Surveillance Alert

OHS and the Ageing Workforce

May 2005

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Executive Summary

Population ageing is occurring across all of Australia due to both a sustained decline in fertility rates and a decline in mortality owing to better healthcare and technology. The shift in Australia's age structure means that the aged dependency ratio (the ratio of people 65 years of age and over to those in the workforce aged 15-64) will increase significantly over the next 40 years. In 2002-03, for every person aged 15-64 years in the workforce, there is 0.190 person over 65 years of age. By 2050-51, for every person aged 15-64 years who are in the workforce, there will be 0.460 person over 65 years of age[1]. In addition, the percentage of the very old (85 years or over) will increase from 1.4 % of the population in 2001-02 to 8 % by 2044-45.

Population ageing has significant economic and social implications. Retention of the labour force and policies to help integrate older workers into the workplace are the two measures the Australian Government is taking to address the social and economic issues related to the ageing population (ABS 2004). In addition, a range of legislative and policy changes in the areas of social policy and superannuation have been put in place to remove incentives for early retirement (eg. Pension Bonus Scheme).

Currently, 90 % of males and 74.2 % of females aged 45-54 years are in the workforce. This participation rate declines much further at the 55-64 age group to 66.7 % and 43.7 % for males and females respectively. The low workforce participation rates by mature workers has been attributed to a number of factors such as retirement incentives, employer attitudes, work schedule flexibility and employee health status. Accordingly, Federal and State Governments are implementing policies and establishing programs to encourage increased mature workforce participation. These include abolishing compulsory retirement age, banning age discrimination, removing incentives for early retirement and establishing support programs for older workers.

When considering the OHS implications of the ageing workforce, it is recognised that ageing brings about a number of changes in physiological and cognitive abilities, depending on age, fitness level, and genetics. However, age associated deterioration in muscle strength, aerobic capacity and cognition can be reduced by physical activities such as weight bearing and strengthening exercises. In addition, some cognitive function such as control of language or the ability to process complex problems actually improve with age.

While both Australian and Finnish studies have found that older workers are more likely to suffer from occupational disease, in particular diseases of long latency such as pneumoconioses, cancers and noise injuries, this is due to the cumulative effect of exposure on older workers over their working lives. In addition, long latency diseases by their nature do not manifest themselves until the exposed worker is much older. For example, if a worker is exposed to a hazardous substance at 30 years of age and the latent period of the disease is 25 years, the symptoms of the disease are likely to appear when the worker is 55 years of age or older. Moreover, reductions in exposure limits arising from an increased knowledge of hazards meant that the level of exposure for older workers to many agents has been higher than that among younger workers.

Since ageing is an individual process, one centralized intervention program is not feasible. Individuals need to be assessed for their work ability, allowing mature workers' strengths to be utilised, while compensating for any age related impairment.

[1] The ratio in 2002-03 of 0.199 means that for **every** person 65 years and over, there are **5** people in the workforce aged 15-64. The ratio of 0.456 in 2050-51 means that for **every** person 65 years and over, there will be only **2.1** people in the workforce aged 15-64.

1. Background

At NOHSC 68 it was agreed that the NOHSC office would undertake a 12 months pilot of the surveillance methodology to detect emerging issues. Further it was agreed at PC 14 that Surveillance Alerts would be developed on significant OHS issues identified with a high or extreme rating on the NOHSC Office's emerging issues register. As OHS and the Ageing Workforce is identified as a significant emerging issue, this report has been prepared for stakeholder information and consideration..

The findings of this report are supported by a recent (April 2005) research report by the Productivity Commission, *Economic Implications of an Ageing Australia*. The increased Federal Government focus on this issue is highlighted by the Federal Treasurer, Peter Costello's speech at the launch of the report where he stated "we need to make provision to cope with this looming issue [ageing population]. We must encourage participation in the workforce and set out health arrangements on a secure base. All policies must be framed with a view to the long-term implications, and the way in which they respond to this challenge" (*Sydney Morning Herald 12 April 2005*).

2. Introduction

Australia's population is ageing due to a sustained decline in fertility following the baby boom period and a reduction in mortality rates (ABS 1999). Although immigration tends to delay the ageing effect due to the younger age profile of immigrants, it does not have a significant impact over the long term.

Mature workers, those over 45 years of age, will form more than 80 % of the projected increase in the workforce between 1998-2016 (ABS 1999). The Australian Government recognises this as an emerging issue with economic, social and health consequences and is implementing policies designed to encourage greater workforce participation of older workers. This report confines itself to the OHS needs of the ageing workforce.

Ageing workers face specific occupational health & safety concerns. These include decreased physical capacity, fatigue, increased rates of musculoskeletal disorders and greater incidence of disease. In order to ensure the health and safety of older workers within the workplace organisational practices will need to be adjusted, new technologies adopted, and assistance given to cope with work demands. The impact may be greatest in workplaces that normally do not employ older employees. At present, it appears that fitter workers tend to remain in the workforce at the older age groups but the changing demographic nature mean that more aged people will need to remain in the workforce.

Employers have a legislative responsibility to ensure all reasonable steps are taken to protect occupational health and safety of employees. Therefore, it is important to understand the changing demographics and its associated issues and challenges. This will allow employers to implement effective strategies to reduce risk and subsequently to benefit from employing a productive and healthy ageing workforce.

Studies show that mature worker are a valuable asset to any workplace (Allen 2001; Kumashiro 2000; UK Department for Work and Pensions 2001). Mature workers have higher retention rates and lower absence from work compared to younger workers. In general, older workers are also more reliable, committed, flexible, and dedicated to their work, and have developed strong people oriented skills through their extensive work history. Older workers can also contribute greatly to the development of younger workers and are likely to be extremely useful in mentoring roles.

3. Scope and Methodology

This surveillance report is a literature review of research reports and publications on OHS and population ageing. The report examines impending occupational health and safety concerns created by a steadily ageing workforce, population trends, mature workforce participation, government initiatives and approaches to population ageing. As increased mature workforce participation is a priority of the Federal Government, mature workforce participation rates, barriers to workforce participation by mature workers, and the Federal and State governments' responses to these issues have been included in the report.

Most of the information provided in this report is based on published, peer-reviewed literature, reports by governments, and submissions to government departments, organizations and committees that are concerned with the ageing population. Web searches of Australian and international government departments, occupational health agencies and Australian OHS jurisdictions were conducted to identify Australian and international activities specific to the ageing workforce and impending OHS issues.

Data provided in this report are from the following sources:

- National Workers' Compensation data;
- Australian Bureau of Statistics data; and
- Published literature.

4. Demographics

The expected population trends for Australia are as follows:

- the proportion of the population aged 65 and over is projected to rise from around 12 per cent today to 18 per cent by the year 2021, reaching 25 per cent by the year 2051;
- the proportion of the population age between 0 and 14 years is expected to decline from 21 per cent in 1998 to 17 per cent in 2021 and 16 per cent in 2051;
- the proportion of the population aged between 15 and 64 years is expected to fall from 67 per cent to 65 per cent in 2021 and to 60 percent in 2051; and
- the median age is projected to rise from 34 years today to around 40 years in 2021 and 44 years by 2051 (ABS 1999).

This shift in Australia's age structure means that the aged dependency ratio, the ratio of people over 65 to those in the workforce (15-64), will change substantially over the next 50 years (Banks 2004). The ratio of the very old (85+) will increase even more significantly than the aged dependency ratio. This pattern is similar throughout Australia although it is more distinct in South Australia and Tasmania (Table 1). The Australian Bureau of Statistics (ABS) has also reported that Tasmania's population is ageing the most rapidly overtaking South Australia as the oldest state by 2021 (ABS 2001).

Table 1: Age dependency ratios, 2002-03 to 2050-51 (Banks 2004)

	Age dependency ratio[a]		Very old dependency ratio	
	2002-03	2050-51	2002-03	2050-51
ACT	0.140	0.413	0.017	0.101
NT	0.057	0.179	0.004	0.021
Tasmania	0.218	0.639	0.025	0.156
WA	0.167	0.455	0.018	0.102
SA	0.225	0.556	0.027	0.138
QLD	0.176	0.455	0.020	0.097
VIC	0.196	0.463	0.023	0.105
NSW	0.199	0.456	0.023	0.099
Australia	0.190	0.460	0.022	0.102

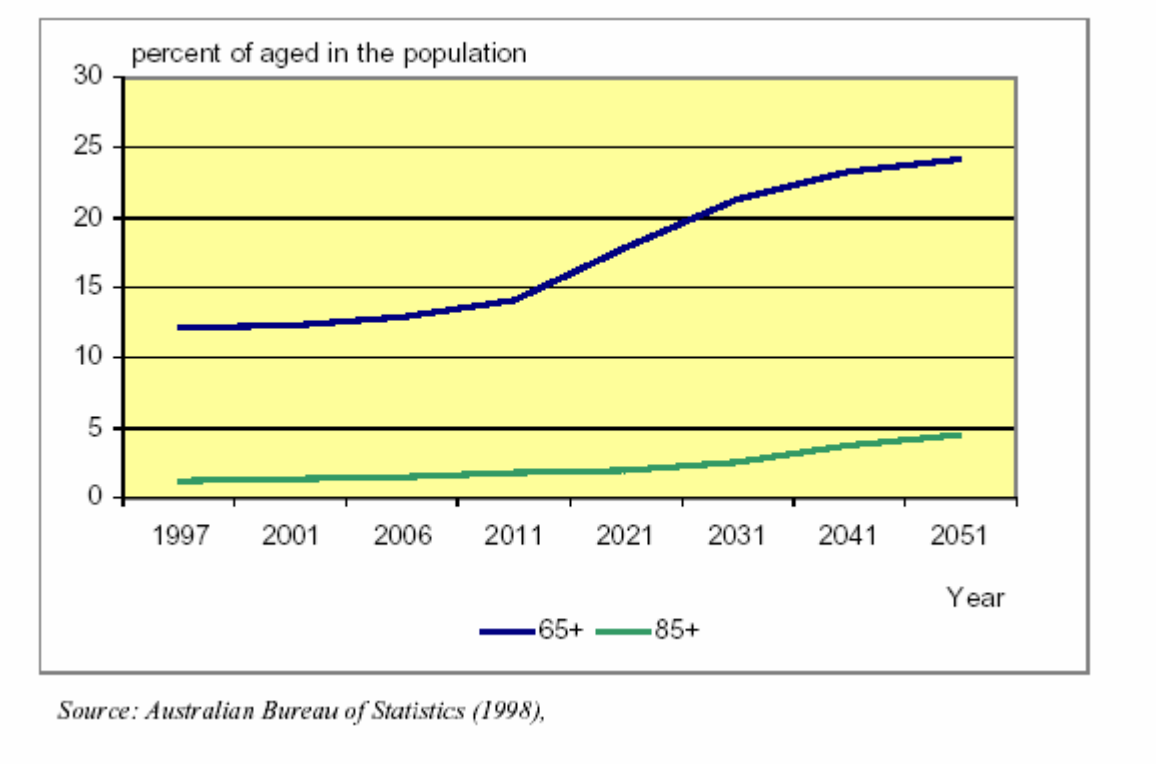
(a) The age dependency ratio is the ratio of people 65 years of age or over to those in the workforce aged 15-64. For example, the ratio for NSW for 2002-03 is 0.199 and this means that for **every** person 65 years and over, there are **5** people in the workforce aged 15-64. The increase in NSW ratio to 0.456 in 2050-51 means that for **every** person 65 years and over, there will be **2.1** people in the workforce aged 15-64.

5. Social and economic implications

One of the economic implications of ageing is the increased burden on the pension, welfare and healthcare systems. The Australian Government expenditure on aged care is projected to increase from 0.85 % of GDP to 2.1 % of GDP by 2044-45 (Encel 2003). There will also be an increased demand for disability and community support. However, due to a decline in 5-24 year age group, educational expenditure is expected to decline from 4.9 % GDP to 3.7 % GDP. By 2044-45, combined aged related fiscal gap is expected to be 7 % of the GDP and most of this fiscal pressure will fall on the Australian Government. It is also expected that some jurisdiction will face more pressure from ageing, for example, South Australia and Tasmania due to their rapidly ageing population and its associated demand on the health expenditure (Banks 2004).

One of the approaches for dealing with this fiscal pressure is to keep people in the workforce for longer. Without a rise in the age of retirement, most individuals are unlikely to be able to maintain their material quality after retirement. According to Ghilarducci (2002), the average worker today would have to work 30 % longer to receive a pension similar to that of a 1974 retiree. In addition, many organizations are facing skills shortages and there is a need to recruit or retain older workers in their organization. Although immigration policies have attempted to address these skill shortages by increasing the intake of skilled migrants, the number of immigrants each year is small. Therefore, immigration alone is unlikely to have a large impact on the whole workforce. In addition, immigration also has to offset the outflow of skilled, professional Australian residents to other countries. Moreover, Australian mature aged workers have a wealth of skills, strengths, and capability, and it makes good business sense to encourage these workers to remain in the workforce.

Figure 1: Percentage of aged in the population



Source: Australian Bureau of Statistics (1998),

6. Mature Age Workforce Participation

Mature age workforce participation in Australia is a complex picture. The ABS defines mature age workers as those aged 45-64 years. There was a fairly consistent decline in participation rates until the 1970s, but from the 1980s until the present, there has been a slight increase in the participation rates by mature workers, largely due to increased workforce participation by women.

When examined by gender, 90 % of males and 74.2 % of females aged 45-54 years were in the labour force in 2003. The participation rate declines further at the older age groups and for those aged 55-64 years, the rates for males and females are 66.7 % and 43.7 % respectively. There is a lower participation rate for females over 60 because females are eligible for the age pension before the age of 65 years (ABS 2004).

Adding to the complexity, the proportion of people in the labour force aged 45-64 years has increased over the past two decades, from 1983 to 2003. In 2003, 32 % of people participating in the workforce were aged 45-64 years compared to 24 % in 1983 (ABS 2003). This is due to both baby boomers entering this age group as well as changes in workforce participation rates, mainly due to a large increase in workforce participation by women (Kennedy and Hedley 2003).

However, even with the increase in the past twenty years due to greater workforce participation by women, workforce participation rates have still not reached the rate of 1971, mainly due to early exit from workforce by men. Between 1971 and 2003, the older age groups, those 50 years and over, showed larger declines in male workforce participation rates. For example in 1971, 75 % of men aged 60-64 years were in the workforce compared with 51 % in 2003. This decline is

even more marked when two birth cohorts were compared (ABS 2003; Banks 2004). Participation rates for males aged 60-64 years for 1896-1900 born cohort was approximately 80 % but the participation rate for the 1936-1940 cohort was only about 50 %.

In contrast, the overall workforce participation rate for women increased from 37 % to 55 % between 1971-2001. In 1971, 32 % of women aged 45-64 were participating in the workforce whereas in 2001, this proportion has increased to 58 % (ABS 2003). This large increase in female workforce participation is due to significant social changes that have occurred over the last 20 years such as decline in fertility rates, easier access to child care, greater acceptance of women with children remaining in the workforce and a strong growth in female dominated industries and occupations (Encel 2003).

In 2003, the *Education* industry employed the highest proportion of mature aged workers with 47 % of its workers aged between 45 to 64. This is followed by the *Agriculture, Forestry and Fishing* industry at 44 % and the *Health and Community Services* industry at 42 %. The industry with the lowest proportion of mature aged workers in 2003 is the *Retail Trade* where only 21.9 % of workers were between 45-64 years of age (ABS 2004).

With regard to occupational groups, the proportion of mature aged workers is higher in high skill occupations, highlighting that older workers have skills and experience gained through many years in the workforce (ABS 2004). In addition the hard manual labour work required in many low skilled jobs can become too taxing for older workers to sustain.

7. Reasons for retirement

Reasons for retirement from full time work vary with age. For workers under 60 years of age, the most common reason for retirement is usually due to ill health or injury followed by retrenchment (Table 2). Those retiring between 65-69 years of age do so because they felt they have reached an appropriate or compulsory age for retirement (ABS 2000).

In a retirement study of Finnish workers over an 11 year period, information from retirees was obtained via medical examination and self-completed questionnaires (Salonen *et al.* 2003). These workers were 54 years of age or older after the 11 year study period. Active employees and old age pensioners formed the normal pensioner group whereas those who had retired early belonged to the group of early pensioners. Although all participants worked for the same food factory, a difference in perceived workload was observed between early pensioners (those who retired before 65) and normal pensioners. That is more early pensioners considered themselves as having had moderate or heavy physical workload compared to normal pensioners. Factors such as morbidity, sickness absence, stress symptoms and degree of work impairment due to disease were also significant factors associated with early retirement.

As demonstrated by both Australian and Finnish retirement studies, if increased mature workforce participation is to be achieved, strategies should be directed at increasing the health and well being of older workers by allowing flexible working conditions, adjusting workload, and encouraging healthy aging. In addition, retrenchment of older workers can be avoided by providing them with skills and training necessary to keep them in the workforce.

Table 2. Reasons for retirement among men, 1997 (ABS 1997)

Reasons for retirement	Age at retirement(a) (years)				
	45-54 %	55-59 %	60-64 %	65-69 %	Total %
Own health or injury	56.0	40.1	23.2	6.8	32.6
Reached compulsory retirement age	0.6	2.9	17.9	64.9	19.8
Reached appropriate age for retirement	4.1	14.3	26.7	17.1	16.7
Retrenched	14.5	18.7	12.3	3.7	11.9
Early retirement package/pension or super eligibility	5.1	10.5	8.9	1.1	6.2
Business closed down (economic and other reasons)	4.8	3.3	2.9	1.9	3.1
Pursue leisure activities	2.1	2.7	1.7	0.6	1.7
Look after family/house/someone else	2.6	1.5	1.5	0.9	1.7
Other (b)	10.2	6.0	4.8	3.0	6.2
Total	100.0	100.0	100.0	100.0	100.0

(a) Retirement from full time work

(b) Includes technological advancement/nature of job changed; temporary, seasonal or holiday job, unsatisfactory work arrangements/pay/hours; wanted to work part-time, or full-time work too stressful; to get married; to coincide with partner's retirement; to have holiday/move house/ spouse transferred.

8. Barriers to workforce participation

As partly demonstrated by the retirement trends outlines in Table 1, mature aged people face disadvantages and barriers when looking for work or wishing to remain in the workforce. These include attitudes of employers, their duties as carers, and a lack of relevant skills and experience (House of Representatives Standing Committee on Health and Ageing 2005).

A major barrier to mature workforce participation can be employer perception. Some employers believe that older workers are less productive, and are more likely to take time off. An Australian survey undertaken by Drake Personnel (1999) found that 62 % of the 500 organizations surveyed preferred to choose staff from the 31-40 years age group. Older workers are also less likely to be offered workplace training or promotion. In addition, older job seekers tend to take longer to find employment than younger job seekers (ABS 2004).

Contrary to stereotypical beliefs held by employers, there are many benefits in maintaining older workers in the workforce (UK Department for Work and Pensions 2001; Myhrmann 2000; Singapore Manpower Research and Statistics 1999). Older workers are more likely to stay in the organisation compared to younger workers which means their knowledge, skills and experience can be retained by the organization. Older workers also have fewer short term absences possibly due to saving up sick leave as a cushion. This leads to substantial cost savings and efficient work as well as allowing employers to plan work activities with high confidence. Older workers also demonstrate high levels of reliability, commitment and dedication.

Increasing the awareness of the contribution of older workers to the workplace among employers, supervisors and HR personnel would enable increased workforce participation by mature workers.

A large proportion of lower educated, unskilled male workers are being forced into early retirement partly because there is a downturn in the number of jobs for these workers (O'Connell 2005; Schwedes 2004). However, there is a discrepancy between the demand for high skilled and low skilled jobs (Wooden 2000). The majority of labour market growth has been in high skilled jobs whereas there is a decline in demand for low skilled workers. Today's workforce also requires workers to be more productive for the same pay. In addition, the rapidly changing nature of the workforce means that older workers need to update their skills in order to remain in employment. Therefore, without having the opportunity to update and learn new skills, the unskilled older worker is more likely to be retrenched from his job.

Studies have found that older workers are less likely to be offered training opportunities (UK Department for Work and Pensions 2001; O'Connell 2005; Burholt & Windle 2001). This is due to the attitudes of employers as well as older workers' belief that they are too old for training. Even when training is offered, time, work and family commitments make it difficult to attend training. Flexible learning arrangements where learning builds on the worker's skills and experience and where learning is offered in a less formal and positive environment are found to be effective methods of training delivery for older workers (Schwedes 2004).

The ageing community in Australia also means that there is an increasing number of carers including mature aged workers. Many people are providing care for ageing parents or relatives. In addition, the delay in child bearing meant that many mature workers also have responsibilities for their young children. This means that older workers may find it necessary to leave the workforce. Providing flexible working arrangements and parental care should be considered so that the older worker can fulfil their role as a carer and also participate in the workforce.

9. Australian Responses to the ageing population

In the 1990s, the Commonwealth government and a number of States legislated against age discrimination in matters relating to employment. They also abolished compulsory retirement (NSW Committee on Ageing 2001; Human Rights and Equal Opportunity Commission 2000). However, the coverage of the legislation varies across jurisdictions.

Both the Federal and State governments have taken a comprehensive approach to dealing with employment and retirement of older workers. The policies under this approach include:

- Removal of incentives to early retirement, encouragement of later retirement;
- Abolition of compulsory retirement;
- Banning of age discrimination;
- Awareness campaigns;
- Guidance and training programs for older workers;
- Support for older employees; and
- Employment subsidy and other employment incentive schemes.

9.1 Commonwealth Initiatives

The Commonwealth Department of Health and Ageing introduced the National Strategy for an Ageing Australia in 2002. The goal of the National Strategy is to deliver the best outcomes for all Australians regardless of age and it is a framework for a national response to the challenges and opportunities that an older Australia will present.

There are indicators that the Government is increasing its focus on retaining mature-age persons in the workforce and reducing the existing incentives to early retirement. The pension bonus scheme was introduced in 1998 for those workers remaining in the workforce for at least 960 hours per year after 65 years of age (Centrelink 2004). It provides for an additional tax free payment of 9 % on top of the standard Age Pension.

A package called "Implementing Organizational Renewal: Mature Aged Workers in the APS" was introduced in 2003 which aimed to retain older workers by focusing on flexible working conditions, phased retirement and less demanding roles for older workers so that they can maintain a better work/life balance. The Federal Government also announced an *Australians Working Together* program in 2003 which increased the focus on getting mature aged people back to work. As part of this program, the Mature Age Allowance for unemployed people aged 50 and over was removed and older job seekers now receive Newstart Allowance although the participation requirements are relaxed for mature job seekers. Under the old system, older people are deemed unemployable and were not encouraged to access services that would help them gain employment. Now mature workers can get training credit and support through Job Network members. The Job Network scheme is taking the special needs of the mature-aged unemployed more into account (Encel 2003). The Minister for Workforce Participation, Peter Dutton, recently awarded *Mature Age Workers' Employer Champion Awards* to employers for who successfully implemented age positive HR policies (Department of Employment and Workplace Relations 2005).

The Federal Government increased its focus on older workers in the 2004-05 budget with the announcement of the Mature Age Employment and Workplace Strategy. This strategy provides $12.1 million over four years for assistance that is in addition to services already available to mature age job seekers through Transition to Work and Job Network (Commonwealth Government 2004). The three major elements in the package are:

1. Jobwise Outreach composed of Jobwise Labour Market Update Seminars; Jobwise Workshops and Jobwise Job Seeker Self-Help Groups;
2. Mature Age Workplace Strategy: The Mature Age Workplace Strategy is aimed at employers. It consists of Business Learning Networks, an enhanced Jobwise Portal; and Mature Age Workplace Guidelines; and
3. Mature Age Industry Strategy which includes cooperative industry initiatives that improve recruitment and retention measures for mature age job seekers and workers.

9.2 State based initiatives for mature workers

Many States have sponsored initiatives and programs for mature workers. These include the *Profit from Experience* program in Western Australia, and the *Mature Age Employer Incentive Scheme* in South Australia. Table 3 outlines state based activities for mature age workers.

Table 3. State based programs and activities for mature workers

NSW	• Mature Workers Program (MWP) aims to maximize the retention of mid-life and older workers in the labour force and to facilitate the entry of unemployed mature persons into the workforce.
Victoria	• The Community Business Employment Program places job seekers over 45 into appropriate jobs. • The Community Jobs program aims to provide access to jobs and training. • The Private Sector Skills Development Program is for job seeker 40 years and older.
South Australia	• Mature Age Employer Incentive scheme was introduced in 1999 and it offers a subsidy to employers who take on an unemployed older worker. • The SA government has also supported DOME (Don't Overlook Mature Enterprise) which provides employment assistance to mature aged persons.
Western Australia	• "Profit from Experience" program includes a network of access offices, a career restart scheme for retrenched workers, a skills redirection program, a "cyber job link" for remote communities and a skill recognition process. • The Western Australian Government established the Active Ageing Taskforce in 2002 to recommend a five to 10 year policy framework to achieve active ageing in WA. One of the aims of the taskforce is valued participation in the workforce by ageing workers.
Queensland	• The Qld Government hosted an information session and workshop "The Ageing Workforce: Staying Competitive In a Time of Change" in 2004. International researchers and policy makers made presentations on international trends in policy and best practice for managing age diversity, national policy and lessons from Australian case studies and economic implications of ageing for Queensland. • The Department of Industrial Relation published "A Guide for the Queensland Public Service: Managing an Ageing Workforce." This includes discussions on changes in retirement, age discrimination, age stereotypes, workforce management, flexible retirement, and flexible working conditions.

10. Physiological and cognitive changes associated with ageing

Although everyone experiences ageing, the changes brought about by ageing varies depending on age, fitness level, and genetics. Age greatly increases differences between individuals. The distribution of the physical capacities of a population, which is already marked at the age of 20, does not stop increasing with age. This is particularly true for height, muscular strength, lung capacity, aerobic capacity and systolic blood pressure (Molinie 2003).

Physical capacity declines with age and after the age of 50 years, this decline is more marked (Illmarinen 1999; LaBar 1996). Physical capacity includes a range of anatomical and physiological factors such as aerobic capacity, muscle strength and joint flexibility which are affected by individual, neurological and psychological factors.

Loss in age related physical capacity is an important concern for workers involved in heavy jobs. If a worker's physical capacity cannot meet its task demands, it can lead to excessive fatigue, leading to a poor quality of work along with an increased risk of industrial accidents (Shephard 2000). In a Finnish longitudinal study of municipal workers, the average decline in physical capacity was 20 % during the 16 year study period (Savinainen *et al.* 2004). The average age of the workers were 51.9 years at the beginning of the study and 67.3 years at the end of the study.

However, it is important to note that although physical capacity declines with age, the ageing worker has synergistic capacity, that is the capacity to perform tasks using a wealth of experience and knowledge. Older workers learn to incorporate different strategies to compensate for their physical decline and those who work tend to maintain the level of physical skill required to complete tasks. This use of synergistic capacity is evident in the Australian Mining Industry where older workers are more productive, have fewer accidents, and have less absenteeism (Parker 2004). The greater the employee's skills, competence and experience, the smaller the decline in productivity with advancing age. Therefore, it is crucial that this synergistic capacity be utilized to compensate for the decline in physical capacity in ageing workers (Kumashiro 2000).

10.1 Muscle strength

Individual factors such as age, physical capacity as well as anatomical and physiological factors such as type of muscle work and muscle group, play a role in muscle strength (de Zwart *et al.* 1997). A decline of 0.3 % to 0.5 % in muscle mass occurs after the age of 30 years, and this loss is accelerated after 60 years of age. The decline in muscle strength is also seen with ageing reaching a rate of 3 % per year after 70 years of age (Hammerman 1998). Reduction in muscle strength is not only affected by the decrease in muscle mass but also by the reduction in the number and size of muscle fibres (Frontera *et al.* 2000; Hamerman 1998).

Research shows that exercise can slow the loss of bone and increase the size and strength of muscles, including the heart muscle (Lewiecki 2004). Strengthening exercises (such as weight training) performed at least twice a week help to counteract the muscle and strength loss caused by aging (Narici *et al.* 2004). Apart from reducing the decline in muscle strength associated with ageing, weight bearing exercises such as walking and strengthening exercises can also reduce the risk of type II diabetes, heart disease, osteoporosis as well as improve mental well being.

10.2 Aerobic capacity

Aerobic capacity is the ability of the cardiorespiratory system to deliver oxygenated blood to metabolizing tissues and the ability of these tissues to extract oxygen from the delivered blood. Longitudinal and cross section studies examining either sedentary, active or healthy populations have found that aerobic capacity declines with age although declines in cross sectional studies are less than those reported in longitudinal studies (Hossack and Bruce 1982; Fleg and Lakatta 1988; de Zwart *et al.* 1995). Aerobic capacity peaks about age 20 and decreases about 1 percent per year to about half of peak levels by age 80. However, active, normal weight adults lose only about 7 % of aerobic capacity by the age of 70.

10.3 Cognitive Changes

Cognition refers to mental processes used for perceiving, remembering and thinking (Roth 2005). Cognitive abilities are the greatest between 30 to 40 years of age and start to decline in the late 50s or early 60s. However, it should be noted that within each age group there are wide variations in cognitive ability. Weakening of precision and slower speed of perception is age related (Illmarinen 1999). However, some cognitive functions such as control of language or the ability to process complex problems improve with age. Data from the Baltimore Longitudinal Study of Aging show that mental skills may decline in certain categories, such as short-term memory, but not in all. The quality of reasoning and problem-solving remains much the same as we age, according to this long-term study, although the speed of mental processes may slow.

11. OHS Implications

The interaction between age, work and occupational health is complex and not well understood. Ageing results in mental and physical changes but there is a large variation between individuals. Given this and the fact that ageing workers tend to develop a wide range of coping strategies, it is hard to predict the exact relationship between age and occupational health and safety.

Older workers are more likely to experience sleep disturbances and gastrointestinal symptoms associated with decreased shiftwork tolerance (Harma 1996). This is due to age-related changes in circadian rhythms and preferred timing of sleep as well as reduced flexibility in sleep patterns (Dijk *et al.* 1999).

As noted in Section 10, physical capacity declines with age, but this decline varies enormously depending on the job of the worker (Millanvoye 1998). Compared to the younger workers, older workers need higher reserves for recovery. This makes the ageing worker more susceptible to fatigue and other adverse symptoms. This situation, together with the increased potential for chronic disease, decreases the safety margin which protects the worker against injury and work-related disease (Parker and Worringham 2004).

It is essential to modify tasks so that demands are consistent with the reduced physical capacity of the ageing worker and these changes should be made on the basis of a discussion with the ageing worker. Although physical demands of work should be reduced as workers age, both Australian and Finnish studies have found that there was little difference in exposure between older and younger workers (Parker and Worringham 2004; Cogan and Burchell 2002). This indicates that so far tasks have not been modified to allow for a reduced capacity in the ageing worker.

Age associated changes in flexibility and postural system make it difficult to adopt certain working positions (Roth 2005; Bosek *et al*. 2005). Furthermore, the reduction in aerobic capacity reduces the ability to exert concentrated intense effort over a short period (Shephard, 1999). Although the ageing body retains significant abilities to carry out fairly sustained work, if it is exposed to sudden heavy loads, the consequences can be serious.

In addition, as people age, it becomes increasingly difficult to bear two types of constraint at the same time (Aoyagi *et al*. 1997). A 50 year old worker can carry out medium physical work; his heart rate remains moderate and similar to that of a 25 year old worker. However, if the older worker is in a hot atmosphere (30°-50°C in a humid environment), his heart rate increases far more than that of a younger worker, and can reach dangerous levels.

Mature workers are more likely to suffer from diseases of long latency such as noise induced hearing loss, asbestos related diseases and other pneumoconioses whereas occupational diseases in younger workers are due to agents of short latency such as dermatoses and respiratory allergies (Ilmarinen 1999).

11. 1 Work-related Injuries

Falls are a leading cause of injury among older adults and as the population ages, occupational falls must be addressed appropriately. Slip, trips and falls are significantly higher among workers over 45 years of age than younger workers (Kemmlert and Lundholm 2001; Walton 2002). The majority of falls (66 %) for workers over 55 are same level falls with the service industries experiencing the largest number of falls among older workers.

Older workers are more likely to have an injury due to exposure to vibration. A European survey of working conditions found that exposure to vibration was the highest at the middle age group (35-44 years) and declined consistently afterwards (Molinie 2003). Among men subjected to vibration for at least half of their time, 58 % said they suffered from osteoarticular pain connected to work. The proportion of men who suffered from this pain increased with age, from 47 % in 15-24 years old to 70 % in the 55 and over age group.

11. 2 Work-related Diseases

Compared to occupational injury, much less is known about occupational diseases in older workers. Older workers are more likely to have an existing illness and this may affect their susceptibility to specific occupational exposures (Allen 2001). Although there are no studies examining the impact of ageing on sensitivities to chemical exposures, it is speculated that ageing increases the worker's susceptibility to the effects of chemical exposure. This is due to the effect on the body of cumulative substances such as heavy metals and mineral fibres, the decline in liver and kidney functions associated with the normal ageing process, changes in nervous and immune systems and the long latency periods of carcinogens.

Both the Australian and Finnish data have indicated that the incidence of occupational disease is much higher among older people, and this ageing cohort of the workforce is the group with the highest risk for occupational diseases (NOHSC 2005; Ilmarinen 1999). Diseases of long latency such as pneumoconioses, cancers, noise injuries manifest themselves in the older worker due to the cumulative effect of exposure. In addition, due to reductions in exposure limits arising from

an increased knowledge of hazards, the level of exposure for older workers to many agents have been higher than among younger workers.

Although it is commonly believed that older and younger workers find similar situations stressful, specific work problems may be more of a concern for older workers. For example, hearing deteriorates with age and affects certain lower frequencies that has an impact on normal everyday speech (Brant and Fozard 1990), so older workers are more likely to have difficulty hearing speech in noisy environments (Millanvoye 1998). Even low levels of noise can make it more difficult for older workers to concentrate on complex tasks and can cause stress and related health problems (Kok 1994).

12. Australian Data on Age and Work-related injuries and diseases

This section contains information from the Australian National Data Set for Compensation Based Statistics (NDS). The NDS data is unlikely to provide a full picture of work related injuries and diseases in Australia, partly due to a large underreporting of injury and illnesses related to the need to retain employment and maintain production (Cant *et al.* 2001). Furthermore, Cant *et al.* (2001) found the incidence of this non-reporting of illness was exceptionally high in older workers (45+), particularly for musculoskeletal conditions and back conditions. Nevertheless, this data set provides useful information.

12.1 Compensated Fatalities

During the five year period from 1997-1998 to 2001-2002, the number of compensated fatalities steadily decreased (Table 4). This decline was observed for all age groups including workers over 45 years of age. The incidence rate (the number of claims per 1000 employees) showed that workplace fatalities were more likely to occur among older employees. However, as with the number of fatalities, the incidence rates have declined for all age groups. For the 45-54 years age group, there was a 40 % decline in its incidence rate for the five year period and for 55 years and over age group, a 29.4 % decline in its incidence rate was observed. Although the incidence rate is decreasing for all age groups including mature workers, it should be noted that in 2001-2002, the fatality incidence rate for employees 55 years and over was seven times greater than that rate experienced by the youngest employees, aged 15-24 years.

The cause of a compensated fatality can be either classified as an injury or a disease. Injuries are defined as resulting from a single traumatic event. Diseases are defined as resulting from repeated or long-term exposure to agents or events. These definitions indicate that fatalities resulting from diseases are much more likely to be found in older workers in order to meet the long term, repeated exposure or long latency periods. The NDS data demonstrates that the frequency rates for both injury and disease related fatalities increased with age but this increase is more prominent for disease related fatalities. In 2001-02, the disease related frequency rate for employees 55 years and over (3.6) was 36 times higher than that for those aged 15-24 years of age (0.1). In comparison, the frequency rates for injury-related fatalities for the same two age groups (0.8 and 2.2) differed in magnitude by a factor of 2.8.

Table 4. Compensated fatalities by age: 1997-98 to 2001-02 (NOHSC 2005)

	1997-98	1998-99	1999-2000	2000-01	2001-02
Number of Claims					
All ages (a)	**376**	**358**	**342**	**319**	**281**
15-24 years	34	27	24	19	21
25-34 years	63	67	58	51	49
35-44 years	86	82	72	75	61
45-54 years	109	89	92	100	77
55 years and over	81	89	92	100	77
Incidence Rate (per 100,000 employees)					
All ages (a)	**5.1**	**4.7**	**4.4**	**4.0**	**3.4**
15-24 years	2.2	1.7	1.5	1.1	1.3
25-34 years	3.2	3.4	2.9	2.5	2.4
35-44 years	4.6	4.3	3.7	3.8	3.1
45-54 years	7.5	5.8	5.7	6.0	4.5
55 years and over	14.3	14.8	13.8	10.1	9.5
Frequency Rate (per 100 million hours worked)					
All ages (a)	**3.0**	**2.8**	**2.6**	**2.4**	**2.1**
15-24 years	1.6	1.2	1.0	0.8	0.9
25-34 years	1.8	1.9	1.6	1.4	1.4
35-44 years	2.6	2.4	2.1	2.2	1.8
45-54 years	4.1	3.2	3.2	3.4	2.5
55 years and over	8.5	8.9	8.3	6.1	5.8

(a) Includes claims for which age was not stated

12.2 Compensated Injury and Disease Claims

The incidence rate for compensated injury and disease claims showed age-related increase with age from 15.8 for employees 15-24 years of age to 27.7 for employees 55 years and over (Table 5). However, it should be noted that for all age groups, the incidence rates declined over the five year period 1997-98 to 2001-02 with the largest decline (25.3 %) observed in employees 55 years and over from 27.7 in 1997-98 to 20.7 in 2001-02.

A similar trend was observed for frequency rates (claims per 100 million hours worked) where the frequency rate increased with age. All age groups demonstrated a decline in frequency rates over the five year period where the age group 55 years and over experienced the largest percentage decline of 24.1 % from 16.6 in 1997-8 to 12.6 in 2001-02.

The pattern of time lost by age was different for injury and disease claims. For injury claims, the median time absent from work for those aged 15-24 was 2.2 weeks compared to those aged 55+ at 3.8 weeks (the highest median time lost). For disease claims, the median duration of absence increased with age till 35-44 years of age (4.6 weeks) then declined in 45-54 and 55+ groups to 3.8 weeks and 0.2 weeks respectively. This is due to the fact that a high proportion of disease related claims for older workers were due to non-traumatic deafness and although it is a permanent incapacity, it usually involves little or no time absent from work.

Table 5. Compensated claims by age: 1997-98 to 2001-02 (NOHSC 2005)

	1997-98	1998-99	1999-2000	2000-01	2001-02
			Number of Claims		
All ages (a)	**153 230**	**150 130**	**150 940**	**151 010**	**142 090**
15-24 years	24 360	23 550	23 890	22 890	20 540
25-34 years	38 950	37 760	36 790	36 170	33 410
35-44 years	39 790	39 810	39 790	40 110	37 850
45-54 years	34 310	34 130	34 720	35 900	34 320
55 years and over	15 710	14 790	15 670	15 920	15 960
			Incidence Rate (per 100,000 employees)		
All ages (a)	**20.8**	**19.8**	**19.2**	**18.9**	**17.4**
15-24 years	15.8	14.9	14.5	13.8	12.2
25-34 years	20.0	19.2	18.4	17.9	16.7
35-44 years	21.4	21.0	20.4	20.4	19.1
45-54 years	23.5	22.1	21.6	21.6	19.9
55 years and over	27.7	24.5	23.8	22.6	20.7
			Frequency Rate (per 100 million hours worked)		
All ages (a)	**12.2**	**11.6**	**11.3**	**11.2**	**10.4**
15-24 years	11.3	10.7	10.3	10.1	9.0
25-34 years	11.2	10.7	10.2	10.0	9.4
35-44 years	12.0	11.7	11.4	11.6	10.9
45-54 years	13.0	12.3	12.0	12.1	11.2
55 years and over	16.6	14.7	14.3	13.6	12.6

(a) Includes claims for which age was not stated

The median cost of claims for both injury and disease claims was the lowest for the youngest employees and the highest for older employees. Although the oldest age group (55 and over) had the lowest total number of claims, due to the smaller number of employees in that age group, its incidence rate (number of claims per 1000 employees) was the highest among all age groups.

In 2001-2, the frequency rate (number of claims per million hours of work) for claims across all industries did not show any clear age related trend. However, on further analysis, in the *Construction* Industry the frequency rate increased with age and a similar pattern was observed for the *Health and Community Services* industry. In contrast, the frequency rates for employees in the *Agriculture, Forestry and Fishing* industry decreased with age. When the claims were analysed separately by injury and disease claims, a clear pattern emerged for disease related claims. For all six industries examined, the frequency of disease related claims increased consistently with age. However, the pattern for injury-related claims was mixed.

When analysed by occupation, differences in frequency rates were observed for different occupation, although for most occupations, the frequency rate increased with age. Labourers and related workers had the highest frequency rate among occupations for all age groups. Sprains and strains were the most common reason for making a claim across all age groups. A high proportion of injury and disease claims in older workers (55+) were due to fractures (9 %) and deafness (11 %).

Falls, slips and trips of a person was the second most common mechanism leading to a claim after body stressing and it showed an age related pattern where the proportion of claims

increased slightly with age, 18 % in 15-24 years age group and 22 % in 55+ age group. The proportion of claims involving environmental factors increased with age, from 12 % in 15-24 year group to 23 % in 55+ group. Internal conditions which include factors such as temperature, lighting, ventilation, lack of oxygen and noise accounted for 27 % of environmental factor claims in workers over 55 years of age.

13. Accommodating changes in the workplace

The work environment has a significant impact on a person's work ability. For an ageing worker, it is important that physical, mental and social work environments be adjusted to accommodate changes associated with ageing. Addressing the needs of the older worker will also have an impact on younger workers as causes of work related injuries are similar across all age groups.

Poor ergonomics is the main work-related cause of premature decline of work ability (LaBar 1996). Since ageing is an individual process, ergonomics for older workers should be individualised in order to accommodate for the worker's limitations and utilise their strengths. Therefore, assessing the work ability of employees so that no mismatch of work capacities occurs for the ageing worker will be an important part of an ergonomic strategy for the ageing worker (Kumashiro *et al.* 2000).

Job and work task design should be improved by avoiding the use of excessive work rates and production workload targets. For example, self paced work is preferable to machine paced work or time limits imposed for handling call centre based inquiries. Research indicates that employees experience lower anxiety, lower depression and higher job satisfaction when they have higher control over the timing of their work and methods they use in their work. Adequate control can enable older workers to adopt performance strategies to minimise problems that may be associated with age related reductions in processing and response speed. It will also be beneficial to offer training on the easiest and most efficient methods for task performance.

As evidenced by the NDS data and the available literature, older workers are affected by environmental factors such as noise, temperature and lighting. Reduction of noise, along with regular testing of workplace noise levels, partitions to reduce noise, and specific office arrangement should compensate for the reduction in hearing experienced with ageing (Green 2002). Increased illumination can compensate for the impaired optics associated with ageing as well as somewhat accommodate for age related diseases such as glaucoma and cataracts that also affect mature worker's vision. Increased susceptibility to glare in older workers can be accommodated by providing anti-glare screens for computer monitors, and using non-reflective surfaces for office furniture.

Due to the observed changes in the circadian rhythm and sleep patterns associated with age, the Finnish Institute of Occupational Health recommends the following in its ergonomic principles of shiftwork for older workers:

- As little as possible night work;
- Long work shifts (more than 8 hours) should be considered only if the long shift suits the character and loading of the work;
- If the shift work does not contain night shifts, early morning shifts should be avoided;
- The period between the shifts should be at least 11 hours and

- Forward rotation of shifts (morning shifts – evening shifts – night shifts – days off) seems to be favourable for avoiding sleep disturbances.

Decline in cognitive function can be reduced by using memory aids such as calendars, and lists. In addition, encouraging older workers to have a healthy lifestyle, including regular exercise, proper diet and nutrition can also help in reducing cognitive decline. Physical fitness has been shown to improve cognitive ability in older people aged 58 to 77 years (Colombe *et al.* 2004), and about 90 % of older participants in a Finnish Study reported that physical exercise improved their mental work ability (Bashore 1990).

As updating skills and knowledge is becoming a necessity in the majority of the jobs, this can cause a significant amount of concern and stress for the ageing worker. Training courses should be adjusted for older workers as learning is not dependent on age but on method and delivery (Illmarinen and Rantanen 1999).

Table 6 provides more detailed suggestions for changing the work environment to suit the needs of ageing workers. It is recognized that not all tasks can be changed to suit the ageing employee and in this case, it is suggested that older workers be transferred to other tasks. While most of the suggested changes listed in the table 3 are administrative controls, it is important to keep in mind that all hazards control should be approached using the hierarchy of control: elimination, substitution, isolation, engineering controls, administrative controls and finally personal protective equipment.

Table 6. Accommodating changes to assist the ageing worker (Spirduso 1995 as cited in Illmarinen 1999; Green 2002)

Age-related physiological or psychological changes	Workplace or environmental adjustments
1. Decreased joint mobility, reduced tissue elasticity	▪ avoid jobs that require/have elevated arm activities, prolonged unusual postures ▪ position objects, controls, displays to minimize prolonged flexing, bending, stooping ▪ adjust furniture to individual anthropometry ▪ design seats to reduce vibration
2. Loss of strength	▪ avoid controls and tools that require high strength, lifting, lowering, pushing, pulling loads, lifting rapidly ▪ design tasks so that load is kept close to body, task does not require bending or stooping, sufficient breaks between tasks ▪ teach workers correct method of lifting and pushing ▪ reduce weight of objects that need to be lifted
3. Reduced physical functional capacity	▪ jobs requiring energy expenditures should not exceed 0.7 (men) or 0.5 (women) L/min oxygen consumption
4. Slowed perception and decision making Attention deficits, memory deficits	▪ provide longer training sessions, practice with written instructions, video tapes of desired performance, increased signal to noise ratio ▪ assign older workers to tasks in which work is previewed rather than reacted to, tasks that are predictive rather than novel
5. Visual deficits, Acuity, Colour discrimination	▪ provide more illumination for older workers, increase task contrast on control panels, writing on labels, increase display letters and symbols, reduce glare, place important signs at eye level ▪ omit blue/green discrimination
6. Less tolerance for heat	▪ reduce heat stress in the workplace
7. Less tolerance for cold	▪ maintain optimum worksite temperature ▪ use protective clothing against cold outdoors
8. Hearing loss	▪ increase signal to noise ratio in tasks that provide audible cues instructions
9. Greater incidence of low back pain (LBP)	▪ provide job training on prevention of LBP, risks on job, basic knowledge of body mechanism, specific notions to avoid, planning job activities to minimize back stress, off-the-job injury prevention
10. Increased risk of falling	▪ eliminate slippery walkways ▪ mark steps of ramps ▪ illuminate workplace adequately ▪ make handrails accessible
11. Slower rehabilitation from injury or disease	▪ allow more gradual return to full load work ▪ allow rotation between light and heavy jobs to phase in work requirements ▪ provide information regarding proper rehabilitation and return to work
12. Higher work stress	▪ avoid paced work ▪ give worker control over load ▪ emphasize accuracy rather than speed

14. Australian OHS initiatives for the ageing workforce

Victoria

Victorian Work Cover has a farm safety program with a particular focus on ageing workers. Although it cannot be determined from Australian data, it has been reported that in the US, workers over 55 years of age are at a higher risk of farm related injuries (Myers et al. 1999). The Victorian Work Cover has found that farm place fatalities usually occur in farmers 50 or over, and is offering a 3 hour free farm safety inspection and farm safety kit.

South Australia

During the 2004 South Australian Safework week, there were presentations on the health and safety of ageing workers and discussions on utilizing strengths of ageing workers to maintain healthy and safe workplaces.

Queensland

The Division of Workplace Health and Safety, Queensland, has published strategies and actions to improve the occupational health of mature age workers in the Queensland Public Service in 2005.

Commonwealth

Comcare has produced the booklet "Productive and Safe Workplaces for an Ageing Workforce" which provides Commonwealth managers with guidance material. The material is intended to assist agencies to consider strategies to address workforce ageing in the context of the wide variety of work situations within the Commonwealth jurisdiction. Some of the strategies will be more relevant to some agencies and work environments than to others. It is recommended that agencies consider the strategies outlined and, where necessary, apply an appropriate mix depending on their specific workplace and workforce characteristics and risk management assessments.

15. International Initiatives

FINLAND

Finland is the leading country in the area of OHS and the ageing workforce. Its past and present activities and programs include:

- The National Programme of Ageing Workers which provides training for workers and employers, and aid in the development of research projects on the improvement of working life for ageing workers.
- The implementation of a Working Life Barometer and Working Life Survey, that measures working conditions.
- The National Programme for Older Workers, a five year program which ended in March 2002. This program targeted the age bracket of 45-64 for both employed and unemployed people and was a coordinated effort by social partners (employer and employee groups) and government departments. Within a few years, employment rates for over 55 year olds improved faster than any other age, and the trend for companies to 'pension off' older workers began to reverse. Finland has effectively raised the actual retirement level by one

year, from 58-59, and is reportedly still experiencing growth. The program focused on 6 key areas: early retirement; low rate of labour force; low rates of re-employment; reduced working capacity; low education levels; and prejudice and ignorance in the general community.

- The 'Finnage - Respect for Aging' program to promote health, work ability and well being of aging workers was implemented between 1990-1996. This program focussed on the effects and feasibility of a number of measures related to job demands (ergonomics, occupational hygiene, safety); work organisation (developmental, psychosocial and management issues); and individual (health promotion, physical exercise and refreshing lifestyle).
- The Work Ability index (WAI) is an instrument that has been developed over the last 20 or so years through years of ergonomic research: In 1981, a follow up questionnaire study was performed on 6257 workers aged 48-58 years old, and again in 1985 and 1992. By using this cross-sectional data, an effort was made to construct an index that described the participants capabilities as they relate to work demands. After a series of analyses, seven items were chosen, and an index (The Work Ability Index) was created. This index measures work ability against clinical assessment of health status and the associations between functional capacity and work ability were studied.
- The Maintenance of Working Abilities program (TYKY in Finnish), which was developed by the Institute of Occupational Health. This program encompasses occupational safety, physical fitness, lifestyle, professional skills and management of the working environment. The program is measured using the TYKY Barometer, which is published biennially. Barometer results indicated that in 1999, measures to enhance OH&S rose from 50% to 69%.
- The Finnish Institute of Occupational Health has also developed a system of 'participatory ergonomics programs' and have conducted applied tests. This is a process by which workers, as professionals in their area of work are included in decisions made about ergonomic factors in their office environment.

United Kingdom (UK)

The UK government produced a report titled 'Winning the Generation Game' in 2000. It contains a number of actions specifically targeting the types of OH&S services that would be required by an ageing workforce. These included: marketing the Health and Safety Executive's OH strategy increasing funding for the "Back in Work" initiative as part of the 2000 spending review determining whether occupational health should be covered in Health Improvement Programs engaging Health Action Zones with Employment service and the Benefits Agency and dissemination of awareness and training on helping sick or disabled people back to work

The UK's British Telecom offers a program called 'NewStart', which was designed to challenge people's expectations about retiring early. NewStart consists of a range of flexible options that provide job structures that allow ageing employees to retire gradually, as part of a career/life-planning concept. The options available currently include:
Wind Down - Part-time working, job share
Step Down - Lower 'responsible' job at lower grade
Time Out - Phased sabbaticals
Ease Down - Reduction in hours or responsibility
Helping Hands- Secondments

United States (US)

Operation ABLE (Ability based on Long Experience) runs privately funded programs that are found in several cities. These programs organize job fairs, help with resumes, provide interview tips, help with conducting job searches and career counselling. The Federal Government funds a small job placement program, Senior Community Services Employment Program (SCSEP), aimed at severely disadvantaged older workers (55+). However, this program has only limited coverage. The National Older Worker Career Centre was established in 1997 and runs an employment agency which offers services of workers over 40 to both private and public employers.

The use of flexible working programs is not widespread in the US although it has been practiced by some private employers. Several government employers, particularly those employing teachers, have adopted the DROP program (deferred retirement option plan) that allows a worker of a retirement age to continue working while drawing a pension.

The US National Institute of Occupational Safety and Health has been focusing on the ageing workers in the mining industry. The median age of mining workers is rising faster than that of the rest of the population.

16. Conclusions and Recommendations

As people grow older and their health status changes, they tend to change to a better suited job or leave the workforce. This leads to the survivor, healthy worker effect (Molinie 2003). Since there is an increasing need to retain older workers in the workforce, strategies to minimise age-related problems ideally should begin with young workers and continue throughout their working lives. In addition, any changes to improve occupational health and safety of older workers will also benefit other age groups and therefore, have a positive impact on the whole workforce.

The Finnish National Program for Ageing Workers was very successful in raising the average age of pension from 58 to 59 years (See Section 15). It aimed to balance the abilities of mature workers with incentives to work. The program focused on health, life-long learning and the interaction between health, education and working life (Myhrmann 2000). Even if this program is not directly applicable in an Australian setting, implementing a similar program will benefit the ageing workforce.

Health and well-being promotion in the workplace will reduce the impact of risk factors and slow the changes associated with ageing (Scanes 2004). Modifiable risk factors include physical inactivity, smoking, alcohol and drug use, diet and stress. Examples of programs include healthy life seminars, fitness programs, weight loss programs, supported access to gym facilities, hearing and other specific health testing, assistance to quit smoking and access to annual flu vaccinations.

Training programs for management to increase awareness of the needs of ageing workers such as flexible work hours and work design could be conducted. Supervisors of ageing workers should have a positive age attitude, and be willing to provide reasonable individual solutions to suit the ageing worker. As retirement trends have shown, illness, injury, and higher perceived workload are the main reasons for early exit from work. The resulting enhanced awareness will hopefully

bring about improvements in work design, and reduced work loads to suit the older worker and therefore reduce the incidence of illness and injury as well as mental stress experienced by older workers.

Diseases such as hearing loss or pneumoconiosis should become less of a problem due to the increased awareness and reduction of risk factors, however, new risk factors could emerge in the future. Risk factors for occupational disease or injury also vary by occupation, for example, risk factors for an office worker will be very different from that of a mine worker. Therefore, one centralized intervention or prevention program is not feasible. While having a broad focus, programs should allow individuals to be assessed for their work ability and be able to utilize the ageing worker's strengths while compensating for any age related impairment.

A reduction of same level falls, the type most seen in ageing workers should be targeted. At present, occupational fall prevention campaigns mainly focus on falls from heights. Information on same level falls as well as simple preventative strategies such as installing non slip surfaces, better lighting, and removing trip hazards could be included in the current fall prevention programs.

The industries where the frequency rate for compensation claims increases with age should be focused on such as the *Construction* and the *Health and Community Services* industries. Attention should also be focused on in the *Agriculture, Forestry and Fishing* industry where, not withstanding the low frequency rate, the percentage of mature workers is high.

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