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# GENERIC HEALTH SURVEILLANCE – LESSONS FROM WA

## INTRODUCTION

The Mines Safety and Inspection Act, 1994 (MSIA) and Regulations, 1995 (MSIR) introduced a generic health surveillance system for all mining employees who may be exposed to noise and particulates at work. This data, stored in the MineHealth database includes:

- a detailed work history,
- respiratory questionnaire,
- lung function test (spirometry),
- hearing test (audiometry) and
- a chest x-ray (for designated occupations/employees).

Additional tests may also be required for employees exposed to other hazards at levels that may impact health. Biological monitoring for lead, mercury or arsenic may be required, with appropriate clinical assessment based on likely health impacts.

## THE MINEHEALTH SYSTEM

- All mining employees have an initial assessment within three months of commencing employment and periodic assessments every five years.
- Resources Safety oversees training, approval and re-accreditation of "approved persons" for MineHealth. Approval to test is for two years after which further training is necessary.
- The MineHealth assessment is organised and paid for by the employer and is often done at the same time as the pre-employment fitness medical.
- It is the responsibility of the approved person or medical practitioners to
  - explain the results to the employee and
  - notify the employer of the outcomes of the assessment with advice on the need for remedial action (if required).
- Clinical review at the assessment is essential for effective intervention, where necessary.
- Amongst all stakeholders, there are a variety of perceptions about the MineHealth system. Some believe:
  - clinical review at assessment is not required for epidemiological studies or
  - it verifies an employee's fitness to work on mines, acting as a complete health check.
- Misperceptions have continued as producing regular and meaningful MineHealth reports has had considerable challenges ranging from problems with reporting software to data quality.

## METHODS

In the main study, three separate cohorts were compared based on the number of health assessments completed. As each cohort had some differences in gender, age and occupation composition, only those with two assessments are reported in this poster. As no significant differences were observed between assessments, graphs represent the initial assessment.

Weight, for body mass index (BMI) summaries, was collected from January 2008 until 30 June 2009 for 30,138 employees (males - 26,635; females - 3,503).

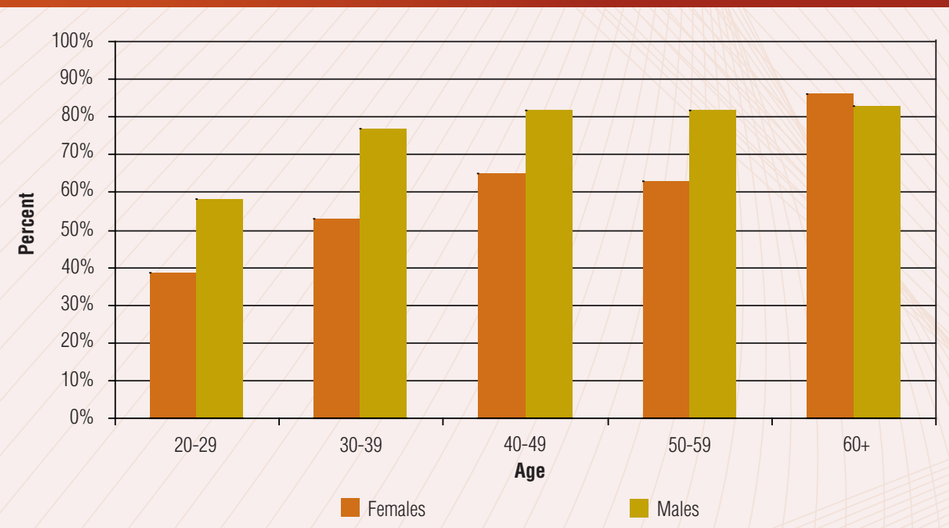
Confidence intervals based on variance of population statistics were calculated using 95% confidence intervals.

## FINDINGS

- Using a minimum cost of $130 per standard MineHealth assessment, the total cost to employers is $27,460,680. Costs to government were estimated at approximately $300,000 per annum.
- Of the 211,236 assessments; 160,627 were initials, 39,536 were second assessments, 11,055 were third assessments and 18 people had four assessments.

### Overweight and Obesity

Figure 1. Prevalence of overweight and obesity, by age




*Legend: Overweight is defined as a recorded BMI of 25-30 and obese is BMI>30.*

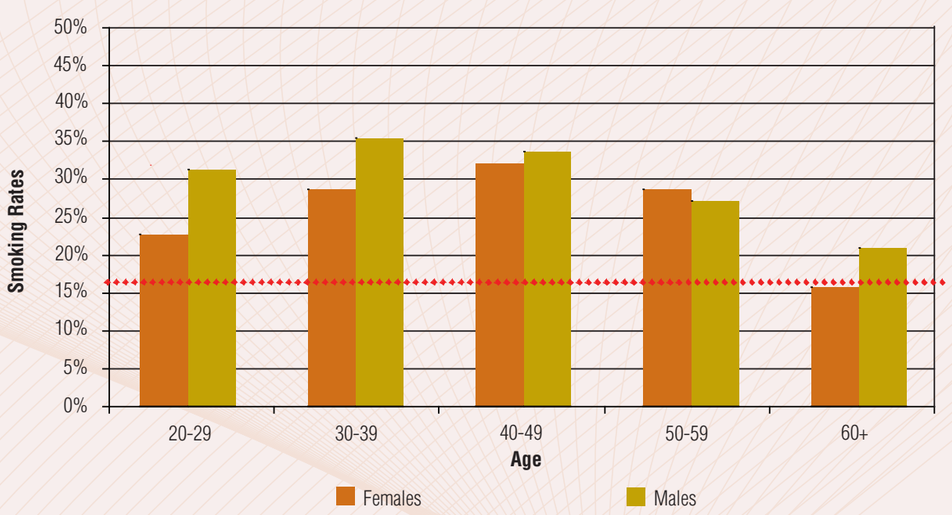
Figure 1 shows a greater proportion of male mining employees in WA who are overweight or obese, compared with

- female mining employees younger than 60 years of age (72% versus 50%) and
- males in the general Australian population (72% versus 67%[1]).

Overweight and obese rates for females in the WA mining industry mirror the general Australian female population (50%[1] versus 52%, respectively).

### Cigarette Smoking

Figure 2. Prevalence of daily smoking, by age




*Legend: Dashed line indicates smoking rate for Australian general population at 17.5%.*

### Self-reported Respiratory Symptoms

Figure 3. Prevalence of respiratory symptoms, by smoking status

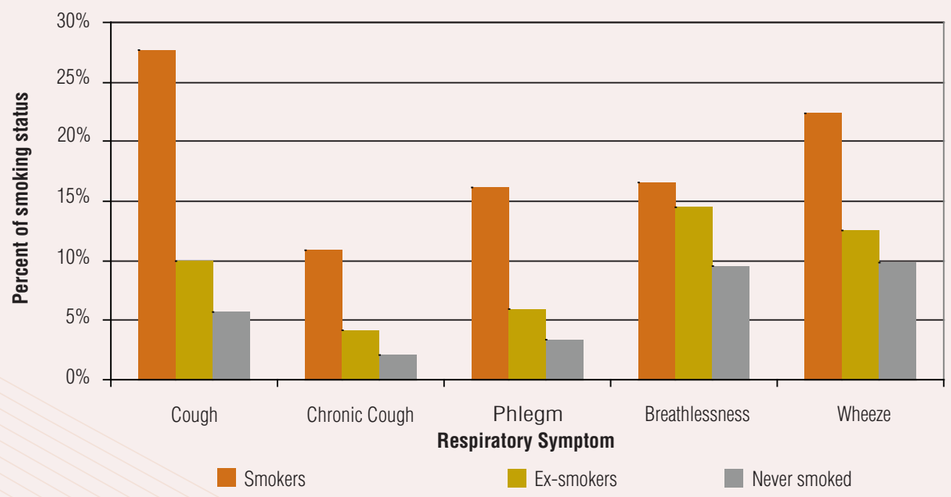
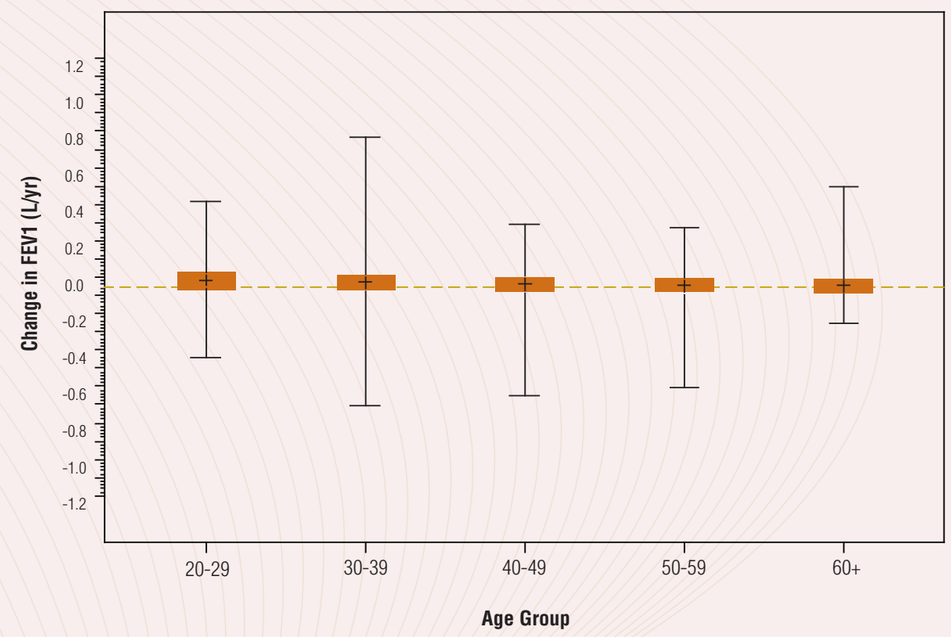



Figure 3 shows the prevalence of self-reported symptoms from the respiratory questionnaire, and indicates:

- a significantly increased prevalence for all symptoms in smokers compared to ex-smokers and those who have never smoked.
- cough, chronic cough and regular phlegm production are reported around five times more frequently in smokers than non-smokers.

### Lung Function Testing

Figure 4. Rate of change in FEV1 between initial and second assessment in smokers versus age




In healthy, non-smoking adults, a decrease in FEV1 of 30-50mL/year is considered normal[2]. Figure 4 compares FEV1 loss per year versus age, between the first and second assessment for smokers. It suggests, that for most people tested, lung function is actually improved, with a median for all ages at or above 50mL/yr. However it is probably more likely that WA mining employees have learned good spirometric technique by their second assessment.

This observation seriously questions the validity of spirometry as a screening tool to detect early changes in respiratory health.

*Legend: Orange line shows FEV1 losses of 50ml/year.*

### Hearing Loss

Figure 5. Binaural noise induced hearing loss (NIHL), age corrected

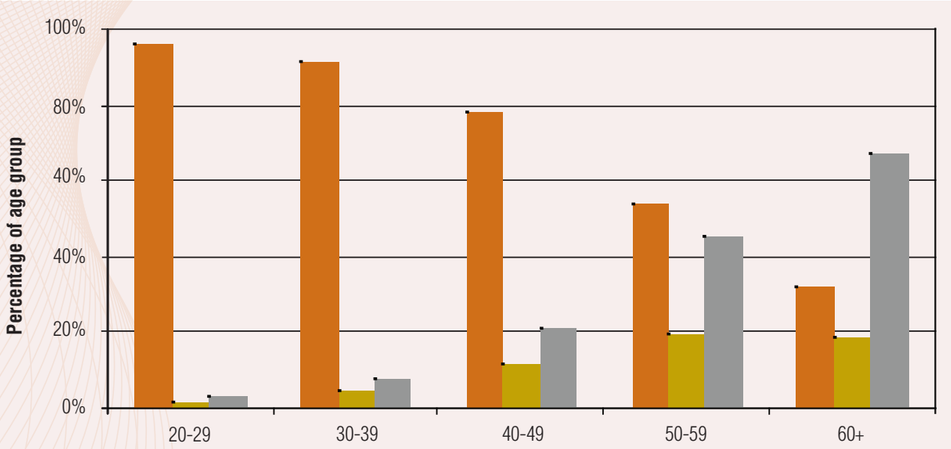



Figure 5 demonstrates age-corrected, percent binaural hearing loss at the initial health assessment by age. It clearly demonstrates the relationship between age and hearing loss highlighting that people join the industry with significant losses. This implies non-occupational noise exposures appear to also play a major role in hearing loss.

## CONCLUSIONS

Analysis of MineHealth has shown that the WA mining industry has:

- a high proportion of overweight and obese employees
- increased rates of respiratory symptoms in smokers,
- smoking rates at almost double the Australian population and
- significant hearing losses at the initial health assessment.

Use of screening spirometry in healthy populations is questionable based on costs versus benefits to stakeholders, thus MineHealth methodology is currently under review.

References

[1] Australian Institute of Health and Welfare (2008) Australia's Health 2008. Cat. No AUS 99. Australian Institute of Health and Welfare. Canberra. ACT.

[2] Johns and Pierce (2003) Interpretation of ventilatory function tests in Pocket Guide to Spirometry. McGraw-Hill Australia. North Ryde Australia.

www.dmp.wa.gov.au/resourcessafety