HEARING THRESHOLD LEVELS: AUSTRALIAN COAL MINES 1991 - 2015

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INTRODUCTION
Why Hearing Loss?

- Occupational hearing loss - specifically NIHL:
  - Contributes to 20% of all workplace compensation claims (SWA, 2016) and
  - 4676 DALY’s every year (AIHW, 2015)
    - measure of the years of healthy life lost from living with, or dying from disease and injury

- NIHL contributes to 20% of all workplace compensation claims in Australia (SWA, 2010)

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- NSW coal mining audiometric tests conducted through Coal Services Health (CSH) for:
  1. pre-employment audiograms
  2. periodical audiograms and
  3. exit audiograms to assess NIHL for coal mine employees

- **Aim:**
  - To investigate prevalence of hearing loss for NSW coal miners between 1991 and 2015
This is an observational, retrospective, repeated cross-sectional study

De-identified, pre-employment audiometric records for NSW coal miners analysed

- **Cohort 1**: 1 January 1991 – 31 December 1995 (n = 5852)
- **Cohort 2**: 1 January 2001 – 31 December 2005 (n = 20254)
- **Cohort 3**: 1 January 2011 – 31 December 2015 (n=53947)

University of Newcastle Ethics Committee (Approval number H-2016-0074)
Statistics

1. Descriptive statistics at all test frequencies (0.5kHz – 8kHz)
   – Mean, SD, percentiles

2. Pure tone average (PTA) hearing loss:
   – PTA\textsubscript{speech} (dB HL), binaural of 0.5 kHz, 1 kHz, 2 kHz and 4 kHz, and
   – PTA\textsubscript{high} (dB HL), binaural of 3 kHz, 4 kHz and 6 kHz

3. The prevalence of audiometric notches calculated using the audiometric notch definition as described by Coles (Coles et al., 2000)
Hearing Threshold Level (HTL) shifts > 25 dB HL evident for:

1. workers > 45 years and older in cohorts 1 and 2
2. workers > 50 years cohort 3

Average pure tone hearing thresholds: $\text{PTA}_{\text{speech}}$ and $\text{PTA}_{\text{high}}$

- ↑ HL at $\text{PTA}_{\text{high}}$ compared to $\text{PTA}_{\text{speech}}$ (male and female)
- Clinically significant HTL shifts of > 25 dB HL evident for older workers
### Prevalence of audiometric notches

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<tr>
<td></td>
<td>Left ear (n, %)</td>
<td>Right ear (n, %)</td>
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<tr>
<td>Male</td>
<td>19.5 (3723)</td>
<td>16.0 (3053)</td>
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<tr>
<td>Female</td>
<td>5.5 (5.5)</td>
<td>4.1 (47)</td>
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<tr>
<td>Total</td>
<td>25.0 (3785)</td>
<td>20.1 (3100)</td>
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Approximately 20 – 25% of workers display evidence of an audiometric notch at 4khz
Discussion

1. Proportion males (93%) to female (7%) workers – for all cohorts

2. ↑ HL with age - consistent with other studies

3. ↑ HL at PTA\textsubscript{high} compared to PTA\textsubscript{speech}
   \textit{Not clinically significant (<25 dB HL)}

4. Audiometric notches at 4kHz evident for 20 – 25% of workers

IMPLICATIONS
Implications for practice:

Assist workplaces to:
• implement effective control strategies for workers with early onset hearing loss, and
• prevent the progression of NIHL

It matters. It’s personal. We make the difference.