special demonstration projects.

Table 4: Areas of emphasis in long-term care

	United States	Canada	Australia	Germany
Cost/Quality/Access	C/q/a	A/C/q	A/C/q	A/C/q
Instititutional/Community	I/c	I/c	I/c	C/i

The areas of emphasis in long-term care programs vary across the four countries, as reflected in Table 4. Virtually all of health services can be addressed under one or more of the three basic headings: cost, quality and access. Whereas one might describe the relative priority for three of the four countries addressed as emphasising access in the context of cost, with concerns about quality a lower but still important concern, the US appears to place much more emphasis on cost control and less on access. With regard to the relative reliance on institutional as compared to community-based care, Germany appears to be the outlier. Its long-term care program actively promotes community care over institutional. The other three countries all share a commitment to shedding their current emphasis on institutional care, but the present balance is heavily tilted in that direction.

Cost Control Strategies

Current and forecasted demographic pressures in each country have created strong incentives to examine strategies for controlling the costs of these programs that are targeted primarily or exclusively to an the ageing portion of each country's population. These strategies are summarised in Table 5.

Table 5: Strategies for cost control

	United States	Canada	Australia	Germany
Income/pension	Hands off; address cost of living adjustment.	Moving to means testing.	Increased means testing.	Reduce benefits. Raise eligibility age. Reduce credits.
Health	Provider payments; Managed care.	Provider payments; supply control.	Fixed hospital budgets.	Co-payments.
Long-term Care	Managed care; cash benefits.	Provider payments; supply control; managed care.	Means testing.	Cash payments.

In the US the so-called mandatory spending components of the national budget have been favourite targets, but social security appears to be a politically protected area. The current controversies are more inclined to address ways to make it more economically viable. One hotly debated proposal calls for some degree of private investment, either by giving each beneficiary control over some portion of the apportioned assets to invest in the private market or by sanctioning direct private investment at the federal level. Concerns about individual investment center around the consequences of poor financial decisions. Efforts to control the costs of social security have been more subtle. They involve recalculating the basis for cost-of-living adjustments.

Canada and Australia have seen a press for moving a larger portion of the basic federal pension scheme into the category of means-tested incomes. Germany has attempted to reduce pension costs by a combination of several strategies. They have reduced the pension benefits, while raising the eligibility age and reducing the credits given for years of work for activities that were not strictly working (eg. education). All of these changes have been phased in slowly over several years in each country.

Efforts to control health costs have utilised slightly different strategies in each country. Lessons from one country have been watched closely by the others and some have already been emulated.

The US has had a long and unsuccessful history with using provider payment controls as a vehicle to control health care costs. Limits on unit costs have led to increased volume. Even efforts to combine unit payment and overall volume controls have not been very successful. Increasingly, Medicare has moved to various types of prospective payment, either for individual services like hospital stays, or an overall capitated payment that covers all mandated care in what has come to be termed managed care.

Canadian strategies have relied on a combination of controlling provider payments by negotiated fee schedules and global payments to hospitals to cover all care in a year and restricting the supply of expensive technologies by effectively franchising them in some form of regionalisation. Australia has also used a variation of global payments to hospitals and fee schedules. Germany has placed the emphasis on consumer behaviour by requiring co-payments for services. Although the US Medicare program also uses co-payments they are accorded little effect, largely because a vast majority (over 90%) of the older population has purchased some form of insurance to cover these co-payments. This private insurance market has not yet developed in Germany.

Cost control in long-term care is less developed. In the US, because much of the long-term care benefits are attached to welfare programs, the most effective cost control comes from restricting access. Once a person becomes eligible, controlling costs is more difficult. Demonstrations are underway to test the feasibility of managed care. Most of these must interface with Medicare as the dominant provider of health care for older persons. As noted earlier, a few demonstration projects have begun to test the concept of allowing older persons to cash out their long-term care obligations, but these programs have not gone on long enough to examine how allowances are made for irresponsible management of the funds or unpredictable consequences.

Canadian efforts to restrict long-term care costs have primarily addressed controlling provider payments and limiting supply of expensive services like nursing homes. There have been a few small experiments with managed care but no ground swell to date. Brief challenges to generous programs with liberal community-based service benefits have been fended off.

The Australians have used means testing as a basis for controlling long-term care costs. More programs and components of programs are moved from entitlements to cost-shared efforts.

As Germany gains more experience with long-term care, cost pressures will become a growing concern. The universal program has begun with community services. Institutional care has begun to come on line with substantially higher costs. A primary route for cost control has been the option that permits families to accept a cash payment in lieu of services. Thus far, this payment has represented a deep discount on the face value of the foregone services. However, because cash will induce the greatest demand, the ultimate savings are still not clear. Some people may apply for the program to obtain the cash who would otherwise never demand the services.

Common Threads

Looking across the four countries, some common issues can be discerned. There are never enough resources to meet the demands for domestic social programs. Some limitations and trade-offs are inevitable.

The first basic trade-off is between money and services. In effect, an adequate pension scheme should provide sufficient resources for older individuals to manage their own long-term care. (Most observers will continue to favour some form of health insurance because of the large unpredictable costs involved.) However, not everyone can be counted on to take prudent precautions. Because governments inevitably wind up with the residual responsibility for those who cannot look after themselves, many policy makers are uncomfortable with simply handing over cash in the form of larger pensions. They prefer to see some means to direct the spending to assure that needed services are provided.

Each country has forged a comprehensive policy to address each of the four areas, although the intensity of coverage or control varies considerably from place to place. Each country has developed deliberate goals, although these goals may not have been altogether clear at the outset. For example, the founders of Medicaid in the US never intended that this program become the major vehicle for long-term care. They saw it as a means to enfranchise poor people for acute medical care. Payment policies create incentives for market expansion and adaptation. Coverage of one form of care will induce its use over another. Thus, the pictures that emerge

internationally represent the cumulative efforts of deliberate planning and unexpected consequences of political decisions.

Political environments inevitably shape these programs. Some have begun so ingrained as basic benefits that it would be suicidal to tamper with them overtly. At the same time, basic philosophic stances can change. For example, the public's view of the appropriate role of government has changed over time and across countries. Some continue to look to government as a means of addressing social programs. Others view government as too cumbersome an instrument to function efficiently and expect better results from the private sector. Still others worry about how to maintain principle of equity under a privately operated system of care unless there is at least some adequate level of regulatory oversight. While some would press for putting more control of one's destiny into one's own hands (under the principle that everyone has an equal opportunity and hence equal responsibility for one's future). Others prefer a more paternalistic approach that emphasizes providing needed services to those in greatest need.

Despite the differences in philosophy and strategy, there is a surprisingly consistent theme to the political rhetoric. Each country talks about the importance of the individual and how to support responsible choices. Each acknowledges the pressures created by an ageing society and the obligations we have to those who are no longer able to look after themselves. In each country, people are beginning to appreciate that ageing is a different phenomenon from what it was a few generations ago. The picture of the frail, impoverished older person has given way to one of active ageing with a dramatic delay in the onset of disability for many. The chronological definitions of ageing have begun to be challenged. As has age per se as a basis for entitlement. More emphasis is being placed on individual responsibility with government assuming more of a backstopping role.

However, many major social programs cannot be left to individuals and the private sector. They require collective action to become individually affordable. Government has a natural role as the coordinator, if not the operator, of such efforts. Much of the rhetoric today is directed at identifying the appropriate role for government and the extent to which governmental program should continue to be viewed as entitlements.

Molecular Biology of Ageing: Age-associated Attenuation in the Regulation of the Expression of Stress Response Genes

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Abstract. The attenuation in the capacity to respond to stress is one of the major characteristics of ageing organisms. There are several cellular pathways of response to various types of stress. We briefly discuss the NFkB pathway that is altered with age as was primarily shown by Papaconstantinou. We suggest that another important transcription factor system that should be investigated is that involved in the response to hypoxia. Our own work shows that the capacity to respond to elevated temperatures is considerably diminished in ageing organisms. Our studies demonstrate that this is due to faults in the control of the activation of the transcription factor, HSF, which is a major protein that activates many stress response genes. The nature of the alteration of the control of HSF with age is described and discussed.

Introduction

Molecular biology should not be regarded as a distinct discipline within the field of biology. It is rather an entity that encompasses the development of sophisticated molecular methodology and

techniques that aid in the investigations of basic biological processes. These are the processes that involve gene control of:

- differentiation and development;
- intercellular communication and interaction via the production of chemical signals and signal transduction;
- storage of information and the capacity to retrieve and analyse it;
- the fine tuning of cellular metabolism under various conditions;
- the response to crises such as stress.

In this communication we will discuss the use of molecular biological tools in an attempt to search for basic alterations which underlie the process of senescence. Because this area is very broad, it will be only appropriate to limit the discussion to one aspect: the response to stress.

The process of ageing is characterised by a gradually diminished capacity of the organism to respond to environmental challenges. This reduced ability to cope with stressful conditions eventually results in increased morbidity and impaired capacity to survive upon exposure to adverse environmental conditions.

Some environmental factors which are considered to play a major role and are commonly related to reduced survival capacity are oxidative damage, hypoxia, extreme temperatures, xenobiotics and microbial and viral infections.

The sensing of stress and the production of stress signals by cellular systems elicit the appropriate stress response. This is achieved by the activation of specific gene families whose function is to encode for proteins that aid cells to counteract the effects of the stress. The capacity to respond massively and rapidly to stress at the gene level determines to a large extent the adaptive and, therefore, the survival capacity of the organism. A detailed analysis of the response to stress at the molecular genetic level in organisms of various ages is, therefore, expected to yield important clues to the nature of the alterations which play a significant role in the onset and progression of senescence.

We shall briefly discuss here two stress gene systems that have been investigated: the nuclear factor [kappa] B (NF[kappa]B) and heat shock protein gene systems. We will suggest another interesting system that can serve as an exciting paradigm for studying gene expression in ageing: the hypoxia-induced factor(HIF-1).

The NF[kappa]B Transcription Factor System

Elegant work on this system with regard to gene expression in ageing has been carried out by Papaconstantinou and his group [1]. NF[kappa]B is a complex transcription factor that has a crucial function in the array of regulatory steps that involve the activation of stress genes such as the acute phase, immune and inflammatory responses [2].

Figure 1 depicts part of the functions and mechanism of action of this system. It can be seen that various stress factors such as active oxygen species and cytokines can activate, via src kinases and specific receptors, respectively, the constitutive transcription factor NF[kappa]B. This factor is held in an inactive form in the cytoplasm by I[kappa]B, an inhibitory subunit. Upon processing of a stress signal the I[kappa]B undergoes phosphorylation and is removed from the complex and is rapidly degraded. The released NF[kappa]B factor is translocated to the nucleus and activates the indicated stress response genes in a tissue related fashion.

Papaconstantinou and his group have found that in tissues of old mice the NF[kappa]B DNA-binding activity is significantly increased in the absence of challenging stress factor. Moreover, in response to bacterial lipopolysaccharide the NF[kappa]B-regulated angiotensin gene is over-expressed in liver of old mice as compared to young tissues. This is most probably due to the over-expression of the NF[kappa]B gene [1]. This is presumably true with other NF[kappa]B-regulated genes. This age-associated phenomenon can be explained by the hyper-phosphorylation of I[kappa]B observed in livers of aged mice [1] . I[kappa]B also inhibits the translocation of NF[kappa]B to the nucleus, its hyper-phosphorylation therefore abolishes the confinement of the transcription factor to the cytoplasm and creates an unnecessary `crowding' of the nucleus under non-stress conditions. This constitutes a major alteration of the regulation of stress gene function in the cells of aged individuals.

The physiological outcome of this breach in the NF[kappa]B system has yet to be fully elucidated. An initial clue to this phenomenon is provided by Toliver-Kinsky et al. [3] who showed loss of cholinergic activity in neurotrophin-dependent neurons in the hippocampus of aged mice, most probably due to over-expression of NF[kappa]B. This is a clear case where post translational regulation of a master transcription factor goes awry in old individuals with serious effects on the functions of cells.

Figure 1: A model of stress-response gene activation in the NF[kappa]B pathway (modified from ref.1)

Gene Regulation of the Response to Hypoxia

Hypoxia commonly occurs in older individuals mostly due to disturbances in blood supply resulting from obstructions in the vascular system [eg.4]. It has recently been discovered that the response to hypoxia is regulated by a master transcription factor, hypoxia-induced factor (HIF-1) which is activated by an `oxygen-sensing system' in all cell types [5].

As is depicted in Figure 2, there is as yet an unknown cytoplasmic heme-protein which serves as an oxygen sensor. It is kept inactive under normoxia and is activated when oxygen levels drop. The deoxy form of this protein activates a signal that may then be transduced to an unknown

factor X which activates a pre-existing HIF-1[alpha] subunit of the transcription factor. The activated [alpha] subunit can now form a heterodimer with a constitutive [beta] subunit to form an active transcription factor HIF-1[alpha] /[beta] . This factor can now activate or induce in a tissue-specific manner a series of genes that are crucial for the continued activity of the hypoxic cells. Among these are the genes that code for the glycolytic enzymes that are essential for an increased supply of ATP to the oxygen-starved cells.

Another essential gene that is activated by HIF-1 is that for erythropoietin that induces the production of erythrocytes. Recent work by Wang et al. [6] shows that the hypoxia induction of erythropoietin is much reduced in kidneys of old rats. It would be important to relate this to the function of the HIF-1 system. Other genes that are induced by HIF-1 are essential for vasodilation, angiogenesis and increased breathing (Fig.2). All of these genes are induced in concert due to their inclusion of a common consensus HIF-1-binding element.

Recent studies in our laboratory indicate that old Drosophila flies are much more sensitive to hypoxia as judged by considerable reduction in their activity during exposure to 1% O2 for 4 hours. Young flies are much less affected by the same conditions (Keidar and Gershon, to be published). We are trying to relate this phenomenon to the function of the Drosophila HIF-1 system as a function of age.

Figure 2: The hypoxia-induced pathway of HIF-1 activation of stress response genes

The Regulation of the Expression of Heat Shock Protein Genes

All organisms respond to hyperthermia and other forms of stress (Fig. 3, lower panel) by the activation of several gene families which encode a series of highly conserved heat shock proteins (HSP). These proteins are involved in the prevention of the aggregation (and thus the irreversible inactivation) of denatured protein molecules and help the refolding of these to the active conformation upon return to normal temperatures. Most of the hsp genes are constitutively expressed under normal conditions but their expression is enhanced by hyperthermia. Several of these genes are induced as a result of the heat activation of a special transcription factor (HSF). All the heat shock genes contain in the promoter a special consensus element (HSE) to which

HSF binds. The HSF is constantly found in the cell in an inactive monomeric form. In response to heat shock the monomers undergo a modification which allows their trimerisation and, consequently, competence to bind to HSE (Fig.3, upper panel). This binding initiates the transcription cascade of the hsp genes.

Figure 3: A model of the response of cells to thermal stress (lower panel). The mode of activation of HSF to bind HSE (upper panel). HS= heat shock (370 and 420 C for Drosophila and mammals, respectively). HSF=heat shock factor, the universal transcription factor of the heat shock protein (HSP) genes. The consensus nucleotide sequence of the heat shock element (HSE) to which HSF binds to initiate hsp gene transcription is depicted.

It has been found that with ageing there is an attenuation of the activation of the hsp genes in rats [7]. In Drosophila there is also a considerable attenuation of the response to hyperthermia with age. An extensive investigation of the molecular basis for this attenuation has yielded the following results: reduced induction of the expression of the hsp83, hsp70 and hsp27, as judged by metabolic labelling of proteins during the period of heat shock. This is manifested in a 30% reduction in the synthesis of the respective proteins. This reduction is the consequence of an age-related decline (75%) in the levels of m-RNA synthesised from these genes in response to heat shock (370C for 1-2 hours). Furthermore, the activation of the HSF by heat shock as determined by gel mobility shift revealed a 70% decline in the capacity of `old' HSF to bind to HSE. Taken together these results indicate that there is a significant attenuation of the hsp gene expression system with age.

Further studies revealed that there is a regulatory protein (for which we have also evidence in mammalian systems) that controls the activation of HSF by inhibiting its trimerisation under normal temperatures. This protein undergoes a conformational change at elevated temperatures which results in freeing HSF monomers to trimerise and bind HSE. Consequently, the transcription of the hsp genes is initiated (Keidar, Efrati and Gershon, to be published). This proposed mechanism is depicted in figure 4. We find that the regulatory protein in old flies is more thermo-resistant than in young flies and, therefore, does not release the HSF monomers to trimerise as readily as in young flies. As a result the hsp genes are not induced efficiently in

young flies. This can perhaps explain at the gene and molecular levels the increase in heat sensitivity of old organisms.

Conclusions and Perspectives

Three examples were discussed here of the control of `master' transcription factors which turn on a battery of genes in response to different forms of stress. For two of them we have now good evidence that the control of these transcription factors is altered in cells of ageing organisms. The third one is very likely to prove as significant. The detailed chemical aspects of these senescence-related alterations have yet to be elucidated. Nevertheless, it becomes clear that the era of precise and incisive molecular analysis of crucial gene expression and its attenuation with age is already here. Changes in the activities of individual master genes involved in the organisms' adaptive capacity to various stressors is going to yield major insights into the most basic underlying mechanisms of ageing. It is our conviction that this will inevitably lead to devising interesting means of intervention with the process of ageing.

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International Trends in Health Expectancies: a Review

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Abstract. Are we living longer but in worse health? Are the increases in life expectancy at older ages in developed countries occurring because we are keeping sick or disabled people alive longer or because we are saving people from death but leaving them in states of disability and handicap? This question was addressed in a symposium entitled International Trends in Health Expectancies. This review paper summarises the international evidence presented at that symposium on trends in health expectancies in developed countries. Health expectancies provide a powerful tool for monitoring the health of older populations, testing hypotheses about the evolution of health, and developing public policy. The available international evidence of time series of health expectancies for older people suggests that increases in disability prevalence began in the late 1960s and 1970s at the time when mortality rates at older ages began to decline significantly, but that these increases were confined to the less severe end of the disability spectrum. There is no evidence of expansion of morbidity based on more severe measures of disability prevalence. Recently emerging evidence from Europe and North America suggests that disability prevalence rates among older people may be starting to decline and we may actually be starting to see compression of morbidity in low mortality populations.

Introduction

Since the mid-19th century, the populations of developed countries like Australia have experienced one of the most important and dramatic changes in the history of the species - a near doubling of the expectation of life at birth from around 40 years to near 80 years. Today, mortality rates in younger and middle aged Australians are so low that the complete elimination of mortality before the age of 50 would increase life expectancy at birth by less than 3 years. At the same time, a substantially increasing proportion of people are surviving to older ages where the prevalence of disability and handicap is high, and according to some indicators, increasing. It is clear from the recent trends in life expectancy at older ages in Australia and other countries that compression of mortality as postulated by Fries [1] has not yet started to occur (see Figure 1 for illustrative Australian trends).

Figure 1: Trends in life expectancy at age 65 years, Australia 1905-1994

Data from Australian Bureau of Statistics [34] and Cumpston [35]

Are the increases in life expectancy that are occurring in developed countries at older ages because we are keeping sick or disabled people alive longer or perhaps saving people from death but leaving them in states of disability and handicap? The concept of disability-free life expectancy, and more widely that of health expectancy, has been developed in order to attempt to answer this question. Health expectancy is an extension of the concept of life expectancy to measure the expectation of years of life lived in various health states [2-4]. Health expectancy is used as a generic term for all the population indicators that estimate the average time (in years) that a person could expect to live in a defined state of health. Disability-free life expectancy is the best known of these.

An international research network, REVES (Reseau Esperance de Vie en Sante/Network on Health Expectancy) was set up in 1989 specifically to facilitate international comparisons by examining the requirements for harmonisation of health expectancies [5]. Using health expectancies to assess population health trends, three major hypotheses have been advanced for the evolution of population health in countries where birth and death rates are low and death rates are continuing to fall, particularly at older ages, with consequent increasing life expectancies. The first hypothesises declining health status, the second improving health status and the third a sort of status quo [6].

The expansion of morbidity hypothesis [7,8] postulates that the decline in mortality is due to decreasing fatality rates for diseases and not to a reduction in their incidence or progression. Consequently the decline in mortality is accompanied by an increase in chronic illness and disability. Olshansky and colleagues [9] have developed further arguments from evolutionary biology supporting this hypothesis.

The second hypothesis, compression of morbidity, was first proposed by Fries [10] who suggested that adult life expectancy is approaching its biological limit, so that, if the incidence of incapacitating disease can be postponed to later ages, then morbidity will be compressed into a shorter period of life.

The third hypothesis was proposed by Manton [11], who suggested that the decline in mortality may be partly due to decreased fatality rates, but at the same time the incidence and progression of chronic diseases may be decreasing, leading to a dynamic equilibrium.

Because we may be trading off longer life against quality of life, health expectancy indices which combine mortality and morbidity into a single composite indicator provide an attractive tool for monitoring long-term trends in the evolution of population health. Calculations of health

expectancies have been made for over 37 countries and time series exist for 10 countries [12,13]. However, it is impossible to compare these time series directly as the methods and population health data used differ substantially from one country to another.

Reviews of recent international health expectancy time series for disability-free life expectancy at birth [4,14,15] have suggested that there is no evidence of expansion of morbidity based on more severe measures of disability prevalence. A similar pattern is seen for severe disability-free life expectancy at age 65 years, where available trends show increases paralleling that for total life expectancy at age 65 (Figure 2). These time series suggest that there has been a four-year increase in life expectancy at age 65 among females in developed countries from 1965 to 1993, that life expectancies free of severe or very severe disability are increasing at about the same rate, and that the average years lived with severe disability have remained constant. The trends for older men are very similar. In contrast, there has been a stagnation in disability-free life expectancy at age 65 years where that includes less severe disability states (Figure 3). We can conclude that, although the gains in female life expectancy in general represent extra years of disability, these are not years of severe disability.

Figure 2: Disability-free life expectancy, all levels of severity, for females at age 65 years: international comparison 1970-1993

Sources: Crimmins et al. [36], Robine [37], Wilkins et al [38]
Mathers [2], Bone et al. [39], Perenboom et al. [40]

Figure 3: Severe disability-free life expectancy, for females at age 65 years: international comparison 1965-1993

Sources: Crimmins et al. [36], Robine [37], Wilkins et al. [38], Mathers [3]

The international evidence thus suggests that since the 1970s, when mortality rates at older ages began to decline significantly, disability levels have increased, but these increases were confined to the less severe end of the disability spectrum. During this period, increasing medical attention was paid to secondary prevention, the early detection of disease and subsequent intervention to slow its progress, for many major fatal and non-fatal diseases. In addition, greater awareness of chronic conditions due to improved diagnostic techniques, more frequent contacts with the health care system and, perhaps, better communication by doctors to patients has probably led to increased reporting of chronic disease conditions in surveys [16] and to behaviour modification. For example, over the last two decades there has been substantially increased screening for and treatment of high blood pressure which may have led more people to restrict their activity without any change in the underlying incidence or prevalence of high blood pressure, or in the intrinsic levels of activity limitation. Potential factors contributing to changes in disability prevalence have been discussed by Crimmins [17] and are summarised in Table 1.

Table 1: Factors potentially influencing trends in prevalence of morbidity and disability

1. Changes in health status

- Increasing life expectancy
- Changes in disease incidence upwards and downwards
- Changes in recovery rates
- Improved survival of sick people
- Cohort effects (education, nutrition, etc.)

2. Environment

- Changes in built environment
- Changes in clothing, food, technical aids
- Changes in household composition and social structures
- Social security, compensation, other income support

3. Perception

- Knowledge and awareness
- Diagnosis and screening
- Increased use of medical care
- Medicalisation of problems
- Perceived standard for good health
- Comparing Population Health Expectancies

Health expectancy indicators are also potentially very attractive for comparing the health of populations, although considerable care must be taken to ensure their comparability. Available comparisons suggest that health expectancies show larger inequalities for disadvantaged population subgroups (eg. minorities, people with low income or low levels of education) than do

mortality or morbidity indicators on their own. Mortality inequalities are compounded by disability and handicap differentials for such groups [18,19].

Davis [20] presented estimates of health expectancies for New Zealand showing that the Maori/non-Maori differences in disability-free life expectancy were greater than the corresponding differences in total life expectancy. His estimates of two forms of disability-free life expectancy for New Zealand over the decade 1981 to 1991 were consistent with the international evidence for an expansion in years lived with disability. Davis also discussed issues in the construction of comparable disability prevalence estimates from surveys carried out at different times with different instruments.

Self-reported measures of health status are based on perceptions and expectations of health that vary with culture and community and are also likely to vary with time - for example, as societies undergo epidemiological transition [21,22] or as public health campaigns alter the community's awareness of and understanding of health problems [23]. Murray and Chen [24] and Murray and Lopez [25] reviewed studies suggesting that there are significant cross-cultural differences between self-report and observation of disability and poor health. Much of the variation in self-reported disability associated with changing perceptions and standards arises at the milder end of the disability spectrum [3].

Conceptual development for disability statistics is following two strong patterns, the WHO international classification and the disablement process (or Institute of Medicine/Nagi) schema. Both schemes run into trouble with (a) environmental factors that relieve or exacerbate a person's dysfunction and (b) multiple disabilities (dubbed codisability). Direct implications of environmental factors and mutiplicity for trends in disability prevalence and active life expectancy, and strategies to handle the troublesome factors in statistics, were examined by Verbrugge [26] in the symposium. Jagger [27] examined the issues of comparability for population survey measures of disability resulting from mental impairments (eg. Alzheimer's disease) and identified core comparable data items in European surveys of mental health.

In order to make more detailed and specific international comparisons of health expectancy trends, it will be necessary to undertake further work to harmonise concepts of health, the severity of health states taken into account in health expectancy calculations, the wording of questionnaires, and the study design of health surveys (particularly by including the populations living in health institutions such as nursing homes).

Recent Evidence for Compression of Morbidity

Very recent studies are providing some evidence that disability prevalence may be declining at all severity levels in developed countries [28-32].

While the evidence is not unequivocal in indicating compression of morbidity [17], it is the first evidence of a trend in this direction. Crimmins et al. [30] have found evidence for decreasing disability incidence rates and increasing remission rates at older ages in the US Longitudinal Study on Ageing (LSOA) and the National Health Interview Survey (NHIS). Neither of these datasets include institutionalized older people. Manton and coauthors [28,31] have also found significant declines in morbidity using data from the National Long Term Care Surveys for 1982, 1984 and 1989, which did include the institutionalized population. Two European studies have found evidence for long term declines in disability prevalence in older people whose reporting of perceived health status did not similarly improve [29,32].

Conclusions

There has been a significant mortality decline among the old in most developed `western' countries in the last two to three decades, but mixed trends in population health expectancies. Severe disability-free life expectancy is increasing in parallel with total life expectancy, but there

has been stagnation in disability-free life expectancy, when all levels of disability are included. During the 1970s and 1980s, there was an expansion in the reported prevalence of mild disability and more people reporting poor perceived health. In the last few years, some evidence has started to emerge for improving health in the older populations of developed countries.

These results illustrate the usefulness of health expectancies for monitoring global trends in population health. This has been recognized in the recent Jakarta Declaration on Health Promotion into the 21st Century [33] which identified the ultimate goal of health promotion as to "increase health expectancy, and to narrow the gap in health expectancy between countries and groups". Measuring progress to this goal will require continued work to increase the international comparability of health expectancies.

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Energy Metabolism, Nutrition and Ageing

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Abstract. Energy metabolism and nutrition have long been suggested to play a role in ageing processes, in age-related disease and in the health of the elderly. This review addresses new insights arising from selected studies of the interplay of these factors. Data on overfeeding and underfeeding in young versus elderly men and women demonstrate a deficit with age in the ability to regulate energy balance. They also indicate that current values of Recommended Daily Allowances of caloric intake underestimate the needs of the elderly. The studies suggest that diminished capacity of energy metabolism with age may have a nutritional component and the involvement of the central nervous system. The contribution of peripheral tissues is suggested by studies of mitochondrial DNA isolated from tissues of humans and rodents. The studies demonstrate age-related and disease-related increases in rates of mutation in some but not all tissues. The further involvement of mitochondrial dysfunction in ageing is suggested by data on oxidative free radical production in mitochondria of birds versus rodents. These elegant studies

indicate greatly reduced rates of free radical production in mitochondria of long-lived birds versus short-lived rodents. They further demonstrate that Complex I of the respiratory chain may be a major factor in these species-specific effects. Restriction of caloric intake (dietary restriction, DR) is the only manipulation known to consistently extend lifespan in a wide variety of species. Previous work shows that extension of lifespan in DR is not necessarily related to reduced metabolic rate per unit metabolic mass. More recent work in exercising DR rats demonstrates consistently high daily metabolic rates together with extended lifespan. Other studies also show altered characteristics of fuel use in DR, indicating the ability of DR rats to maintain appropriate rates of fuel use under conditions less damaging to the organism. All of these new approaches to the interaction of nutrition, energy expenditure and ageing suggest that regulation of energy balance and the characteristics of fuel use play significant roles in ageing and in age-related disease.

Introduction

Just over a century ago a scientific renaissance resulted in the discovery of many fundamental laws of nature, including formulation of the principles underlying electricity and magnetism and the laws of thermodynamics. It was in this environment that Max Rubner decided he had discovered "the unity of a great law" governing the lifespan of living creatures [1]. His data on the oxygen consumption of domestic animals suggested that sexually mature animals have a fixed lifetime metabolic potential, ie. that all adult organisms consume about the same amount of energy per unit of mass over their lifespan. Subsequent experiments, notably by Loeb and Northrop [2] and Pearl [3] resulted in formulation of the "Rate of Living" theory of ageing, suggesting that "duration of life.....varies inversely as the rate of living during its continuance..." [3]. This view has played a pivotal role in later theories of ageing, with evidence both in support of and against it. In particular there is no strong evidence in homeothermic animals in support of the original views [4].

Despite the controversies, however, few gerontologists would deny the probable importance of nutrition and energy metabolism in ageing and in age-related disease. The goal of this review is to discuss recent evidence that processes other than metabolic rate per se may govern the interplay between nutrition, energy metabolism and ageing. The review focuses on selected recent research demonstrating that characteristics of fuel use, rather than intensity of fuel use, may link these quantities. The studies were conducted in intact organisms (humans and rodents) and in isolated mitochondria (in humans, rodents and birds) the organelles having major responsibility for energy transduction. More general discussions of energy use in ageing provide a broader view of the field [5, 6].

Energy Balance

Relative constancy of body weight over the adult lifespan is determined by balancing energy input (nutrient intake) with energy output (total energy expenditure, or metabolic rate) over a sustained period of time. A constant daily energy expenditure in the face of decreased nutrient input will lead to loss of weight, to a decrease in amount of metabolically active tissue and in turn to a decrease in metabolic rate. Mechanisms involved in balancing energy input and output have not been identified.

The work of Roberts and Saltzman [7] strongly suggests, however, that ageing in humans is associated with decreased ability to regulate energy balance. These studies in young adult and elderly men involved measurement of body weight and food intake following several weeks of both underfeeding and overfeeding. Similar losses or gains of body weight occurred during controlled under- and overfeeding, respectively in the young adults and in the elderly. Following these periods, young individuals allowed to eat ad libitum increased or decreased food intake appropriately, resulting in a return to the pre-trial bodyweight. In contrast, elderly individuals permitted ad libitum eating did not make appropriate adjustments in food intake, exhibiting sustained losses or gains of body weight. The experiments demonstrated a differential effect in

young versus elderly of change of energy intake on resting energy expenditure (REE): Young individuals exhibited a significantly greater increase in REE for a given change in energy intake than did elderly individuals. Data on total energy expenditure (TEE) also indicated that current Recommended Daily Allowances for calorie intake may be inadequate in the case of the elderly.

These provocative results suggest that problems of energy use in ageing may be due in part to decreased ability to maintain energy balance. Decrease in metabolic rate with age and in particular loss of muscle mass with age may therefore involve central mechanisms as well as peripheral cellular mechanisms. The data warrant in depth investigation in animal models for identification of mechanisms involved.

Mitochondrial DNA

Direct involvement of cellular organelles in the age-related decline of energy metabolism is indicated by studies of mutations in mitochondrial DNA (mtDNA). In an extensive series of studies Linnane and colleagues [eg. 8-11] have examined rearrangements of mtDNA in a variety of tissues in humans and rats of various ages. Their data indicate random mutations of mtDNA in cells throughout life, that these mutations accumulate in tissues with age, that the rates of accumulation are tissue- and species-specific and that some age-associated diseases are correlated with the presence of mtDNA mutations. These workers hypothesise that the accumulated mutations lead to disruption of usual mitochondrial function, to an `energy mosaic' of cells of different bioenergetic capacity, and that this loss of energy transduction capacity, in turn, is a basis of senescence and age-related disease.

In support of these ideas the authors have demonstrated a strong correlation between decreased cytochrome oxidase activity and extent of mtDNA mutations in human skeletal muscle fibers with age [10]. They have also demonstrated amelioration of the effects of oxidative stress using coenzyme Q10 as a redox agent to `re-energise' issues [8]. The extent to which the decline of oxidative metabolism with age in some tissues is due to mtDNA mutations is not known, however. Studies of this group, by Aiken et al. [12] and others certainly suggest the possible involvement of mtDNA in ageing processes.

Mitochondrial Oxidative Free Radical Production

Further demonstration of the possible involvement of mitochondrial energetics in ageing processes has come from the interesting work of Barja and colleagues [eg. 13-15]. These authors have addressed the apparent paradox (at least for adherents of the Rate of Living theory of ageing) of the great longevity of birds which also exhibit high specific metabolic rates (SMR). The paradox lies in the inverse relation which exists, according to the Rate of Living theory, between longevity and metabolic rate per unit mass (SMR).

Barja and colleagues have isolated mitochondria from brain, lung and liver tissues of rats (of maximum lifespan about 4 years) and pigeons (having maximum lifespan of about 35 years). Despite having significantly greater rates of resting whole body oxygen consumption and mitochondrial respiratory rates, the rates of mitochondrial free radical production were 2-4 times lower in pigeon than in rat tissues. Indeed, the rates of free radical production per unit oxygen consumption were one order of magnitude lower in pigeon than in rat mitochondria. Free radical `leak' from the respiratory chain was significantly less in pigeon than in rat mitochondria [13]. Further studies of this group demonstrated that, in heart mitochondria, Complexes I and III are the principal generators of reactive hydrogen peroxide. Differences in free radical generation between heart mitochondria of rats and birds were mainly attributable to species-variations in Complexes I and III in the heart [14].

The recent work of these authors [15] addresses another paradox: namely the fact that lifelong exercise is not usually associated with a significant shortening of lifespan [16], in apparent contradiction to predictions of the Rate of Living theory. Mitochondria isolated from the brains and

hearts of rats and pigeons exhibited similar levels of free radical production from Complex I in both states 4 (resting) and 3 (uncoupled, or maximum rate), a possible consequence of greatly decreased free radical leaks from Complex I in state 3 respiration.

The results of all these studies are consistent with the Free Radical theory of ageing, based on the primary importance of tissue degeneration due to accumulated free radical damage. The results demonstrate also that the characteristics of fuel use, rather than the intensity of fuel use may determine the rate of ageing.

Dietary Restriction

Restriction of caloric intake is the only manipulation known to consistently retard ageing processes in homeothermic animals [17]. Extensive studies in laboratory rodents have demonstrated that this dietary restriction (DR) not only extends longevity but also delays or prevents age-related pathology and slows functional decline [18]. Equally extensive studies of the interaction of DR and energy metabolism [19] have demonstrated that metabolic rate decreases following the initiation of DR to an extent greater than can be explained by a decrease in metabolic mass, ie. DR results in a decrease in specific metabolic rate (SMR). It was logical therefore for George Sacher [20] to suggest that DR slows ageing processes as a consequence of a decrease in metabolic rate, in accord with the Rate of Living theory of ageing. Despite some controversy in this area [21], extensive studies by McCarter, Masoro and colleagues [22-24] have demonstrated that, following an initial transient decrease, SMR and food consumption per unit lean mass are not lower in DR rats than in ad libitum fed rats. It is important to note that these measurements were conducted under usual living conditions and over the lifespan. In contrast, experiments demonstrating decreased SMR in DR have been conducted usually at single time point following relatively short periods of DR and measured only resting metabolism rather than total daily metabolism. Data confirming the absence of change in SMR in DR have also been obtained in non-human primates subjected to long-term DR [25].

Recent studies by McCarter et al. [26] have focused on the effects of lifelong voluntary exercise in DR. Surprisingly, rodents given 40% fewer calories than ad libitum controls from 6 weeks of age onwards exhibited great running wheel activity. The DR rats ran about 5 km per 24 hours over most of their lifespan. Remarkably, when all ad libitum fed rats were dead, more than 80% of DR rats were still alive and running 4 km per 24 hours! The intense voluntary exercise resulted in lean rats of low body weight and significantly greater SMR than all other groups. Despite having the highest levels of SMR, these DR exercising rats nevertheless exhibited the greatest average lifespan and a maximum lifespan (10% survivors) equal to that of sedentary restricted rats. These data demonstrate again the probable lack of primary importance of SMR in ageing processes. Both DR groups of rats (sedentary and exercising) exhibited altered characteristics of fuel use (decreased levels of plasma glucose, insulin and decreased tissue free radical damage) in comparison with ad libitum fed control rats.

Conclusion

Results of these selected studies indicate that Rubner perhaps discovered the unity of a great focus rather than the "unity of a great law" [1]. The Rate of Living theory of ageing [3] has served as a necessary focus for experimentation in ageing research. It provided a basis for the more recent Free Radical and Glycation theories of ageing [27, 28] and the notion that indeed all of the characteristics of fuel use may be involved in ageing processes [6]. The transduction of nutrient energy into energy necessary for the maintenance of cellular homeostasis inevitably involves highly reactive fuels and potentially damaging processes. The extent to which different organisms are successful in limiting damage resulting from energy transduction may constitute one parameter determining lifespan. The studies described above indicate that loss of ability to regulate energy balance, accumulation of mutations of mitochondrial DNA, rates of generation of free radicals at different complexes in the mitochondrial respiratory chain and finally,

characteristics of fuel use, may all play a more significant role in ageing and in age-related disease than intensity of metabolism per se.

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Total Quality Management and Geriatric Care

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Abstract. For numerous reasons it is essential that geriatric practitioners become involved in improving the care delivered to older patients in all clinical settings. One of the more promising approaches to enhancing care for older persons is the set of techniques and philosophy embodied in the Total Quality Management (TQM) method. To develop an agenda for improving

the quality of care delivered to older persons, we surveyed over 1,600 geriatric practitioners and asked 38 experts in geriatric care and quality improvement (QI) to respond to a series of questionnaires. Findings resulted in suggested approaches to improving care in four delivery sites (office, home, acute hospital nursing home). Of note, the experts strongly favoured the newer QI methods such as TQM over traditional approaches such as Medicare Review and Minimum Data Set. Potential next steps to improve QI methods in geriatric care are outlined, use of TQM in office practice and nursing homes is reviewed, and examples of successful TQM programs in these settings are described.

Introduction

It has become essential for geriatric practitioners to become involved in programs to improve care delivered to older persons for several reasons.

First, studies have convincingly documented that physicians and other health care practitioners frequently miss important problems in older patients in many different clinical settings [1-10]. For example, malnutrition in nursing home patients is frequently overlooked [1,2]. Lewis et al. found that emergency physicians recognized only 17% of the cases of delirium in older patients who were being seen in an emergency department [3]. In older inpatients, Pinholt and colleagues demonstrated that physicians missed moderate impairments in cognition, nutrition, vision and continence in 46% to 73% of cases [4], and Mowe and Bohmer found that physicians failed to recognize 65% of cases of undernutrition [5].

A similar phenomenon exists regarding treatment. Numerous investigations throughout the world have shown inappropriate or questionable use of major procedures such as coronary angiography and carotid endarterectomy in 25% to 35% of patients [11,12]. Meanwhile, iatrogenic complications are common in seniors, more than one-third of which are potentially preventable [13].

If quality of care delivered to older persons could be improved, they would probably experience better outcomes and the cost of care would probably decline as well. It is unlikely that either a change in physician payment or limitation in funding through global budgets will improve such care. Instead, approaches that directly improve clinical care will be required [11]. One of the more promising methods for doing this is a set of techniques known as Total Quality Management (TQM) (described in greater detail below) [14-17].

Second, health care budgets are being restricted in many countries. For a number of reasons, seniors are particularly at risk for having their quality of care compromised as funding is diminished [17].

Third, many useful TQM techniques have been developed and refined in institutional settings [18] and are available for improving health care now with little additional developmental delay [14,15,19].

Fourth, geriatricians have the kind of background, experience and philosophical approach to provide needed leadership as medicine embraces TQM. There are many similarities between the techniques and philosophy involved in TQM and modern geriatric care [16,17]. Thus, geriatric practitioners should find involvement in TQM programs a logical extension of their clinical activities, be able to recognize and articulate the advantages of TQM, and therefore be well positioned to provide valuable leadership to health care systems as they move from traditional quality assessment programs to TQM.

Suggestions for Improving Geriatric Care in Four Delivery Sites

To develop an agenda for quality improvement in the care of older persons, we elicited the opinions of experts in geriatric care and in the newer quality improvement methodologies through

surveys and discussion groups [17,20]. Quality improvement (QI) is used here as a general term to encompass all methods designed to improve the quality of health care. These include peer, utilisation, license and medication reviews; traditional institutional quality assurance methods based on outlier detection; clinical reminder systems; formal assessment and feedback of clinical outcomes and complete TQM.

TQM refers to a new approach to health care QI which encompasses all systems involved in delivering health care services and focuses on changing process to improve patients' outcomes with that care. TQM includes a philosophy and a set of procedures, both of which are important for its successful application [20]. Important characteristics include focuses on systems rather than individuals, on improving mean functioning rather than punishing outliers, on interdisciplinary team problem solving, and - perhaps most importantly - on data rather than opinion or tradition to drive decision making [17]. Interested readers are referred to relevant publications for more details [15,19,21].

Table 1. Ten conditions among seniors most amenable to quality improvement, by practice site, from survey of practicing geriatricians

			Practice Site		
	Rank	Home Care	Office Practice	Hospital	Nursing Home
		(N=96, AAHCP)	(N=125, AGS)	(N=146, AGS)	(N= 1 34, AGS)
	1	Heart disease	Heart disease	Heart disease	Undernutrition
	2	Undernutrition	Depression	Undernutrition	Incontinence
	3	Dementia	Dementia	Polypharmacy/Compl.	Decubiti
	4	Decubiti	Hypertension	Decubiti	Falls
	5	Polypharmacy/Compl.	Incontinence	Delirium	Polypharmacy/Compl
	6	Diabetes mellitus	Undernutrition	Incontinence	Depression
	7	Incontinence	Polypharmacy/Compl.	Pneumonia	Behaviour problems
	8	Depression	Arthritis	Falls	Dementia
	9	COPD	Falls	Dementia	Heart disease
	10	Arthritis	Diabetes mellitus	UTI	UTI

Modified from reference 20, Compl. denotes adverse drug reactions, and UTI denotes urinary tract infection.

Three independent random samples of 400 each were drawn from the master list of the American Geriatrics Society (AGS) and one random sample of 426 from the membership list of the American Association of Home Care Physicians (AAHCP). The three AGS groups were asked to respond relative to geriatric care in the office, hospital and nursing home, respectively, and the AAHCP group responded to care of older persons in their own homes. All four groups were asked to name up to 10 conditions found in elderly patients in the respective setting that would be most likely to benefit from quality improvement efforts [17,20]. Their responses are shown in Table 1.

Table 2. Critical factors for successful implementation of quality improvement programs, from survey of expert panel (N=25)

Dimension	Necessity for Improving	Need for Special
	Geriatric Care	Training
Leadership	1	3

Building local commitment	2	8
Incorporating patient preferences into	3	5
program design and decisions		
Using outcomes to improve processes	4	1
Management and planning	5	4
Developing and using practice guidelines	6	6.5
Team member selection	7.5	9
Team building	7.5	2
Access to statistical resources	9	6.5

Modified from reference 20.

A panel of 38 experts in geriatric care and QI was employed for subsequent steps of the process. In the first mailed questionnaire to this group, panel members were asked to rate different aspects in developing and performing QI programs (Table 2). In the second questionnaire, the expert panel was asked to rate each of the geriatric conditions identified by the AGS/AAHCP panels for the likelihood that quality of care would be improved by a QI effort (Table 3). In the final questionnaire, the experts were asked to rate several site-specific QI techniques for appropriateness and cost-effectiveness in each of the four practice sites (Table 4). It is worth noting that in each setting, the traditional QI methodologies (eg. Medicare review in home care) was identified as least likely to be helpful.

Table 3. Ranking of ten geriatric conditions for likelihood that quality improvement efforts would improve seniors' functional health, by practice site (N=21)

		Practice Site		
Rank	Home Care	Office Practice	Hospital	Nursing Home
1	Depression	Depression	Pneumonia	Depression
2	Polypharmacy	Polypharmacy	Delirium	Polypharmacy
3	Undernutrition	Arthritis	Undernutrition	Decubiti
4	Arthritis	Undernutrition	Polypharmacy	Undernutrition
5	Incontinence	Diabetes	UTI	Falls
6	Diabetes	Heart disease	Decubiti	UTI
7	Heart disease	Falls	Falls	Behaviour problems
8	Decubiti	Incontinence	Heart disease	Incontinence
9	COPD	Hypertension	Incontinence	Dementia
10	Dementia	Dementia	Dementia	Heart disease

Modified from reference 20.

Table 4. Expert panel's estimate of appropriateness and cost-effectiveness of

applicable quality improvement approaches, by practice site (N=18)

SITE: HOME CARE

Quality Approach	Appropriateness	Cost-Effectiveness

Guidelines for Clinical Care	1	1.5
Total Quality Management	2	1.5
Outcomes of Clinical Care	3	3
Management Information Systems	4	4
Medicare Review	5	5

SITE: OFFICE PRACTICE

Quality Approach	Appropriateness	Cost-Effectiveness
Guidelines for Clinical Care	1	1
Outcomes of Clinical Care	2	3.5
Total Quality Management	3	2
Medication Review by Pharmacist	4	5
Management Information Systems	5	3.5

Modified from reference 20.

SITE: ACUTE CARE HOSPITAL

Quality Approach	Appropriateness	Cost-Effectiveness
Total Quality Management	1	1
Outcomes of Clinical Care	2	2
Guidelines for Clinical Care	3	3
Management Information Systems	4	4
Utilization Review	5	6
Professional Review Organization	6	5

SITE: NURSING HOME

Quality Approach	Appropriateness	Cost-Effectiveness
Total Quality Management	1	1
Guidelines for Clinical Care	2	2
Outcomes of Clinical Care	3	3
Management Information Systems	4	4
Minimum Data Set	5	5
State License Review	6	6

Modified from reference 20.

Twenty-nine of the expert panel convened in St Louis immediately before a symposium on TQM in geriatric care in September 1993. After reviewing the questionnaire results, they suggested next steps for promoting effective QI in geriatric care settings [17,20]. In brief, these suggestions included a cooperative effort among relevant professional organizations to develop and disseminate TQM in geriatric settings, establish a cadre of experienced TQM practitioners to lead such efforts, to include training in TQM in professional educational programs, to maintain a clearing house of successful programs, conduct TQM research, develop validated needs

assessment protocols, and consider an electronic list server or chat room to enhance interaction among interested parties.

TQM in Office Practice

The bulk of care delivered to older persons is provided in the offices of primary care practitioners, but there is a paucity of information about the quality of care provided in this setting for older individuals and even less information about successful interventions to improve any quality deficiencies. As noted in Table 4, our expert consultants believed that guidelines, TQM and related techniques are very appropriate for application in office practice settings and likely to be cost-effective in improving outcomes.

While identifying TQM's potential in office settings, it is also useful to recognize the special attributes of office practice that can make application of successful QI programs difficult. Such potential barriers include:

- small number of office staff, making it difficult to spare them for TQM training programs, for designing and evaluating programs and for collecting needed data;
- rapid turnover of patients, making it difficult to include any additional data collection activities; complex `external customer' structure;
- lack of regulations by regulatory bodies mandating extensive QI efforts.

Nevertheless, as the examples below demonstrate, effective TQM programs are possible.

We conducted a QI program based on TQM techniques in an academic outpatient department, After demonstrating that only 7% of targeted geriatric conditions (cognitive impairment, depression and recent weight loss) had been recognized by the patients' primary practitioners, we instituted a simple education and information intervention that led to physicians addressing the newly identified problem in 30% to 55% of cases [9].

Subsequently we evaluated the prevalence and prior recognition of nine geriatric conditions in a rural family practitioner's office. Despite his strong interest in geriatric care, 40% to 100% of identified cases received a new diagnosis or enhanced treatment based on the intervention. After participating in the program and reviewing the results, the practitioner concluded that screening for hearing problems was most helpful, followed fairly closely by depression and urinary incontinence, and has continued tracking these problems [22].

Subsequently, Moore and Siu have developed and validated a short screening instrument for identifying eight geriatric problems in office settings [23], that also can be modified for periodical tracking of such problems. Chad Boult and colleagues have demonstrated the effectiveness of targeting older medical outpatients for comprehensive geriatric assessment and treatment using the Pra screening instrument [24, 25]. Beck et al. identified a group of frequent users (abusers) of their outpatient department and entered them into an innovative, very nontraditional program that reduced repeat hospital admissions and emergency care use, lowered the total cost of care, and increased patient and physician satisfaction [26].

TQM in the Nursing Home

The nursing home is an arena that lends itself especially well to TQM techniques, especially via the interdisciplinary team. Jacob Dimant, a medical director in New York state, developed the first clearly defined TQM program in nursing homes [27]. He designed a problem identification system, which was fed back to employees, who were then empowered to develop and implement solutions that resulted in continuous improvement in multiple care processes.

Studies at the nursing homes associated with St Louis University have demonstrated multiple improvements associated with the TQM process. Utilising a nurse practitioner to review charts, we developed a feedback system for physicians with patients in the nursing home. This system proved highly effective in reducing both psychotropic drug use and inappropriate medicine use [2].

A major component of a successful TQM program in the nursing home is a regular monthly monitoring system. Results can be represented in the form of a statistical control (p) chart. This system allows the recognition of statistically meaningful deviations from the norm. In addition it is highly useful to compare the performance of the index facility to other facilities. Zinn et al. [28] have published on the use of risk-adjusted, standardised indicators (mortality, pressure ulcers, physical restraints and urethral catheterisations) as a potential agent for change in Pennsylvania (US) nursing homes. Large variations were present between facilities. When a quality indicator deviates from the expected level, further information is gathered and subjected to a Pareto analysis [15]. The principle of this approach is that while there may be many causes for an increase in a marker event (eg. falls), usually one or two indicators of causation (eg. limited geographic location) will account for the majority of events in a small subgroup. We have successfully used this system to detect an abusive nurses aide in one of our facilities. Team meetings can be extremely useful for problem solving sessions. Studies have demonstrated the utility of the maintenance engineer and the food manager in solving important nursing home problems [29].

At St Louis University, the team approach was utilised to successfully reduce physical restraints use from levels greater than 40% to less than 5% in three facilities [30]. Similarly we used TQM to reduce weight loss markedly by recognising both problems with the food processing service and untreated causes of weight loss [31].

Schnelle et al. [32] have developed a measure of urinary incontinence that was easily fed back to the nurses aides using a statistical control chart. This resulted in increased utilisation of prompted voiding and decreased wetness rates in the facility. Capriani et al. [33] in Rome have utilised the Resident Assessment Instrument derived from the Minimum Data Set to enhance gerontological education in nursing homes. The program appeared to augment the ability of staff to develop a quality improvement program for elder care.

In French nursing homes the development of Geronte (a diagram of a person) allowing rapid interdisciplinary communication of problems in the patient has been highly successful [34]. We have successfully utilised this model in our subacute care unit.

Overall TQM techniques have come of age in the nursing home. Areas in which they have been found to be particularly useful are falls, incontinence, weight loss, medication monitoring, infections, contractures, pressure ulcers, skin tears, depression and hospital transfers.

The Eden Alternative. Originally introduced by William H. Thomas, MD, the Eden Alternative combined the introduction of animals and plants into the nursing home together with a team approach to problem solving. Thomas [35] suggested that the Eden Alternative resulted in decreased infections, decreased deaths and a decrease in staff turnover. At the National Health Care nursing home in Maryland Heights (near St Louis), the introduction of the Eden Alternative has been associated with a decrease in staff turnover, a high level of quality of life as expressed by the residents, less depression than normally seen among nursing home residents, and an increased influx of `private pay' residents. In this study medium sized birds in the rooms of individual residents appeared to be particularly effective. Neither of these studies was adequately controlled to give overwhelming support that the Eden Alternative truly improves outcomes, but the approach appears promising.

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Emerging Demographic Changes in an Ageing World: an Overview

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Abstract. This overview reviews the presentations on demographic trends that were given at the IAG Congress in Adelaide and the pre-Congress satellite in Singapore. It provides a framework for the field of the demography of ageing, and suggests some promising future research directions. The presentations provided the main features of trends in the demography of population ageing occurring in the main regions of the world. Highlights include the diversity that is found between and within regions, which stem mainly from variations in the pace of the demographic transitions towards lower levels of fertility and mortality. Notable changes also are occurring in the demography of the aged population. These include the growth of the oldest-old, increasing proportions of females at the older ages, and important emergent cohort differences in those reaching the older ages. One thrust of future demographic activity will be to provide more realistic population projections of future trends, especially for countries that are showing super-ageing. A second direction will be more concerted attention to cohort developments, which are particularly crucial in determining social, economic and political responses to changing population structures. A third will be greater attention to changing family structures and behaviours. Finally, there is growing interest in the field of biodemography that draws social scientists, demographers and biologists to focus on interdisciplinary aspects of morbidity, disability and mortality dynamics.

Introduction

It is indeed a pleasure to be able to present a keynote address that affords an opportunity to review the demographic papers given at this International Association of Gerontology (IAG) Congress and in Singapore, to lay out a more extended statement of the demography of ageing, and to suggest some promising research directions in the field of population studies.

My first attendance at an IAG meeting took place in Jerusalem in 1975 - twenty-two years ago. On that occasion I was asked, along with Paul Paillat of France, to organise a session dealing with demographic changes and their impact on population ageing. It was the sole session at the meetings devoted to demographic topics. I think that Jay Siegel, who is attending this meeting, was one of the presenters of that session. At the current meeting of the IAG, demographic aspects have been given widespread attention, with numerous sessions dealing with these topics.

Coverage of Demographic Presentations

First of all I want to say that demographers count! But we do more than count in the sense of enumeration. We also are interested in both the determinants of demographic changes as well as their implications; some aspects of which I will touch on today. The demography of ageing is now being defined in terms of two different dimensions: one dealing with what might be called the demography of population ageing and the second dealing with the demography of the aged population [1]. The symposium papers presented at the Singapore pre-Congress satellite covered both of these considerations. Excellent papers covered demographic developments in a number

of the world's regions and major countries. For example, Roberto Ham-Chande covered Latin America. Another presentation by William J. Serow and Marie E. Cowart dealt with demographic changes specifically in the Caribbean region. Shigemi Kono discussed developments and future implications of population changes in the Asian region, especially Japan, and Du Peng reported on recent trends in China. Finally, Anthony M. Warnes presented a paper that focused on mortality changes in Europe over an extended period of time.

Demography of Population Ageing. The main conclusion from the papers, as expected, is that we are experiencing intensive population ageing on a global basis. When lay persons think of the term global, they often picture the earth spinning in orbit around the sun. Demographers, however, think about pyramids - age and sex pyramids. From the traditional kind of pyramid with a broad base and tapering top, the world's population structure is evolving into a V-shaped kind of pyramid. The world is literally being turned upside-down demographically and this is a prime reason why gerontology has become such an important center of attention. These developments are occurring, of course, at different tempos in various regions of the world.

The papers also brought out the tremendous diversity that exists among countries within the regions. In particular, the paper dealing with China by Du Peng went extensively into changes that are occurring within the different areas of that country. Of course, China with its population of 1.2 billion persons is a subject unto itself in many regards. I found this intra-national treatment particularly interesting and a topic that is seldom examined in depth.

Another feature of the presentations was the effort to systematically classify countries according to the progress of population structure modification. The United Nations Population Division [2] has designed such a classification scheme in terms of countries that were early initiators of population ageing, countries that are middle initiators, and others that are late initiators. This classification was applied effectively in the Ham-Chande paper. The important finding revealed by such frameworks for examining population ageing is not only the diversity among countries, but also that middle and late initiator countries are moving more rapidly than early initiators through the process of a demographic transition - a transition in the vital rates of fertility and mortality. So we need to pay particular attention to the rapidity of change in these later initiator countries. Moreover, some of these middle initiator countries appear to be moving towards levels of population ageing that may be referred to as super-ageing. In these countries, fertility levels have fallen to unprecedented low levels. If these trends persist the proportions of the aged population are going to rise to as much as 40 percent of the total populations at ages 65 and above.

This emphasizes the point that we need to pay attention not only to the numbers of older people, but also the proportions of older people in total populations. When we talk about population ageing, we are really talking about shifts that are taking place throughout the aged distribution and, for the that matter, the sex distribution as well. Demographers often talk about support or dependency ratios - ratios of older persons to younger persons and older persons to the working aged population. These are imbedded aspects of the process of population ageing that have important and often direct implications on policy issues concerned with the allocation of resources and transfers of resources between generations.

It is possible to direct attention to the ageing of almost any group in the population that can be categorised by certain characteristics. For example, the ageing of the labor force. Profound changes are occurring in the labor force of many countries in terms of tipping the balance from younger workers to older workers. This has important implications, obviously, for general economic development. The ageing of the electorate is another aspect of the ageing process. The ageing of the voting age population, which again is occurring very rapidly in many countries, can lead to potentially greater political influence for older persons. I noted the other day there has been some recent attention to the ageing of the prison population, which has been increasing at a very rapid pace in the US. One consequence has been its impact on health care expenditures; providing for prisoners who are reaching advanced ages with deteriorating health has proven very costly.

Demography of the Aged Population. A crucial aspect of the demography of the aged population is the large growth that has occurred in the numbers of the oldest old. We sometimes refer to this as a double-ageing process. Not only is the total population ageing, but we are also experiencing ageing of the aged population. This growth also has important implications in terms of gender balance in that a high proportion of the oldest old are females. This raises specific issues relating to widowhood and other needs of older women, both social and health-related, deriving from their greater longevity compared to males.

In examining the aged population, it is important to examine how changes are occurring to this population, particularly through cohort succession. The aggregate changing characteristics of persons who are reaching older ages, whether defined by age 60 or 65, modify the overall nature of the aged population. The aged population, therefore, is a dynamic, ever-changing population that is altered both by people succeeding into this population and by those dying off.

This leads to some further considerations about likely changes in the aged population. A great deal of attention has been paid to the baby-boomers, who will reach the older ages in the second decade of the new millennium. Incidentally, this is true not only for more developed countries, but also for developing countries, which experienced extremely high fertility following World War II. I also want to draw attention to my own generation, which I've called the leading-edge generation [3]. The 1930-45 birth cohorts, which are reaching age 65 in 1995 and thereafter up to the baby-boom generation, represent a distinctive group in many developed countries. In the US, for example, these are the parents of the baby-boom generation. They are people who received higher levels of education attainment following World War II. They are also the first generation that has experienced high levels of divorce and separation. It is also true that this generation has experienced economic benefits that preceding cohorts did not share. Even the baby-boomers are probably not in as good an economic situation. Because the leading-edge cohort are parents of the baby-boom generation, they should have ample children to take care of them in their old age, but whether that will follow is problematic. So this leading-edge generation is a particularly interesting one to study, along with the baby-boomers.

We also have another younger generation that we are starting to call the X-generation. This was the cohort that reflects low fertility, or birth/dirth, who will join the aged population in the 2030s and thereafter for a number of decades. Again, there is relatively little systematic knowledge about this generation. The other day I saw, in Australia, reference to a new generation called the T-generation. This refers to tots who are apparently picking up on computers and other things electronic at very early ages. It should be interesting to see how they fair in their adult years and when they reach older ages. So demographers are interested in looking ahead into the future and examining the characteristics of people who are going to make up the aged population well into the next millennium. It is a challenge to examine their characteristics over time - their economic conditions, their social conditions, their health conditions - and to look at the dynamics of these changes.

Directions of Future Demographic Research

Finally, in closing, I would like to summarise some thoughts about important research issues likely to concern demographers in the years ahead.

One, we need to continue to develop some new population projections that take into account realistic fertility, mortality and even international migration assumptions. The Population Division of the United Nations, which has been projecting world populations, has made considerable progress in improving its forecasts, but these projections still terminate at age category 80 and above. Thereby, they fail to capture mortality improvements that are occurring at advanced ages in many countries. The fertility forecasts that re used in their medium variant projections that are most commonly reported also remain unduly optimistic. This relates to the potentially super-ageing in countries such as Italy, Spain, Japan, and Hong Kong, which are experiencing sub-replacement fertility currently. Yet the projection series that is often being reported shows their

fertility rising and clearly this is, I think, not a true indication of their possible demographic development. The low and constant fertility variants are probably more relevant.

It can be noted that these countries have relied extensively on informal family systems for supporting older persons (eg. co-residence, long term health care) with younger generations taking care of the older generations. Italy has one of the highest levels of co-residence in Europe. Japan has been traditionally noted for these patterns. It is curious that the countries that have the lowest fertility in the world at present are countries that have been most reliant on family support structures. I think that this presents some serious problems in terms of whether they are going to be able to cope with these changes in the numbers of children that are emerging.

A second direction that I think is very important is to pursue cohort analyses along the lines that have been suggested. Unfortunately even the papers that were presented in Singapore and many that have been presented here at this meeting, have neglected to examine cohort changes. Cohort analyses are absolutely crucial in terms of understanding the changing nature of the older population and demand structures.

A third area in need of considerable development is one that looks at changing family structures and family behaviour more specifically. This, of course, gets us into areas of modifications of kinship and household structures. But going beyond that, greater attention should be given to changing family functions. For example, in Japan approximately 90 per cent of older persons lived with children in 1960, but that has declined to about 58 per cent now; a profound change over a relatively short 30-year period of time. Not only have household structures changed, but the relations and behaviours among family members have undoubtedly been altered. In this regard, longitudinal surveys are particularly important in assessing the changes that are occurring in family structures, health conditions and economic well-being. It is very gratifying to see so many sessions at this meeting that have been devoted to longitudinal studies.

Finally, I want to mention another rapidly emerging research area often referred to as biodemography. In this field, we are beginning to examine underlying factors associated with transitions in health status, morbidity and overall mortality trends occurring at the older ages. These dimensions include biological and genetic markers, as well as social and environmental factors, and the importance that they play in the whole process. Many of the surveys underway today are moving into more rigorous measurement of the health, physiological and cognitive states of older persons. I think this is a very rich area in which demographers, biologists, epidemiologists and social scientists can pursue truly multidisciplinary and interdisciplinary kinds of activity.

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Ageing and Memory: Mechanisms Underlying Age Differences in Performance

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Abstract. Although it is widely believed that memory generally declines with age, in fact, age decrements occur for most, but not for all, types of memory. Age differences are always found for free and cued recall but are rarely found for picture recognition, implicit memory and measures of verbal ability. Understanding the conditions under which age differences occur and when they do not across memory domain is a challenging puzzle for cognitive ageing researchers. The hypothesis adopted here is that the magnitude of age-related decrements in memory function across different domains of memory can be accounted for by the amount of processing resource or mental effort required to encode and retrieve information. Different conceptualisations of processing resource are explored and supporting data are reviewed.

The topic of age-related changes in cognition is a complex one that spans many different domains of research. The primary focus of this paper will be on the impact of normal ageing on memory function.

Although it is widely believed that memory generally declines with age, in fact, age decrements occur for most but not for all types of memory. For example, it is nearly always the case that one finds differences with age in free recall performance and cued recall performance [1-3], but age differences are infrequently found for picture recognition [4], for implicit memory [5] and for measures of verbal ability [2]. Age differences are sometimes found for recognition memory performance [6,7], for spatial memory [7,8], and for prospective memory [9]. Understanding the conditions under which age differences occur, and when they do not, across these many domains of memory function has been a challenging puzzle for cognitive ageing researchers.

The hypothesis adopted here is that the magnitude of age-related decrements in memory function across different domains of memory can be accounted for by the amount of processing resource or mental effort required to encode and retrieve information on a specific task.

Based on this hypothesis, one might expect age difference to always occur for free recall because it requires effortful organisation and search. Similarly one would almost never expect age effects for picture recognition or implicit memory because neither encoding nor retrieval strategies require much use of cognitive resource. The mixed findings with respect to age reported for tasks like prospective memory and spatial memory can be explained, according to the resource hypothesis, by the amount of cognitive resource required to perform that particular spatial or prospective task. For example, we found evidence for age differences in responding to an event-based prospective memory task (remembering to perform an action in response to a cue) [9], but Einstein and McDaniel [10] did not.

Kidder, Park, Hertzog and Morrell [11] resolved this difference and demonstrated the importance of the resource construct. They reported that age differences were only found in responding to an event-based prospective memory cue when subjects were performing a high load working memory task, but the differences did not occur when the working memory task had a lower load and was less cognitively taxing.

A primary issue with respect to cognitive ageing has been determining what cognitive resource is and how to measure it. Four possible measures of cognitive resource, all of which evidence substantial age-related decline, are

- the speed of information processing [12];
- the amount of working memory capacity that an individual has [13];
- the efficiency with which inhibition processes operate [14];
- general overall neuro-biological integrity crudely measured by sensory function [15, 16].

The speed of processing view [12] suggests that with age, mental operations are slowed and, as a result, there is less time to perform later operations due to the amount of time required to perform the earlier ones (limited time mechanism). In addition, the products of earlier processing that are required for later stages of information processing may dissipate by the time the later stages of processing are reached (simultaneity mechanism).

Speed of processing is typically measured by simple perceptual comparison tasks where one makes rapid yes/no decisions about whether two simple figures or strings of digits are identical. The dependent variable is the number of comparisons completed.

A working memory view of age-related decline suggests that the amount of on-line mental energy one has available to process, manipulate and store information simultaneously decreases with age [17,13]. Working memory decreases with age and is typically measured by computation span or reading span [18]. Computation span is measured when subjects perform the addition in a simple equation (8 + 4 = ?), and simultaneously remember the second number (in this case, 4) in the equation. Capacity is measured by the number of items in a sequence for which one can successfully complete both operations.

However, Craik & Jennings [13] suggest that deficiencies in memory due to limited cognitive resource of older adults can be repaired by the provision of environmental supports that decrease the processing requirements of the memory task, so that age differences become less pronounced. We have found that age differences are indeed smaller when subjects use environmental supports such as related cues to retrieve words from memory compared to unrelated cues [3,19]. The facilitation occurred, presumably, because the related cues drew upon world knowledge and did not require resource or mental effort to link to the target noun, thus acting as an environmental support.

Inhibitory function is a third measure of processing efficiency and is viewed as the ability to block out irrelevant thoughts or activations from memory and attend only to a focal stimulus. Measures of negative priming assess inhibitory function [20,21], and the Stroop effect is also conceptualised by some as a measure of inhibition. Older people appear to have less cognitive resource due to the inefficient operation of their inhibitory processes and inability to attend to primary target information.

Finally, a fourth view is that of Lindenberger and Baltes [15] and Baltes and Lindenberger [16]. They present compelling evidence that simple measures of sensory function, balance and gait account for nearly all age-related variance in cognitive function and that these measures are even more fundamental to understanding cognitive ageing than speed of processing or working memory. They argue that these measures provide an index of `brain age' and are an assessment of neurobiological integrity. These measures explain essentially all age effects on most cognitive tasks because the decrements evidenced are due to a `common cause' - the decreasing neurological integrity of the ageing brain.

Until recently, the establishment of direct relationships between measures of processing resource and memory performance has been somewhat elusive. Salthouse has demonstrated repeatedly connections between speed of processing and age-related differences in cognitive performance using hierarchical regression and structural equation modeling techniques [see 12 for a thorough review of this work].

Nevertheless, the relationship among these various resource constructs (speed, working memory, inhibition and sensory function) has not been investigated and it has remained an open question whether tasks that have been hypothesised to require more mental effort and show larger age deficits actually require greater investments of processing resource. Moreover, it has not been demonstrated that tasks that are hypothesised to have more environmental support actually require less cognitive resource to perform. Finally, it has also not been clear whether constructs like speed, working memory and inhibition make independent contributions to memory

function or whether speed is perhaps a more basic resource that operates through working memory, with no independent contribution of working memory to long-term memory function.

In an effort to resolve some of these important issues, Park et al. [2] tested 301 adults, aged 20 to 90, collecting multiple measures of processing speed and working memory function, as well as measures of three types of memory function - free recall, cued recall and spatial recall. These three types of memory are hypothesised to require different amount of processing resource, with free recall most demanding and spatial recall least demanding. A structural equation model describing the results of this research is shown in Figure 1, which demonstrates that although speed is a central construct in explaining age-related variance in memory function, working memory is also an important construct for the two types of memory hypothesised to require more processing resource - free recall and cued recall - but makes no contribution to spatial recall.

Figure 1: A model that represents all three types of memory - free recall, cued recall, and spatial recall - and the relationships of speed, working memory (WM) and age to them. For each path, the standardised path coefficient is presented. All paths shown were statistically significant. BDigit = backward digit span; CSpan = computation span; RSpan = reading span; PComp = pattern comparison; LComp = letter comparison; DSymbol = digit symbol. List 1 = recall list 1; List 2 = recall list 2. Adapted from Park et al. [2] Copyright APA.

As the memory requirements of the task became more effortful, the contribution of working memory performance increased. The model also suggests that perceptual speed is a more fundamental cognitive resource than working memory and accounts for nearly all age-related variance, but on more demanding tasks, working memory function is also important. In general, the model provides clear support for the processing resource view of cognitive ageing by measuring the resource constructs independently of memory function and modeling the causal relationships of resource to memory.

What are important questions for cognitive ageing researchers in the future? First, with the advent of neuroimaging techniques, we are beginning to bridge the gaps between processing models of cognitive function and actual brain activation. There is evidence for differential patterns of brain activation between old and young adults, particularly with respect to frontal function [22], suggesting that old may need to recruit more brain areas to perform the same cognitive operations as young adults. Such findings are consistent with limited resource models of memory and provide evidence for the neurobiological constraints that lead to resource limitations.

A second important issue is to determine whether cognitive resource is a general construct or whether there are specific pools of resource that vary in their age-sensitivity, such as verbal and

spatial working memory. It may be the case that well-differentiated pools of resource in young adults dedifferentiate across the lifespan resulting in a single general factor. The work of Baltes and Lindenberger [16], showing the general deterioration of brain function through sensory measures, would support such a dedifferentiation hypothesis.

A third area of interest involves understanding the mechanisms governing less resource-intensive types of memory such as prospective memory, implicit memory and spatial memory. We know relatively little about the causal mechanisms underlying variance in this type of memory.

Finally, it seems increasingly likely that as older adults' cognitive resources become more limited, automatic or unconscious processes are likely to guide their everyday memory and behaviour. Jacoby, Jennings and Hay [23] provide compelling evidence that the automatic component of memory does not change with age, and determining how to exploit and control these automatic processes to enhance memory function in older adults could be a fruitful avenue of future inquiry.

In summary, much progress has been made in understanding age differences in controlled, effortful memory processes and what mechanisms control these processes. Less is known about automatic, low effort processes, as well as about the relationship of brain function to cognitive models of behaviour. Finally, much remains to be learned about the relationship of these laboratory processes to the everyday memory function of the older adult in the real world.

Acknowledgment

This research was supported by the National Institute on Aging through Grants R01-AG06265 and P50-AG11715 to the author.

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In-Home Programs of Prevention and Comprehensive Geriatric Assessment: International Perspectives

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Abstract. Innovative geriatric care programs have developed worldwide in the past two decades to better address the special problems and care needs of the growing elderly population. Many of these have been based in the home setting and involved basic concepts of prevention and comprehensive geriatric assessment (CGA). Some have focused on periodic screening of relatively healthy and independent elderly persons in their homes and provision of prevention-oriented services, others have targeted more frail and disabled individuals (eg. post-hospitalisation), still others involve entire population groups of elderly persons and provide both prevention and treatment. A common thread has been the use of CGA to evaluate patient problems, understand needs for care, help arrange for services and plan follow-up. Benefits have included more complete diagnosis, discovery of important treatable problems, improvement in drug regimens, reductions in use of hospitals and nursing homes, improved function and satisfaction and reduced mortality. Meta-analysis has confirmed some of the most important of these benefits: improved functional status, reduced mortality and reduced use of institutional services. In this symposium, reports on in-home prevention and geriatric assessment programs were presented from six countries: Australia, Denmark, Italy, Switzerland, the UK and the US.

Effects of Home-based Intervention on Unplanned Readmissions and Out-of-hospital Deaths. (S.Stewart, S.Pearson, C.G.Luke and J.D.Horowitz; Department of Cardiology, TQEH, Adelaide, Australia). Simon Stewart reported on an a randomised clinical trial of a innovative program of post-hospitalisation in-home assessment and follow-up. The study was conducted at The Queen Elizabeth Hospital in Adelaide, a tertiary care referral hospital that serves a largely elderly population of lower socio-economic status with higher rates of chronic illness and hospitalisation than other parts of the region. A pilot study of post-hospitalisation home visits suggested the potential value of such an intervention reducing the need for subsequent hospitalisation, and a randomised trial was recently performed to confirm the pilot data.

Patients admitted to medical and surgical units at the hospital were randomised to either usual care (UC) or home-based intervention (HBI) prior to discharge home with a prescribed medication regimen for a chronic condition. Of 906 eligible patients initially identified, 762 (84%) agreed to participate in the study. Following randomisation, patient baseline characteristics and potential risks for unplanned readmission were documented. All patients and caregivers in the HBI group (n = 381) were counselled prior to discharge by a study nurse and/or hospital pharmacist in relation to medication compliance and early detection/reporting of clinical deterioration. According to the pre-discharge risk assessment, 314/381 HBI patients were considered at high risk for

rehospitalisation and were scheduled for a home visit one week post discharge by a study nurse and pharmacist.

During subsequent home visits the study nurse and pharmacist principally assessed the following: treatment knowledge and compliance, health status and extent of social support. Any remedial action was designed to address immediately any acute problems relating to the patient's health status and/or management of prescribed treatment (eg. medications) and in the longer term improve vigilance by the patient, care-givers and/or relevant health professionals to identified problems that had the potential to lead to unplanned hospitalisation. All patients (381 HBI vs. 381 UC) were followed-up for a minimum of six months. The primary end-point of the study was number of unplanned readmissions plus out-of-hospital deaths, and secondary end-points included duration of hospital stay, number of emergency department contacts, overall mortality, and cost of hospital-based care.

Analysis of baseline data, including extent of co-morbidity, suggested that the groups were well matched. The mean age of the study cohort was 66 ± 16 years, the majority were of low socio-economic status and 84% were being treated for at least 2 chronic conditions and were taking a mean of 4.8 ± 2.5 medications.

During home visits 44% of the HBI patients were found to be poorly compliant with their prescribed medications, 96% demonstrated inadequate knowledge concerning their treatment status, whilst 14% were found to have experienced significant clinical deterioration since discharge. Remedial action included both immediate counselling and problem solving and subsequent contact with pre-existing community-based health professionals (including the patient's primary care physician) to prevent future problems.

During study follow-up, the primary (composite) end-point occurred on 155 occasions in the HBI group and 217 occasions in the UC group ($P < 0.001$): this comprised 154 vs. 197 unplanned readmissions ($P = 0.022$) and 1 vs. 20 out-of-hospital deaths ($P < 0.001$ [OR 0.04, 95% CI = 0 - 0.4]). The effect of the intervention appeared to be principally mediated via reduced frequency of multiple unplanned readmissions and out-of-hospital deaths ($P = 0.035$).

Total mortality rate was also significantly lower in the HBI group (12 vs. 29: $P = 0.006$ [OR 0.4, 95% CI = 0.2 - 0.8]). Patient attendances at hospital emergency services were also significantly lower in the HBI group (236 vs. 314: $P < 0.001$). Total days of hospitalisation resulting from all readmissions during study follow-up were significantly less in the HBI group (1452 vs. 1766 days: $P < 0.001$). This comprised 1258 vs. 1497 days associated with unplanned readmissions ($P < 0.001$) and 194 vs. 269 days associated with elective admissions ($P < 0.001$).

Odds ratios for relative probability of unplanned readmission within the entire study cohort were approximately 2.0 for patients with either prior dependence on home-based support or prior unplanned admission(s) and 2.2 for patients receiving greater than or equal to 5 prescribed medications. Significant, independent correlates for out-of-hospital death were non-English speaking background and assignment to UC.

Costs of hospital-based care tended to be lower among HBI patients, with a mean of $A2190 per patient (95% CI = $A1740 - 2630) vs. $A2680 per UC patient (95% CI = $A2030 - 3320); this difference did not reach statistical significance ($P = 0.210$). The cost of implementing the study intervention among the 254 patients who received a home visit was $A190 per patient (total $A48,460), whilst mean cost of community-based care was $A610 per HBI patient (95% CI = $A530 - 690) vs. $A630 per UC patient (95% CI = $A560 - 700) - $P = 0.641$).

This study clearly demonstrated that an inexpensive HBI can reduce unplanned readmissions and mortality among a cohort of largely frail elderly patients discharged to home after acute hospitalisation. While confirmation of the cost-effectiveness of this strategy needs to be carried out among patients at risk of multiple readmissions (within the UC group this included patients with diagnoses of congestive heart failure and/or chronic airways limitation, an unplanned

admission within 6 months of the index admission and a greater number of medications prescribed on discharge), it would appear that this type of intervention merits widespread adoption.

Geriatric Home Visit Programs In Denmark: Recent Developments. (M.Schroll and C.Hendriksen; Department of Geriatric Medicine; Copenhagen University and Municipality Hospital; Copenhagen, Denmark). Marianne Schroll presented a brief history of in-home comprehensive geriatric assessment (CGA) in Denmark, one of the real pioneering countries in this field, and discussed the major research findings from the most important studies of these programs. She also summarised the current Danish policies and program types. Building on the results of the well-known Danish randomised trials of in-home CGA, current Danish law requires all municipalities to offer two home-visits annually to all citizens age 80 and above.

The major components of the Danish in-home CGA programs include: a structured interview (to explore the elderly patient's view of his/her current life situation; and to complete a health inventory that includes medications, physical and mental functioning and social conditions), formulation of action proposals and therapeutic plans and structured follow-up.

Positive effects of these programs have been associated with a number of factors. These include: having more than one home visit, using professional health visitors (social interventions alone from volunteer did not show a beneficial effect), cooperating with the primary care sector including the general practitioner, being fully integrated within the primary health care system, and having health care professionals fully familiar with the local social and health care systems.

The `Silver Network': a National Home Care Program Focused on MDS-HC and Case Management. (R.Bernabei and L.Carosella; Istituto di Medicina Interna e Geriatria, Università Cattolica del Sacro Cuore; Rome, Italy). Roberto Bernabei reported results of a randomised trial of an in-home case management program within an Italian urban home care program. The study's purpose was to understand if the in-home case management approach is effective in elderly care. A secondary aim was to promote the diffusion of a second generation in-home assessment instrument, the MDS-HC, in Italy.

In the study, 200 elderly persons already enrolled in home care programs run by Social Services or Health Services authorities in a 35,000-inhabitant Italian city were randomised to traditional care or to a special case management approach. The special approach consisted of a CGA by the community geriatric evaluation unit (which included a case manager, a geriatrician, a social worker and several nurses, plus the primary care physician) and follow-up home visits by the case manager at least seven times over a period of one year. The case manager was constantly available to address problems and monitor the provision of services. Both the intervention and control groups were assessed with the available scales (ADL, IADL, MMSE, GDS, etc.) at the beginning of the study and after one year, and the case management group was assessed every two months during the follow-up year.

After one year, subjects enrolled in the case management program had a significant decrease in functional loss, a significant reduction in hospital and long-term care days with no increase of supportive home care services as compared to the control group. Cost per person was lower in the intervention group by 23%. The study concluded that a case management approach creates a network of integrated services, improves the health of the elderly and is cost effective. This case management centered program will be implemented and tested in ten selected health care Italian districts using a second generation global assessment instrument, the MDS-HC, as part of a multi-site randomised trial.

In-home Care in Switzerland: Description of an Innovative Model and Prevention Perspectives. (C.J.Büla, A.E.Stuck, F.Waldman, J.Antille; Division of Geriatric Medicine, Centre Hospitalier Universitaire Vaudois (CHUV), University of Lausanne; & Zentrum for Geriatrie-Rehabilitation, Zieglerspital, Bern, Switzerland). Christophe Bula carefully described the organisation of in-home care services and prevention programs for community-dwelling elderly persons living in the

French-speaking Canton de Vaud, Western Switzerland, and then described an ongoing randomised trial that is testing the effectiveness of a program of in-home comprehensive geriatric assessment in the German-speaking city of Bern.

The Canton de Vaud has a population of about 600,000 people, about 14% of whom are aged 65 and over. In 1987 in-home services were not centralised, and elderly persons had to depend on several home-care agencies when in-home services were required. After 1987 this changed, as 39 medico-social centers were formalised throughout this canton (one for each 15,000 to 20,000 inhabitants), a major function of which is in-home care.

The number of clients cared for by a center each month varies from 100 to 400. Each center's team includes nurses, nursing aids, occupational therapists and social workers. They provide a full range of services (nursing, social and environmental evaluations, personal care, homemaker chore, meals-on-wheels), coordinated through weekly interdisciplinary team meetings. Each center has a community physician serving as referent. He participates in team meetings and is an intermediary between the center's team and other primary care physicians.

In addition to the medico-social centers, an emergency community nursing service (Bureau d'Orientation des Urgences Médico-sociales [BOUM]) was implemented in Lausanne, the state capital, with three tasks:

- to deliver urgent in-home nursing care and evaluation;
- to organise and supervise respite and long-term care beds in several nursing homes;
- to organise discharge planning for elderly medical in-patients admitted to the academic medical center.

This service is staffed with nurses, available by phone through the medical emergency phone service, 24 hours a day, seven days a week.

In a 1995 survey, 10,834 persons were cared for by the in-home services, representing about 9% of elderly aged 65 and over. Most were women (74%) and lived alone (57%). About half (47%) were aged 80 years and older, and 43% received between 4 and 9 visits a month. These services were mainly nursing and personal care (47% and 29%, respectively), social services (11%) and occupational therapist evaluation (7%). In addition, 56% received housekeeping services, which was frequently the only service provided.

The same year, 2,926 requests were made to the BOUM. Compared to subjects cared for by regular in-home services, BOUM subjects were more frequently male (37% vs. 26%), living alone (71% vs. 57%), and older (62% vs. 47% aged 80+). Most requests were responded to through a temporary increase of in-home services (76%). Urgent respite or rehabilitation admissions (21%) were also organised, thus preventing unnecessary hospital admissions.

Although this model has been efficient in providing home-care services, no systematic preventive approach has yet been implemented. Evolution of the pattern of medico-social centers' service use seems to indicate a tendency toward an increased use by a limited number of elderly persons, requiring frequent visits. Redirection of some resources toward prevention should now be considered.

In this regard, the results of an on-going randomised trial implemented in Bern (EIGER project) will soon provide important information on CGA effectiveness in the Swiss environment. In this trial, an intervention combines preventive annual in-home CGA by specially trained nurses with follow-up visits every 3 months for 2 years. Between July 1993 and July 1994, 791 community-dwelling subjects aged 75 and over living in the city of Bern were enrolled in the study. Although most subjects were functionally independent at study enrolment, baseline data show a high prevalence of risk factors for functional dependency such as hypertension (35.5%), lack of exercise (45.8%) or polypharmacy (18.6%). In addition, only 24.8% were vaccinated against

influenza. One of the challenging aspects of this program is its integration in the primary care system. Although 74% of involved primary care physicians were satisfied with the program, 24% considered preventive home visits as a competition to their practice.

The final 3-year results of this trial are expected by the end of 1997 and should help to refine our understanding of preventive applications of in-home CGA and contribute to defining better strategies for disability prevention in older persons.

Assessment of Older People in Primary Care: Experiences in the United Kingdom. (D.A.Jones; Research Team for Care of Elderly People; University of Wales College of Medicine; South Glamorgan, UK). Dee Jones reported on current UK programs and policies of assessment of older people in primary care, particularly in the home, and described an ongoing multicenter trial evaluating different assessment models and strategies. These programs are based on a long-standing concern that significant health problems of older people frequently go unreported and unidentified, and that problems which are identified are inadequately managed or treated. The UK has long been a pioneering nation in geriatrics, and this is particularly true in the field of CGA.

Previous research and meta-analysis showed likely benefit from regular assessment of older people in the community, but the findings have not been fully consistent. Varying outcome measures have been used in past studies: reductions in mortality, hospital admissions, institutionalisation and morbidity. All the previous studies of outpatient assessment, apart from the meta-analysis, have been too small in sample size and too short in follow-up to give definitive findings on morbidity, functioning and quality of life.

As part of the change in the general practitioner contract, GPs were required to offer an annual health check to those aged 75 years and over. GPs were not advised on the methods and strategies to assess older people effectively. This requirement has met with varying responses from GPs due to the lack of evidence of benefit. A multicenter trial is currently in-progress to evaluate different strategies and models of assessment used by GPs throughout the UK. Design of this ongoing trial was outlined, and results will be available over the next several years.

Home Assessment, Prevention and Care in the US PACE Program. (D.Wieland, G.P.Eleazer, C.Hornung, and R.McCann; Division of Geriatrics, University of South Carolina School of Medicine, Columbia, South Carolina, USA). Darryl Wieland presented data on patient needs and home-service use from the US Program for All-inclusive Care for the Elderly (PACE). PACE replicates the comprehensive (medical and long-term care) service delivery and integrated financing model pioneered by On Lok Senior Health Services in San Francisco. PACE aims to maximise autonomy and health in very frail elderly persons, allowing continued community tenure and preventing institutionalisation. To do this, it employs interdisciplinary teams to comprehensively assess participants needs, develop care plans and seamlessly deliver total care in appropriate settings. PACE provides primary care, social work and restorative therapy in centers, homes, hospitals and nursing homes (NHs).

Demographic, health and utilisation data from the PACE information system were analysed. Enrollees (n=3,664 through 12/95) were >55 years old, and all were certified eligible for NH care by states. The typical PACE participant was an 80-year-old widow living alone, suffering from eight chronic illnesses. Overall, 60% were cognitive impaired, 50% required walking assistance and >80% needed help managing medications.

Given these needs, PACE provided a large amount of in-home personal care, chore and meal services. These varied across sites, depending on service environments, housing arrangements and informal support availability, although virtually all clients received some home services. Drivers and aides contributed eyes and ears to assessment and care planning as well as supportive care, and social workers assessed participants at home quarterly. While most primary care was delivered at centers, many clients received in-home urgent care and diagnostic services. In toto, 35% of 1995 expenditures were allocated for centers, and 19% for in-home

care, vs. 17% for institutional care. PACE clients used fewer expensive institutional services than elderly generally (eg. mean PACE hospital LOS was 4.9 vs. 7.6 days for all Medicare stays).

In conclusion, compared with the general elderly US (Medicare) population, PACE utilisation patterns strongly suggest that PACE has successfully implemented cost-effective comprehensive community-based care for its particularly frail sub-population.

Studies of In-home Preventive Geriatric Assessment: Overview and Discussion of Previous and Ongoing Trials in Southern California. (L.Z.Rubenstein, C.A.Alessi, K.R.Josephson, J.O.Harker; UCLA School of Medicine & the Geriatric Research Education & Clinical Center (GRECC) at Sepulveda VA Medical Center, Los Angeles, California, USA). Laurence Rubenstein presented an overview of in-home preventive CGA programs in the US and data from two completed and one ongoing trial of in-home preventive CGA in Los Angeles. Over the years, many diverse programs of CGA and preventive outreach have been devised and tested, with a variety of documented benefits as well as some equivocal trials.

Among the most consistently successful programs, in terms of outcome, have been hospital-based programs and those based in the home. Both program types have demonstrated positive impacts on survival, functional status and service utilisation. The in-home preventive assessment programs have the advantage of being much less costly and accessible to a larger population base. While some programs have focused on providing periodic screening and other preventive services to relatively healthy and independent elderly persons in their homes, and other programs have targeted more frail and disabled individuals and been more involved with providing hands-on treatment, a common thread had been the use of CGA to evaluate patient problems, understand needs for care, help arrange for services and plan for follow-up.

In Los Angeles, two recent trials of in-home preventive geriatric assessment have shown positive results - a randomised trial based in Santa Monica (which showed that in-home assessment and follow-up by gerontological nurse practitioners with geriatrician oversight can lead to improved functional status and reduced nursing home use) and the HAPSA trial (which showed that a similar in-home assessment and follow-up program, relying more on volunteers, can improve preventive practices and functional status).

Currently ongoing is a randomised trial of a preventive outreach program in which high-risk elderly outpatients are identified by postal questionnaire, confirmed by phone interview and referred for targeted interventions with follow-up by a case manager over a 2-year period. Pilot data, which identified 38% of responders as `high-risk' and referred 89% of these for geriatric services, suggest that postal screening can effectively identify high risk persons likely to benefit from targeted interventions.

Advances in Longitudinal Research Methodology

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Abstract. Issues in longitudinal research in geropsychology are identified. Advances in longitudinal research methodology are illustrated by summarising three symposium contributions. Tjörborn Svensson discussed whether biographical retrospective data can be conceptualised as a longitudinal inquiry, and what the kind of design would be that one would want to apply given a positive answer to the question. Scott Hofer treated the topic of subject attrition in longitudinal studies within the more general framework of contemporary missing data analysis. Christoph Rott addressed the issue of variability within and across individuals. Using the example of the Bonn Longitudinal Study (BOLSA), he showed how model misspecifications can circumvent limitations

of the designs using an age-cohort-period model. He also incorporated adjustments for attrition and substitution of an event definition for calendar time.

Introduction

In summarising the content of the symposium on Advances in Longitudinal Research Methodology I will begin by reminding the reader of the important role of longitudinal inquiry in geropsychology. I will also briefly touch on some of the early issues that are currently being given full attention by researchers designing serious longitudinal studies.

For the content of the symposium I purposively selected a diverse group of contributions. The first (Tjörborn Svensson, Gerontogisk Institute, Lund, Sweden) discusses an important content question, namely whether biographical retrospective data can be conceptualised as a longitudinal inquiry, and what the kind of design would be that one would want to apply given a positive answer to the question. The second contribution (Scott Hofer, Pennsylvania State University, USA) discusses the thorny topic of subject attrition in longitudinal studies. It places this topic within the more general framework of contemporary missing data analysis. This permits illustrating the applicability of modern multivariate methodology to the solution of attrition-related questions. The third paper (Christoph Rott, University of Heidelberg, Germany) deals with the issue of variability within and across individuals. Using the example of the Bonn Longitudinal Study (BOLSA), examples are provided of how model misspecifications can be used to circumvent limitations of the designs currently used to estimate components of the age-cohort-period model, as well as how the dependency of the time-of-measurement (period) component might be resolved by substituting an event definition for a calendar time definition.

Some Historical Notes on the Role of Longitudinal Inquiry in Geropsychology

In the beginning, most psychologists who later on became interested in adult development and ageing, started out as child psychologists. Child psychologists soon became interested in the differential developmental paths taken by children. They realised that antecedent-consequent relationships could not be elucidated by comparing different age groups, but that it was essential to follow cohorts of children over the path of their development if one were interest in between individual differences in the intra-individual development occurring in particular children.

Some of the original longitudinal studies in geropsychology began as child studies. Perhaps the best known in this class are the Berkeley Growth and Guidance studies originating in the 1930s [1] or the Terman study of genius [2] which as their subjects aged developed into studies of adult development and ageing. Other studies were explicitly designed to follow adults from middle or early old age into advanced old age. Examples of such studies are the Duke Normative Aging studies [3] and the Bonn Longitudinal Study [4]. These studies followed one or two cohorts of particular interest in their historical location, while others (such as the Seattle Longitudinal Study [5] have followed multiple cohorts spaced equally in time. Studies have varied widely in substantive content, but all have been important in increasing our understanding of human ageing and in particular in being able to appreciate the wide array of individual differences in developmental trajectories that remain quite pronounced in adulthood [6].

Early Issues in Longitudinal Methodology

Understanding the difference between cross-sectional and longitudinal data. The recognition that longitudinal data were needed to understand development was not necessarily followed immediately by a full recognition of how cross-sectional and longitudinal data were related, and what kind of information could or could not be inferred from one to the other. It was not until 1965 that Norman Ryder [7] in sociology and this author in psychology [8] formally clarified this relationship in what became known as the age-cohort-period model. In short, cross-sectional studies compare groups of individuals at different ages at one point in time. Hence they are useful in describing how population groups differ by age, but they do not inform us how particular

individuals will change as they age, unless our observations are made in a completely static context (that is, where cohort and period effects are close to zero). But longitudinal studies are also fraught with methodological problems, the most serious of which have been described by Campbell and Stanley [9] as threats to internal validity common to all quasi-experiments, that is studies that do not allow completely random assignment to levels of the independent variable.

Threats to the internal validity of longitudinal studies. The major concerns here for ageing studies include the confounding of historical change with age-related effects. This problem is generally handled by following more than one cohort over a similar age span. Experimental mortality (attrition) involves the typically non-random dropout of part of one's sample (see below). When attrition is due to causes other than death, it is often necessary to estimate what performance levels would have been like in unattrited samples. Practice effects (reactivity) may be a function of subjects becoming `testwise' or leading to actual treatment effects in improving performance. Practice effects can be controlled for by adding control groups which have been assessed one occasion less than the target group [10].

Obtaining Longitudinal Data via Introspection

Although longitudinal studies are generally conceptualised as a sequence of data gathered on the same individuals over a long period of time, it is also possible to conceptualise the reconstruction of events occurring over a person's life by means of autobiographical data as a form of longitudinal inquiry. How this can be done was laid out in Tjörborn Svensson's presentation.

Introspection as a means of revealing the inner self. As distinct from objectively assessed longitudinal data, the autobiography rather represents a quasi-longitudinal account of the subjects' perceptions of their lives. Nevertheless, it is argued that it is only the life story as told by the individual that can reveal for us the developmental course of the inner self.

The interviewer as a response elicitor. If biographical data are obtained by means of an interview, then the characteristics of the interviewer are important. Is that person someone to whom intimate details can be safely revealed? Does the subject perceive possible consequences to his revelations in terms of the relationship with others? Is the interviewer in an authority role with the possibility that the data revealed may influence future relationships? All these dimensions are likely to influence the veracity and completeness of information gathered.

Context within which the life story is told. Reports of the past must be seen in the context of what currently holds meaning in our lives as well as what we expect the future to hold. Equally important is the presence or absence of meaningful family members, friends and others that are part of a person's support system. Since these will shift over time, we can expect that the life story will change as well. Just as objective longitudinal data are influenced by the historical situation during which they are collected, so do biographies shift over time. It is as if we had several `cohorts' of life histories.

Cross-sequential designs for conceptualising autobiographies. Svensson proposes alternate designs for collecting multiple autobiographies on the same persons to understand the confounding factors listed above. First he would assess change in content of the autobiographies as people age (eg. ask subjects to tell about their life at different ages, say 60, 70 and 80). Second, he would study change in perspective from different ages (eg. at 70 describe age 60, at 80 describe age 70). Third, he would compare whole life reviews conducted at different ages; and finally he would inquire into life events only mentioned at later but not at earlier ages.

Longitudinal Attrition as a Missing Data Problem

Scott Hofer's paper was designed to propose methods for minimising the effect of missing data and attrition in the study of change over time.

Classical methods for dealing with missing data. The classical approach has been to engage in listwise or pairwise deletions (the latter often not tractable to multivariate analyses), or to throw up one's hands and decided that certain sets were simply not interpretable because of missing date problems. Also popular means replacement downwardly biases standard errors. Regression imputation underestimates variances and standard error. Both methods assume that data are missing randomly.

Patterns of missing data. Several types of missing data patterns can be distinguished. The most benign is called sparse missingness (typically within occasion) which involves item or scale nonresponse. More typical in longitudinal studies is differential attrition; ie. subjects do not return for further testing. If information is available on the characteristics of these dropouts it may be possible to model nonrandom attrition patterns [11]. Missing data may also be a function of unequal intervals. In this case subjects may miss some test occasion but return for later assessment. Finally, the investigator may plan selecting only partial data and then proceed to estimate population parameters [12].

Causes of attrition. Sparse missingness (within occasion) may occur because some subjects lack the ability needed to perform the test, have low motivation, fear negative consequences, or accidentally fail to return to skipped questions. Subjects may fail to return in longitudinal studies because of death, illness or disability. If such attrition is random with respect to the dependant variables it can be ignored. Otherwise, probability of dropout depends upon covariates and/or previously observed response, or on current unobserved responses [13,14].

Algorithms for estimating missing data. In one step approaches, structural equation approaches specify each pattern of missingness as a separate group, or estimates the case-wise likelihood of the observed data (suitable programs would be LISREL, EQS, MX or AMOS). Alternative approaches involving sensitivity analyses can be run within a Bayesian framework. Two-step approaches begin by including all available data that might explain missingness. Here maximum-likelihood covariances and means are obtained and bootstrap methods are used to obtain standard errors (programs for the latter approaches are EMCOV and NORM. Copies of relevant computer algorithms can be obtained from the following web sites:

AMOS http://www.smallwaters.com/amos

BUGS http://www.mrc-bsu.cam.ac.uk/bugs

EMCOV http://methcenter.psu.edu (freeware)

MX http://views.vcu.edu/mx (freeware)

NORM http://methcenter.psu.edu (freeware)

Examples. Studies referred to by Hofer that provide examples for this method are from the Newcastle Longitudinal Study of Cognitive Aging [15], the biomarker of ageing studies [16], and from prevention research [12].

Designs for Studying Inter- and Intra-Individual Variability

Problems in applying optimal designs. Christoph Rott addresses the issue that ideal designs for longitudinal studies are time and resource consuming and that compromises must often be made in the real world. He calls attention to the fact that many longitudinal studies with less than ideal designs are often insufficiently exploited. Often only cross-sectional analyses are conducted on the different data points, and threats to the internal validity of the studies are not examined even when data are available.

Examples of useful model misspecifications. Rott points out some ways in which existing data sets can be more utilised by making limiting assumptions or testing strategically misspecified

models. He uses the example of the Bonn Longitudinal Study of Aging (BOLSA)[17], which remains the only large sample longitudinal study of ageing in Germany, which was designed as a two-cohort cohort-sequential study. After comparing intra-individual change in the two cohorts, he concludes that time-of-measurement effects are likely to be trivial, or at least not related to systematic historical effects. He then proceeds to substitute age as the independent variable for cohort, and by treating the successive observations on individual subjects as independent sample. This approach makes it possible to use all observations and to model age gradients over a longer portion of adulthood [see also 5]. This approach works well, except for the limitation that while there is overlap across cohorts in the middle, different cohorts contribute to the age change information at the younger and older ends of his age distribution.

Incorporating attrition adjustments into basic study design. Attention is made to the problem of attrition, by segregating data into sub-samples that were retained in the study for various periods of time. This analysis shows results in agreement with previous findings [10] that subject attrition leads to overestimation of performance levels, but does not seem to effect estimates of rate of change.

Introducing non-calendar related events. Another novel empirical contribution of this paper is to implement use of event occurrence as an alternative for calendar time. Rott uses information on the onset of sensory deficit in BOLSA as an independent variable predicting decline on the German version of the Wechsler Adult Intelligence Scale. He shows that the occurrence of severe decline in hearing leads to decline in cognitive functioning which is reversed after some time. On the other hand, severe decline in visual functioning is related to irreversible decline in cognition.

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The Economics and Financing of Long-Term Care

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Abstract. Population ageing does not mean unaffordable care costs for the elderly, given economic growth. But current wide variations in financing chronic care in old age need to be reassessed. Major options discussed in the paper are: community care, home equity conversion, and private insurance.

There is an expression that is often used to explain a successful outcome of some important event. You often hear that someone or something was "in the right place at the right time."

Instead I want to argue with regard to long-term care financing that almost all countries are in the wrong place at the wrong time. We are at a place in the development of medical care services where policy makers are thinking less about the need for additional services and much more about how to scale back services to keep costs down. And it is a time when demographic shifts in the population are frightening people with regard to the economic burden of the elderly. The last thing many people want to think about is providing major new entitlements to what many think is now an `advantaged' age group.

So the long-term care issues that gerontologists see as so important for our later years are coming to the fore just at the wrong time. The rising number of very old in need of services and special living arrangements is colliding head-on with two institutional realities. First, as Professor Binstock pointed out, there is the erosion of the family's ability to provide care, given the rising labor force participation of women and changing family structures. Second, there is the growth of a care-giving industry increasingly dominated by market driven, for-profit firms.

A recent book edited by Laura Katz Olson documents well the problems and failures of long-term care around the world [1]. Particularly distressing is the shift to privatisation in so many countries - what Alan Walker and Lorna Warren call `supermarket-style consumerism' in long-term care [2]. The fact is that `the market' has produced throughout the world growing numbers of custodial institutions with poorly paid and low morale staff, providing marginally acceptable services, at increasing unaffordable prices.

This conclusion may sound strange coming from an economist. However, while I see markets and competition as effective mechanisms for many things, there is no clear evidence that they are appropriate as the dominant way to run medical care delivery systems.

Will nations be able to change this dismal picture? And how will they do it? Fortunately, despite the times, many nations are giving the matter great attention, and a variety of new programs are being tried or are on the drawing boards. Reports were given at the IAG Adelaide symposium on developments in Australia, Germany, Israel, and the US.

To understand the economic constraints confronting policy makers in the area of long-term care, one must understand the perceptions and realities of population ageing throughout the world. The general ageing of populations that is occurring in both developed and developing countries today is primarily a product of economic growth and concurrent fertility decline. This is a force for good: the old world of many children, short life spans and little time for leisure and recreation is disappearing. In its place is a new world of fewer children, longer life spans and a more relaxed retirement.

But, as is now well known, this new world is viewed with alarm by many. Almost every prediction of demographic doom starts with statistics of growing dependency.

It is now commonplace for people to scare policy makers and the public with `dependency ratio' statistics. These numbers represent an attempt to measure the number of persons in the society not engaged in producing economic output relative to those in the labor force who are. The aged dependency ratio measures the relationship between, for example, social security old-age recipients and those workers paying social security taxes based on their labor force participation.

The truth is that aged dependency ratios are one-sided and very misleading. In almost all industrial countries of the world, the `total dependency ratio' (ie. measuring both young and old) is actually quite low, much lower than in the past and much lower than the ratios in developing nations today!

There have been all sorts of demographic statistics presented in the population ageing discussions to date. Most of them are worthless in assessing the economic impact of an ageing population. Demographic analysis without economic analysis is a kind of voodoo demographics with regard to the issues in question. In the US, for example, the parents of the `baby boomers' shared a per capita GDP of about $12,000 in 1964. Assuming less than two per cent annual growth, the retired boomers and their children will share in the year 2030 a per capita income (adjusted for inflation) that is $36,000 - almost three times greater [3].

In our book, The Economics of Population Aging, Allan Borowski, William Crown and I extended the demographic statistics to incorporate moderate economic growth [4]. We concluded, first, "that the economic impact of demographic ageing is not as bad as those doomsayers who use simplistic dependency ratios would have us believe. Second, as in other areas of social policy, relatively small increases in economic growth rates have the potential to substantially moderate the ill effects of other factors that have a negative impact." In fact, our research concludes that the future overall "support burden" will be less in the years 2030-50 than it was during 1950-70.

Analysing economic data over the past 100 years for the US and ten European countries, Richard A. Easterlin (one of the top experts on population economics) also finds little support for predictions that population ageing will have a negative impact on economic growth and the

economic welfare of future generations [5]. He finds a generally consistent inverse relationship between trends in economic growth and population growth - economic growth rising while population growth is falling. As he points out, this "is just the opposite of what one would have expected if declining population growth were exerting a serious drag on the economy" (p.78). Moreover, based on the historical data, "one would be hard put to argue that dependency had much to do with the dramatic post-1973 drop in economic growth rates, and, not surprisingly, it is never mentioned in scholarly attempts to explain this decline" (p.80).

All this is good news for people worrying about the economics of long-term care. If the fears of economic crisis arising from the ageing of populations is overblown, then the financing constraints will not be as great.

But clearly there are still many important issues that need to be addressed. Unfortunately, it is impossible to briefly summarise the current approaches used by nations around the world to financing long-term care services, given the huge variation among countries. This variation results in part from the fact as pointed out by Patrick Hennessy that "until fairly recently, few countries had an identifiable policy towards long-term care..." (p.23) [6]. Existing institutional mechanisms span a large continuum - ranging from the laissez fair policies of the US to the liberal hospital-stay provisions in Canada, France and Japan.

All the symposium speakers, especially Allan Borowski and Bleddyn Davies, identified financial problems that continue to arise.

With regard to financing approaches, the most common approaches are:

- paying for services through a compulsory insurance program;
- general revenue/taxation funding by the central government;
- local government financing;
- some combination of central/local financing.

But these four broad approaches hid the great variation among countries. Even if we restrict comparisons to those countries with the same basic approach, there are vast differences with regard to such things as what services are covered, the nature of eligibility requirements, the extent of means-testing, and the extent to which community care is available as an option to institutionalisation.

What is common among most countries, however, is the search for ways of dealing with the growth of long-term care costs and concerns regarding costs in the future. As the long-term care population grows, countries have found the old ways of financing straining under the burden. For example, Professor Igl points out that one of the major factors encouraging Germany to introduce its relatively new long-term care insurance program was the strain on the budgets of local authorities, who historically were responsible for much of long-term care costs.

The projection model developed by Bleddyn Davies and his colleagues at the University of Kent seeks to assess what factors are key to understanding cost tends. Davies reported in the symposium how sensitive future costs were to small changes in the trends of certain factors.

Over the last couple of decades, one of the most popular ideas for reducing the costs of long-term care has been to develop community care options that would keep persons with chronic care problems out of `high-cost institutions'. The hope was that people could stay at home or in their community (which they greatly prefer) and at the same time save money. "Ironically, in the end, the decision to expand in-home care was made based on the attractiveness of the home care option, rather than on the cost argument ..... [In the US, for example,] no fewer than twenty research and program demonstration programs were conducted during the 1970s and 1980s to

test whether in-home care would be a cost-effective alternative to nursing home care" (p.3) [7]. As Professor Binstock indicated in his paper, the answer was clearly no.

Another financing approach that some have advocated is developing mechanisms that permit converting the illiquid asset wealth contained in owned-home equity into economic resources that could be used to finance long-term care. This option seems especially attractive in countries like the US and Australia, where home ownership rates among the population are very high (or in cities like Tokyo and Hong Kong, where housing values have skyrocketed for units owned by the current older population).

Again, what looks attractive in theory has not worked very well in practice. For almost two decades, the US federal government has encouraged `reverse annuity mortgages' to be issued by commercial lenders. These mortgages provide the elderly needing more income with monthly payments based on the equity in their home. To date, however, only a few thousand of these special mortgages have been issued. The slow acceptance of this mechanism results in large part from the perceived risks involved for financial lenders and borrowers and the small amount of income that often becomes available through the mechanism. Moreover, a study now underway at the National Policy and Resource Center on Women and Aging at my university also documents the fact that it is difficult and costly to give people the information they need to make informed choices. Moreover, lenders in the US are charging very large administrative fees (often prohibitive fees) to process the loan applications [8].

Then there is the view that the best way to reduce government costs is through privatisation. Part of the privatisation fad that is sweeping the world is the idea that the way to deal with long-term care is to finance it privately, largely through private insurance. In some countries private provision is already quite high. In the UK and the US, for example, it is estimated that about half of long-term care in nursing homes is financed by private payments [9]. Increasingly, private insurance benefits are being used to meet these expenses.

However, based on the experience to date in the US, private long-term care insurance looks like an approach appropriate for the well-to-do who want more security and more choice of options and can pay for it. For those of lesser means, however, the option is not very appealing. Most people feel they can not afford the high premiums charged at the point they become interested in the product (ie. when they get close to vulnerable ages). Moreover, sales people charged with the responsibility of providing information on which individuals can make informed choices, not unexpectantly, are prone to give only that information that will `make a sale' [10].

Thus, while the demand for long-term care is growing, we are far from finding solutions to providing such care that can be financed out of what people and governments are willing to pay.

On a more positive note, all speakers at the symposium indicated some success in dealing with escalating costs. The key to this success was effective government action. Not just government action but effective government action. Anna Howe's presentation, for example, documented two very distinct periods in Australia's long term care regulatory history - one where costs spiralled and one where the government promulgated an effective framework for cost control.

Twenty-seven years ago Dr Robert Butler in his now classic book, Why Survive? Growing Old in America, wrote: "The tragedy of old age is not the fact that each of us must grow old and die but that the process of doing so has been made unnecessarily and at times excruciatingly painful, humiliating, debilitating and isolating through insensitivity, ignorance and poverty" [11]. At no point in their lives are older persons more sensitive to the issue Butler raises than when they confront the issue of long-term care and the potential costs of that care.

Now that we have provided (in industrial countries) minimally adequate income in old age to most people, it is time we tackled the scariest economic issue still facing older people: how to finance the services needed in those days when we are no longer completely independent. Unfortunately, a minimally satisfactory answer to this question still eludes us.

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Free Radicals and Glycoxidative Stress in Ageing and Age-Related Diseases

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Abstract. Free radicals and glycoxidative reactions are known to be associated with ageing on the level of the cell and whole organism. Free radicals are ubiquitous in living things and they lead to irreversible reactions in cell organelles and cell metabolism. One important source of free radicals is advanced glycation end products (AGEs) resulting from non-enzymatic glycation and oxidation of proteins and lipids. Ageing, and thus life span, correlate with free radical generation and antioxidative defense as well as with advanced glycation end products. Most chronic diseases are also associated with free radicals and AGEs. Overproduction of free radicals accelerates cell ageing and is counteracted by antioxidants. Antioxidant status is in part amendable through nutritional and pharmacological interventions. AGE interaction with its receptor contributes also to accelerated ageing in many pathological conditions. Particularly vulnerable are long-lived proteins, eg. in lens crystallin and skin collagen. The analysis of the mechanism generating free

radicals and of the reaction of AGEs with cellular metabolism opens new avenues for the delaying of the development of chronic diseases such as atherosclerosis and neurodegenerative disease. On the other hand, the impact of free radicals on carcinogenesis may differ according to the cancer stage and hence the preventive potential of antioxidants is proposed to be different in early and late stages of cancer development. Free radicals and AGE products are important mediators of age-related diseases and ageing per se. Intake of antioxidants over the life-time determines, among other factors, the rate of ageing and the development of degenerative diseases. Interventive strategies such as soluble receptors for AGEs and effective antioxidants might become important therapeutic strategies in the near future.

This combined symposium looks at new evidence of the role of free radicals and glycoxidative changes in ageing and age-related diseases. In dealing with this subject, it is useful to define the most important terms concisely.

Free radicals are ubiquitous in living things. They are highly interactive intermediates, bearing unpaired electrons. They lead to irreversible reactions. Free radicals may occur as normal intermediates in metabolism or induced by injury to tissue. Oxidative stress occurs during injury to tissue which leads to cellular and metabolic responses and generates free radicals. The balance of reactive oxygen species (ROS) and naturally present antioxidative defense is tipped in favour of ROS. One important source of free radicals is advanced glycation end products (AGEs) resulting from non-enzymatic glycation and oxidation of proteins and lipids.

There is ample evidence that ageing and thus life span correlate with free radical generation and antioxidative defense as well as with advanced glycation end products. The correlation of the mean life span with repair and antioxidative defense capacity supports this view. In addition antioxidant systems, as well as having the capacity to degradate proteins, become less effective with advancing age and free radical formation increases with advancing age.

For a number of age-associated diseases, there is evidence of an association with free radicals and AGEs. Table 1 lists these diseases.

Table 1: Age-associated diseases thought to be related to free radicals and AGEs

- Atherosclerosis
- Cancer
- Complications of diabetes
- Cataract
- Alzheimer's disease
- Parkinson's disease
- Amyotrophic lateral sclerosis

The close link between ageing and age-associated diseases, possibly mediated by free radicals and AGEs, has several important implications. Thus, it is difficult to speak of 'normal ageing'. Nevertheless, it is quite evident that many individuals remain free of many age-associated diseases. Thus, the interaction of genetic and environmental/nutritional defense mechanisms in the presence of endogenous and exogenous noxious factors might determine local disease development. The question remains whether free radicals cause ageing per se.

J. Remacle from Naumur (Belgium) developed in his presentation a theoretical model of ageing based on the fact that free radicals are constantly generating and exerting toxic effects on DNA, proteins and lipids. He observed that fibroblasts, while ageing, show a shift of cell type which depends also on energy supply. Stress, such as overproduction of free radicals, was able to accelerate drastically the shift to more aged cell types. This shift in cell type was counteracted by

antioxidants. Ageing on the cellular level therefore depends on cell defence, genetic adaptability and energy production.

In age-related pathology, free radicals are important contributing factors. P. Evans from Glasgow reviewed the different issues relating to brain ageing, emphasising that brain tissue is particularly vulnerable to oxidative stress, that beta-amyloid and aluminum silicate stimulate microglial cell release of reactive oxygen species and pro-oxidant iron might contribute to the evolution of neurodegenerative diseases. Antioxidant status is in part amendable through nutritional and pharmacological interventions, which hold great promises for primary prevention of age-related neurodegenerative diseases.

One particular mechanism was explored by A.M. Schmidt (New York). She demonstrated that receptors for AGEs (RAGE) exist at the cell surface of endothelial cells, smooth muscle cells and neurons. AGE-RAGE interactions include vascular hyperpermeability, enhanced endothelial procoagulant activity and expression of VCAM-1 activation of SMC and phagocytes with increased production of IL-1, TNF-[alpha] and growth factors. Similarly, AGE-RAGE interaction contributes to neuronal loss in Alzheimer's disease by activating microglial cells. The interaction between AGEs and the receptor thus contributes to accelerated ageing in many pathological conditions. One interesting therapeutic approach is that soluble receptors for AGEs are able to reverse pathological alterations in vitro.

The question of different receptors for AGEs was further explored by S. Horiuchi (Kumamoto, Japan). He described in addition to the known AGE-receptor RAGE, galactine-3 and macrophage-scavenger-receptor (MSR), a new receptor functional in smooth muscle cells that induces chemotactic migration and thus contributes to the development of atherosclerotic lesions.

In atherosclerosis, LDL oxidation is thought to play a pivotal role. The mechanism of how ox-LDL is generated is, however, still poorly understood. J.W. Heinecke (St Louis, US) reported his findings that myeloperoxidase secreted by phagocytes or macrophages generates HOCl in the presence of H2O2. LDL exposed to myeloperoxidase accumulates 3-chlorotyrosine, a marker of LDL oxidation. LDL in atherosclerotic lesions contains a 30 times higher concentration of 3-chlorotyrosine than circulating LDL, suggesting that this may be an important step leading to the oxidation of LDL and thus showing how free radicals generated by myeloperoxidases from macrophages contribute to atherogenesis.

In more general terms, J.W. Barnes (Columbia, US) explored the role of oxidation in ageing proteins. Particularly vulnerable are longlived proteins, eg. in lens crystallin and skin collagen. However, he emphasised that the known biomarkers account for only a small fraction of total oxidative modification accumulating in protein with age, suggesting that many more different effects of protein oxidation may be present.

In view of the increase in mean life span by calorie restriction, the question arises whether it is possible to retard glycoxidation of collagen by dietary restriction and thus to influence the rate of ageing. This hypothesis was studied by D.R. Sell (Cleveland, US). Reviewing the work on dietary restriction he could show that crosslinking and pentosidine formation is inversely related to mean life span. Hyperglycemia accelerates collagen ageing, and dietary restriction is more effective in strains of short-lived animals than in long-lived ones, suggesting that protective mechanisms in long-lived animals are less dependent on exogenous factors.

It is generally assumed that the presence of metals such as Cu++ is necessary to oxidise glucose or glycated aminoacids. Recent data suggest that methylglyoxal might be responsible for damage to proteins exposed to high glucose. One important factor in this context is, among others, the efficacy of glycoxylase I and II. This enzyme decreases with age. P.J. Thornalley (Clochester, UK), reported that in insulin dependent diabetes mellitus, methylglyoxal is increased 5-6 fold; in adult onset, non-insulin dependent diabetes mellitus, 2-3 fold. In the presence of oxidative stress, glycation of proteins by methylglyoxal is enhanced. This may underlie the link of methylglyoxal and oxidative stress with diabetic complications, and may also contribute to pathological

processes of ageing. This suggests that increasing antioxidant defense in diabetics, eg. by selenium and antioxidant vitamins C and E could indeed diminish diabetes-associated damage.

An interesting observation is the fact that transformed cells and cancer cells are poorly or not at all responsive to free radical induced toxicity. On the other hand, epidemiological findings strongly suggest that an adequate long-term antioxidant intake protects against cancer. H.B. Staehelin (Basel, Switzerland) suggests that antioxidants act differently in different stages of cancerogenesis. Thus, the conflicting results of intervention trials in high risk population with antioxidants might be explained. Life-long high antioxidant intake is protective, whereas transformed cells might be resistant to oxidative stress. A high level of antioxidants and a low level of peroxidable substrates might even protect cancer cells.

In summary, free radicals and AGE products are important mediators of age-related diseases and ageing per se. Intake of antioxidants over the life-time determine, among other factors, the rate of ageing and the development of degenerative diseases. Interventive strategies such as soluble receptors for AGEs and effective antioxidants might become important therapeutic strategies in the near future.

Filial Piety in Modern Times: Timely Adaptation and Practice Patterns

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Abstract. In recent years industrialisation and urbanisation have weakened the willingness of adult children to care for their elderly parents. The results of the author's studies reveal that the majority of Korean adult children still value and practise filial piety in their day-to-day living. However, the way they express this cultural value has changed in the process of adapting to rapid and massive social changes. For instance many of them, due to job situation, schooling and needs to explore better opportunities, live separately from their elderly parents. In spite of this physical separation, most Korean adult children strive to practise filial piety in terms of affection, responsibility, family harmony, repayment, sacrifice and so forth. By expressing and practising these basic values using the telephone, letters, visitation and other tools for communication, they maintain close relationships with their elderly parents. The relationship between parents and adult children in Korea is transforming into a new type in which mutual respect and reciprocal care and support are considered more important than submission to the authority of the elderly.

Social values guide the perception and treatment of the elderly [1,2]. These values differ from one culture to another and cultural change has a significant effect on care and support for the elderly [3,4]. It is important, therefore, to have greater knowledge of differing trends in the provision of eldercare in dissimilar cultures.

Filial piety is a social value which has greatly influenced the parent care and parent-child relationship of East Asian peoples - Koreans along with Chinese and Japanese [5-9]. The traditional value of filial piety is reflected in the ritual and propriety of these peoples. Even minute details governing their family system and manners of daily living are touched by the value.

The practice of filial piety has traditionally been the natural duty and norm of adult children in Korea. In recent years, however, as Korea has undergone a major social change in the process of rapid industrialisation, concern over parent care has been growing. This concern necessitates a critical review of the practice of filial piety. The very definition of filial piety has become a public issue.

The author conducted a series of studies of Korean adult children's attitudes and behaviours toward parent care [9,10]. Results of these studies reveal that the majority of adult children still practice filial piety. However, the ways in which they express this traditional value have been changing. This paper introduces categories of filial piety identified and discusses needs for adjusting parent care practices to changing times, distant-living adult children and the practice of filial piety, social efforts for the preservation of the filial piety tradition, and cultural differences in attitudes toward elder respect and care.

Categories of Filial Piety

What are the specific actions taken for the practice of filial piety? To answer this question, the author has identified a set of 12 categories of actions of filial piety [9,10]. Table 1 presents those categories in order of frequency and importance.

Table 1: Categories of actions and reasons for filial piety: comparison of rankings based on frequency and importance *

Categories	Ranking Based on Frequency of Actions a	Ranking Based on Importance of Reason b	Average Ranking c
Showing respect for parents	1 (88)	1 (4.78)	1
Fulfilling filial responsibility	2 (84)	1 (4.78)	2
Repaying debts to parents	3 (71)	5 (4.16)	4
Harmonising the family	4 (46)	3 (4.46)	3
Making filial sacrifice	5 (43)	6 (3.90)	6
Expressing love and affection	6 (41)	4 (4.37)	5
Expressing filial sympathy	7 (26)	7 (3.29)	7
Maintaining family continuity	8 (20)	7 (3.29)	8
Compensating care	9 (10)	10 (3.25)	9
Showing respect to other elders	10 (6)	9 (3.27)	9
Complying with religious teachings	-	11 (2.62)	11
Maintaining family honor	-	12 (2.41)	12

a: Frequency with which an action is cited

b: Importance based on the 5-point scale (5=most important ~ 1=not important at all)

c: (a + b)/2

* Based on data on exemplary filial adult children

Of the twelve action categories identified, six stand out: showing respect to parent, fulfilling responsibility for parent, harmonising family centering around parent, making repayment for debts to parent, showing affection toward parent, and making sacrifice for parent. It is noteworthy that all these categories are the virtues which Koreans have traditionally cherished. The rest of the categories have important cultural and moral meanings as well.

Each of the categories may reflect moral actions which demonstrate particular ways of caring for the well-being of the parent. Thus, filial piety is explained by multiple categories. In the description of the holistic meaning of filial piety, therefore, all of these categories would have to be considered, as they portray it in combination. Ideally, all of the categories should be practiced concurrently. For many adult children, however, it would be a challenge to do so because of constraints associated with their family, work situation and social environment. Cross-cultural research is needed to ascertain which of these categories might be universal and which might reflect ethnographic qualities specific to Koreans and other East Asian peoples.

Need to Adapt to Social Change

Due to job situation, schooling and need to explore better opportunities, a growing number of adult children in Korea live distant from their elderly parents, who mostly remain in their old residence. In parallel with these changes, the increasing number of women are working outside the family; younger generations are preferring smaller families; and they tend to emphasise an individualistic life style. These changes among others seem to affect the ways in which filial piety is practiced. Traditionally, the son has been obliged to care for his parents by living with them. Today, adult children of both genders fulfill their filial duties to a growing number of parents who live in separate households for their privacy and convenience. The distant-living children most often practice filial piety by telephone, mail and visitation. A growing number of young people express respect and affection toward parents and elders in a more frank, open and friendly manner than their parents did. They tend to be more affection-oriented. In fact, affection toward parents was found to be the most important reason for filial piety in a study of young Koreans [11]. Traditionally, free expression of love and affection has been discouraged in Korea. This is indeed a remarkable change.

Koreans have complied with the principle of primogeniture and gender roles; the oldest son and his wife are socially expected to assume the caregiver role for parents. But, now all offspring - husband and wife and brothers and sisters - tend to share this role.

For so long, the practice of filial piety has been overly, if not intensely, family-centered. But filial piety is now conceptualised and practiced more expansively to cover care and services for elders in the community, eg. free lunch, free transportation, sightseeing tours, discount, homemaking, continuing education, free counselling, etc. Communities emulate each other in rendering such services.

In order to adapt to new social requirements in the changing society, modification of certain phases of the traditional value is necessary. For instance, moving from authoritarian and patriarchal relationships to egalitarian and reciprocal patterns of mutual help and respect between generations and between genders. Korea is well in the process of such changes.

Distant-Living Adult Children and Practice of Filial Piety

Distant-living is a relatively new social trend, to which both adult children and elderly parents must adapt for better opportunities and the continuity of family prosperity. It is, however, a critical change which directly affects parent care and generational relationship. Despite such a change most Koreans do practice filial piety, adapting to changing social environments. The author has identified three typical patterns of practice of filial piety among Korean adult children: co-residence pattern, distant-living pattern, and community service pattern. One of these patterns is the distant-living pattern, wherein filial piety is practiced by adult children living separately or at distance from parent. Two vignettes depicting the practice of filial piety in this living pattern are introduced below.

Vignette I: An adult child and his wife living far away from parents. Mr Han (37) works for a firm in Seoul. His parents, retired teachers, live two hundred miles away. He could not change his parents' firm desire to remain in their old home. Due to his busy work schedule, Mr Han has not

been able to visit his parents often. Every month he sends them pocket money. Three years ago, he opened a life insurance policy for his parents. Last year he set up a new telephone line for them. He calls his parents at least twice a week to inquire about their well-being. Communication relieves his anxiety somewhat. Two months ago, the elderly father had a heart problem, and Mr Han and his wife made two emergency trips to see their parents. Mrs Han spent a week there to nurse him. Last fall, she visited her parents-in-law and replaced the old heater with a new one. As the wife of the eldest son, she feels guilty for not being able to do more for them. She telephones regularly to check on their health, food supplies, housework, etc. Whenever Mr Han thinks about how his parents devoted their lives to raising him, his heart becomes filled with the emotional feeling of the debts he owes to them. Mr Han's two young children write letters and make phone calls to their grandparents, and spend vacations with them. Two weeks ago, the family made a visit to the grandparents to celebrate grandfather's birthday and spent three days with them. A few times a year, the grandparents visit the Hans. When the parents are with them, the Hans take them out to eat, to go shopping, and wherever they would like to look around. Mostly, they talk about things of mutual concern. The couple makes special effort to make their parents feel comfortable and happy. (Underlying filial piety categories: responsibility, affection, repayment, family harmony, sacrifice)

Vignette 2: A parent cared for in an institution. Mr Yoon (47) works for the town hall. It saddens him that his mother, who became a widow at a young age and sacrificed everything she had for him, now suffers from Alzheimer's disease. He and his wife thought the disease was simply due to old-age. So they continued their effort to care for her. However, for Mrs Yoon, caregiving became increasingly difficult; she began having dizzy spells every so often and her arthritis became much worse. One day, she heard from her family physician that her mother-in-law's ailment could be controlled to some extent if adequate treatment was given. She delicately suggested to her husband that they place the mother in a home specialising in caring for demented patients before her condition became worse. She took special care not to offend him. Traditionally, it is considered unfilial to institutionalise one's parent. Mr Yoon took her suggestion seriously, taking into account that his mother's condition might improve if adequate care was given and that his wife suffered from the pressure of having to care for her. He reluctantly agreed. A few days later, the couple visited several homes for demented patients and chose one which had the best facilities and staff members. In the past three months, the Yoons have visited their mother every week at the home which is two hours away from their house. The couple substantially cut back their living expenses to pay for the home. They are pleased to see that their mother receives proper health care and humane treatment at this home. Mrs Yoon's condition is gradually improving. Mr Yoon is praying that his mother returns home before long and lives more closely with him and his family. (Underlying filial piety categories: responsibility, sacrifice, respect, family harmony.)

As the above vignettes show, children practice filial piety despite living far away from their parents. Multiple categories of actions of filial piety are practiced at the same time, including respect, responsibility, harmony, repayment, sacrifice and affection. In practice, an adult child might have given more emphasis to certain categories of filial piety action while giving less to other categories for tactical and situational reasons.

Better filial conduct beyond these essential and fundamental types of filial piety actions, could hardly be demanded from adult children living distant from their parent. The vignettes reflect adult children's effort to practice filial piety in adaptation to social changes. The ideal of filial piety is upheld; only the ways of expressing it have changed.

Efforts to Preserve the Filial Piety Tradition

The decline of parent care has impact not only on the welfare of the elderly but also on the nation's fledgling social welfare system. In recent years, the social concern over eldercare has necessitated nationwide efforts to preserve the filial piety tradition under joint public and private auspices, eg. the establishment of filial piety prizes; Respect for Elders Day and Respect for Elders Week; the enactment of the Senior Citizens' Welfare Law and the Filial Responsibility Law;

the provision of health and social services for elders; the establishment of a nationwide web of seniors' centers and seniors' colleges for continuing education and recreation, and the holding of campaigns and events for respect and care for elders. Filial piety is the keystone of these social efforts.

The filial piety prize was established first by the Korean government in 1973 and is awarded annually to about 250 highly filial persons. The broad goal of the prize is to preserve the value of filial piety, a cultural tradition of the nation. The immediate objectives are to commend the exemplary parent-caring practices of the prize recipients and to influence others to follow such examples. Along with this public prize, the two largest corporations in Korea, Samsung and Hyundai, also award filial piety prizes annually to individuals, groups and organizations which have rendered exemplary care and services to parents and elders [12 p.104]. Various local associations also award similar prizes.

At home, Koreans still teach that children must revere their parents, teachers and elders, although in a less intensive manner than in the past. Educational influence comes also from outside of the family. For instance, the performance of filial piety by exemplary children is widely publicised via mass media and educational channels. It still largely remains in the Korean cultural context as the most important value that regulates young generations' attitudes and behaviours toward parents and elders, and influences public policies for the treatment of the elderly.

The resurgence of social concern over filial piety, and the increased social effort to exhort the ideal, reflect the resilience and adaptability of Korean people, with which they respond to the challenges of social changes. Korea embodies the relative commitment to two divergent values. One is the traditional value rooted in filial piety which is associated with family-centered informal parent care. The other is a new value of public commitment to the provision of formal services for the elderly. Thus, the nation needs to continue to expand public services while retaining the cultural tradition that has had valuable results in the integration of the elderly with family and society.

Cultural Differences in the Attitude Toward Parent Care

The author compared two sets of data on motivation for parent care focusing on cultural traits associated with parent care: one set about Koreans and the other on Americans in their respective cultural contexts, who have cared for their elderly parents and relatives. From this comparison, specific forms of filial motivation were identified, some of which were country-specific while others were cross-culturally equivalent [13].

The Koreans' outstanding reasons for parent care were affection, repayment, respect, responsibility, harmony and sacrifice, whereas for the Americans, they are responsibility, affection and repayment (see Table 2).

Table 2: Reasons for parent care: comparison between American caregivers and Korean caregivers

Kind of Reason	Americans a N=203 Rank (%)	Koreans b N=226 Rank (%)
Responsibility	1 (58%)	4 (65%)
Affection	2 (51%)	1 (80%)
Repayment	3 (17%)	2 (75%)
Respect for Parent	-	3 (74%)

Family Harmony	-	5 (58%)
Filial Sacrifice	-	6 (24%)

a: Based on data from A. Horowitz and L.W. Shindelman [14].

b: Based on data from Sung [13]: Ordinary Korean adult children.

% Percent of the caregivers who indicated.

Only items cited by more than 17% of respondents are shown.

Given these reasons, one can easily notice that the Americans do not include respect, family harmony and sacrifice. Thus, those reasons which are common to both parties are affection, responsibility and repayment. These findings reflect a similarity in terms of the common human nature and a difference in terms of the cultural orientation. Compared to the Americans, the Koreans tend to be more embedded in a web of extremely close emotional relationships with their family members [15]. In such a web, they practice filial piety, the core of which is reflected in the reasons for filial piety, including respect for parent, family harmony and filial sacrifice - the three reasons which the Americans did not cite. Koreans' orientation toward family cohesiveness and dedication of self for family well-being further enhances filial piety, the ideal of family-centered parent care.

Of the three motivation categories which Americans missed, respect for parent was given a high ranking in terms of importance. In the teachings of filial piety, respect for one's parents and all elderly persons is the most stressed point. Respect for elders remains the essential element in maintaining the status of the elderly and their integration into the family and society.

Streib [2] identified a major difference between China and the US in terms of the respect for elders naturally and habitually expressed by Chinese people. He termed this cultural trait as `automatic respect.' Chow's [6] finding in China basically supports this view. In Japan, as Palmore and Maeda [7] report, respect for elders is rooted in the basic social structure of Japanese society. They termed this phenomenon `residual respect.' Meanwhile, Korean children learn through conditioning and socialisation how to behave courteously and respectfully toward parents, elders and teachers. The use of honorific language and the exhibition of courteous manners widely observed among Koreans in addressing elders are behavioural expressions of that propriety. Although some extreme expressions of respect have been modified, the moral value associated with respecting elders has not been greatly undermined in the process of social change in Korea. The author would term this Korean case of respect as `socialised respect'.

These obvious cultural phenomena largely approximate the continuing influence of the value of filial piety in the East Asian nations. The terms automatic respect, residual respect and socialised respect are generally missing in the Western world. It seems that the vast majority of East Asians still have substantially more respect for their elders than do most peoples in the West. Thus, in this key value, there still exists difference between the East and the West.

Throughout East Asia, changes are taking place. But the influence of the tradition persists. In China, particularly in urban areas, young persons tend to have negative opinion about respect and support for the elders, and they prefer to maintain an independent lifestyle [16]. Despite the change, the traditional value is upheld in China as in other Chinese communities including Hong Kong, Taiwan and Singapore [17-20].

In Japan intergenerational relations are becoming more affection-based, convenience-oriented and free from the norm of filial piety than they used to be. But Japanese people have been rather firmly maintaining their traditional patterns of co-residence and the family care of aged parents [21-23].

In Korea as well, modification is in progress. Some extreme expressions of respect are being modified. A growing number of adult children live distant from their parents. They fulfill their filial duties by telephone, visitation and mail. The young express respect and affection toward parents and elders in a more frank, open and friendly manner than their parents did. Filial piety, which has been overly family-centered, is now practiced more expansively to serve elders in the community. Despite these changes, Koreans still do respect their parents, teachers and elders, although in a less intensive manner than in the past. Foregoing descriptions suggest that an emerging trend in East Asia is to re-stress the traditional ideal of reciprocity between generations.

Filial piety is, in fact, a value which espouses mutual respect and love between parents and children, husbands and wives and siblings. T'oegye (Yi Hwang), a towering figure in Korean Neo-Confucianism, taught that the love of parents for children is out of mercy and that piety of children for parents is filial piety [24,25 p307]. The aim of his philosophy can be found in his devotion to reverence. Reverence to him meant the practice of mutual respect and love [25,26]; the practical meaning of reverence is the ideal of children respecting for their parents and parents being benevolent toward children. What is stressed in this teaching is the reciprocal relationship between parents and children.

The reconstruction and modification of the ways in which filial piety is practiced would have to proceed in line with this classical teaching.

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Advocacy: Bringing Science to Policy and Practice

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Abstract. During the 1997 Congress on Gerontology the issue of advocacy was prominently raised in numerous sessions. The delegates affirmed the Declaration of Adelaide, an important statement which called attention to the policy implications of scientific findings. The Declaration set research, practice and education agendas and urged increased resources for gerontological research and programs affecting the well-being of older persons and their families. The wisdom of "linking what we know and can do with what we hope for and desire," as the theologian Jurgen Moltman has written, requires a systematic effort on the part of gerontologists to influence public policy, standards and professional practice. In short, gerontologists must become advocates. To be effective advocates they must raise awareness of critical issues, form coalitions with those who share the goal of a better world, and exchange information and best practices if the elders of society today - and those who will be the elders of tomorrow - are to benefit from science translated into sound policies and effective practices. Gerontologists must take their scientific findings - and questions - to the forums where policies are discussed and standards and practices developed.

"Social policy only emerges when sociological, economic and
purely scientific extrapolations are linked with ethical anticipations
It does not emerge from the calculable and extrapolated future, or
solely from ethical maxims and desires, but only from the linking of
what we know and can do with what we hope for and desire."

Jurgen Moltman in Renewal of Social Vision, Cross Currents, Summer 1989.

Advocacy is an action-oriented process by which one translates what one values into policies and practices that affect the well-being of individuals, families, communities and societies. Advocacy is the means by which those who care deeply and believe strongly that life can be better, attempt to influence policies and practices. The subject of advocacy received considerable attention at the 1997 World Congress of Gerontology, through workshops, papers and during informal times and networking. While hardly a `hard science', advocacy is gaining respectability even among those devoted to their science. For an international scientific society to acknowledge that its members have a role and an obligation to address and inform policy and practice issues is a step, I believe, in the right direction.

While the International Association of Gerontology (IAG) has not been known for public declarations regarding the issues its members have addressed for decades, the Declaration of Adelaide, a statement affirmed by the delegates, was not the IAG's first such declaration. In 1982, the IAG presented "A Message to the World Assembly on Aging of the United Nations" which outlined "possible contributions of the science on aging for a policy for the aged in the 1980s and beyond." That document, edited by Hans Thomae and George Maddox, featured the scientific agendas of scholars who were becoming acutely aware of population ageing. The consequences of rapidly ageing societies on health care delivery and social trends were mentioned as requiring both the scientific communities and decision makers to apply good science to policy issues.

The IAG-approved document, published in 1982 as New Perspectives on Old Age, called on those in leadership positions to cope with the demographic changes by acknowledging that "developmental and humanitarian issues are inseparable". The writers presented an ambitious policy agenda and called for interdisciplinary panels to recommend how limited research resources should be allocated. They identified social insurance programs throughout the world, adequate appropriate housing, effective health care delivery systems, and preventive measures against risk factors associated with old age, as requiring immediate attention by decision makers. They stressed the importance of an accurate portrayal of older people as national resources, properly trained professionals, continuing educational opportunities for older people, special attention to the particular needs of rural areas, and suggested the development of a data base to inform decision makers and practitioners throughout the world.

In short, the IAG in distributing New Perspectives on Old Age, became an advocate for policy developments based on humanitarian, social and cultural values and utilising the science of the

many disciplines within the IAG membership; the IAG-approved document highlighted both the needs and contributions of older people. The report acknowledged that sound policy rests on accurate images of ageing.

From 1982 to 1997, advocacy has remained a controversial issue for many within scientific communities. In Singapore, Honolulu and Adelaide - venues for the 1997 World Congress - delegates shared their research findings, raised serious questions about the results and methodology of their colleagues as befits the community and, with greater vigour than noted at previous congresses, discussed policy implications of their findings.

The number of national, regional and international congresses is increasing dramatically throughout the world as the implications of rapidly ageing societies and intense competition for resources become clearer. World Congress workshops and plenary sessions focused not only on scientific findings but also frequently on the need to raise awareness about the diversity, the needs and the contributions of older people. References were made to such events as the White House Conferences on Aging in the United States, the Dialogue of the Millennium in the United Kingdom, the Brazilian Declaration on Aging, and on regional IAG congresses scheduled for 1999 throughout the world.

The United Nations has proclaimed 1999 as the Year of Older Persons. Planning is underway in many nations to celebrate the achievements of older people, to draw attention to the intergenerational solidarity vital to the well-being of older people, and to focus attention on tremendous unmet and increasing needs among elderly persons, especially the oldest old. The 1997 IAG World Congress provided evidence that a large and growing number of scholars are giving serious attention to cross-national, cross-cultural research with applicability across national and cultural boundaries with relevance for rich and poor, developed and developing nations.

In presentations at the 1997 World Congress on Gerontology the following points received particular attention and generated considerable discussion.

First, reflecting the wisdom of those who in 1982 wrote New Perspectives on Old Age, the importance of raising public awareness about issues that comprise what has been called the `gerontological revolution' was a common theme. Inaccurate images of old age, either too positive to generate concern or so negative that the problems seem insurmountable, affect negatively older people and confuse those responsible for making appropriate, responsive policies and budget allocations. Gerontologists, using large data sets and applying critical analyses, have a key role to play in presenting an image of old age that corrects stereotypes, destroys the myths that so often emerge, and provides a profile that enables decision makers to grasp the realities of individual and social ageing. Raising public awareness of the unfortunate conditions that many older people endure and providing solutions that address underlying problems is, the delegates seemed to agree, well within the purview and competence of gerontologists.

A second issue, raised again and again, had to do with the allocation of public and private resources for research. Diseases and disabilities associated with long life remain a major threat to ever increasing numbers of older people due, in large measure, to the fact that basic and applied research are underfunded. The information essential to informed decisions for one's personal well-being, and for society's, depends on systematic investigations - biomedical, social and behavioural - adequately funded to produce reliable findings. Advocates for increasing the quality of life for older people must join together with the scientific community seeking to reduce risk factors to ensure adequate resources are available for research.

A third issue focused on the importance of building coalitions among diverse groups that share goals for a better life for the elders of their communities. The delegates reported inter-generational efforts offering evidence that the well-being of older people depends on the efforts of all generations. Problems solved for today's elders provide a strong foundation for a better life for

future elders, was a point made frequently. To achieve results, coalitions must cross social, cultural, economic and generation boundaries.

Information exchange was identified as critical to successful advocacy. Decision makers want to see what works, they want information about how a similar problem was solved in another place, at what cost, and with what consequences. The gerontological community, with access to evaluation research, and with means to exchange information through publications, conferences and emerging technologies has a leading role to play in making certain that colleagues throughout the nation, region or world can build on what is known to create what is needed, linking, as Moltman writes, "what we know and can do with what we hope for and desire."

Creating partnerships was another strategy mentioned often as a key to successful advocacy. While various nations have developed strong social compacts between government and the citizens, many of these compacts are being sorely tested by voters who seem less willing to accept responsibility for the well-being of their disadvantaged fellow citizens. In other places the process of development has enabled a relatively few to become incredibly rich while huge populations struggle for food, shelter and health care. If vital programs such as health care, retirement, housing and social services are to have the resources needed to serve the growing older populations, their advocates must make a powerful case for community support through personal voluntary efforts and their willingness to pay taxes sufficient to meet community needs.

Corporations should see that it is in their self-interest to enable their employees to care for their parents as well as their children. They can develop and market products that preserve and enhance the well-being of older persons and their care providers. Ageing, in a manner of speaking, is everybody's business; advocates with persuasive information and clearly stated values aided by an accurate portrayal of older people and examples of how seemingly intractable problems can be solved should `invest' in this business to ensure a better old age for their parents, their children and themselves.

Advocacy, based on solid research, driven by humanitarian values, organised to reflect the diverse elements of the community, and offering real solutions to acknowledged problems - and opportunities - can make the difference between `academic' endeavours of scientific and clinical professionals - which all too often have little impact on policy and practice - and strategies that lead to public and private decisions that positively affect the well-being of older people. During the 1997 IAG Congress the delegates benefited from the experiences of their colleagues from diverse parts of the world who have undertaken the difficult task of translating information into action, theories into practice, philosophy into action and good intentions into effective policies, programs and practices.

Bridging the Gap: Maintaining Information Exchange on Ageing

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Abstract. As pointed out in Article 106 of The Vienna International Plan of Action on Aging, the exchange of information and experience at the international level is an effective means of stimulating progress and encouraging the adoption of measures to respond to the economic and social implications of population ageing. Research, which will inform policy and planning for an ageing population, is becoming more and more a priority if we do not want events to overcome history. This is the more so in developing countries where the majority of the world's elderly live. Moreover, there is a growing awareness in favour of cross-national research. The very motto of the 1997 IAG World Congress of Gerontology, namely: Ageing Beyond 2000: One World One Future, clearly stresses the growing need of overcoming cultural, economic, social and political boundaries in all matters concerning ageing. In this context, research, and particularly the widest

dissemination of research, is of paramount importance. Consequently, it needs to be better co-ordinated and more focused. More attention needs to be given to the design of programs and their evaluation against specific and objective criteria and within the framework of relevant internationally agreed instruments. In spite of this, however, researchers are becoming more and more aware of the existence of a number of conceptual and practical barriers in the gathering, analysis and dissemination of research results both at the national and international levels. There exists a lack of standardised definitions, terminologies and research methodologies. This gap needs to be bridged.

In the study of old age, as in other areas, strengthening of national research capability as well as the exchange of information and experience at the national and international level, are effective points of entry to promote development of national policies and programs aimed at responding to the multi-disciplinary implications of population ageing. Reliable data on the ageing of population structures, socio-economic indicators and facilities required for action, are essential for effective policy design, program formulation, decision-making, and program implementation. Similarly, the assessment of future needs and demographic projections, the trends and scenario forecasting, help to identify progress options and to test hypotheses such as, for example, whether family and community support is decreasing or decreasing, or whether successful medical and social interventions will result in a healthier elderly population. This is the more so in developing countries where the existing majority of the world's elderly is expected to increase further.

There are, however, some obstacles which need to be overcome. Various problems are being faced in the gathering, analysis and dissemination of information and research results both at the national and international levels which need to be overcome. There is, therefore, a gap which needs to be bridged.

Research and surveys to determine changes in demographic structure and to identify the needs of the elderly are under way in many countries. However, one has to be aware of the fact that any form of research, be it at the national or local level, is an on-going process and as such it should go beyond the collection of purely descriptive data. It is of the utmost importance to look at research on population ageing from the developmental and cultural point of view, namely by studying and building feasible models to meet the challenges of this twentieth century phenomenon according to every country's needs. In this context, research and particularly its widest dissemination needs to be better co-ordinated and more focused.

National experiences in meeting the challenges of population ageing suggest the fundamental importance of establishing or strengthening machineries, for co-ordinated data collection, planning and implementation. Wide divergencies exist with respect to the situation of older persons in various societies. This is reflected in different situations and needs. Consequently, every country should decide upon its national strategy. Notwithstanding this, however, and precisely because of this, the exchange of information and experience at the international level is an effective means of stimulating progress and encouraging the adaptation of measures to respond to the diverse economic and social implications of ageing.

There is a growing awareness in favour of cross-national and cross-cultural research. A lot stands to be gained through the analyses of cross-national differences and the evaluation of divergent experiences of population ageing and its effects. Innovative efforts throughout the world in the field of ageing should be documented and the experience and evaluation of such programs shared. Both developed and developing nations will benefit from the sharing of such information.

At the same time, however, researchers are becoming conscious of the existence of a number of conceptual and practical barriers which are hindering and handicapping effective cross-national comparative research. What at face value might appear to be a simple attempt to gather data on different ageing populations, very often may latently be riddled with complex issues of definition, measurement and analysis. These issues become compounded when the gathering of data is conducted across several cultures, languages and nationalities.

To speak of the heterogeneity of older persons is a truism. However, we often tend to forget the wider heterogeneity which exists in the very terms, definitions, research methodologies and analytical issues used in the field of ageing. From the very start, one has to be aware of the terminologies used so that we may be clear in our minds what we mean.

There is hardly any consensus regarding the very definition of old age as well as to how older persons are to be identified and addressed. Some call them the aged, the elderly, senior citizens, seniors, the old, the grey haired. Wider divergencies exist as to what is the phenomenon of ageing, what constitutes the ageing process, and in what way is ageing to be measured.

In the study of old age as a socio-demographic phenomenon, the analysis of its determinants and the evaluation of its consequences, one often makes reference to the number of years lived. But even here there is no consensus, not even between the different United Nations Organizations. Many studies and statistics use a 60 year old criterion, while others, for example, the World Health Organizations prefer that of 65 years. However, neither of these two cut off points have complete legitimacy. They are the result of practical decisions taken with a degree of arbitrariness. The use of age 60 as the threshold to ageing instead of 65, is sometimes just to enhance the statistical weight of older persons in order to vindicate programs and plans.

The demographic and social characterisation of old age requires other elements beyond the simple number of accumulated birthdays. Moreover in the face of the considerable socio-economic heterogeneity prevailing in many countries and between countries, the concepts of ageing and old age should be modified taking into account regional circumstances and the various socio-cultural differences.

Old age has also social and legal determinants that translate in numbers. The main ones are those established by legislation in the assignment of social security benefits for retirement. However, the validity of such a criterion as age of retirement is questioned especially when one considers the fact that by far the majority of the world's older persons are outside the benefits of retirement and pensions.

Ageing is a socio-economic product. A large part of the variability in the degree of ageing is explained by a broad social and economic class discrepancy emerging from the multiple sectors that compose its society. Ageing, particularly in the developing countries, has a considerable variance with regard to its initiation, appearance, development and consequences in its different biological, socio-economic and psychological manifestations. By reason of the variability in the economic and psychological, social and biological, formal and informal, pragmatic and legal determinants of ageing, we recognize the inaccuracy in determining a chronological age at which one is considered to have arrived at that last stage of life.

Many other issues arise which hinder us from effectively exploiting the rich benefits which can be derived from comparative cross-national research. International research is plagued by a myriad of variations. Thus, for example, cross-national research on ageing intrinsically implies cross-national comparisons of the quality of life of older persons. This implies our ability not only to measure the health and well-being but also to accurately define the presence or absence of impairment or disability. It is precisely here that several doubts are expressed as to the possibility and quality of such attempts made at international comparative studies.

Thus one asks whether the very terminologies of health, well-being, disability, etc. are so precise as to enable us to reliably, efficiently and validly use them as research tools in cross-national and cross-cultural research. Furthermore, although we often speak of functionality in old age, we still lack a universally accepted composite measure of functionality, resulting in innumerable variations in such areas as activities of daily living, general activities' scales, general health status, physical performance measures, etc.

The complexity of the issues at hand is further pronounced due to the fact that the research studies on ageing have not only multiplied, but their scope has also broadened to include many

disciplines and age-related phenomena. These studies examine the various aspects of ageing from basic biomedical, biological, behavioural, demographic, economic, environmental and social perspectives. Thus, more detailed data coupled with qualitative information is becoming necessary so as to avoid misinterpretation of findings through the application of overly simplistic theoretical models.

Major barriers to cross-national and cross-cultural research arise due to the great variation of methodologies used, including research designs, sampling rules, methods of data collection, processing and analysis, etc. This is the more so in developing countries, many of which are using Western research methods and instruments. Many of the survey items which have been developed particularly in the social and behavioural sciences are culture specific. Hence the danger that these may not remain as valid and reliable in very different socio-economic and cultural settings. A case in point is the translation of questionnaires, particularly questionnaire items and concepts. Similarly, different countries utilise different approaches to such sampling techniques as sampling forms, sample generation method and sample size calculation.

Enumeration of the older population is often inadequate in many of the standard sampling forms used such as national surveys and censuses, electoral registers, health services utilisation records, death and morbidity registers, social security beneficiary lists, etc. Another obstacle to cross-national and cross-cultural research is the danger that the analysis and interpretation of the data collected may not only be subjectively biased but may have politically sensitive overtones. Consequently, this may colour the research presentation.

Equally important as the research tools are the procedures utilised. National investigators often do not have any agreed guidelines covering data recording, entry, transfer, processing and analysis.

In conclusion, one must be aware of the fact that to enhance the success of the various studies which are being conducted at multi-dimensional cross-national levels in the field of ageing in various regions, and at the same time to overcome the barriers mentioned in this paper, it is essential to establish a healthier climate in which research endeavours will be facilitated and to develop more effective mechanisms of regional co-ordination.

A co-ordinated approach using standarised, valid and reliable survey instruments which are culturally appropriate is essential. Efforts should be made to develop standard definitions and standard population survey instruments in the field of ageing in different cultural, environmental and socio-economic settings.

Such instruments, used in conjunction with careful attention to data bases, will allow for the establishment of international study designs, sampling rulers, measurement procedures, data gathering, analysis and reporting. This is no simple task. However it is the only way through which we can ensure that the rich opportunities for reliable comparative analyses can be effectively exploited.

The creation of these data bases should be accessible at the national, regional and global level. The international community should intensify its efforts at assisting governments in developing countries to collect, organise and analyse data in the field of ageing and to disseminate these findings systematically. Special attention should be directed to the preparation of compendia and directories to facilitate comparisons and co-operation between and among countries. Networks are also a great help in this regard although we are reaching a stage where we have so many networks that we need a network of networks.

It is only in so doing that we can avert the situation where events overtake history. This is the only way in which we can implement the very motto of the 16th World Congress of Gerontology, namely: Ageing Beyond 2000: One World One Future

Age and Employment

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Abstract. This thematic plenary paper reviews the changing relationship between age and employment. The important role of the labour market in defining the onset of 'old age' in both developed and underdeveloped societies is emphasised at the start and taken for granted in the subsequent analysis. The first and main section of the paper examines the changing relationship between age and employment and three distinct phases are identified in the post-second world war period. The decline in the age of exit from gainful employment is of great importance in all advanced industrial societies. The second section of the paper focuses on the role of employers in determining the inclusion and exclusion of ageing workers - an issue that has only recently begun to interest researchers in social gerontology. Age discrimination is high on this new research agenda. Brief reference is made to two recent research projects, in Europe and Canada, which have undertaken case studies of employer practices. Despite the development of greater age awareness on the part of employers, the continuation of disadvantage among older workers is emphasised and the 'gendered ageism' experienced by older women is also highlighted. The final key section of the paper argues for a deconstruction of age at the workplace - the replacement of remedial action to combat age barriers with a preventive strategy aimed at avoiding their occurrence.

Analysing the relationship between age and employment is essential to any contemporary understanding of the meaning of old age. Although pathological accounts of the ageing process tend to focus on functional loss, the entry point to old age is determined to a considerable extent by the employment process [1]. In pre-industrial or developing societies it is exclusion from the labour market, due to declining work capacity or other factors such as age discrimination, that marks the onset of old age, regardless of the actual age of the individual.

Retirement is a luxury that many older workers in developing societies cannot afford. In developed or modern societies age-barrier retirement and pension systems have institutionalized the orderly labour market exit of older workers. Thus 'old' age came to be defined more generally in those societies as commencing at a fixed age, such as 60 or 65. In recent years the relationship between age and employment has been thrown into question in all industrial societies but, in fact, it has been a fluctuating relationship throughout most of the latter half of the twentieth century. Also, recently social scientists have begun to study age and employment more closely and to move beyond a narrow focus on the process of retirement which preoccupied social gerontology from the 1950s through to the 1970s. In this brief review I will trace the changes in the relationship between age and employment and examine the emergence of a new research agenda focusing on employers and the workplace rather than ageing workers.

The Changing Relationship Between Age and Employment

Since the second world war it is possible to distinguish three phases in this relationship among the OECD nations.

First of all the superannuation of older workers was consolidated in the 20 years following the second world war. The introduction of age-barrier retirement was a critical moment in the history of age and employment. In effect the social meaning of old age was defined, or manufactured, by this process and a dividing line created between economic productivity and dependency. This was a process which involved governments, employers, individual workers and their representatives.

Subsequently retirement policies have been used by employers, including the public sector, to reduce and restructure their workforces in response to both the constant pressure to increase productivity and cyclical changes in the demand for labour. Some of the impetus behind the development of retirement was provided by the economic, medical and managerial theories of the late nineteenth and early twentieth centuries concerning the industrial efficiency of younger versus older workers - such as F.W. Taylor's theory of scientific management [2]. With the benefit of hindsight such theories may be criticised for being inherently age discriminatory: favouring the young and portraying the old as inefficient burdens. Although the scientific management theories have been discredited and there is a growing body of counter-factual evidence about productivity in older age groups, they helped to legitimate lasting age discriminatory prejudices.

A second, transitional, phase took place from the early 1970s to the late 1980s, when the boundaries between economic activity and retirement became increasingly blurred for larger and larger groups of older people. In this period early retirement, or early exit, from the labour market became established in a majority of OECD countries [3]. Again, both policy makers and workers' representatives were actively involved in this reconstruction of the relationship between age and the labour market. It was in this transition phase that the distinction was made between the third and fourth ages and it was the former that bore the main impact of the changes.

The decline in the age of exit from gainful employment is one of the most important structural changes of the twentieth century. Some countries in Europe witnessed the virtual collapse of paid employment for older men. The main factors explaining this dramatic change were demand related: recession, unemployment and redundancy [4]. In addition, in several countries, public policies played a key role. For example, pre-retirement (Denmark, Germany) and disability pensions (Sweden) openly encouraged the trend towards early exit [5].

Table 1: Age-specific employment rates by cohort

	Born in:						
Age group							
60-64	1901-5	1906-10	1911-15	1916-20	1921-25	1926-30	
France	- men		66.6	55.1	44.9	29.4	22.0
	- women		33.2	28.9	25.7	17.6	16.2
W. Germany	- men		70.1	55.2	41.4	31.7	31.8
	- women		20.2	15.2	11.8	9.8	9.5
Japan	- men		79.8	76.8	74.2	67.4	69.2
	- women		39.1	37.6	38.4	37.9	39.0
Norway	- men		79.4	76.9	73.4	71.3	64.2
	- women		38.2	40.0	40.2	45.7	46.5
USA	- men	76.6	69.9	61.6	57.7	52.7	53.0
	- women	33.6	33.9	31.3	31.9	32.0	34.4

Source: OECD

Thirdly there is the present phase, the central theme of which has yet to emerge, but in which contradictory policies co-exist. On the one hand, older workers continue to be excluded from the labour market, or at least its secure core; while on the other, there are indications of changing

attitudes by both employers and governments which may herald new opportunities for older workers. Thus, at the moment, the future relationship between age and employment hangs in the balance.

In this present phase the trend towards early exit is being reassessed in all OECD countries. It was always paradoxical in an era of increasing longevity, but with political pressures to reduce pension costs everywhere and shortages of young labour market entrants in some countries, it looks increasingly out-of-date. The early exit strategy also had unforeseen negative consequences, such as increasing the insecurity of older workers, as pension systems ceased to be the main determinants of labour force exit, and compounding the pressures on social security spending [6]. Also, as the age thresholds governing labour market exit have been lowered, there have been significant consequences for those ageing workers left in the labour market because this is likely to have affected employers' perceptions of the age at which workers may be considered 'too old'.

In Europe the reassessment of the early exit strategy is part of a broader package of reforms to retirement and social protection systems. Other reforms include raising the age of retirement (Germany, Austria, Greece, Italy, France, Portugal and the UK); increasing flexibility in the age of retirement and the promotion of gradual retirement (Germany, Austria, France, Luxembourg, Italy, Belgium, Sweden and Spain); and lengthening the contribution periods for public pensions (Italy, Sweden, Denmark, Finland, Germany and the UK) [7].

Employers and Old Age

The shift in official attitudes towards early exit, coupled with the changing agenda of the scientific community, influenced greatly by the rise of the political economy perspective in social gerontology [8], has focused attention on the role of employers in determining the inclusion and exclusion of ageing workers. This has opened up a rich and exciting vein of research which is contributing to both knowledge and policy. One of the most promising aspects of this new research agenda is the widespread comparative foundations that have been constructed remarkably quickly.

The first survey in Europe of employers' attitudes towards older people was conducted in the early 1990s in the UK and has fed into research in other European countries, in Canada, Australia and Hong Kong [9]. This and subsequent research has revealed the operation of age discrimination in employment in both internal labour markets (for example with regard to training and promotion) and external ones. Some key findings from the UK include the use of age as an important factor in the recruitment of staff, the exclusion from training opportunities of those over 50 and the crucial role of line managers in decisions about the employability of older workers (often in contradiction to an organisation's written policy). With regard to employers' attitudes towards older workers the research reveals both positive and negative elements. Employers are positive with regard to factors such as loyalty, productivity and reliability, but relatively negative on ones such as cautiousness, new technology, flexibility and interaction with younger managers. Significant proportions of employers exhibit negative stereotypes of ageing workers, for example with regard to trainability and adaptation to new technology. Of course there are differences between younger and older workers but both past and current psychological research shows that, although older people do not learn as quickly as their younger counterparts, they can acquire substantial knowledge and skills and they do not forget these any faster than younger people. Moreover, what differences there are between older and younger workers are highly job specific, thus undermining generalisations about the capacity of older workers [10].

Table 2: Employers' attitudes towards older workers

			Per cent of all employers		

	Agree strongly	Agree slightly	Not sure	Disagree slightly	Disagree strongly
Older workers...					
are hard to train	4	39	11	28	14
do not want to train	2	23	10	36	26
have a lot of mileage left in them	37	44	10	5	1
lack creativity	3	19	17	37	21
are too cautious	3	33	18	32	10
are employees marking time until retirement	1	23	13	33	26
are very productive employees	22	41	20	10	3
cannot adapt to new technology	5	35	14	32	9
are more reliable than young workers	31	43	15	5	2
cannot do heavy physical work	8	40	19	24	5
are interested in technological change	2	29	24	36	4
are inflexible	1	26	12	43	14
dislike taking orders from younger workers	5	33	14	31	12
have fewer accidents	8	25	50	9	4
are less likely to be promoted in this country	10	34	12	30	10

Source: Taylor and Walker [9]

The issue of age discrimination is high on this new research agenda. The US led the way on this front, in both research, following from the pioneering work of Robert Butler, and of course in legislative terms (the US Age Discrimination in Employment Act was passed in 1967). But Europe has been the main location of comparative research so far. The first survey of public opinion on this matter was conducted in 1992 [11]. The first comparative study of age discrimination was carried out in 1993 and has been followed up by a survey in 1997 [12]. However these surveys have concentrated on the macro policy level.

Table 3: Proportion believing that older workers are discriminated against in employment

	EC12	Belgium	Denmark	France	West Germany	East Germany	All Germany	Greece	Ireland	Italy	Luxem-bourg
Recruitment	78.7	82.5	80.1	81.8	76.3	82.2	77.6	76.9	74.7	77.1	82.4
Promotion	61.5	59.9	63.6	63.3	56.1	49.6	54.7	62.3	63.3	54.7	57.5

Training	67.1	68.5	64.2	68.6	63.7	62.5	63.4	64.4	69.3	63.3	66.7
Status	48.7	49.5	37.9	52.1	39.6	26.0	36.7	63.9	49.7	48.8	49.1

More detailed empirical research has begun to investigate the ways in which age is socially constructed at the workplace by the attitudes and practices of the individuals and organizations responsible for employing ageing workers. The UK survey paved the way and has been replicated in part or in whole elsewhere. This micro-level research involves the close examination of the policies and practices of individual organizations, for example with regard to job recruitment and training.

For example a recent project funded by the European Foundation for Living and Working Conditions focused on combating age barriers in job recruitment and training in seven European Union countries [13]. The project adopted a case study approach with the specific intention of collecting examples of good practice in age management. Good practice was defined with reference to the five main dimensions of age management in organizations: job recruitment; training; development and promotion; flexible working practices; ergonomics/job design; and, changing attitudes within organizations. The project generated a portfolio of more than 150 examples of good practice and, from these, 22 detailed case studies were constructed. These case studies were used to illustrate the factors which influenced the development of good practice and to distil some key lessons from its implementation in different contexts.

A similar, though more extensive, case study approach has been adopted by Canadian researchers in a project on Issues of an Ageing Workforce [14]. Like the European project the Canadian research was very practically oriented, with the aims of determining the level of awareness among employers, employees and unions about the issue of the changing age structure of the labour force and its implications for Canadian business, their attitudes towards older workers and identifying policies and practices that affect or respond to the changing age structure of the workforce. This research approach has already made important contributions to both knowledge and practice and there is a promise of more to come.

Table 4: Percentage in 50+ age group

COUNTRY	1990	2015
France	17.4	22.3
Germany	21.8	30.0
Italy	19.6	24.2
Netherlands	14.2	22.6
UK	20.2	25.9
European Union	19.5	24.9
USA	20.0	30.6
Australia (55-64)	7.0	11.0
	(1993)	(2011)

We know that some employers are developing good practice but they are a tiny minority. Most employers know very little about older workers and workforce ageing. Thus many older workers continue to experience disadvantage in the labour market and, as a result, economic insecurity. Also there are significant differences in experience among older workers. The impact of work

organisation on older women is attracting increasing interest. There is evidence, for example, that age combines with gender to disadvantage women within organizations. This 'gendered ageism' takes various forms: women are said to 'plateau' in organizations or to meet a 'glass ceiling'. One recent UK study quotes a personnel director in a public authority: "women hit their peak younger than men", "women get where they are going by the age of 35" [15]. In other words, women are 'older' in employment at younger ages than men. Thus there are gendered as well as ageist processes in the workplace which can have a profound impact on women in later life. Social gerontologists have yet to research thoroughly the ways in which changes to work and retirement reflect gendered assumptions and policies which create and maintain differences between men and women over the life-course.

Integrating Age and Employment

Over the past decade the research agenda on age and employment has been shifted significantly from older workers to employers. Over the next 10 years we can expect a continuation of this very fruitful line of inquiry into the social construction of age (and gender) at the workplace and the determination of the factors which either exclude older workers from employment or encourage their integration. The new context for this research is workforce ageing - a phenomenon that is developing at a different rate in different countries but which can be detected in all industrial societies. At the same time the workforces of these societies are being restructured and, with it, the life course is being transformed. These developments have enormous implications for older workers. There are important questions too about intergenerational relations at the workplace and the succession of generations, with the potential for conflict over increasingly scarce jobs, particularly in the secure core of the workforce [16].

However the coincidence of interest between governments, employers, trade unions and older workers suggests not only the potential to avoid conflict but, also, for the emergence of positive policies on age and employment. Key elements in the growth of policy consensus are workforce ageing and the pressures on social protection systems. In addition, independently, some employers have been developing a business case for the employment of older workers. US employers led the way on this front in the 1980s and some European ones have followed more recently. (Though it must be said that such employers are in a tiny minority.) Some of the calls for more 'productive ageing' are fuelled by narrow economic interests but it is becoming apparent from research that this also favours both older workers and younger ones too. As far as older worker are concerned there are the important links between activity and health and employment and the avoidance of poverty in old age. Older and younger workers alike have an interest in the avoidance of work injuries caused by some production processes and the de-skilling that occurs in the absence of training.

Table 5: The 'business case' for employing older workers

1. Return on investment

2. Preventing skill shortages

3. Maximising recruitment potential

4. Responding to demographic change

5. Promoting diversity

Thus the way forward is to deconstruct age at the workplace. What would this entail? Rather than focusing only on the latter part of an individual's working life the integration of age and employment would encompass their whole career. Instead of only remedial action to correct the age discriminatory effects of some employment practices an holistic human resource strategy on age and employment would include both preventive measures (such as life-long education and training and job redesign) and remedial ones (training for older workers lacking specific skills, for

example in new technology) [17]. This sort of strategy would also help to avoid intergenerational friction. In essence it is designed to extend the choices open to workers of all ages, not to force older workers to remain in employment against their will.

Conclusion

The relationship between age and employment has altered substantially over the past 50 years and will go on doing so. This aspect of ageing is firmly a part of the research agenda in social gerontology and has resulted in some major advances in knowledge and important contributions to policy. There are excellent opportunities for comparative research, including east-west comparisons, and to contribute to policies in developing countries. As the workforces of the developed societies age the need for continuing research and policy development can only increase. This calls for both policy oriented research and theorising. There is a need for new theoretical constructions of later life, to replace the crude dichotomy of work and retirement, an important element of which will be a broad understanding of the ways in which age interacts with gender and race in the third and fourth ages. The study of age and employment has progressed a great deal in recent years but there is still a big research agenda to tackle.

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Older People as Social Pioneers

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Abstract. The five papers examined reveal diverse responses among older people to social and economic change. The main themes were: the changing accommodation and care needs of older people in urban areas as customary forms of family-based support are compromised; the strength and resourcefulness of family obligations in managing support and care; and similarities and contrasts in private sector and governmental responses to needs. In São Paulo, Brazil, the inventiveness of families in establishing networks of support and in contriving physical aids to patients with paralysis is impressive. In the rural areas and townships of South Africa, the strength of family ties is revealed in the readiness of social-benefit recipients to support others. In Ontario, Canada, several thousand retirees have responded to the marketing of vacated housing in a collapsed mining town; and in the Basque Country, the older residents of new supported housing have few regrets about not living with their children but worry that others see them as recipients of charity. Around the Mediterranean, increasing numbers of retirees from several northern European countries are exploring new ways of developing mutual help, of pressing the authorities and businesses for better services, and seeking a resolution between their ethos of self-responsibility and how to help those who cannot help themselves. Change is endemic, and constructive and assertive responses from older people are widely seen.

This symposium provided a forum for cross-cultural studies of the response of older people to changing social and economic situations and to their changing needs, and directed attention to the innovative and positive responses of older people and their carers.

María-Teresa Bazo (University of the Basque Country, Spain) described the reaction of low income older people in Spain to new social policies designed to promote independent living. She remarked that much gerontological study concerns frail and dependent older people and the arrangements for their care and support, the most commonly described behavioural and attitudinal responses being coping, adjustment to loss and stoicism. While positive, developmental and innovative responses to later life occur, they receive relatively little attention. Positive responses to personal losses are sometimes described patronisingly as brave, and too often marginalised as eccentric. But in rapidly modernising countries and those with rapid political change, adjustment has also to be radical and is sometimes critical.

Bazo drew on official data on household composition and living arrangements, and a survey of older women in supported housing. Older people in Spain have recently become more economically independent, and their life styles have become similar to those in other urbanised societies. Some differences remain: 34% of Spanish households include at least one elderly person and only 16% of Spanish elderly people live alone, and three in four are women. Family ties and solidarity in Spain are traditionally strong. Sometimes the eldest parent, generally a woman, moves to her children's house because of widowhood, disability or poverty, but most prefer to live independently.

Social services for older people although inadequate are more developed in the Basque Country than elsewhere in Spain. Innovatory supported housing schemes for healthy but poor elderly people are being developed by municipalities. While the clients of domiciliary social services generally perceive them as charitable and stigmatising, nevertheless their attitudes are positive about the independence which they gain.

The second presentation by Ursula Karsch (Catholic University of São Paulo, Brazil) was on innovative approaches to the family care of elderly people who had suffered strokes in São Paulo. Family and informal caregivers are the main support system for people with functional disabilities. Very few hospitals provide follow-up care after discharge, and the primary health network is not sufficiently developed to provide support. The findings are from a longitudinal study during 1992/95 of 102 patients aged 50 years and more. Over a half (58%) had a monthly income of less

than US$ 400. Seventy-five (74%) lived with at least three relations. 42% were cared for by their spouses, 31% by their daughters, and 6% by their daughters-in-law; and 87% of the carers are women. Many innovative care arrangements were observed: physical adaptations in the houses as well as complex allocations of the caring responsibility among relations and neighbours.

The third paper dealt with an unusual concentration of middle income Canadian retirees. Gordon Streib (University of Florida, USA) delivered Transforming a Snow Belt City into a Retirement Community, which describes the adoption of a former uranium mining town in Ontario as a retirement centre. The mines had closed with the loss of 4,000 jobs, producing population losses and housing vacancies. Two mining companies and the city council jointly developed a community retirement program to advertise the high quality of life and affordable housing in the town. An Economic Development Office provided information and support for new businesses and established a recruitment program.

Over 3,000 retirees have been attracted and they sustain 2,000 jobs. The impacts of the influx were examined using secondary data, a survey of residents and government and business reports. This imaginative program adapted the community's resources in a cold climate and attracted older persons who formerly lived nearby or who saw the advantages of moving from high cost Toronto. It restored the vitality of a dying community and afforded many economic advantages to the retirees.

Moving back to Europe, Tony Warnes (University of Sheffield, UK) presented a paper on Multinational Retirement Communities on the Mediterranean Littoral, which examined the social relationships and well-being of communities of expatriate northern European retired people in Tuscany, Malta, Spain and Portugal. A systematic survey had been undertaken, comprising (a) a self-completion questionnaire, (b) depth interviews, and (c) interviews with key informants in the expatriate and host communities. Since the early 1980s, the number of northern European retirees who have settled in the continent's Mediterranean nations has substantially increased. They are now an important element locally with considerable impact on property prices. The values and interests of the settlers are sometimes shared and sometimes opposed to those of the host communities.

The formation was described of residents' associations of retirees in Malta on the Costa del Sol, to lobby estate developers, municipalities and governments to provide or to improve residential services, from garbage collection through policing to social centres, or to end discriminatory tax legislation. One group in Spain is now sufficiently established to have minor administrative functions. Two fascinating aspects of the evolution of these groups are the breaking down of national exclusivity, through co-operation among expatriates from different countries, and the slowly growing mutual respect between the incomers and national authorities. Another innovation among the expatriate retired community on the Costa del Sol is a voluntary association to provide domiciliary nursing and palliative care. This has introduced to Spain the concept of modern, non-denominational hospice care and the idea has been taken up enthusiastically by local doctors, lawyers and politicians.

Valerie Møller (University of Natal, South Africa) gave a paper on Living Arrangements and the Quality of Life among Low-income South Africans'. This concentrated on the household situation of the African (black) population, using two nationally representative surveys, the 1993 Living Standards and Development Survey of 9,000 households, and the October 1995 Household Survey (95HS) of 30,000 households.

The majority of older Africans live with children and grandchildren, and 24% of the 95HS households included at least one person aged 60 years or more, two-thirds in rural areas. The proportion living in multi-generational households has remained stable since the early 1990s, even in urban areas. South Africa's new political order has unlocked technological, economic and moral support for the multi-generational living arrangement. Møller examined the role of five supportive factors: continuing respect for older people (reinforced by that accorded President Mandela), the government's commitment to improve housing amenities and conditions, the recent

achievement of racial equality in the payment of state pensions, the willingness of grandmothers who receive pensions to support relatives, and the increasing evidence that young people receiving the new student bursaries support other family members. State pensions are not only one of the most tangible benefits of the new political order but also distinctively promote family solidarity.

Rapid social and economic changes often disrupt customary approaches to the support and care of older and sick people, especially when family or household employment decline, as on smallholding farms or in retail trading. Modern capitalist production invariably separates homes from work and enforces retirement, but there is generally a lag before social security, private pensions or formal caring systems grow up to fill the gaps. Some cohorts of older people may be exceptionally disadvantaged, as happens when one finds that traditional support systems have weakened before replacement forms have grown. But disasters do not necessarily prevail for older people in situations of rapid change. As several of the papers in this symposium showed, older people and their carers are resourceful, and the strength of family obligations provides for the needs of many older people. The main limitation of reliance on informal care and spontaneous responses to emerging needs is the absence of a `safety net' for people without family or friends.

In Ontario, entrepreneurs and innovative city authorities have responded to the preferences of middle income retirees for affordable housing in relatively quiet and safe residential environments. In the Basque Country, the public authorities have responded to lobbies to provide the same. But in the south of Spain, the expatriate retiree communities, who took themselves to the Mediterranean through individual consumption and investment decisions, pressure the public authorities to increase services for their needs. In new international retirement communities, the resolution of not only the national and social melting pot but also the ideologies of care and support will be subtle and protracted.

Challenges and Directions for Gerontological Research Beyond 2000

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Abstract. There is a world-wide demographic revolution taking place. The population is ageing, causing us to rethink health, disease and ageing globally. New strategies must be developed to provide medical and social services for the increasing numbers of older people. In addition we are challenged to expand our knowledge of causes of morbidity and mortality and to explore new strategies to prevent excess disability and promote the health span of older people world-wide. Increased effort in three promising areas of research will help us to reach this goal. These include research into reducing disability, increasing healthy life span, and conquering Alzheimer's disease. Although major scientific advances have been made, there is still much to be done to understand the major causes of disability and to develop and implement preventive strategies to decrease the incidence of excess disability. Promoting healthy life styles as well as understanding the biological bases of ageing and age-related diseases hold the key to increasing healthy life span. Alzheimer's disease is a major cause of disability, and while our understanding of Alzheimer's disease is expanding, continued efforts are necessary to conquer this devastating disease. The demographic revolution has caused us to rethink health, disease and ageing globally. World-wide, epidemiologists are predicting a shift in the disease burden from infectious diseases prevalent in the developing world (eg. respiratory and diarrheal diseases) to the chronic diseases of more developed societies (eg. ischaemic heart disease, depression and cerebrovascular disease). The ageing of the population world-wide and the shift in the global burden of disease pose many challenges to research scientists, clinicians and policy makers. Not only will we need to develop new strategies to provide medical and social services for the

increased numbers of older people, but we are also challenged to expand knowledge of the causes of morbidity and mortality among the old and to explore new strategies to prevent excess disability and promote the health span of people world-wide.

As we approach the turn of the century, three areas of research hold particular promise for addressing these goals. These are research into reducing disability, increasing the healthy life span, and conquering Alzheimer's disease.

Disability increases with advancing age and results in diminished life quality and expanding health care costs. However, substantial improvements are being made in rates of disability. New evidence from research supported by the National Institute on Aging (NIA) has shown that rates of disability are decreasing among older people, suggesting that progress has been made in improving their health. Using data from the 1982 US National Long Term Care Survey, Dr Kenneth Manton projected the numbers of disabled persons expected in 1994 based on age and gender data from the population. Rather than the 24.9% expected in 1994, there were only 21.3% disabled among elders. In numbers of individuals this meant that rather than the 8.3 million disabled elders expected, there were only 7.1 million in 1994. Updating this projection to 1996, there were 1.3 million fewer disabled elders than projected, resulting in substantial savings of potential health expenditures (Figure 1).

The absolute numbers of individuals living with disability, however, are of continuing concern. The challenge, therefore, is to better understand these improvements and to accelerate them by focusing on those diseases and conditions that affect not only the length of life, but the quality of life in later years. [1]

Three major causes of disability in the US are falls and fractures, osteoporosis, and cardiovascular disease. It is estimated that 250,000 hip fractures occur each year in individuals over 65 years of age. NIA-sponsored investigators are using a multiple risk factor approach to reduce the rate of falls with interventions targeted at risk factors for falls, such as bone fragility and muscle weakness, postural hypotension, use of sedatives or multiple medications, impairments of motion such as balance and gait, and environmental hazards. Participants received individualised treatment, including medication adjustments, strength and balance training, and instruction on safe practices to avoid lightheadedness and environmental hazards. This approach resulted in a 44% risk reduction for all falls and a 32% risk reduction in falls requiring medical care.[2] Annual health cost savings per individual were significant, $2,129 for all participants and $3,695 for the high risk group.[3]

Basic research on bone metabolism continues to increase our knowledge of the loss of bone density with age, including investigations of the potential role of cytokines in the regulation of bone metabolism. More is also being learned about risk factors for osteoporosis, including the roles of estrogen and dietary calcium. There is a need to develop models and markers using human bone, bone marrow or bone cells to more accurately study the processes in the mature human skeleton that lead to osteoporosis and other diseases of the musculoskeletal system. Preventive strategies include a healthy diet with adequate calcium intake, refraining from smoking, and moderate alcohol consumption. Estrogen replacement therapy and weight bearing exercise have also been shown to decrease the risk of osteoporosis.[4,5]

Cardiovascular disease is also a major cause of disability in the older population. Research is investigating the basic biology of changes in cardiovascular function with age, including the role of vascular stiffness in normal ageing and disease. Heart failure is the most common reason for hospital admission among persons aged 60 and older and is the only cardiovascular disorder whose prevalence is increasing.

Heart failure is often preceded by isolated systolic hypertension. Recent research from the Systolic Hypertension in the Elderly Program (SHEP) has demonstrated that, in persons aged 60 years and older with isolated systolic hypertension, antihypertensive stepped-care drug treatment with low-dose chlorthalidone as step 1 medication reduced the incidence of total stroke by 36%

and of major cardiovascular events including heart failure by 32%. In patients with a prior myocardial infarction, an 80% risk reduction was observed.[6] In another study of the SHEP population, low-dose diuretic-based treatment was particularly effective in preventing major cardiovascular events in diabetic patients with isolated systolic hypertension.[7] Other preventive strategies include improvements in diet and exercise, estrogen replacement therapy for women, and early diagnosis and treatment of hypertension and other cardiovascular disease.

Another major direction of research is increasing the healthy life span. Basic biology has provided clues about the genetics of longevity in different organisms ranging from nematodes to mice. Studies in mammals and lower organisms have yielded important findings on longevity assurance genes, which modulate the rates of ageing and longevity. Normal development and longevity in a primitive worm, C. elegans, are regulated by the `age-1' gene. Lack of age-1 activity in adult worms, due to mutations in the age-1 gene, results in a doubling of adult lifespan.

One method of increasing healthy life span, demonstrated in animals is caloric restriction. Life-long caloric restriction in rodents has been shown to maintain vitality, delay or reduce the incidence of neoplasias and other age-associated diseases, and extend life span by as much as 35%. The anti-aging effects of caloric restriction are believed to be related, at least in part, to changes in energy metabolism. NIA investigators are currently extending studies of caloric restriction into primates, who show a lowering of body temperature and energy expenditure similar to rodents. Continuing research seeks to understand the precise energy conservation mechanism represented by the reduced metabolic rate and its relationship to beneficial changes in longevity and other anti-ageing effects.

According to current knowledge, the best way to increase the healthy life span is through promoting healthy life styles, including a balanced low-fat, high fibre diet, exercise for strong bones and heart, avoiding smoking, careful monitoring of alcohol and medication use, preventive health care and screening, and early diagnosis and effective treatment of disease, all of which reduce excess disability.

The third area of promising research is on dementing illnesses. An estimated four million people now suffer from Alzheimer's disease (AD) in the US. AD is a progressive brain disorder marked by an irreversible decline in intellectual abilities and by changes in behaviour and personality. Because the prevalence of AD doubles every five years beyond age 65, the rapid growth of the oldest old population is expected to place a significantly greater number of people at risk for the disease. Some scientists have projected a tripling of AD patients by the year 2050 to 14 million individuals.[8]

When Dr Alois Alzheimer studied the pathology of this dementia in 1907, he described two distinctive features in the brain that still characterise the disease, senile plaques and neurofibrillary tangles. While some plaques and tangles occur with normal ageing, they are much more numerous in persons with AD.

Researchers have recognized different forms of AD. A rare, early-onset form of AD occurs in a small number of individuals as young as age 30, accounting for approximately 10 percent of cases. The common, late-onset form, in which symptoms appear after age 65, accounts for approximately 90 percent of cases.

Beginning in 1990, research has produced a remarkable series of genetic discoveries. Researchers identified mutations in three genes that cause the rare familial, early-onset form of the disease on chromosomes 21, 14, and 1.[9,10]

A fourth gene, associated with the more common late-onset form of AD was found on chromosome 19. This gene codes for forms (alleles) of the protein apolipoprotein E (ApoE). One of the forms, ApoE4, is now recognized as the first genetic risk factor identified for late-onset form AD. Age of onset of AD can vary by as much as 20 years depending on whether a person inherits no copies, one copy or two copies of ApoE4. It is possible that development of at least some

cases of late-onset AD involves other risk factor genes, and investigators are pursuing the location and identification of these genes on other chromosomes.

Understanding the basis of AD offers opportunities for discovering disease mechanisms, improving diagnostic tests and identifying targets for treatment. For example, scientists recently studied the cognitive and brain function of volunteers aged 50 to 64 years, comparing those having two copies of the ApoE4 allele (who are at high risk for developing AD) with controls having no ApoE4 allele. Although neuropsychological tests were cognitively normal, brain imaging technology showed that an increased proportion of individuals with two ApoE4 alleles had reduced glucose metabolism in the same areas of the brain as patients with probable AD. This suggests that brain function abnormalities in persons with no clinical manifestations may appear years before they develop symptoms. Development of early interventions for these people could prevent the brain damage seen in fully developed AD. [11]

Epidemiologic studies, particularly those comparing different racial and ethnic populations, provide crucial clues to risk and protective factors for AD. Age, a history of severe head trauma, and coexisting medical conditions, such as vascular disease, have been shown to be risk factors for AD. In contrast, high levels of education and early life cognitive ability have been linked to lower risk for developing AD in late life.[12]

Epidemiologic studies have also suggested that estrogen replacement therapy, use of non-steroidal anti-inflammatory drugs, and use of anti-oxidants are protective against AD. In one study of the potential protective effect of estrogen, 16.3 percent of the women who had not used estrogen developed AD, while only 5.8 percent of the women who had taken estrogen developed the disorder over 5 years.[13] Recent results of a 15-year study found that anti-inflammatory drugs such as ibuprofen, taken for as little as two years, also appear to reduce the risk of AD.[14]

A recently completed clinical trial, conducted by the NIA's Alzheimer's Disease Cooperative Study, assessed the effectiveness of selegiline (an anti-oxidant drug used in Parkinson's disease) and vitamin E (an antioxidant vitamin), both separately and in combination, in delaying the progression of AD. This trial showed that selegiline and vitamin E may slow development of functional signs and symptoms of AD by about seven months. Each of the two drugs delayed important milestones for people with moderately severe AD, such as entry into nursing homes and loss of ability to perform activities of daily living.[15]

We are also learning more about the relationship of AD to other conditions affecting older persons. In a recent finding that described the coexistence of AD with vascular disease in elderly US nuns, the presence of small strokes in parts of the brain below the cortex resulted in more severe dementia than expected on the basis of AD neuropathology alone. In comparison, people with such small strokes in any brain region in the absence of AD neuropathology generally had no significant changes in cognitive function when compared with controls. Approximately half of the demented patients in this autopsy study had these small strokes. These results strongly suggest that prevention or treatment of vascular disease could delay or reduce the development of symptoms in many AD patients.[16]

In summary, although there are many challenges to be faced as we approach the 21st century, exciting progress is being made in our understanding of the basic processes of ageing and the development of age-related diseases and disabilities. With continued advances in both basic and clinical research, we have the very real hope of improving the health span as well as the life span of older populations around the world.

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Self Care and Health Promotion I: The Uses of Large Scale Surveys

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Abstract. This was the first part of a dual symposium that addresses research on self-care and its application to health promotion efforts in a range of developed countries. The focus of this session, Self-Care and Health Promotion I, has as its theme the conceptual frameworks, methods, and findings from national and specialised surveys on self-care and the policy context in which they are supported. The papers comprising the first part of this symposium discuss many important uses of data to meet these aims. These include, for example, 1) collection of baseline data for monitoring achievement of national health goals; 2) identification of target groups for health promotion programs; 3) advancement of our understanding of the social, psychological, and economic factors that facilitate or impede self-care practices; and 4) investigation of relationships between patterns of self-care and use of health care services.

Background

During the last several years, we have witnessed the expansion of the field of self-care and aging in tandem with developments in health promotion and the determinants of population health. Although there remains a bias favouring health promotion initiatives focusing on younger and middle-aged groups (Hickey & Stilwell, 1991; Rakowski, 1986), evidence has been mounting that demonstrates the benefits of self-care and health promotion for persons across the life-cycle, including persons in their later stages of life (Ory & DeFriese, 1998).

Large surveys represents only a sub-set of research carried out in the field of health promotion and aging. Community development, participatory research, health promotion interventions and evaluations, and ecological approaches represent a selection of other important strategies needed to extend and disseminate self-care and health promotion knowledge.

Definitional and Conceptual Boundaries of Self-Care

Dean (1986, 1986b) and Dean and Kickbusch (1995) view self-care as a continuum of caring for the self to enhance health, prevent disease, evaluate symptoms and restore health, which is organised by the perceptions, decisions and options available to each individual. There are several connotations implicit and explicit within this definition. First of all, it suggests increased control by the individual engaging in self-care. Thus, we have observed an increase in research elaborating on the influence of self-efficacy, sense of mastery, sense of coherence, as well as other social-psychological domains tapping into the notion of control (Antonovsky, 1993; Lorig & Holman, 1989; Pearlin, Lieberman, Menaghan, & Mullan, 1981; Rosenberg, 1965). This in turn has implications for compliance and medical intervention. Second, there are implications with regard to the availability of social, financial, and other resources as facilitators of self-care.

It may also be useful to identify at least two continuums upon which self-care practices can be organised. Preventive self-care may be considered as health behaviours engaged by healthy individuals, and self-management of disease as the day-to-day tasks an individual must undertake to control or reduce the seriousness of an illness in collaboration with health professionals (Clark, Becker, Janz, Lorig, Rakowski & Anderson, 1991:5). A second is whether the health or coping behaviour is performed solely by the individual, or whether there are significant others involved within a professional-based or one that is informal, including family and friendship support, self-help, and mutual aid.

Research Domains

In covering the literature in this field, we observe several concentrations of research. A considerable amount of research has examined the influence of life-style on health and illness, especially exercise and smoking.). For example, exercise appears to have a beneficial impact for osteoporosis in women (Oyster et al., 1984), cardiovascular diseases (Paffenbarger et al., 1990), muscular strength, flexibility, and functional capacity (Frontera & Meredith, 1989; Spirduso and Gilliam-MacRae, 1991), the prevention of falls (Shepard, 1987), chronic pain management, such as for arthritis (Young, 1986), and longevity (Paffenbarger et al., 1990; Rakowski, 1992). However, the percentage of sedentary older adults remains relatively high in the face of health promotion efforts.

A growing body of literature is alternative health therapies and practices. Eisenberg, Keesler, Foster, Norlock, Calkins, and Delbanco (1993) published a landmark study in the New England Journal of Medicine. In a study of 16 self-care practices (including relaxation, chiropractic, massage, imagery, spiritual healing, commercial weight-loss programs, lifestyle diets, herbal medicines, megavitamin therapy, self-help groups, energy healing, biofeedback, hypnosis, homeopathy, acupuncture, folk remedies, exercise, and prayer), the authors estimate a prevalence rate of about 34%. Furthermore, the cost is estimated to equal the annual out of pocket expenditures on hospitalisation in the United States. It is also estimated that about 25% of people who see their medical doctor for a serious problem use these self-care practices.

Thus, self-care is a burgeoning field, attracting researchers from a wide variety of backgrounds, interests and expertise. Let me turn now to some of the findings from our session specifically related to the analysis of secondary data.

Presentation Summaries

The first, by Gordon DeFriese from the University of North Carolina at Chapel Hill, U.S.A., in collaboration with Marica Ory is entitled New National Dataset on Self-Care and Functional Capacity Offers Potential for Cross-National Research. In this presentation, Dr. DeFriese described several findings from the National Survey of Self-Care and Aging, which is a panel study of 3,400 older adults in the United States. Included were prevalence rates of a number of self-care practices, evidence documenting the impact of self-care on functional ability, and in turn, the effect of functional ability on mortality. Initial findings from this study focus on the extent to which older adults engage in self-care to offset specific functional limitations. Interestingly, research suggests that a single item question measuring functional ability may be most fruitful. It is concluded that these data may be ideal for cross-national comparative research and that this style of research may facilitate important future research in this field.

A second paper, by Wataru Koyano, Health Sciences University of Hokkaido, Japan, is called Health Status and Health Behaviour of the Japanese Middle-Old. This paper examines the hypothesis that lifestyle-related health behaviour that occurs during one's 50s influences health status when one is in their 70s. Dr. Koyano employs retrospective data on health behaviour and based on a sample of over 1,300 persons aged 75-79 living in two Tokyo areas. The Lisrel analysis shows that functional capacity was directly affected by health practices that occurred when people were aged 50-59. Associaitons were also uncovered between functional capacity

and self-rated health, social relationships, life satisfaction, depression, gender and educational attainment. These findings suggest the existence of important health trajectories that occur throughout one's life, a point that we often allude to but without the support of this kind of empirical evidence.

In a third paper, Hal Kendig of La Trobe University, Australia, with co-authors Browning and Osborne, presented a paper entitled Australian Research on the Health Status of Older People. This research is based on the Health Status of Older People Project sponsored by the Victorian Health Promotion Foundation (VHPF). It involves a representative survey of 1,000 non-institutionalized persons aged 65 and over living in the Melbourne area collected in 1994, with a follow-up telephone survey in 1996. Two very important results emerge from this work. First of all, Dr. Kendig demonstrated the social context of health by elaborating older people's definitions of health and illness using secondary data analysis. Secondly, the findings from the secondary data analysis were directly linked to the development of recommendations for a number of proactive health promotion initiatives supported by the Victorian Health Promotion Foundation of Australia. A number of important processes connected to health behaviours were found to be important, including: changes of health conditions, personal motivation or skills, social support, and structural factors such as transport, costs, and availability of facilities. Dr. Kendig concludes that lifestyles are generally resistant to late life change, yet that there is ample opportunity for individual and social actions that can lead to improvement as well as maintenance in later life functioning.

In the final paper of this session, Andrew Wister presented a paper under the modified title Using National Survey to Examine Self-Care Practices: A Canadian Perspective. Several national data sets and one local survey are reviewed for the purpose of assessing self-care data on older populations. Initially, the surveys are positioned within the larger context of the health promotion and the population health movements in Canada. This is followed by an assessment of a number of self-care measures for use in a proposed standard minimum data set. This is a circumscribed set of variables than can be used in a number of national surveys that would facilitate cross-national comparisons. It is concluded that these data would facilitate useful cross-national comparative studies in which diversity in cultural dimensions, health care systems, and self-care practices could be examined.

In sum, the presentations briefly outlined above share several properties. One of these is the recognition that there exists a number of research gaps and that some of these can be filled through innovative research using large data sets. I will list only a few of these, given space limitations. First of all, documenting the incidence and prevalence of self-care practices and alternative therapies across important sub-groups, and over time and place, is imperative. Second, we need more work on the relationship between social inequality and self-care, including inequality related to wealth, but also gender, ethnic and other dimensions of inequality. Third, research is required that helps to identify the timing and pathways by which individuals learn about and adopt health practices, and linking these to the evolution of theories. Fourth, there is also an urgent need to use the results from secondary data analysis to direct policy decision-making, through both basic and applied research, including cost-benefit analysis. And finally, there is a lack of cross-national comparative work. In this regard, the twin symposia on Self-Care and Health Promotion have responded to this need by bringing together renowned researchers from a range of countries. It is hoped that these meetings will inspire interesting collaborative work for the next World Congress.

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19. Andrew Wister (Chair) and Marcia Ory (Co-chair) convened the Symposium on Self Care and Health Promotion I: Large Scale Surveys, World Congress of Gerontology, Adelaide, Australia, 1997. The following papers were presented:

20. DeFriese, G, Ory, M. New National Dataset on Self-Care and Functional Capacity Offers Potential for Cross-National Research.

21. Koyano, W. Health Status and Health Behaviour of the Japanese Middle-Old.

22. Kendig, H, Browning, C. and Osborne, D. Australian Research on the Health Status of Older People.

23. Wister, A. Using National Survey to Examine Self-Care Practices: A Canadian Perspective.

Self Care and Health Promotion II: Interventions Research

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Abstract. This multi-disciplinary symposium presented research informing the development of health promotion programs for older people. Emphasis was given to physical activity and functioning. The papers included a US. exercise program and evaluation; a Swedish study of disability transitions and walking programs; an Australian qualitative study of older people and doctors; and a US study on the centrality of family in designing theory-based community interventions. The discussion reviewed directions for a next generation of studies which can improve methodologies and better integrate research with programs and policies.

Introduction

This second symposium on self care and health promotion concentrated on interventions research, with a particular focus on physical activity. As with the first symposium, it was co-chaired by Dr. Marcia Ory. The papers closely related the earlier symposia on health status surveys and their uses for understanding determinants of health and baseline health conditions.

The papers addressed critical issues concerning the capacities of research to guide policies and programs. With previous studies having identified the benefits of health promoting actions, information is now required on ways to encourage and enable more older people to adopt health-promoting actions1. Focusing on vulnerable people has high potential for maximising health gains. The areas for action concern not only individuals' actions but also the social, economic, and physical environments which influence their lives.

The first paper, by Tom Prohaska from the University of Illinios, was entitled 'Stages of Readiness to Participate in Exercise Programs for Older African-Americans: Recruited and Non-Recruited'. The study was funded by the US National Institute on Ageing and it was a model for both community intervention and action research. The intervention dealt with vulnerable older people and involved strong collaboration between health professionals, researchers and older people. The exercise program was fully documented, which is essential for transferring knowledge and interpreting the evaluation. How can we understand an intervention without full knowledge of its operations and, equally importantly, the social and organisational context in which it was developed and delivered?

This evaluation research applied the transtheoretical model of behavioural change in examining processes of delivering interventions. As would be expected, participants were more positive than the non-participants. However, both groups had the same access barriers, with the crucial difference being that participants had the motivation and means to overcome barriers. The major challenge identified in this study – in fact for much of the whole field of interventions – concerns ways of maintaining involvement as much as attracting initial participation.

The second paper was entitled 'Longitudinal Studies of the Incidence of Physical Disability, Impairment and Physical Limitations among Elderly Women and Men in Sweden'. The authors were Ulla Sonn, from Gothenburg University in Sweden, and Birgitta Lundgren-Linquist, from La Trobe University in Australia. Their multi-disciplinary study built on the strong epidemiological base of the Gothenberg Longitudinal Studies, with a further therapeutic focus from health professions including occupational therapy. The key innovation was to include an interventions sample in the latest cohort studies. The study design provided proven methods and a natural comparison group for interpreting the findings.

The Gothenberg survey provided valuable data on the incidence of disability. The sensitive measures showed that disability was strongly affected by various kinds of assistance devices; aids can have a major impact on the capacities of older people to live independent lives. One of the most notable successes was the establishment of 150 walking groups. The widespread participation was explained by the life-long importance of walking for the older people, and the priority given to outreach to more vulnerable older people. Evaluation of the walking groups showed major gains in terms of social activity as well as the exercise.

The third paper, by Wendy Walker-Birckhead from La Trobe University in Wodonga, was entitled 'You Just Go On Day to Day': Understanding Health and Independence in Old Age'. The study included both an urban area and a rural area, and it was funded by an Ageing and Well-being Research Initiative by the Australian Government. In contrast with the quantitative papers in the symposium, this qualitative investigation addressed the fundamental questions of 'What the older people think?' The key to understanding their views was sensitivity to issues of meaning and identity. Health promotion initiatives need to make sense in terms of how older individuals feel and their own goals and ways of life.

The older people in this study viewed themselves as survivors. There was often a sense of aloneness among the very old, many of whom simply lived day to day (as many people do at other ages). Individuals had pointed observations about interventions, in particular about general practitioners and other medical doctors. Some stayed away from doctors because they felt that doctor's surgeries are the place where they can be found out to be sick or ill; the clear implication was that maybe you could keep healthy by keeping going and hiding problems from doctors. The paper raised major challenges, for example: if health promotion fails, who has failed? If we are going to have interventions, do we intervene with older people only or do we also focus on the professionals and social structures with whom they relate?

William Satariano and his colleagues, from the University of California at Berkeley, were scheduled to present an important paper 'Family-Based Interventions to Enhance Self-Care in Older Populations'. The topic has self evident importance given that many health habits, risks, and exposures are family or household-based, and some involve strong genetic predispositions. Yet this study funded by the US National Institute on Ageing is one of the few studies to have examined the family context of physical performance and age-related change. While the paper could not be presented at the Congress, this research promises to shed considerable light on the limits and potentials for change in old age.

Marcia Ory, from the Social Science Division at the US National Institute on Aging, provided a summary of key issues from both of the Self Care and Health Promotion symposia. She identified the following themes:

- The public and policymakers must be reminded continually that health promotion is as important for older people as it is for younger people.
- Research is showing that it is never too late to start more healthy life styles and never to late to quit health threatening habits.
- Health promotion interventions need to be carefully targeted to specific groups and individuals; no single approach can be expected to be universally effective.
- It is important to target more than the individual older person, also including health professionals and physical and social environments.
- Efficacy can be increased when interventions aim for multiple outcomes, for example, an exercise program may have additional benefits such as increased social activity.
- It is very important to tailor the interventions to particular communities and individuals, in particular, their belief structures. The health belief model is one of the theories that can underlie health promotion research.

The papers generated lively discussion about difficulties in conceptualisation of health promoting behaviours. For example, the language of exercise, with its connotations of running shoes and gyms, can be restrictive largely to middle class and/or younger groups. The more generic term physical activity is more appropriate for older people, including older women who say 'I don't have time to exercise. I'm too busy with the washing, cleaning, gardening and running off to do this and that around the neighbourhood'. The importance of long-term maintenance was reinforced by the adage 'It's easy to change, I've done it many times'. There was widespread recognition of the importance of a life span perspective in understanding ways in which orientations and exposures earlier in life have consequences for future ageing.

A broader conception of evaluation can yield multiple benefits. In addition to identifying impacts and outcomes, studies can shed light on causal mechanisms and processes by which interventions may or may not work in a particular context. This information is crucial to the transferability of innovative programs. Applied theory provides an essential nexus between intervention evaluations and understanding individual's actions in the context of their everyday lives. The papers in these two symposia have provided an important impetus to advancing the field.

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3. Prohaska, T. Stages of readiness to participate in exercise programs for older African-Americans: recruited and non-recruited.
4. Sonn, S, Lungren-Linquist, B. Longitudinal studies of the incidence of physical disability, impairment and physical limitations among elderly women and men in Sweden.
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The Economics and Financing of Long-Term Care

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Abstract. Population ageing does not mean unaffordable care costs for the elderly, given economic growth. But current wide variations in financing chronic care in old age need to be reassessed. Major options discussed in the paper are: community care, home equity conversion, and private insurance.

There is an expression that is often used to explain a successful outcome of some important event. You often hear that someone or something was "in the right place at the right time."

Instead I want to argue with regard to long-term care financing that almost all countries are in the wrong place at the wrong time. We are at a place in the development of medical care services where policy makers are thinking less about the need for additional services and much more about how to scale back services to keep costs down. And it is a time when demographic shifts in the population are frightening people with regard to the economic burden of the elderly. The last thing many people want to think about is providing major new entitlements to what many think is now an `advantaged' age group.

So the long-term care issues that gerontologists see as so important for our later years are coming to the fore just at the wrong time. The rising number of very old in need of services and special living arrangements is colliding head-on with two institutional realities. First, as Professor Binstock pointed out, there is the erosion of the family's ability to provide care, given the rising labor force participation of women and changing family structures. Second, there is the growth of a care-giving industry increasingly dominated by market driven, for-profit firms.

A recent book edited by Laura Katz Olson documents well the problems and failures of long-term care around the world [1]. Particularly distressing is the shift to privatisation in so many countries - what Alan Walker and Lorna Warren call `supermarket-style consumerism' in long-term care [2]. The fact is that `the market' has produced throughout the world growing numbers of custodial institutions with poorly paid and low morale staff, providing marginally acceptable services, at increasing unaffordable prices.

This conclusion may sound strange coming from an economist. However, while I see markets and competition as effective mechanisms for many things, there is no clear evidence that they are appropriate as the dominant way to run medical care delivery systems.

Will nations be able to change this dismal picture? And how will they do it? Fortunately, despite the times, many nations are giving the matter great attention, and a variety of new programs are being tried or are on the drawing boards. Reports were given at the IAG Adelaide symposium on developments in Australia, Germany, Israel, and the US.

To understand the economic constraints confronting policy makers in the area of long-term care, one must understand the perceptions and realities of population ageing throughout the world. The general ageing of populations that is occurring in both developed and developing countries today is primarily a product of economic growth and concurrent fertility decline. This is a force for good: the old world of many children, short life spans and little time for leisure and recreation is disappearing. In its place is a new world of fewer children, longer life spans and a more relaxed retirement.

But, as is now well known, this new world is viewed with alarm by many. Almost every prediction of demographic doom starts with statistics of growing dependency.

It is now commonplace for people to scare policy makers and the public with `dependency ratio' statistics. These numbers represent an attempt to measure the number of persons in the society not engaged in producing economic output relative to those in the labor force who are. The aged dependency ratio measures the relationship between, for example, social security old-age recipients and those workers paying social security taxes based on their labor force participation.

The truth is that aged dependency ratios are one-sided and very misleading. In almost all industrial countries of the world, the `total dependency ratio' (ie. measuring both young and old) is actually quite low, much lower than in the past and much lower than the ratios in developing nations today!

There have been all sorts of demographic statistics presented in the population ageing discussions to date. Most of them are worthless in assessing the economic impact of an ageing population. Demographic analysis without economic analysis is a kind of voodoo demographics with regard to the issues in question. In the US, for example, the parents of the `baby boomers' shared a per capita GDP of about $12,000 in 1964. Assuming less than two per cent annual growth, the retired boomers and their children will share in the year 2030 a per capita income (adjusted for inflation) that is $36,000 - almost three times greater [3].

In our book, The Economics of Population Aging, Allan Borowski, William Crown and I extended the demographic statistics to incorporate moderate economic growth [4]. We concluded, first, "that the economic impact of demographic ageing is not as bad as those doomsayers who use simplistic dependency ratios would have us believe. Second, as in other areas of social policy, relatively small increases in economic growth rates have the potential to substantially moderate the ill effects of other factors that have a negative impact." In fact, our research concludes that the future overall "support burden" will be less in the years 2030-50 than it was during 1950-70.

Analysing economic data over the past 100 years for the US and ten European countries, Richard A. Easterlin (one of the top experts on population economics) also finds little support for predictions that population ageing will have a negative impact on economic growth and the economic welfare of future generations [5]. He finds a generally consistent inverse relationship between trends in economic growth and population growth - economic growth rising while population growth is falling. As he points out, this "is just the opposite of what one would have expected if declining population growth were exerting a serious drag on the economy" (p.78). Moreover, based on the historical data, "one would be hard put to argue that dependency had much to do with the dramatic post-1973 drop in economic growth rates, and, not surprisingly, it is never mentioned in scholarly attempts to explain this decline" (p.80).

All this is good news for people worrying about the economics of long-term care. If the fears of economic crisis arising from the ageing of populations is overblown, then the financing constraints will not be as great.

But clearly there are still many important issues that need to be addressed. Unfortunately, it is impossible to briefly summarise the current approaches used by nations around the world to financing long-term care services, given the huge variation among countries. This variation results in part from the fact as pointed out by Patrick Hennessy that "until fairly recently, few countries had an identifiable policy towards long-term care..." (p.23) [6]. Existing institutional mechanisms span a large continuum - ranging from the laissez fair policies of the US to the liberal hospital-stay provisions in Canada, France and Japan.

All the symposium speakers, especially Allan Borowski and Bleddyn Davies, identified financial problems that continue to arise.

With regard to financing approaches, the most common approaches are:

- paying for services through a compulsory insurance program;
- general revenue/taxation funding by the central government;
- local government financing;
- some combination of central/local financing.

But these four broad approaches hid the great variation among countries. Even if we restrict comparisons to those countries with the same basic approach, there are vast differences with regard to such things as what services are covered, the nature of eligibility requirements, the extent of means-testing, and the extent to which community care is available as an option to institutionalisation.

What is common among most countries, however, is the search for ways of dealing with the growth of long-term care costs and concerns regarding costs in the future. As the long-term care population grows, countries have found the old ways of financing straining under the burden. For example, Professor Igl points out that one of the major factors encouraging Germany to introduce its relatively new long-term care insurance program was the strain on the budgets of local authorities, who historically were responsible for much of long-term care costs.

The projection model developed by Bleddyn Davies and his colleagues at the University of Kent seeks to assess what factors are key to understanding cost tends. Davies reported in the symposium how sensitive future costs were to small changes in the trends of certain factors.

Over the last couple of decades, one of the most popular ideas for reducing the costs of long-term care has been to develop community care options that would keep persons with chronic care problems out of `high-cost institutions'. The hope was that people could stay at home or in their community (which they greatly prefer) and at the same time save money. "Ironically, in the end, the decision to expand in-home care was made based on the attractiveness of the home care option, rather than on the cost argument ..... [In the US, for example,] no fewer than twenty research and program demonstration programs were conducted during the 1970s and 1980s to test whether in-home care would be a cost-effective alternative to nursing home care" (p.3) [7]. As Professor Binstock indicated in his paper, the answer was clearly no.

Another financing approach that some have advocated is developing mechanisms that permit converting the illiquid asset wealth contained in owned-home equity into economic resources that could be used to finance long-term care. This option seems especially attractive in countries like the US and Australia, where home ownership rates among the population are very high (or in cities like Tokyo and Hong Kong, where housing values have skyrocketed for units owned by the current older population).

Again, what looks attractive in theory has not worked very well in practice. For almost two decades, the US federal government has encouraged `reverse annuity mortgages' to be issued by commercial lenders. These mortgages provide the elderly needing more income with monthly payments based on the equity in their home. To date, however, only a few thousand of these special mortgages have been issued. The slow acceptance of this mechanism results in large part from the perceived risks involved for financial lenders and borrowers and the small amount of income that often becomes available through the mechanism. Moreover, a study now underway at the National Policy and Resource Center on Women and Aging at my university also documents the fact that it is difficult and costly to give people the information they need to make informed choices. Moreover, lenders in the US are charging very large administrative fees (often prohibitive fees) to process the loan applications [8].

Then there is the view that the best way to reduce government costs is through privatisation. Part of the privatisation fad that is sweeping the world is the idea that the way to deal with long-term care is to finance it privately, largely through private insurance. In some countries private provision is already quite high. In the UK and the US, for example, it is estimated that about half

of long-term care in nursing homes is financed by private payments [9]. Increasingly, private insurance benefits are being used to meet these expenses.

However, based on the experience to date in the US, private long-term care insurance looks like an approach appropriate for the well-to-do who want more security and more choice of options and can pay for it. For those of lesser means, however, the option is not very appealing. Most people feel they can not afford the high premiums charged at the point they become interested in the product (ie. when they get close to vulnerable ages). Moreover, sales people charged with the responsibility of providing information on which individuals can make informed choices, not unexpectantly, are prone to give only that information that will `make a sale' [10].

Thus, while the demand for long-term care is growing, we are far from finding solutions to providing such care that can be financed out of what people and governments are willing to pay.

On a more positive note, all speakers at the symposium indicated some success in dealing with escalating costs. The key to this success was effective government action. Not just government action but effective government action. Anna Howe's presentation, for example, documented two very distinct periods in Australia's long term care regulatory history - one where costs spiralled and one where the government promulgated an effective framework for cost control.

Twenty-seven years ago Dr Robert Butler in his now classic book, Why Survive? Growing Old in America, wrote: "The tragedy of old age is not the fact that each of us must grow old and die but that the process of doing so has been made unnecessarily and at times excruciatingly painful, humiliating, debilitating and isolating through insensitivity, ignorance and poverty" [11]. At no point in their lives are older persons more sensitive to the issue Butler raises than when they confront the issue of long-term care and the potential costs of that care.

Now that we have provided (in industrial countries) minimally adequate income in old age to most people, it is time we tackled the scariest economic issue still facing older people: how to finance the services needed in those days when we are no longer completely independent. Unfortunately, a minimally satisfactory answer to this question still eludes us.

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