Coping with Growth

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Age related changes in risk of injury and the development of musculoskeletal disorders : a whole of working life issue

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- Ageing of population presents major challenges to Australian economy & labour market.
- Coincides with changes in work organisation, high production demands, skills shortages & workforce growth.
- Interactions between work & ageing evident in 24hr industries involving physically demanding jobs.
- Premature retirement adverse outcome of occupational injury more commonly associated with older workers.

The changing demographics of the Australian workforce is a significant challenge to the existing OH&S system

Australia >80% of projected workforce growth between 1998-2016 in those over 45years of age

ABS, 1999

Average age of Australian mining workforce 40.3 years 2004, compared to 35.9 in 1984

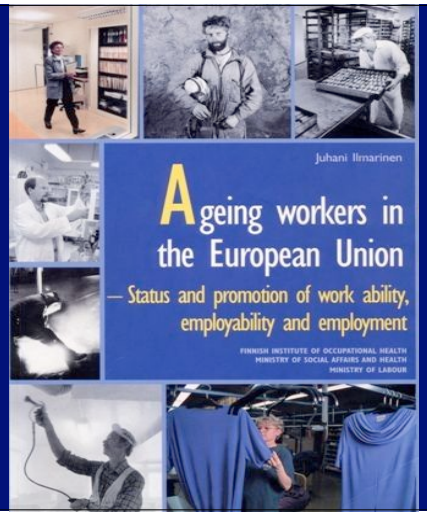
ABS, 2005

59% of NSW & QLD employees workers in Coal mining industry were over 40 years of age.

ABS, 2001

Objectives

- Determine the match between *work demands* and *work ability* in Australian coal mine employees of different ages.
- Determine any differences in medically related factors which may impact on work ability across age, mine type & occupational category;
- Characterise those older miners who have *high levels of work ability* and *low rates of injury* in terms of work history, individual attributes and work patterns.



Work ability Index

Developed at Finnish Institute for Occupational Health

Depicts workers own assessment of his or her work ability

Results show good agreement with clinical examinations

Can be used at different stages of working life to ensure correct measures are taken to maintain work ability

Can form basis for further measures to draw up individual programs to maintain work ability

Work ability index – measure of perceived work ability

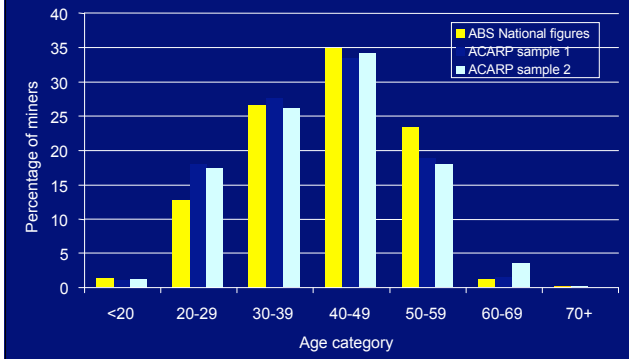
- Questions in seven categories
- Work ability compared with lifetime best
- Work ability in relation to demands of job
- Number of current diseases diagnosed by physician
- Estimated work impairment due to disease
- Sick leave during past year
- Own prognosis of work ability 2 years from now
- Mental resources

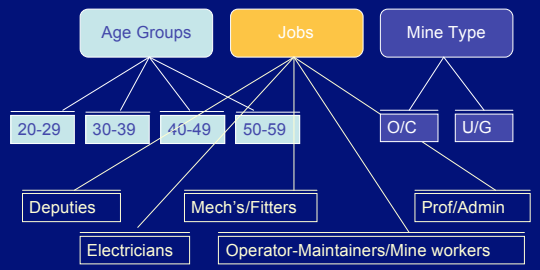
Study sample summary

- 21mine sites (12 open-cut; 9 underground);
- 10% (5/49) of NSW mine sites & one-quarter of QLD mine sites;
- Sample comprised 1624 workers representing 7% of the total coal mining workforce (ABS, 2004);

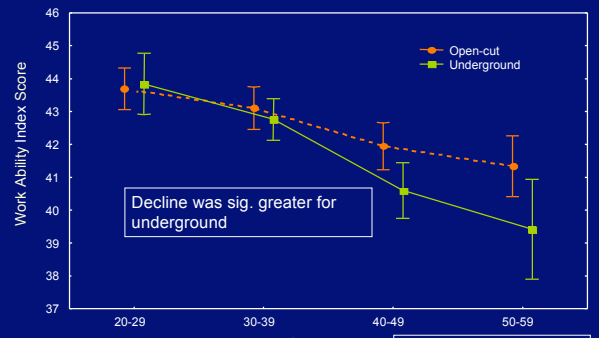
- Average age 39.9 years - (50.3% over 40)
- Open-cut 40.5 years, underground 38.4 years

ABS 2001 Census figures for national coal-mining workforce, Survey 1 and 2 samples by age



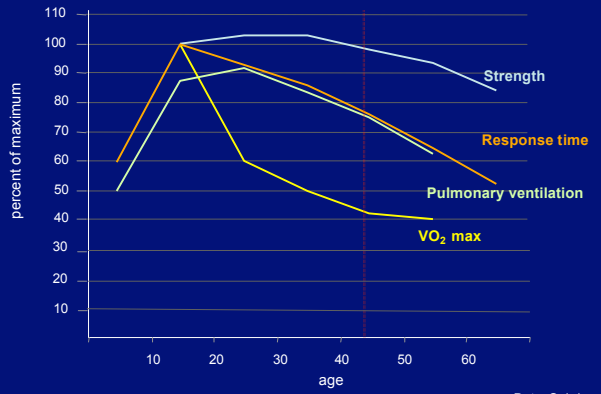


Work ability by age group & mine type



Older age groups had significantly lower WAI ($p < 0.05$)

Age related changes in function



Data: Spirduso, 1995

Injury

- Number of injuries (both self-report and doctor-diagnosed) increased significantly from the 20's to the 50's age groups.
- Rates doubled for self-reported injuries and trebled for reported doctor-diagnosed injuries.
- Clear linear trend with age in underground workers.
- Data with respect to injury frequency consistent with previous analyses of NSW & QLD injury data for mining.

Mean work ability index score in relation to injury status

Significantly lower WAI in workers 45+ who reported a current doctor diagnosed injury 42.5 without injury v 36.3

6 point difference - equivalent to 10.2years age related decline observed in Finnish longitudinal studies

What distinguishes those older miners who report current injury from those with no reported injury in terms of work history, individual attributes & work patterns ?

Survey of 178 Miners

– **Physical demands of work**

Significantly increased exposure to:
– **Manual handling, lifting carrying;**
– **Pushing, pulling, dragging cables hoses etc.;**
– **Prolonged work in an awkward or uncomfortable posture;**
– **Repetitive work.**

Differences between injured and injury free older mineworkers (45+) in ratings of exposure to work environment & physical factors

Work Environment

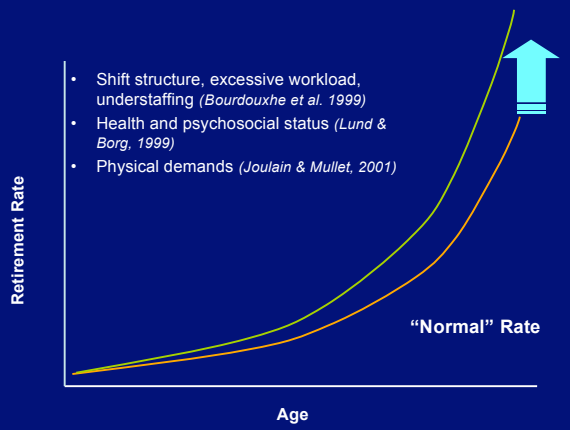
Significantly increased exposure to:
– **Poor match between machine, vehicle or equipment**
– **Working under poor ergonomic conditions**
– **Excessively uneven ground**
– **Poor illumination**
– **Wet conditions**

Differences between injured & injury free older mineworkers (45 +) in ratings of work & health

Work & Health

- **Significantly reduced exposure to regular physical activities outside work**
- **Inadequate sleep**
- **Perceptions of being too tired to exercise outside of work**

Early Retirement Influenced by Working Conditions



Ageing workers in European Union

Nearly 50% of older workers were exposed to repetitive hand or arm movements, poor work postures (30%), & carrying or moving heavy loads (20%).

Physical demands were similar for younger & older workers.

Prevalence of MS disorder increased from 35 – 49% in men & 38 – 53% in women from 51 to 62 years of age

Increase most pronounced in those who stayed in same occupation & exposed to physical work.

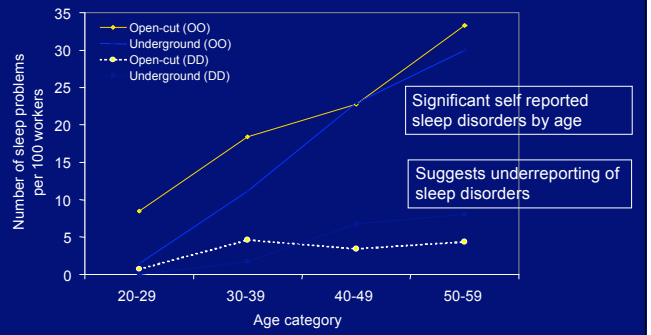
A normal ageing process between 45 – 65 Yrs requires a decrease of about 20 – 25% in physical workload

Ilmarinen, 2002

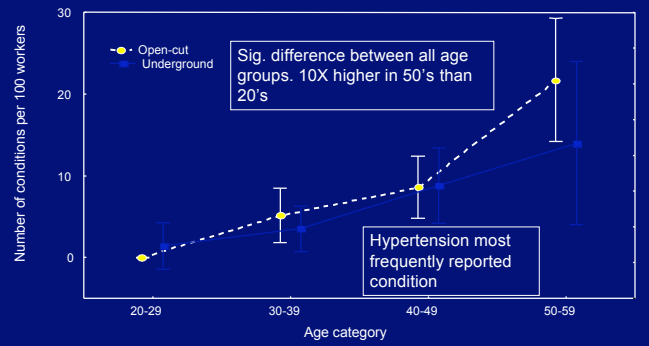
What are the 3 most important things that help older miners continue to work safely and productively as long as they wish ?

1. Decrease the length of shift
2. Decrease in the physical demands involved with work tasks
3. Increase in job rotation to change/experience multiple tasks
4. Improved ergonomics & machine/equipment matching
5. Increased fitness
6. Take older workers off night shift
7. Increased involvement in supervisor/training roles

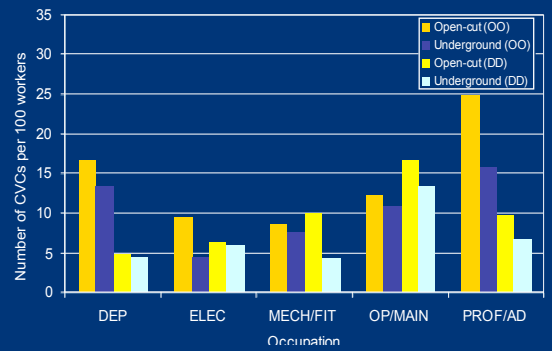
Reported sleep problems by age group & mine type



Reported cardiovascular conditions by age group & mine type



Cardiovascular conditions by job category & mine type



Effects of cumulative exposure to heavy physical exertion and vibration on vertebral structure

Radiographs of miners and other workers involved in long term (10-21 years) exposure to heavy spinal loading and/or whole body vibration

- Heavy spinal loading associated with decreased intervertebral disc height
- Whole body vibration without appropriate damping of effect decreases disc height

Brinckmann et al 1998

Musculoskeletal disorders

Significant age effects for number of reported MSD's

- 4x increase in open cut sector from 20's to 50 age groups.
- 3x increase in underground sector from 20's to 40 and 50 year age groups.
- Older workers who stayed in physically demanding jobs prevalence of MSD's doubled from 51-62 years.
  Seitsamo & Klochars, 1997
- Presence of MSD's among older workers most common grounds for early retirement in Finland.
  Karpansalo et al 2002

Occupational stress during working life & locomotion impairment in retirement

Occupational stress during working life has significant effect on low back, shoulder/arm impairment and functional independence in retired coal miners.

Charbonnier et al., 1998

Summary

High & increasing level of musculoskeletal injury & disorder & need for greater emphasis on prevention.

Importance of interventions designed to reduce physical as well as psychosocial stressors.

Need for improved & consistent injury reporting procedures, particularly with respect to exposure & causation.

Opportunities for new technologies to monitor mechanical load non-invasively & exposure assessment.

Increase awareness of longer term perspective in terms of cumulative injury across working life.

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