



*Exploring the Impact of an Ageing
Workforce on the South Australian
Workers' Compensation Scheme:*

**Chapter 3 Ageing and capacity to work:
research findings**

The Australian Institute for Social Research

by

Dr Kate Barnett, Assoc Prof John Spoehr & Mr Eric Parnis

prepared for

The South Australian WorkCover Corporation

July 2008

3 Ageing and capacity to work: research evidence

In this chapter we review the research evidence relating to the impact of ageing on capacity for work. This involves research findings about health, functional status and ability to work, ageing-related changes in functional capacity (respiratory and cardiovascular, sensory, musculoskeletal, psychological, cognitive), capacity for learning and training, productivity and health and safety risks. The chapter concludes with a summary of the contributions and challenges of an ageing workforce and an overview of the myths associated with older workers balanced against research findings.

Research Questions Addressed

- *What is known about ageing-related health conditions and ability to work? What population groups are at greatest risk of acquiring such conditions?*
- *What is known about the relationship between workforce participation and health?*
- *Does the research establish a relationship between stress-related conditions and age? Which age groups appear most at risk of acquiring stress-related disorders?*
- *What is known about older workers in terms of capacity for ongoing training and contribution to the workplace?*
- *What does the research tell us about the positive impact of older workers in the workplace?*

3.1 Ageing-related health, functional status and ability to work

Age is only one of a number of determinants of health that are equally as (if not more) important than lifestyle, nutrition, fitness, education, socio-economic status and quality of health care (Benjamin & Wilson, 2005: 3). Many of these determinants are interdependent. **Longitudinal research has found factors within individual control, such as, lifestyle and fitness, are greater predictors of health in old age than chronological age** (Vaillant & Western: 2001).

The general health of older Australians has been improving for many years. The *2001 National Health Survey* by the Australian Bureau of Statistics (ABS), older Australians reported overwhelmingly that they had good, very good or excellent health. In fact, at least 60% of people in the 65-74, 75-84 and 85 and over age groups reported good to excellent health. Hence many are continuing to actively contribute to the community not only through paid employment, but also volunteer activities, extended family support, and participation in community social, sporting and cultural activities (AIHW: 2004).

Setting aside self-reported health, it is also the case that the health of older Australians is affected by exposure to risk factors throughout their lives, and that these health effects are often cumulative. People's health in later life is affected by their health behaviour earlier in life (AIHW: 2004a). Therefore, the onset of many diseases and injuries in older Australians is affected by risk factors present when they were younger, which are often preventable, and highlights the importance of community education and health promotion. Some risk factors have a cumulative effect over the life course, but there is potential for health improvement at all stages of life by managing risk behaviours and early health prevention behaviour (AIHW: 2004a). The major preventable risk factors for onset of disease and injury in older Australians are:

- o overweight and obesity;
- o inadequate physical activity;
- o smoking;
- o consumption of alcohol at levels considered at risk for health;

- o poor diet and nutrition; and
- o falls (AIHW: 2004).

In addition to these risk factors, high blood pressure and high blood cholesterol levels were major long-term problems of middle and older age reported in the ABS 2001 *National Health Survey*. These are risk factors for a range of cardiovascular diseases, but they can be managed with appropriate medical treatment. Changes in diet, alcohol and tobacco intake, and amount of exercise also treat and prevent such illnesses (Benjamin & Wilson: 2005). Risk behaviours tend to interact with each other, for example, physical inactivity and poor diet can increase body weight, blood cholesterol and blood pressure. Impaired glucose tolerance, a risk factor for Type 2 diabetes, is more common in older people where risk factors of inactivity and obesity exist (AIHW: 2004a).

Rates of chronic disease and disability increase significantly with age, which may or may not be work-related. While some long term exposures to occupational hazards are associated with an increased risk of illness, it is also true that the incidence of chronic disease is higher in the older population. This situation has been recognised as decreasing the safety margin which protects the worker against injury and work-related disease. However, older workers have been found to cope better with ill health than their younger colleagues (Ilmarinen: 1999).

The following data from the Australian Institute of Health and Welfare (2001) identify several age-related trends in relation to a number of common chronic diseases:

- o In the 2001 ABS National Health Survey, over 550,000 Australians reported that they had diabetes. Of these, 434,000 said they had **Type 2 diabetes** – which can be prevented with appropriate diet and lifestyle. However, it is recognised that many more people have undiagnosed diabetes, in part because the symptoms of the disease are not apparent in its early stages. The prevalence of Type 2 diabetes rises with age. The highest prevalence rates were among males aged 65-74 and females aged 75 and over.
- o **Colorectal cancer** is the second most frequently occurring cancer in Australian men and women if skin cancers other than melanoma are excluded. In 2000, there were 12,405 new cases (14.6% of all new cancer cases diagnosed), an incidence rate of 64.8 per 100,000 population. The risk of colorectal cancer increases with age, especially after the age of 45. The highest incidence was found in people aged 85 and over.
- o According to the National Cancer Statistics Clearing House, **lung cancer** is the fifth most commonly diagnosed cancer in Australia. There were 8,060 new cases in 2000, with an incidence rate of 42.1 per 100,000 population. New cases of lung cancer currently occur in males at more than twice the rate among females: 62.1 per 100,000 (age-standardised) compared to 27.4 per 100,000. Lung cancer incidence increases with age, with the highest incidence in those aged 75-79: 450.4 per 100,000 males and 156.4 per 100,000 females in 2000.
- o The incidence of **coronary heart disease** increases dramatically with age - rates among 75-90 year olds were 18 times those of 40-54 year olds.
- o The prevalence rates of both **osteoarthritis and rheumatoid arthritis** increase with age, and are highest among those aged 65 and above (AIHW: 2001).

When assessing the importance of general health on the structure of the workforce, it is particularly important to note that ABS data indicate that **health or injury** was the primary reason for retirement in approximately one-third of Australian men in 1997 (ABS: 2000). Research

by the Australian Institute of Family Studies (Wolcott: 1999) also confirmed that health concerns were a major reason for retirement, with one-third of men and one-quarter of women citing their own or their partner's poor health as instigating their retirement. Premature retirement on health grounds creates a *self-selection factor* that needs to be taken into account when assessing the likely impact of older workers on workers compensation costs.

Given current policy directions which are designed to prevent premature retirement and to encourage prolonged workforce participation, health and injury are of critical importance to the retention of older workers. Poor health can be expected to have a negative impact on the ability to participate in the workforce, and chronic health conditions not only progress with age (depending on individual lifestyle) but are an acknowledged indicator of reduced labour force participation among mature age workers, leading to early retirement (Murphy: 2003; McGarry: 2002).

However, the relationship between health and premature retirement is not straightforward because of the relationship between good health and higher income. Having a higher level of retirement income can be a motivator for retirement, so that workers in good health may well leave the workforce before the usual retirement age years. It is also important to take into account individual skill levels, as some skills enable workers with health challenges to move into occupations that can accommodate these. Analysis by the Australian Treasury concludes that deteriorating health is probably a better predictor of mature age workers' continued participation in employment than poor health *per se*, significantly influencing retirement expectations than other variables, such as, changes over time in income (Murphy: 2003).

There is also increasing evidence that people with chronic disease are more likely to leave the paid work force (Crotty *et al*: 2002) and analysis of HILDA (Household, Income and Labour Dynamics in Australia) survey data shows that differences in the participation rates of people rating their health as 'poor' or 'fair' had lower rates and that this trend was more pronounced in older age groups, and among women compared to men (Murphy: 2003).

Current expenditure on those aged 65 and over is around four times more per person than those under 65, rising to 6 to 9 times more for people over the age of 85. Rising healthcare costs are often attributed to the higher usage of services by older people. However, Australian Institute of Health and Welfare analysis indicates that ageing as a single variable adds 0.6% to annual health sector expenditure, while changes in medical practice due to *technological innovation* add significantly to health costs – at an estimated rate of 1.9% per person for the past 22 years (AIHW, 2000: 316). While ageing has been the smallest of the contributors to increased health expenditure, the impact of current ageing trends is in its early stage and is projected to have greater effect on the future rate of health expenditure (Productivity Commission, 2004a: 20 - 23).

These findings highlight the importance of activities that promote health and prevent illness, with the workplace having a key role to play in workforce health. A study by de Boer *et al* (2004) showed that targeted intervention (including scheduled consultations with an occupational physician, and development of a detailed work plan and regular assessment) for those 'at risk' of early retirement resulted in greater retention, improved work ability and less burnout. These impacts were present for 18 months post-intervention. The substantial research undertaken over the years by the Finnish Institute of Occupational Health (Ilmarinen, Tuomi and colleagues) shows that health promotion and prevention of illness is not solely the responsibility of public policy, nor is it effective if the work environment is excluded (Comcare: 2003; Ilmarinen: 1999).

... deteriorating health is not an inevitable consequence of ageing.... there is strong evidence that people aged 55 or older who follow an active lifestyle, have the daily functioning equivalent to less active people aged 15 years younger.

...the relationship between health and ageing is also affected by a range of other factors (such as, gender, marital status, education, income, occupation and employment, and country of birth, and ... strategies to promote a healthy old age must ... continue throughout the life course – including during the employment years. During these years the need for strategies to reduce damage (such as avoiding smoking), to protect against damage (such as by improving ergonomic intervention, job design and good nutrition), and to prevent loss through lack of use (such as through physical activity) have been identified (Comcare, 2003: 5-6).

3.1.1 Separating age-related ability to work from age-related working conditions

The European Foundation for the Improvement of Living and Working Conditions (EFILWC) has undertaken numerous studies designed to identify the impact and implications of an ageing workforce, including the *European Working Conditions Survey* which was undertaken in 2005 for the fourth time since 1995. The fourth wave of the survey involved a sample of 29,680 workers from 31 European Union countries. Survey findings were analysed against four areas – career and employment security, health and well-being, skills development, and reconciliation of working and non-working life. **Findings highlight significant differences in the working conditions of younger and older workers and therefore, in the way work life is experienced.** A summary of some of the findings against the four analytical themes is provided in the chart below.

Analytical theme	Key findings
Career and employment security	<ul style="list-style-type: none"> ⇒ Oldest and youngest groups face the highest risk of age discrimination in the workplace ⇒ Temporary employment contracts are concentrated among younger workers but increase among oldest age groups, especially women
Health and well-being	<ul style="list-style-type: none"> ⇒ Older workers report higher exposure to risks associated with heavy workloads, repetitive movement, physical position ⇒ Involvement in High Performing Work Organisations (HPWOs) is low among older workers, but more widespread among younger workers ⇒ Work intensity decreases while work autonomy increases with age ⇒ Young workers are least aware of the impact of work on their health while those aged 45–54 are significantly more likely to recognise this ⇒ The presence of discrimination or violence in the workplace, or low security employment contracts, significantly reduce expectations of remaining in the same job at 60 years of age
Skills development	<ul style="list-style-type: none"> ⇒ Workers with low education levels are mainly older workers ⇒ Older workers receive less training than younger workers, and women have less training opportunities than men ⇒ The largest improvement in the use of computers at work has occurred over time with older workers
Reconciliation of work and non-life	<ul style="list-style-type: none"> ⇒ Inflexible work arrangements are likely to discourage older workers from continuing to work due to work–family imbalance ⇒ Older workers have a higher likelihood of caring for an elderly or disabled relative than other age groups ⇒ The proportion of workers who have autonomy in structuring their work time increases with age

One of the conclusions drawn from the findings is their implications for preventing premature retirement. The authors recommend a focus on those aged between 45 and 54 years to identify work conditions that will encourage their continued participation in the workforce, and to take a preventive approach in doing so.

Research on the issue of older workers' employability ... has pointed out how the low participation of older people in the labour market is the result of a combination of wage conditions, rigidity in

workplace organisation, inadequate skills and competencies and poor health status, rather than the wish to retire early (Villosio, 2008: 4).

An additional factor causing premature workforce retirement is negative employer attitudes and behaviours (Harper *et al*: 2006). Drawing on the findings of a global ageing survey on the future of retirement¹, the Oxford Institute of Ageing concluded that employers did not regard older workers in a less positive light than younger workers, with countries with more advanced economies being generally more positive to older workers but agreeing that they could be offering them more opportunities to pursue new kinds of work. Less than one-third offer the opportunity to work fewer hours, while some two-thirds offer them the opportunity to mentor younger colleagues. Despite widespread workforce ageing, most employers did not regard the potential loss of a significant portion of their workforces as an immediate issue (Harper *et al*: 2006).

3.2 Changes in functional capacity

Ageing has a wide-ranging impact on functional capacity which is not uniform because of individual differences in lifestyle, nutrition, fitness, genetic predisposition to illness, educational level, and work and other environments. It is clear from the research that ageing *per se* is not the determining variable for decline in capacity, but that it interacts with a range of other factors that together affect functional capacity. The trend in findings is for differences in capacity to work to occur in relation to *individuals* rather than in relation to age groups (Ilmarinen: 2005). Nevertheless, numerous stereotypes and myths prevail about the ability of mature age people to participate effectively in work, and in life in general. These are discussed in the conclusion to this section of the report.

In reviewing the literature, we have drawn from a wide range of studies, but have focused on the findings of two literature reviews that have screened research for its methodology and have provided an overview of available data on older workers' injury and illness rates (Harper & Marcus: 2006; Benjamin & Wilson: 2005). In addition, we have given particular attention to the findings of the rigorous *Seattle Longitudinal Study*, (Schaie: 1996) which has continued at seven-year intervals since 1956, and is the only three-generation research undertaken in the USA, and possibly world-wide. Some 6,000 people ranging in age from 22 to 101 years, have participated in the study. In addition to the main study, data have been collected from the sample's relatives to determine family similarity (for example, between parents and children), and some participants have received training designed to slow or remediate changes in cognitive function. Finally, much of the review is informed by the work of the Finnish Institute of Occupational Health (Ilmarinen: 1995, 1999, 2001, 2005; Tuomi *et al*: 2001, 1998).

In structuring research findings about functional change due to ageing, we have adopted the categories used by Harper & Marcus (2006) and isolated their workplace implications:

- o Respiratory and cardiovascular
- o Sensory
- o Musculoskeletal
- o Psychological, including capacity to deal with stress
- o Cognitive.

¹ Conducted in 21 countries in 2004 and 2005, involving some 10,000 people aged 18 and over

3.2.1 Respiratory and cardiovascular function

Cardiovascular capacity and aerobic/respiratory power tends to decline with age, with examples of decline including decreased lung function, breathing capacity, tissue elasticity and ability to undertake aerobically demanding activities, as well as reduced cardiac output, increased heart rate and blood pressure recovery time following exercise, increased blood pressure due to thickening of arteries, and irregularities in heart beats (Harper & Marcus, 2006: 21).

This means that older workers are likely to have a reduced ability to do heavy work, particularly at a fast speed, and more generally to do work which tends to cause shortness of breath, to work in extreme heat or cold, a reduced capacity for shift work, and a need for longer recovery time following exertion. The cardio-respiratory load of even moderate tasks can become particularly critical for older unfit people (Comcare: 2003; ASCC: 2005; Harper & Marcus: 2006).

Workplace implications

Workplaces can be modified to address reduced respiratory and cardiovascular capacity through such changes as –

- ⇒ Job re-design
- ⇒ The use of equipment (eg for lifting) and other assistive technologies
- ⇒ Restrictions on heavy lifting and physically exerting tasks
- ⇒ Training in appropriate lifting
- ⇒ Allowance for recovery following exertion eg through small breaks, increased breaks
- ⇒ Provision of workplace exercise and fitness programs (Harper & Marcus, 2006: 21).

3.2.2 Sensory function

There are a number of research studies identifying a decline in sensory and sensorimotor abilities as part of the ageing process (Li: 2002). Sensory function is the only ageing-related change that declines due to chronological age alone, and even this will vary with environment - for example, ongoing exposure to loud noise and impact on hearing (Harper & Marcus, 2006: 20). Changes have been identified in hearing as early as the mid-forties, in vision and touch in the mid-fifties, in taste in the mid-sixties, and in smell in the mid-seventies.

However, loss of sensory abilities can be compensated – for example, through increased patience and judgement observed in older workers (Shephard: 1997a), but allowances need to be made for slower reaction time (Harper & Marcus: 2006). Deterioration in vision and hearing can be accommodated through aids (such as, spectacles and hearing aids) and workplace design that benefits all age groups while targeting older workers (for example, effective lighting and acoustic conditions (Benjamin & Wilson: 2005). For most people, *hearing* is normal until the age of sixty approximately, and then deteriorates due to such changes as damage to inner ear hair cells, loss of sensitivity to high frequency sound. Changes in *vision* include a decreased ability to see objects clearly, to function in low levels of lighting, to correctly judge distances, to perceive the speed of moving objects and to distinguish certain colour intensities. Ageing also brings the increased likelihood of conditions like glaucoma (especially if diabetes is present) and cataracts. In the 2001 *ABS National Health Survey*, 96-98% of men and women in each of the 65-74, 75-84 and 85 and over age groups reported that they were suffering from long-term diseases of the eye (in AIHW: 2001).

A recent report to *WorkCover SA* (Access Economics: 2007) analysed claims data for the period 2000/01 to 2006/07 and found that an average of 380 workers were compensated for hearing loss

each year in South Australia. Over half of these workers were aged 55 to 64 years and 97.5% were male. A further 168 workers per year were estimated to incur hearing loss from uncompensated workplace incidents. Other findings from this analysis were that -

- o Hearing claims represent some 1% of *WorkCover SA* claims and have risen a little in recent years (no doubt due to the ageing of the workforce).
- o It is important to note that 93% of claims for hearing loss did not involve any days lost from work, a further 2.7% returned to work within one week and approximately 5% had either longer periods off work, or returned to partial duties or did not return at all.
- o There was a strong and positive relationship between degree of hearing loss and average cost per claim. The median lump sum claim was \$7,778 and of hearing aids was \$5,860

Age-related changes in *balance* include greater difficulty in maintaining balance (due to changes in sensory cells and receptors that control balance) bringing an increased likelihood of falling over. Changes in *touch, skin and thermoregulatory* functions include reduced sensation to heat, cold, pressure and vibration, reduced skin elasticity, reduced ability to maintain body temperature (due to thinning of subcutaneous fat), reduced ability of sweat glands to be efficient in keeping cool and skin taking up to four times longer to heal if wounded (Harper & Marcus, 2006: 21-22).

These changes in sensory function mean that -

- a) In relation to hearing, older workers may not be able to hear alarms, instructions or be limited in their ability to converse with co-workers
- b) Older workers may be more sensitive to computer screen glare, less able to work in poorly lit workplaces, and to work in occupations that require the ability to distinguish colour intensity, gauge the speed of moving objects and to correctly judge distances (the last two capabilities have particular implications for older people whose work requires night driving).
- c) Declining balance function can bring an increase in falls among older workers and this highlights the importance of workplace design to minimise the likelihood of falls and the need for training in awareness about appropriate footwear and carrying techniques.
- d) Changes in touch, skin and thermoregulatory functions can increase susceptibility to dermatitis in certain occupations, and the need for protection from ultraviolet light for those working outdoors.

Workplace implications

Workplace conditions play a critical role in the impact of reduced sensory function on ability to work effectively.

- ⇒ There is a need to reduce overall workplace noise levels wherever possible - for example, by using quieter machines, or by reducing exposure time - and to offer protection to workers in noisy environments as well as training that encourages the use of safety and protective aids. Citing research by Daniell *et al* (2006), Harper and Marcus (2006) note that in the USA twenty years of hearing regulation have had minimal impact on employers (most doing little to reduce noise levels) and employees (most not using the protection they were offered).
- ⇒ The provision of protective gloves and other clothing, reduced contact with dermatitis-inducing working conditions (for example, contact with chemicals and other irritants) and protection from ultraviolet sunrays are all preventive strategies in the workplace that address age-related changes in thermoregulatory function, skin and touch.

- ⇒ A preventive approach to hearing loss is also recommended by some researchers, for example, through employers screening their workforces prior to exposure and monitoring at regular intervals (NIOSH: 2004; HSE: 2005).
- ⇒ Workplace lighting plays a key role in the older worker's productivity and safety, as does the provision of large font size on computers and written documentation, and anti-glare computer screens (Benjamin & Wilson: 2005).
- ⇒ A preventive approach to vision deterioration can include regular vision and workplace lighting testing, with some researchers (Ball: 2003) recommending that testing for functional ability (as opposed to diagnosing eye disorders or disease) be undertaken in the workplace. UK employers are required to pay for eye testing for employees working with display screen equipment (for example, computer users) every two years (Harper & Marcus: 2006; Benjamin & Wilson: 2005).
- ⇒ A preventive approach to workplace safety risk due to balance function decline is also identified, with effective lighting, tidy workplaces, non slip surfaces and clear walkways – all of which are beneficial to the workforce as a whole (Harper & Marcus: 2006).

3.2.3 Musculoskeletal function

Age is also associated with reduced elasticity in almost all tissues of the body, leading to a decreased range of movement, and increased time needed to repair damaged tissue. These changes in musculoskeletal capacity can begin in the mid 40s as bone density begins to decrease, in both men and women (Harper & Marcus: 2006). Bone density reduction is a key risk factor for osteo-arthritis, a leading cause of disability in industrialised countries and is particularly significant for women. Common musculoskeletal function changes include –

- o Decreased bone mass which increases the likelihood of fractures at the proximities of long bones and the spine.
- o Decreased muscle mass and subsequent decrease in muscle strength.
- o Reduced elasticity, tensile strength and ability to regenerate the connective tissue in the ligaments and tendons.
- o Decreased mobility (Harper & Marcus: 2006; ASCC: 2005).

These changes can also bring a deterioration of overall physical health, with back or neck pain being evident intermittently (Harper & Marcus: 2006). Risk factors for sickness due to low back pain identify a complex interaction between psycho-social work variables (such as, degree of autonomy and control) and musculoskeletal factors (Hemingway *et al*: 1997, cited by Harper & Marcus: 2006). The combination of flexion and rotation of the trunk, lifting, low levels of job satisfaction and low levels of social support in the workplace have been identified as risk factors for sickness absence due to low back pain (Hoogendoorn *et al*: 2002, 2000; Kerr *et al*: 2001, cited by Harper & Marcus: 2006).

These ageing-related losses in physical capacity are a particular concern for those working in physically demanding jobs. Some researchers note reductions in physical capacity can lead to excessive fatigue, loss of quality and an increased risk of industrial accidents (in ASCC: 2005). One such common industrial accident is falling. Laughton reports that older adults demonstrate increased amounts of postural sway, which may ultimately lead to falls, although the mechanisms contributing to age-related increases in postural sway and falls in the elderly remain unclear (Laughton: 2003). When comparing key muscle function characteristics of older 'fallers' and 'non-fallers', the non-fallers demonstrated significantly greater muscle activation and co-activation compared with young subjects. The study suggests that high levels of muscle activity are a characteristic of age-related declines in postural stability and that such activity is correlated with short-term postural sway. These findings provide some insight into the reasons for falls

being common in older workers and for the rate of injury due to falls being significantly higher in older workers than their younger counterparts.

However, physical strength and endurance is specific to individuals and is influenced by a number of factors of which age is only one. Consequently, some older workers can be as strong or stronger than their younger colleagues (Benjamin & Wilson: 2005; Shephard: 1997; Ilmarinen: 1997), and it is difficult to separate age from other causal changes to physical function - such as, work, fitness - (Ilmarinen: 2001). Researchers are also clear that physical strength and endurance can be improved upon, or compensated for (Shephard: 1997; Benjamin & Wilson: 2005).

Workplace implications

These changes have implications for tasks where workplace layout requires work at extremes of posture, although individual differences can be significant and can be enhanced through physical activity. Furthermore, the rate and extent of deterioration varies greatly from one person to another, depending on individual physical condition - for example, fit and active older workers may be able to outperform more sedentary younger workers. It is also evident from the research literature that while a range of individual, psycho-social and workplace variables determine the extent to which musculoskeletal deterioration causes sickness based absence from work, the way in which this occurs is less understood (Harper & Marcus: 2006).

- ⇒ Due to individual differences, the way in which the workplace is modified to address musculoskeletal change and vulnerability needs to be tailored to the needs and condition of each worker.
- ⇒ It is important that workplace culture and occupational health and safety policies are designed to encourage workers to identify any impact of musculoskeletal change on their ability to perform their work role.
- ⇒ Given the important role of physical fitness, workplaces can play a key role in supporting and encouraging workers to be fit and active prior to and during their older years.
- ⇒ Workplace culture is also important in encouraging workers to notify as early as possible about musculoskeletal difficulties in order to obtain early treatment and redesign of work activity and work space to accommodate these. Training programs that enable workers to understand the nature of musculoskeletal injury and the importance of early notification are part of developing a culture that promotes a preventive approach to health and safety.

3.2.4 Psychological function

As with physical deterioration associated with ageing, psychological impacts are not necessarily correlated with chronological age, as many individual and environmental factors influence individual capacity to manage stress.

A number of research studies have found that older workers are more susceptible to depression than other age groups with symptoms including increased irritability, declining interest in activities that are normally enjoyed, changes in weight and appetite, disrupted sleep patterns, reduced energy levels, lowered self-esteem, and decreased ability to concentrate or make decisions (Harper & Marcus: 2006). In their review of the literature Marcus & Harper (2006) identified numerous studies that found an elevated risk of adverse psycho-social health due to workplace stress (Pikhart *et al*: 2004; Godin *et al*: 2005; Weyers *et al*: 2006; Muntaner *et al*: 2006). Consistent with many other studies of occupational mental health, a Finnish study concluded that high levels of job strain compound the existence of stress and recovery from stress -

... *psychologic distress is associated with long-term medically certified sickness absence in a large contemporary working population. High job strain has an adverse effect on prognosis among employees with psychologic distress* (Virtanen *et al*, 2007: 186).

WorkCover SA data show that in 2006-7, some 313 stress-related claims were made by workers aged 55 years and over, out of a total of 1,798 stress-related claims for all workers². This means that 17.4% of stress-related claims were made by those aged 55 and over, which is a greater proportion of claims than for all injury/illness types (approx 13%).

By contrast, Comcare data did not reveal a direct relationship between 'psychological injury' claims and age (but it needs to be noted that their data pertain to a more restricted number of industries than those of WorkCover SA and are not directly comparable). Nevertheless, Comcare data show two peaks in average total cost per claim for this type of injury – the highest for the 50-54 year group, and the second highest for those aged between 30 and 34 years. Those aged 55 and over had much lower rates, leading to ComCare to conclude that factors other than age are needed to explain these trends (2003: 11).

While it is difficult to directly compare the stress experience of younger and older workers due to the great number of variables that may impact on coping ability, there is some evidence to suggest that older workers experience significantly fewer problems with personal control on the job that might trigger stress, as well as less job tension, less generalized stress, less depression, and fewer stress-related disruptions of job performance (Hansson *et al*: 2001). Furthermore, Hansson *et al* note that while older men (aged 55 and over) reported more problems with health compared to men aged 45–54, they actually reported fewer problems associated with work.

However, stress can be a significant issue for older workers with particular triggers/causes of stress that include the fear of redundancy, lack of opportunities for career development, financial insecurity heading into retirement, and the capacity to adapt to changing technologies (Hansson *et al*: 2001). Ageist assumptions often underpin these triggers, and there are a number of research studies that have documented these among employers (Selby-Smith *et al*: 2007; Taylor & Walker: 1998). Analysis of data regarding the Canadian workforce's participation in an Employee Assistance Program (EAP)³ found that older workers were more likely than younger workers to report more grief due to loss of family members and friends, less likely to report relationship problems, slightly more likely to report work relationship and conflict and workplace stress issues, slightly more likely to report personal stress, and more likely to access financial planning and eldercare support services (WarrenShepell: 2004).

3.2.5 Cognitive function

In assessing change in cognitive function with age, the quality of research methodology is critical. Longitudinal studies following individuals over time, find smaller amounts of age-based cognitive decline than do cross-sectional studies, wherein people of different ages are compared with each other at a single point in time (Benjamin & Wilson: 2005; Ardila *et al*: 2000). Harper & Marcus (2006: 24) concluded from their review of the literature that many studies of the effect of age on cognitive and other functional abilities lacked methodological soundness because they used small samples or samples that do not enable comparison between age groups or across the

² Note: the definition of 'stress-related' claim was made based on the aggregation of data for 'injury types' that are directly related to stress or anxiety. It is likely that claims for other injury/illness types are also stress-related (either directly or indirectly).

³ A national strategy designed to address and reduce psychological problems in the workplace. An EAP is a confidential, independent, early intervention counselling service for employees addressing issues that may be affecting employee performance. EAP services are provided by clinical and registered psychologists through a centralised phone system. The issues that may be addressed through the use of an Employee Assistance Program can be Personal (eg anxiety or depression, grief and loss, emotional or physical abuse), Family (financial, legal, relationship issues, work-life-balance issues) or Work (eg relationships with co-workers, managing conflict).

life spectrum. From those studies considered to be reliable they concluded that a gradual deterioration in mental and cognitive functions occurs with age, involving functions like memory, learning, thinking, concentration and attention. More specific changes that can be problematic include –

- o putting information into memory and retrieving it;
- o understanding text;
- o ability to concentrate;
- o making inferences;
- o working memory capability – the amount of information that can be used without losing any of it (Harper & Marcus, 2006: 24).

Considerable individual variability occurs in the timing, order and occurrence of cognitive changes, and some researchers dispute the assumption that age-related changes have negative implications for performance capacity. Others disagree, for example, Skirbekk (2004) cites a number of studies suggesting that cognitive speed, reasoning and episodic memory decline significantly from the age of 50.

In assessing cognitive capacity for different age groups, it is important to address the influence of other intervening factors, particularly level of education and training. Robertson and Tracy (1998) concluded that age-related changes in intellectual functioning are typically minimal for healthy workers with high levels of education and training who are exposed to appropriate stimulation by their surroundings. Level of education can protect against age-related cognitive deterioration (Ardila *et al*: 2000).

A number of studies have identified education as a useful predictor of return-to-work outcomes. For example, the likelihood of disability insurance claimants returning to work increases with every additional year of education. Improved outcomes for workers with higher levels of education may be attributed to greater adaptability to injury-related impairments and greater ability to accept changes in occupational activities and/or new job skills (Aust Institute for Primary Care: 2006).

Other studies have shown that while older workers were inferior to younger workers in laboratory tests, 'on the job' performance deficits were less apparent. It is evident from the review of research that the assessment of age-related ability needs to occur in real life environments, rather than relying solely on laboratory-based analysis. Task demands usually only cause a problem for older workers when they are accompanied by time constraints and where the employee has no control over such constraints (for example, Comcare: 2003; Skirbekk: 2004).

Some of the participants in the *Seattle Longitudinal Study*, (Schaie: 1996) have undergone cognitive training designed to slow or remediate cognitive change, enabling comparison with their peers who have not had such training. Among the study's findings are the following –

- o Decline in most psychometric⁴ abilities does not occur before age 60, even though there is a slowing in response speed during the testing process.
- o Some individuals show earlier decline due to other individually-based factors, including, genetic makeup and social disadvantage.
- o By age 74, decline is evident on all psychometric abilities, but individual differences occur, and even at age 81, less than half of those tested had shown decline in the preceding seven years.

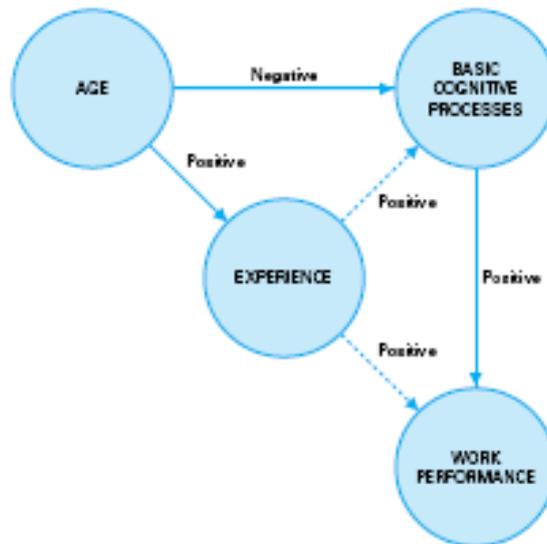
⁴ That is, measured knowledge, abilities, attitudes, and personality traits

- o The data suggest that there has been a slowing in the rate of average decline over successive generations.
- o The variables that reduce the risk of cognitive decline in old age include -
 - ⇒ absence of cardiovascular and other chronic illness;
 - ⇒ participation in an environment marked by complex and stimulating activities;
 - ⇒ a favourable environment mediated by high socioeconomic status;
 - ⇒ a flexible personality style at midlife;
 - ⇒ high cognitive status of spouse/life partner;
 - ⇒ maintenance of high levels of perceptual processing speed.
- o Decline is reversible and is likely to be a function of disuse. Approximately two-thirds of those studied showing significant improvement following cognitive training, and some 40% of those who had declined significantly over a 14 year period were returned to their pre-decline level (Seattle Longitudinal Study web site)⁵.

Of relevance to the workplace is the potential for reaction times to slow as a consequence of cognitive changes arising from the ageing process. These involve a general slowing of the functions controlled by the frontal lobe which is one of the first parts of the brain to be affected by ageing (Zimprich & Martin: 2002). However, reaction times have been found to vary with the type and complexity of task and the time given for decision-making. The more complex the task, the more time is needed (Harper & Marcus: 2006; Haight: 2003). Age differences in performance have been found to dissipate when older workers are familiar with job requirements and are given longer periods of training, and can perform at the same level as younger colleagues when they can compensate for reduced speed (WarrenShepell: 2004). As the *Seattle Longitudinal Study* demonstrates, the environment in which the person is functioning is critical to cognitive response, and can be enhanced to improve that response. Modifying workplace time demands to meet the needs of individual workers is thus important, and is beneficial to all age groups, not only those who are older. Age-related cognitive decline is cumulative across the life course, and cognitive function relies not only on cognitive ability but also on motivation and persistence (Salthouse: 2004).

Importantly, cognitive impacts need to be differentiated from learning capacity. Ilmarinen (2001) asserts that actual functions of information processing change very little in the course of one's career and that moreover, some cognitive functions, such as control of use of language, complex reasoning skills and the ability to problem solve, improve with age. Further, even though the speed of learning may slow with age, the actual learning process is not dependent on a person's age (*see also Section 3.3*). Strong motivation to learn can also compensate for the slower learning speed. Ilmarinen's review of the literature found that some mental characteristics can also strengthen with age. The positive and negative impacts on cognitive ability as people age are presented in Ilmarinen's model below.

⁵ www.geron.psu.edu/sls/researchers/index.htm



Relatively recent research using brain-imaging techniques suggests that the older brain functions differently rather than less effectively compared with younger adults. This is attributed to the humans' lifelong ability to compensate for decline in cognitive functioning by activating other parts of the brain (Reuter-Lorenz: 2002). Earlier research indicates that while some cognitive abilities may slow with age (for example, the speed of processing visual information), other abilities (such as, knowledge) remain the same or even increase (Griffiths: 1997). Certain skills, such as, vocabulary and writing speed, have been found to peak around the 40 to 50 year age period (Shephard: 1997) and cognitive abilities like the ability to process complex information in demanding situations, and the ability to reason, deliberate and comprehend a total situation, actually improve with age (Ilmarinen: 2001). Workforce ageing should be seen as a series of trade-offs rather than a problem, with any functional decline compensated for by increases in experience and knowledge, further training and the development of new abilities (Kumashiro: 2002).

Workplace implications

As with much of the other research findings on age-related functional change, the impact of individual health and educational level is critical, and for many people, interventions can be undertaken to address deterioration. The workplace can play a significant role in avoiding the creation of environments that exacerbate cognitive deterioration and in addressing this through training and work redesign.

- ⇒ Workplaces that require employees to make decisions in the face of time pressure are unlikely to provide appropriate environments in which older workers can perform to their maximum cognitive and psychological ability, and may also risk injury or illness. Conversely, making allowances for individual differences in response rate, and reducing the need for constant rushing to complete tasks, will create an environment that maximises the functioning of workers of all ages, especially those who are older.
- ⇒ It cannot be assumed that all older workers will be inhibited by cognitive decline as individual health, education and training will be critical to performance. Workplaces have an important role to play in supporting older workers in these three areas – all of which are critical to overall workplace and broader economic productivity.

- ⇒ Individual workers have a responsibility over the life course to remain fit and healthy, and to participate in ongoing (formal and informal) learning opportunities. Motivation to do this is essential and likely to be most effective when employers and employees work together to create workplaces that maximise participation for all age groups.
- ⇒ Shift work has been found to have a significant impact on cognitive function which appears to increase in later life (Harper & Marcus: 2006; ASCC: 2005). Tolerance for shift work itself also seems to reduce over time, which is likely due to age-related changes in circadian rhythms and preferred timing of sleep as well as reduced flexibility in sleep patterns (EFILWC: 2003). However, a study specifically designed to test the impact of shift work on older workers (Harma *et al*: 2006) found that a 'fast forward rotating shift system' improved psychomotor performance and alertness on the night shift and on general well being (cited in Harper & Marcus, 2006: 24).

3.3 Ageing and the capacity for learning and training

Ageism is no more evident than in the myths that exist, particularly in the work environment, regarding older workers' capacity for training and re-training. Some researchers report that older workers do not feel motivated or encouraged to participate in training activities, or face barriers based on perceptions that older workers are 'less trainable' than their younger counterparts, disinterested in training, represent a lower return on training investment, and are less competent because of their age (Taylor & Urwin: 2001; Taylor & Walker: 1998). Researchers have found that the older workers get, the less likely they are to receive training (EFILWC: 2003; Griffiths: 1997) which of course has the compounding effect of losing skills and confidence, creating a 'self fulfilling prophecy' of not being 'trainable'.

A key factor in the ability to benefit from training is confidence, with some researchers finding that mature workers may need to be encouraged and supported to participate in formal training, especially if they have lower levels of literacy and numeracy and little ongoing learning experience (Selby Smith *et al*, 2007: 16).

However, this does not mean that mature-aged workers should be 'pathologised' (Barnes, Bimrose and Brown, 2006). Rather, mature-aged workers need to be carefully encouraged by their employers to undertake training. This may be particularly true of assessment, where the fear of failure will be greatest and where demonstration of competency may be a major source of stress for mature-aged workers (Selby Smith et al, 2007: 17).

The way in which work-relevant training is delivered is always critical to its success, across all age groups. Research findings indicate that older workers prefer workplace based learning which is presented in a way which links the training to the workplace environment (Bowman and Kearns: 2007; Selby Smith *et al*: 2007) and self-paced learning with sufficient opportunity to practise or collaborative training where they can help and be helped by their peers (Filipczak: 1998). Older adults, like any age group, benefit from training that is tailored to individual need and this reflects good practice which is beneficial to workers of all ages (Benjamin & Wilson: 2005).

Other researchers have studied the appropriateness of new technologies in training older people, challenging the perception that older people do not respond well to learning modes that incorporate new technologies. For example, Wallen & Mulloy (2006) showed that computer-based training incorporating text, graphics and audio narration is most appropriate for workers over the age of 45 while Van Gerven *et al* (2003) found that multi-media learning tools are suitable and effective for older learners.

The mode or mechanism of training for older people has also been considered in the research. The emergence of *cognitive load theory* (CLT) is particularly relevant for older learners, as it aims to stimulate a learner to use more efficiently working memory which may be diminished with age (Van Gerven *et al*: 2003). It is acknowledged that even healthy older people are likely to experience a decline in working memory and cognitive speed, as well as the ability to suppress irrelevant information. Speed of learning can slow as part of the ageing process (Ilmarinen: 2001) and older workers may take longer to learn new information because of the time taken to filter pre-existing knowledge and experience (Filipczak: 1998). Van Gerven *et al* propose that CLT presents a framework for dealing with this decline while optimising learning opportunities for older people. In practical terms, this means designing instructional tools and processes in such a way that irrelevant operations (and information) are minimised and the most relevant operations maximised.

Motivation to learn can compensate for slower learning speeds (Ilmarinen: 2001). Research findings indicate that people's age and life phase shape the reasons they have for undertaking training – with graduates aged 45 and over being more likely than those 25-44 years to identify 'personal development' as the primary reason for training. For both groups, however, employment-related outcomes are the most significant driver (Karmel: 2007; Kennedy & Da Costa: 2006). Mature age workers are the fastest growing sector in the vocational education and training system (Selby-Smith *et al*: 2007) pursuing the dual goals of vocational and personal development. In the 'second age', lifelong learning and continuous education are particularly useful tools in enhancing participation and work ability. This requires a shift away from the 'front end loaded' rather than life-course approach of post secondary education, which traditionally has produced a student population profile dominated by younger people (Karmel: 2007; Martin: 2007). A key conclusion from research by Walker (2002) is that perceptions of trainability and interest in training for older workers should be the emphasis of future workforce education strategies.

Managing the functional changes brought by the ageing process so that older workers can participate in paid employment in a way that maximises their strengths and enables ongoing learning is usually referred to as 'age management'. Examples of this are provided in [Chapter 4](#), with a number of the case studies identifying training and education as a mechanism by which workforce participation and safety can be enhanced for older workers.

3.4 Workplace assessment of ageing-related health and safety risks, and productivity

3.4.1 Workplace assessment of ageing-related health and safety risks

In their review of the literature Harper & Marcus (2006) found few studies on the health and safety needs of older workers, and extremely varied approach to addressing these issues between occupations, and between countries. They note that ideally, risk assessment should be holistic, taking into account ergonomics, design of workplace tools, equipment, workstations and organisation of work. A *Functional Capacity Evaluation* (FCE) is a systematic approach to assessing individual physical and functional capacity, matching performance to the demands of a specific job, work role or occupation. An FCE can be used for recruitment, work modification and return to work planning (Harper & Marcus: 2006).

In practice, assessment was found to be undertaken from the perspective of work rather than the worker, and in contrast to principles of 'workability'. What is consistent in their review of research in different countries, are the following approaches to creating workplaces that enable older workers to perform at optimal functional capacity –

- o Health promotion activities in the workplace.
- o Continuous opportunities for learning and training.
- o Matching work to individual worker ability to prevent function-based capacities from acting as barriers to performance.
- o Frequent risk assessments to monitor changing status and to design workplaces for age management.
- o Providing age management strategies across the life course
- o Modifying the work environment through strategies that include improved lighting, reduced noise, temperature control, avoiding excessive workload targets.
- o Flexible working patterns.
- o Ongoing training to update skills.
(Benjamin & Wilson: 2005; Scottish Executive: 2005; ASCC: 2005; HRSDC: 2005; APSC: 2003; OSSA: 2002; CCOHS: 2002).

3.4.2 Productivity and older workers

The filter of ageism means that older workers are often perceived to be less productive than younger workers, and much depends on whether both quality and quantity of output are taken into account (Benjamin & Wilson: 2005). Researchers have found that while some older workers may have a slower speed of working, this is offset by a higher quality of output (WarrenShepell: 2004; Shephard: 1997).

Productivity does not simply decline with age. health, cognitive, physical and sensory functioning; abilities to adapt to change and learn new information; and rates of absence and accidents do not simply deteriorate with age. Productivity, therefore, ... will be affected by factors such as days lost from absence and accidents, and there will be great individual variations in productivity with increasing age (Benjamin & Wilson, 2005: 20).

Longitudinal research in Finland, measured by the *Work Ability Index* (Ilmarinen: 1995) identified a general decline with age as well as great individual variation in the ability to work – a variation that increases with age. In other words, the trend to a general decline does not justify the exclusion of older people from work and demands individual assessment of this. Ilmarinen's research found three groups of risk factors which affect the decline in ability to work –

- 1 excessive physical demand, for example, repetitive movements
- 2 stressful and dangerous work environments
- 3 poorly organised work, including lack of control or discretion over the way in which work tasks are performed.

More recently, Ilmarinen (2005: 408) has presented findings on functional capacity in terms of physical, mental and social functional capacity. These show that only physical function decreases – and with individual variation, and depending on remediating or preventive interventions, while social functional capacity improves with age. Mental function can improve in some areas and deteriorate in others, again mediated by individual differences and subject to cognitive training and practice. There is a trend for older people to use many of their physical and mental capabilities less, especially if they are not working. Whether this is due to ageist expectations is difficult to determine from existing research.

These three factors have an especially negative impact on older workers, but all are preventable through appropriate workplace design and accommodation of individual workers. Summarising the importance of the workplace in supporting their productivity, the WarrenShepell Research Group draw this conclusion from their review of research –

Older workers perform well when there are few time pressures and when quality of work is judged over quantity. They especially thrive when they are allowed to compensate for age-related changes and employers are willing to accommodate them...

Given the advantages and costs that have been linked to older workers, it is our position that older workers are a net competitive advantage rather than a liability for employers. The advantages outweigh the costs when workplaces are healthy, and programs and services exist to address their unique needs and issues (2004: page 3, page 6).

A general conclusion of the studies that have been carried out is that differences in individual performance and everyday work tasks are greater than the differences between age groups reflecting differences in work experience, educational level, and profession (Ilmarinen, 2005: 126).

According to the concept of promoting work ability during aging, it is not only possible to obtain good work ability and health, but also a high quality of work and production, a high quality of life and well-being, and an active and meaningful retirement. An important conclusion ...[is] that health promotion should shift its focus from protection against illness to promotion of health and work ability (Tuomi et al, 2001: 318

3.5 Summarising the contributions and challenges of an ageing workforce

It is important not to pathologise mature-aged workers. There is a tendency in the current debates to view mature-aged workers as a "problem" which needs to be solved. This pathologisation of mature-aged workers may arise from the prevalent bio-medical attention to old age in which older people have been traditionally characterized as suffering from a range of problems – physical, social and intellectual. This view of old age as a medical problem tends to colour our views of mature-aged workers and their learning. In fact, recent theories of ageing have tended to depart from this pathological approach and stress instead that old age is simply part of an ageing continuum and that we should speak of successful ageing rather than the problems of old age (Selby Smith, Smith & Smith, 2007: 44).

Ageism generates a number of myths and stereotypes about older people and the ageing process, and these are particularly evident in relation to the perceived capacity for workforce participation. Myths and stereotypes leave no room for individuality – they assume a homogeneity that is not possible when such large numbers of very different people are involved, and are evident in widely used terms like 'the aged' or 'the youth of Australia'. Myths and stereotypes are based on perceptions, rather than reality, and underpinned by prejudice. In the face of a larger cohort of older people (the Baby Boomer generation) proportionate to the population as a whole, coupled with the need to retain mature workforce members, ageism is under siege. In drawing our conclusions from the available research, we present key myths and assess them against research findings. The Chart below summarises all of this information.

Workforce Ageing: Myths and Evidence

MYTH	RESEARCH EVIDENCE
<p>Ageing brings ill health and disease</p>	<ul style="list-style-type: none"> ⇒ Age alone is not the key determinant of health. Other factors include education, lifestyle, fitness, nutrition, socio-economic status, and environment. ⇒ These factors are more reliable predictors of health in old age than chronological age. Much depends on the individual.
	<ul style="list-style-type: none"> ⇒ Rates of chronic diseases and acquired disability increase with age. ⇒ However, most chronic illnesses linked with older age can be minimised or prevented.
<p>Older workers have more sickness based absence</p>	<ul style="list-style-type: none"> ⇒ Factors other than age affect sickness (eg individual health and fitness, lifestyle). ⇒ Older workers take less non-certified sickness but more certified sickness absence. Non-certified absence can be of greater concern to employers. ⇒ Ergonomic and workplace design addresses the most usual cause of absence in older workers – musculoskeletal issues. Workplace environment, including degree of control/autonomy, plays a key role in worker illness and injury, and absence
<p>Older workers have more injuries</p>	<ul style="list-style-type: none"> ⇒ There is little conclusive evidence to suggest older workers are a greater accident or injury risk in the workplace. ⇒ Older workers have fewer accidents, but when they are injured, their injuries are usually more severe. ⇒ However, older workers have a greater risk of fatal injury. ⇒ International research findings show that the incidence of injury decreases with age, but much depends on the definition of the term 'incidence'. If defined as '<i>injuries per thousand employed in that age group</i>', the incidence of injury increases with age (based on <i>WorkCoverSA</i> claims data). However, if the meaning of incidence is simply the <i>number</i> of people injured in that age group, then it does decrease with age. ⇒ International research findings indicate that older workers may take longer to recover from their injuries but <i>WorkCover SA</i> claims data do not show any increased duration times for older injured workers. ⇒ Different types of injury are associated with different age groups (eg sprains, falls are more likely for older workers). ⇒ These can be prevented or minimised through training and workplace design. ⇒ It is not necessarily the person's chronological age that predisposes them to injury at work but their prolonged exposure to health and safety risk factors over time. ⇒ Older workers usually are more responsible regarding health and safety issues.

MYTH	RESEARCH EVIDENCE
<p>The increasing number of older people are responsible for rising health costs</p>	<ul style="list-style-type: none"> ⇒ Expenditure on people aged 65 and over is higher than for younger age groups. ⇒ However, the costs associated with advances in medical technology have a greater impact on the health budget.
<p>Older people have reduced functional capacity and therefore are less able to work</p>	<ul style="list-style-type: none"> ⇒ Cardiovascular and respiratory capacity declines with age, and this is exacerbated if people are unfit. ⇒ However, workplaces can be modified to address this. ⇒ Sensory and sensorimotor ability declines with age, but varies with the amount of previous exposure to certain environmental factors eg loud noise. These changes can begin in the mid-forty years. ⇒ However, accommodation can be made through aids (eg spectacles) and workplace design (eg effective lighting). ⇒ Changes in balancing ability increase susceptibility to falls and changes in thermoregulatory functions make it more difficult to manage extremes of temperature. ⇒ Workplaces can be designed to address these issues. ⇒ Ageing brings declines in musculoskeletal functioning, increasing the risk of injury and reducing physical strength and endurance. ⇒ However, appropriate training can reduce the risk of injury as can workplace design. Individual physical strength and endurance can be improved upon or compensate, and overall decline in this area can be minimised through preventive measures (eg maintaining fitness). ⇒ Ageing can bring greater susceptibility to a range of psychological issues including stress, but much depends on individual circumstances and on workplace factors. ⇒ Cognitive functioning shows a gradual deterioration with age (eg in relation memory, learning, thinking, concentration and attention) but with considerable variation from one individual to another. ⇒ Decline in most abilities does not occur before 60 years, and is usually evident around 74 years of age, and there has been a slowing in the rate of average decline over successive generations. ⇒ Decline is reversible and usually due to lack of use of cognitive abilities. It can also be prevented through active usage and practice. ⇒ Although speed of learning declines with age, this can be compensated for by strong motivation to learn, and actual learning is not dependent on a person's age. ⇒ Some cognitive functions eg problem solving, complex reasoning, use of language, improve with age ⇒ Individual health and education critically affects age-related functional change.

MYTH	RESEARCH EVIDENCE
<p>Older workers lack the capacity for training and re-training, including in the use of new technologies</p>	<ul style="list-style-type: none"> ⇒ Learning is not dependent on age, but people learn in different ways at different ages. ⇒ Learning is facilitated by educational level and older generations are now more highly educated than their predecessors. ⇒ The way in which training is delivered is critical. Older workers usually need training to be applied to the workplace, and respond well to self-paced learning and collaborative (eg with peers) learning. They usually require more time to learn and to practise new learning. ⇒ Cognitive changes do not mean that older workers are unable to learn new information but the way in which they learn is likely to be different. ⇒ Therefore, training should be tailored to individual need - which represents good practice in training for all age groups. <hr/> <ul style="list-style-type: none"> ⇒ Mature workers require confidence to benefit from training and may need encouragement and support to participate in formal training, especially if they have low levels of literacy and numeracy and little ongoing learning experience. <hr/> <ul style="list-style-type: none"> ⇒ Older workers tend to receive less formal training, reducing their confidence to participate and increasing the perception that they are less trainable.
<p>Older workers represent a lower return on the training investment</p>	<ul style="list-style-type: none"> ⇒ Although they may have less time until retirement, older workers usually have lower turnover rates, which increases their potential return on a training investment. In fact the training provided may ensure that they are able to remain in the workplace. ⇒ Due to increased longevity, those currently in the pre-retirement age group are likely to work for longer than previous generations, provided they are given flexible working conditions and the training needed for their work.
<p>Older workers are less able to adapt to change</p>	<ul style="list-style-type: none"> ⇒ Older workers can adapt to change, including in the workplace. ⇒ Adaptation is influenced by a range of factors, rather than by age. ⇒ Resistance to change can be reduced through appropriate consultation, training, support and flexible adjustment to individual need.
<p>Older workers are less productive</p>	<ul style="list-style-type: none"> ⇒ Productivity does not simply decline with age. ⇒ Much depends on individual health, cognitive functioning, ability to adapt to change and learn new information. <hr/> <ul style="list-style-type: none"> ⇒ Older workers are more likely to have a slower speed of working but this is offset by a higher quality of output. ⇒ Reducing time pressures and giving preference to quality rather than quantity of output enhances the productivity of older workers. <hr/> <ul style="list-style-type: none"> ⇒ Three factors have been found to affect decline in ability to work - <ol style="list-style-type: none"> 1 Excessive physical demand, including repetitive movement 2 Stressful and dangerous work environments 3 Poorly organised work. ⇒ These are all preventable through workplace design.

As the above chart shows, there are some forms of decline associated with the ageing process, but most of these can be prevented, minimised, reversed or accommodated. In addition, older workers bring a range of positive attributes that have been identified by researchers, and which more than offset any deterioration. Those benefits include the following –

- o Broader experience from having worked in a variety of jobs, industries and organisations
- o Wisdom acquired from having lived longer and having made mistakes over time from which they have learned
- o Higher rates of retention;
- o Greater reliability;
- o Reduced ‘unsubstantiated absenteeism’;
- o Lower rates of absenteeism;
- o More responsible attitude to workplace safety (Benjamin & Wilson: 2005; Berger: 2005; Brooke: 2003; Critchley: 2006; Ilmarinen: 2001; Selby Smith *et al*: 2007).

It is important to separate myth from reliable research findings, and to acknowledge that –

- o older workers are a diverse group whose ageing process will vary from one individual to another;
- o chronological age is mediated by other variables, particularly health and education;
- o these other variables (eg healthy lifestyles, education, health promotion, healthy workplaces) can be addressed in a proactive way which means intervening across the life course, not just during the later years;
- o many of the functional changes associated with growing older can be delayed or reversed through interventions involving training;
- o many of the workplace accommodations that address ageing-related need are of benefit to all workers, not only those who are older;
- o the workplace has a critical role to play in promoting healthy workforces and workforces whose productive ability is not age-dependent.

The scope that exists for the workplace is explored in *Section 4*, which provides a series of case studies exemplifying good practice in enabling older workers to perform to their maximum ability – an approach often described as ‘age management’.

References

- ABS (2006) *2006 Census of Population and Housing*, Canberra
- ABS (2000) *Australian Social Trends, 2000*, Australian Bureau of Statistics, Cat. No. 4102.0 accessed 1/2/08 at www.abs.gov.au/ausstats/abs@.nsf/2f762f95845417aecca25706c00834efa/d61791951aed2000ca2570ec000e4154!OpenDocument
- Access Economics (2007) *Work-related hearing loss and return to work outcomes in SA*, prepared for WorkCover SA, Adelaide
- ACT Government & ACT Chamber of Commerce (date unknown) *The Silver Lining project: a quick guide for small business*, Canberra
http://www.dhcs.act.gov.au/_data/assets/pdf_file/0007/12958/PTACT_Silver_Lining.pdf
- AIHW (2004) *Australia's Health 2004*, Australian Institute of Health and Welfare, Canberra
- AIHW (2004a) *Older Australians at a glance, 4th ed*, Australian Institute of Health and Welfare, Canberra
- AIHW (2001) *Incidence and prevalence of chronic diseases*, Australian Institute of Health and Welfare, Canberra. Accessed 1/2/08 at www.aihw.gov.au/cdarf/data_pages/incidence_prevalence/
- AIHW (2000), *Australia's Health 2000, Seventh Biennial Health Report of the Australian Institute of Health and Welfare*, Cat. No 19, Australian Institute of Health and Welfare, Canberra
- ANZ (date unknown) *Grey matters: engaging and retaining mature age workforce – Shane%20Freeman%20presentation.doc*
www.dca.org.au/content/documents/Shane%20Freeman%20presentation.doc
- APSC (2003) *Productive and safe workplaces for an ageing workforce*, Australian Public Service Commission, Australian Government, Canberra
- Ardila, A *et al* (2000) 'Age-related cognitive decline during normal aging: the complex effect of education', *Archives of Clinical Neuropsychology*, 15 (6), 495-513
- Arola, A *et al* (2003) 'The connection between age, job control and sickness absences among Finnish food workers', *Occupational Medicine*, 53, 229-230
- ASCC (2005) *Surveillance alert: OHS and the ageing workforce*, Australian Safety and Compensation Council, Canberra
- ASCC (2006) *Compendium of workers' compensation statistics Australia 2003-04*, Australian Safety and Compensation Council, Canberra
- Audit Office of NSW (date unknown) *Performance Audit in brief: ageing workforce – teachers*,
http://www.audit.nsw.gov.au/publications/reports/performance/2008/ageing_teachers/inbrief-teachers.pdf
- Australia Post (2008) 'Australia Post delivers ageing workforce insights', *HR Skillset*, July 1 2008,
<http://www.humanresourcesmagazine.com.au/articles/5E/0C02515E.asp?Type=60&Category=903>

- Australian Employers Convention (2001) *The human resources costs and benefits of maintaining an age-balanced workforce*, Victoria
http://www.businessworkageing.org/downloads/HUMAN_part1.pdf
- Australian Government (2005) Budget 2005-2006, Budget Paper 1, www.budget.gov.au/2005-06/bp1/html/bst4-06.htm
- Australian Institute for Primary Care (2006) *Facilitators and barriers to return to work: a literature review*, Report prepared for the South Australian WorkCover Corporation, AIPC, La Trobe University, Victoria
- Ball, K (2003) 'Real world evaluation of visual function', *Ophthalmology Clinics of North America*, 16 (2), 289-298
- Benjamin, K & Wilson, S (2005) *Facts and misconceptions about age, health status, and employment*, HSL/2005/20, Health and Safety Laboratory, Buxton, UK
- Berger, K. S. (2005) *The developing person: through the lifespan*, 6th ed. Worth, New York.
- Bowman, K & Kearns, P (2007) [E-learning for the mature age worker: Final report](#) [Online], Dept of Education, Science and Training, Canberra. [Accessed 22/5/2008]
- Bracton Consulting Services Pty Ltd & PricewaterhouseCoopers (2007), [Review of the South Australian Workers' Compensation System Report](#) [Accessed 22/5/2008]
- Brooke, L (2003) 'Human resource costs and benefits of maintaining a mature-age workforce', *International JI of Manpower* (0143-7720), 24 (3), 260
- Business Council of Australia (2003) *Age can work: a business guide for supporting older workers*, Melbourne - <http://www.bca.com.au/Content.aspx?ContentID=91720>
- Comcare (2003) *Productive and safe workplaces for an ageing workforce*, Australian Government www.apsc.gov.au/publications03/maturecomcare.htm
- Conway, H & Svenson, J (1998) 'Occupational injury and illness rates, 1992-96: why they fell', *Monthly Labor Review*, 121 (11), 36-58
- Critchley, R (2006) *Designing professional development for the knowledge era: the ageing workforce – to rewire or rust*. Think piece for the TAFE NSW International Centre for Vocational education and Training Teaching and Learning.
<http://www.tafensw.edu.au/vsearch/icvet/?SubUrl=icvet.tafensw.edu.au&refine=new&QueryText=critchley&Submit=go>
- Crotty, M *et al* (2002) 'Musculoskeletal disability, chronic disease and labour force participation in Australia', *Int JI of Disability, Community and Rehabilitation*, 3 (2)
- CCOHS (2002) *Why should a workplace look at issues concerning aging workers*, Canadian Centre for Occupational Health & Safety, www.ccohs.ca/oshanswers/psychosocial/aging_workers.html [accessed 22/5/08]
- Daniell, W., Swan, S *et al* (2006) 'Noise exposure and hearing loss prevention programmes after 20 years of regulations in the United States', *JI of Occupational & Environmental Medicine*, 63 (5), 343-351
- De Boer A, van Beek J-C, Durinck J, Verbeek JHAM & van Dijk F (2004) 'An occupational health programme for workers at risk for early retirement; a randomised controlled trial', *Occup. Environ. Med*, 61, 924-929

- DEWR (2005a) *Better Connections – Better Outcomes*, Workshop 24th November 2005, Department for Employment and Workplace Relations, Canberra
- DEWR (2005b) *Workforce Tomorrow – Adapting to a more diverse Australian labour market*, Department for Employment and Workplace Relations, Canberra
- EFILWC (2003) *Age and working conditions in the European Union*, European Foundation for the Improvement of Living and Working Conditions, Luxembourg. www.eurofound.europa.eu/ [accessed 27/5/08]
- EFILWC (1997) *Combatting age barriers in employment: a European portfolio of good practice*, European Foundation for the Improvement of Living and Working Conditions, Luxembourg.
- Encel S (2003) *Age can work: The case for older Australians staying in the workforce*, A report to the Australian Council of Trade Unions and the Business Council of Australia.
- Equal Opportunity for Women in the Workplace Agency (2008), *Generation F - Attract, Engage, Retain*, Australian Government, Canberra
- European Commission (2003) *The Stockholm and Barcelona Targets: increasing employment of older workers and delaying the exit from the labour market*, Office for Official Publications of the European Communities, Luxembourg – http://europa.eu.int/comm/employment_social/employment_analysis/work/exit_en.pdf
- European Commission (2002) *Increasing labour force participation and promoting active ageing*, Report from the Commission to the Council, the European Parliament, the Economic and Social Committee, and the Committee of the Regions, Brussels
- Farrell, J (2005) *A current debate on employer's responses to an ageing workforce*, AIRAANZ, pp 59-64, Monash University <http://airaanz.econ.usyd.edu.au/papers/Farrell.pdf>
- Filipcak, B (1998) 'Old dogs, new tricks', *Training*, May, 50-58
- Godin, I *et al* (2005) 'A prospective study of cumulative job stress in relation to mental health', *BMC Public Health* 15, 5 (1), p 67
- Government of South Australia (2004) *Prosperity through people: a population policy for South Australia*, Government of South Australia, Adelaide
- Griffiths, A (1997) 'Ageing, health and productivity: a challenge for the new millenium', *Work and Stress*, 11 (3), 197-214
- Guillemard, A (2004) 'France: a country with deep early exit culture' in Maltby, T *et al* (eds) *Ageing and the transition to retirement: a comparative analysis of European welfare states*, Aldershot, Ashgate
- Haight, J (2003) 'Human error and the challenges of an aging workforce', *Professional Safety*, December, 18-24
- Hansson R, Robso, S & Limas M (2001) 'Stress and coping among older workers', Invited Paper for *Work: a Journal of Prevention Assessment & Rehabilitation*, 17, 247-256
- Hansson, R (2001) 'Stress and coping among older workers', *Work (Reading, Mass.) (1051-9815)*, 17 (3), 247

- Harma M, Tarja H *et al* (2006) 'A controlled intervention study on the effects of a very rapidly forward rotating shift system on sleep-wakefulness and well-being among young and elderly shift workers, *Int J of Psychophysiology*, 59 (1), 70-79
- Harper, S & Marcus, S (2006) 'Age-related capacity decline: a review of some workplace implications', *Ageing Horizons*, 5, 20-30, Oxford Institute of Ageing
- Harper, S *et al* (2006) 'Attitudes and practices of employers towards ageing workers: evidence from a global survey on the future of retirement, *Ageing Horizons*, 5, 31-41, Oxford Institute of Ageing
- Hemingway H, Shipley, M *et al* (1997) 'Sickness absence from back pain, psychosocial work characteristics, and employment grade among office workers, *Scandinavian J of Work, Environment and Health*, 2, 121-129
- Hoogendoorn, W *et al* (2002) 'High physical work load and low job satisfaction increase the risk of sickness absence due to low back pain: results of a prospective cohort study', *Jl of Occupational and Environmental Medicine*, 59 (5), 323-328
- Hoogendoorn, W *et al* (2000) 'Systematic review of psychosocial factors at work and private life as risk factors for back pain', *Spine*, 25 (16), 2114-2125
- Howell S, Buttigieg D & Webber W (2006) Management attitudes to older workers in the retail sector, *Monash Business Review*, 2 (2), 1-10 - <http://www.buseco.monash.edu.au/mbr/assets/issue-four/management-attitude-to-older-workers.pdf>
- HRSDC (2005) *Overview of the aging workforce challenges: analysis*, Human Resources and Social Development, Canada
www.hrsdc.gc.ca/EN/LP/SPILA/WLB/AW/09OVERVIEW_ANALYSIS.SHTML [accessed 23/5/08]
- HSE (2005) *What's new? Workshop on ageing, work and health*, Health and Safety Executive, United Kingdom - www.hse.gov.uk/pubns/indg362.pdf [accessed 23/5/08]
- Hudson (2004) *The ageing population: implications for the Australian workforce Australia*, Hudson Australia
- Hugo, G (2008) Information provided to the Australian Institute for Social Research, from ABS and other analyses, The National Centre for Social Applications of Geographic Information Systems, The University of Adelaide
- Ilmarinen JE (2005) *Towards a longer worklife – ageing and the quality of worklife in the European Union*, Finnish Institute of Occupational Health, Helsinki
- Ilmarinen JE (2001) 'Ageing Workers', *Jl Occup. Environ. Med*, 58 (8), 546-552
- Ilmarinen JE (1999) *Ageing workers and the European Union – status and promotion of work ability, employability and employment*, Finnish Institute of Occupational Health.
- Ilmarinen JE (1995) 'Aging and work: the role of ergonomics for maintaining work ability during aging', *Advances in Industrial Ergonomics and Safety*, VII, 3-17
- Karmel, T (2007) *A peripatetic research perspective on older persons and VET*, Paper presented to Skilling Victoria's Older Workforce Conference 2008, NCVET, Adelaide.
- Karr, A (2000) 'They're falling', *Safety and Health*, 161 (1), 30-35

- Keating, M (2008), *Review of Skills and Economic Development in South Australia – Final Report*, prepared by the Economic Development Board for the Government of South Australia
- Kemmlert, K & Lundholm, L (2001) 'Slips, trips and falls in different work groups- with reference to age and from a preventive perspective', *Applied Ergonomics*, 32: 149-53.
- Kennedy, S & Da Costa, A (2006) *Older men bounce back: the re-emergence of older male workers*, Australian Government (Treasury), Spring Roundup 2006.
- Kerr, M *et al.*: (2001) 'Biomechanical and psychosocial risk factors for low back pain at work', *American JI of Public Health*, 91 (7), 1069-1075
- Koh GC, Koh D (2006) 'Occupational health for an ageing workforce: do we need a geriatric perspective?' *Jl Occup Med Toxicol.* 23, 1, p. 8.
- Kumashiro, M (2002) *Aging and Work*, Taylor & Francis
- Laughton, CA (2003) "Aging, muscle activity, and balance control: physiologic changes associated with balance impairment", *Gait & Posture* (0966-6362), 18 (2), p. 101
- Li, KZH (2002) "Relations between aging sensory/ sensorimotor and cognitive functions", *Neuroscience and Biobehavioral Reviews* (0149-7634), 26 (7), p. 777
- Martin, B (2007) *Skill acquisition and use across the life course: current trends future prospects*. NCVET, Adelaide
- McGarry, K (2002) 'Health and retirement: do changes in health affect retirement expectations?', NBER Working Paper 9317
- Murphy, J (2003) Health Promotion, Paper prepared by Macroeconomic Policy Division, Australian Treasury – www.treasury.gov.au/documents/1009/PDF/03_Health_Promotion_Roundup_article.pdf [accessed 2/6/08]
- Mercer (2008) Workplace 2012: what does it mean for employers?, Mercer Australia Pty Ltd <http://www.mercer.com.au/workplace2012> [accessed 26/5/08]
- Murphy, L (1995) 'Occupational stress management: current status and future direction', *Trends in Organizational Behavior*, 2, 1-14
- Muntaner, C *et al* (2006) 'Work organisation, economic inequality, and depression among nursing assistants: a multilevel modelling approach', *Psychological Reports*, 98 (2) 585-601
- Naegele, G & Walker, A (2006) *A guide to good practice in age management*, European Foundation for the Improvement of Living and Working Conditions, Luxembourg. www.eurofound.europa.eu/publications/htmlfiles/ef05137.htm [accessed 27/5/08]
- NIOSH (2004) *Worker health chart book*, National Institute for Occupational Safety and Health, www.cdc.gov/niosh/docs/Chartbook/ [accessed 23/5/08]
- OECD (2000) *Reforms in an ageing society*, Organisation for Economic Cooperation and Development, Paris
- OECD (2006) *Labour Force Statistics 1985-2005*, Organisation for Economic Cooperation and Development, Paris

- OSSA (2007) *Putting a price on age and experience*, Ontario Service Safety Alliance, www.ossa.com/content/resources/olderworkers.cfm [accessed 26/5/08]
- OSSA (2002) *An aging workplace*, Ontario Service Safety Alliance, www.ossa.com/content/resources/agingworkplace.cfm [accessed 26/5/08]
- Pikhart H, Bobak, M *et al* (2004) 'Psychosocial factors at work and depression in three countries of Central and Eastern Europe', *Social Science and Medicine*, 58 (8), 1475-1482
- Pillay H, Kelly K, Tones M (2006) 'Career aspirations of older workers: an Australian study', *Int Jl Training and Development*, 10 (4), 298-305.
- Planning SA (2007) *Population Projections for South Australia (2001 - 31) and the State's Statistical Divisions (2001 - 21)*, Planning SA, Adelaide
- Planning SA (2007) *Population Projection Scenarios for South Australia (2001 - 51), Draft Report*, Planning SA, Adelaide
- Productivity Commission (2005) *Australia's Health Workforce*, Research Report, December 2005, Australian Government
- Productivity Commission (2004) *Economic Implications of an Ageing Australia*, Research Report, Canberra - <http://www.pc.gov.au/study/ageing/index.html>
- Productivity Commission (2004a) *Annual Report 2003-2004*, Chapter 1 'Prospering in an ageing society', Australian Government
- Queensland Government (2005) *A guide for the Queensland Public Service: managing an ageing workforce*, Brisbane
http://www.opsc.qld.gov.au/library/docs/resources/publications/Retention/Ageing_AGuide_01.ExecSummary.pdf
- Quintin, O (2001) Opening speech at the conference *A new architecture for social protection in Europe*, Belgian Federal Ministry of Social Affairs, Public Health and the Environment in collaboration with the European Commission, Leuven, October 19-20, 2001
- Reuter-Lorenz P (2002) 'New visions of the aging mind and brain', *Trends in Cognitive Sciences*, 6 (9), 394-400
- Robertson, A & Tracy, S (1998) 'Health and productivity of older workers', *Scandinavian Journal of Work, Environment and Health*, 24 (2), 85-97
- Salthouse, T (2004) 'What and When of cognitive aging', *Current Directions in Psychological Science*, 13 (4), 140-144
- Schaie, K (1996) *Intellectual development in adulthood: The Seattle Longitudinal Study*, New York: Cambridge University Press
- See further details on the (SLS) *Seattle Longitudinal Study* website, Penn State University, at - www.geron.psu.edu/sls/about/index.htm [accessed 26/5/08]
- Scottish Executive (2005) *Healthy working lives - a plan for action*. The Scottish Government, www.scotland.gov.uk/library5/health/hwls-04.asp (accessed 22/5/08)

- Schofield, K (2003), *Skills South Australia – Final Report of the Ministerial Inquiry, Skills for the Future*, Government of South Australia, Adelaide
- Schultz K & Adams G (eds) (2007) *Aging and work in the 21st century*, Lawrence Erlbaum, United States
- Selby Smith C, Smith A, & Smith E (2007) *Training of Mature-aged Workers*, Centre for Organisational Performance, Ethics and Leadership and Research in Vocational Education and Training, Charles Sturt University. Prepared for Manufacturing Skills Australia
<http://www.mskills.com.au/DownloadManager/downloads/Training%20of%20mature%20aged%20workers.pdf>
- Sharp, R & Broomhill, R (2005), 'Gender-Responsive Policy' in Spoehr, J (ed) *State of South Australia - Trends and Issues*, Wakefield Press, Adelaide.
- Shephard, R (1997) *Aging, physical activity and health*, Human Kinetics, Leeds
- Shephard, R (1997a) 'Aging and productivity: some physiological issues', in Seppälä, T *et al* (eds) *From experience to innovation, Volume V*, (pp 526-528) Proceedings of the 13th Triennial Congress, International Ergonomics Association, Finnish Institute of Occupational Health, Helsinki
- Skirbekk, V (2004) *Vienna Yearbook of Population Research* – www.demogr.mpg.de
- Sterns, H (1995) 'The aging worker in a changing environment: organizational and individual issues', *Jl of Vocational Behavior* (0001-8791), 47 (3), 248
- TASC (2005) *Population Ageing and Workforce Supply*, Training and Skills Commission, South Australian Government
- Taylor, P (2006) *Employment initiatives for an ageing workforce in the EU15*, European Foundation for the Improvement of Living and Working Conditions, Luxembourg. www.eurofound.europa.eu/ [accessed 27/5/08]
- Taylor, P & Urwin, P (2001) 'Age and participation in vocational education and training', *Employment and Society*, 15, 4: 763-779.
- Taylor, P & Walker, A (1998) 'Employers and older workers: attitudes and employment practices', *Ageing and Society*, 18: 641-658
- Thomson L, Griffiths A & Davison S (2000) 'Employee absence, age and tenure: a study of non-linear effects and trivariate models', *Work and Stress*, 14 (1), 16-34
- Tuomi, K *et al* (2001) 'Promotion of work ability, the quality of work and retirement', *Occupational Medicine*, 51 (5), 318-324
- Tuomi, K *et al* (1998) *Work Ability Index, 2nd revised ed.*, Finnish Institute of Occupational Health, Helsinki
- Vaillant G & Western R (2001) 'Healthy aging among inner-city men', *International Psychogeriatrics*, 13 (4), 425-437
- [Van Gerven, PW Paas, F Van Merriënboer, JJ Hendriks, M Schmidt, HG](#) (2003) 'The efficiency of multimedia learning into old age', *Brit Jl Educ Psychol*, 73, (4), 489-505.
- Villosio, C *et al* (2008) *Working conditions of an ageing workforce*, European Foundation for the Improvement of Living and Working Conditions, Luxembourg.
<http://www.eurofound.europa.eu/publications/htmlfiles/ef0817.htm> [accessed 9/6/08]

- Virtanen, M Vahtera, J Pentti, J Honkonen, T Elovainio, M Kivimäki, M (2007) 'Job strain and psychologic distress influence on sickness absence among Finnish employees', *American Jl Prev Med*,.33(3), 182-7.
- [Wallen, E S & Mulloy, KB](#) (2006) 'Computer-based training for safety: comparing methods with older and younger workers', *Jl Safety Res*.37 (5): 461-7. Epub Nov 28.
- Walker, A (2002) 'A Strategy for Active Ageing', *International Social Security Review*, 55, (1), 121-139
- Walker, A (1998) *Managing an ageing workforce: A guide to good practice*, European Foundation for the Improvement of Living and Working Conditions, Luxembourg - <http://www.eurofound.eu.int/publications/htmlfiles/ef9865.htm>
- Walker, A (1997) *Combating age barriers in employment*, European Foundation for the Improvement of Living and Working Conditions, Luxembourg, <http://www.eurofound.eu.int/publications/htmlfiles/ef9717.htm>
- WarrenShepell (2004) 'The aging workforce: an EAP's [Employee Assistance Program] perspective', WarrenShepell Research Group, *2004 Series*, Volume 3, Issue 6 www.shepellfgi.com/EN-CA/News/Research%20Report/pdf/ir_agingpop_enREPORT.pdf
- Westpac (2008) *Business, boldness and benefits: how Westpac tackled the ageing workforce* - <http://www.humanresourcesmagazine.com.au/articles/5b/0c02c65b.asp>
- Weyers, S., Peter, R *et al* (2006) 'Psychosocial work stress is associated with poor self-rated health in Danish nurses: a test of the effort-reward imbalance model. *Scandinavian Jl of Caring Sciences*, 20 (1), 26-34
- Wolcott, I (1999) Older workers, families and public policies', *Family Matters*, 53, 77-81
- Zimprich, D & Martin, M (2002) 'Can longitudinal changes in processing speed explain longitudinal age changes?', *Psychology and Aging*, 17 (4), 690-695