Medical Screening, health surveillance and coal workers' pneumoconiosis

Malcolm Sim

Debbie Yates

David Meredith

Julia Brotherton

Panel discussion

Chairs: Malcolm sim and Beata Byok

9 May 2017

New lessons from an old hazard – ‘black lung’ in Queensland coal miners

Professor Malcolm Sim

Centre for Occupational & Environmental Health

Monash University, Australia

9 May 2017

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Centre for Occupational
and Environmental Health

Coal Mine Dust Lung Disease (CMDLD)

- Coal Workers' Pneumoconiosis (CWP)
- Progressive Massive Fibrosis (PMF)
- Silicosis
- Mixed dust pneumoconiosis
- Chronic bronchitis
- Emphysema
- Diffuse dust-related fibrosis

Laney SA, Weissman DN. Respiratory Diseases Caused by Coal Mine Dust. J Occup Environ Med. 2014 Oct; 56(0 10): S18–S22.

CWP in US Coal miners

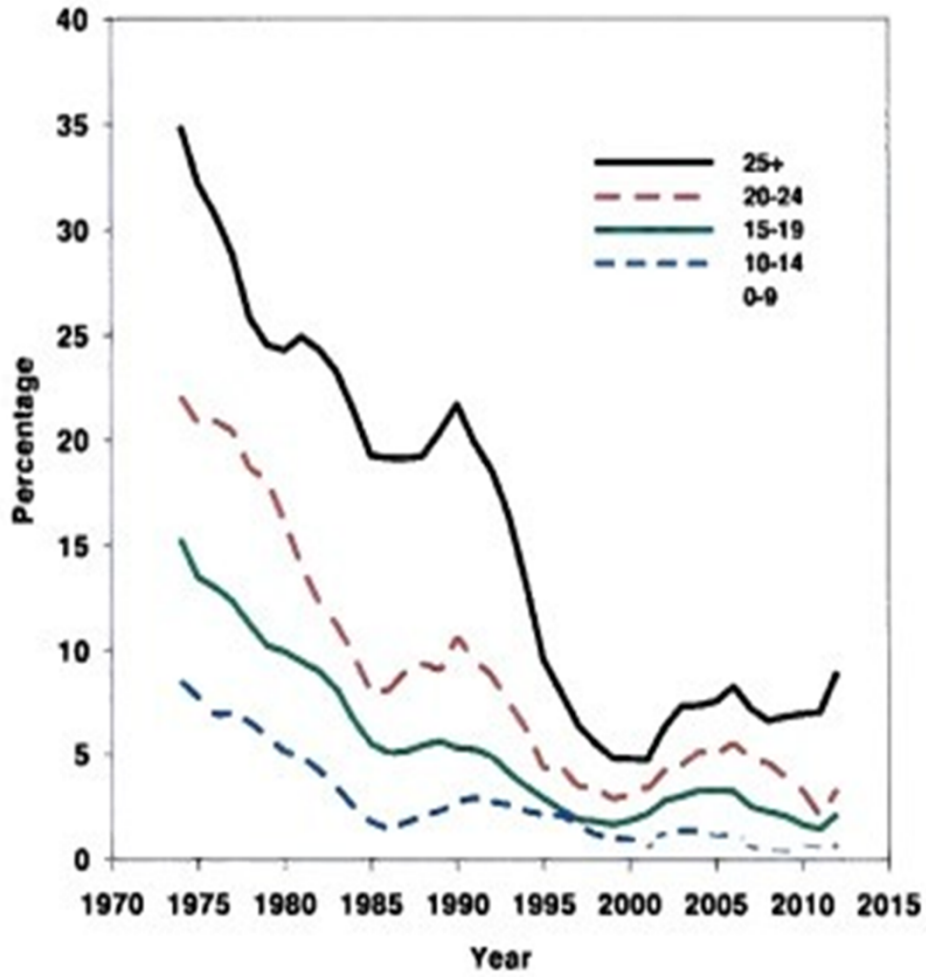

FIGURE 2. Percentage of examined US underground miners with coal workers' pneumoconiosis (ILO category 1/0+), 1970–2012. Data are shown as 5-year moving average, with separate plots for various tenures in coal mining. Data are from NIOSH CWHSP.[19]

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CWP in Queensland coal miners

- 1984 report of a chest x-ray screening program (7,907 miners) found 75 cases of CWP
- Since then, coal mine workers' health scheme regulated in Qld, including respiratory screening
- No new cases of CWP for at least two decades
- In 2015, several new cases of CWP were identified outside the scheme and more in 2016 and 2017
- Raised concerns about effectiveness of dust control in Qld coal mines and the effectiveness of the health scheme, as well as loss of confidence in doctors

DECEMBER 1 2015

'Black lung' disease returns to Queensland mines

The potentially deadly black lung disease has re-emerged in Australian coalmines for the first time in more than three decades.

Queensland Mines Minister Anthony Lynham confirmed in parliament on Tuesday that three cases of pneumoconiosis - or black lung - had been reported by the state's coal industry.

Media Statements

Minister for State Development and Minister for Natural Resources and Mines
The Honourable Anthony Lynham

Thursday, January 14, 2016

Action plan revealed on coal miners' health issue

The Palaszczuk Government today released a five-point plan to tackle an important health issue for the state's past and current coal miners.

Natural Resources and Mines Minister and Acting Health Minister Dr Anthony Lynham announced measures to help identify and prevent coal miner's pneumoconiosis, a lung disease caused by long-term inhalation of coal dust in underground coal mining operations.

"Protecting the health and safety of workers is a fundamental issue for any Labor Government, and particularly for me as a doctor," Dr Lynham said.

"We have confirmed five cases of coal miner's pneumoconiosis in Queensland and I have asked for Queensland Health data on any other possible cases.

"There's still research to be done on the medical and workplace records, but I suspect there are more cases to come.

"I am determined to get on top of this issue to protect workers now and into the future and to be open and transparent as we progress."

Dr Lynham outlined action on the five points.

- **A review to improve the existing screening system**, where coal mine workers have chest X-rays when they start work, at least every five years, and when they retire.

"Monash University's Professor Malcolm Sim is heading the review of the Coal Mine Workers' Health Scheme, which I ordered late last year after the early cases were identified," he said.

Review team

Monash University
Professor Malcolm Sim
Associate Professor Deborah Glass
Dr Ryan Hoy
Dr Mina Roberts

Alfred Hospital, Melbourne
Professor Bruce Thompson

University of Illinois at Chicago
Professor Robert Cohen
Assistant Professor Leonard Go
Ms Kirsten Almberg
Dr Kathleen Deponte


V060
V082

Objectives of the review

A. Determine whether the respiratory component of the medical assessment performed under the Queensland Coal Mine Workers' Health Scheme is adequately designed and implemented to most effectively detect the early stages of coal mine dust lung diseases in Queensland coal mine workers

B. Recommend necessary changes to correct deficiencies identified under Objective A, recommend measures to follow up cases that may have been missed as a result of these deficiencies and identify what additional capacity is needed in Queensland to improve this scheme.

- **Established a reference group of stakeholders**
- **Given 6 months!**

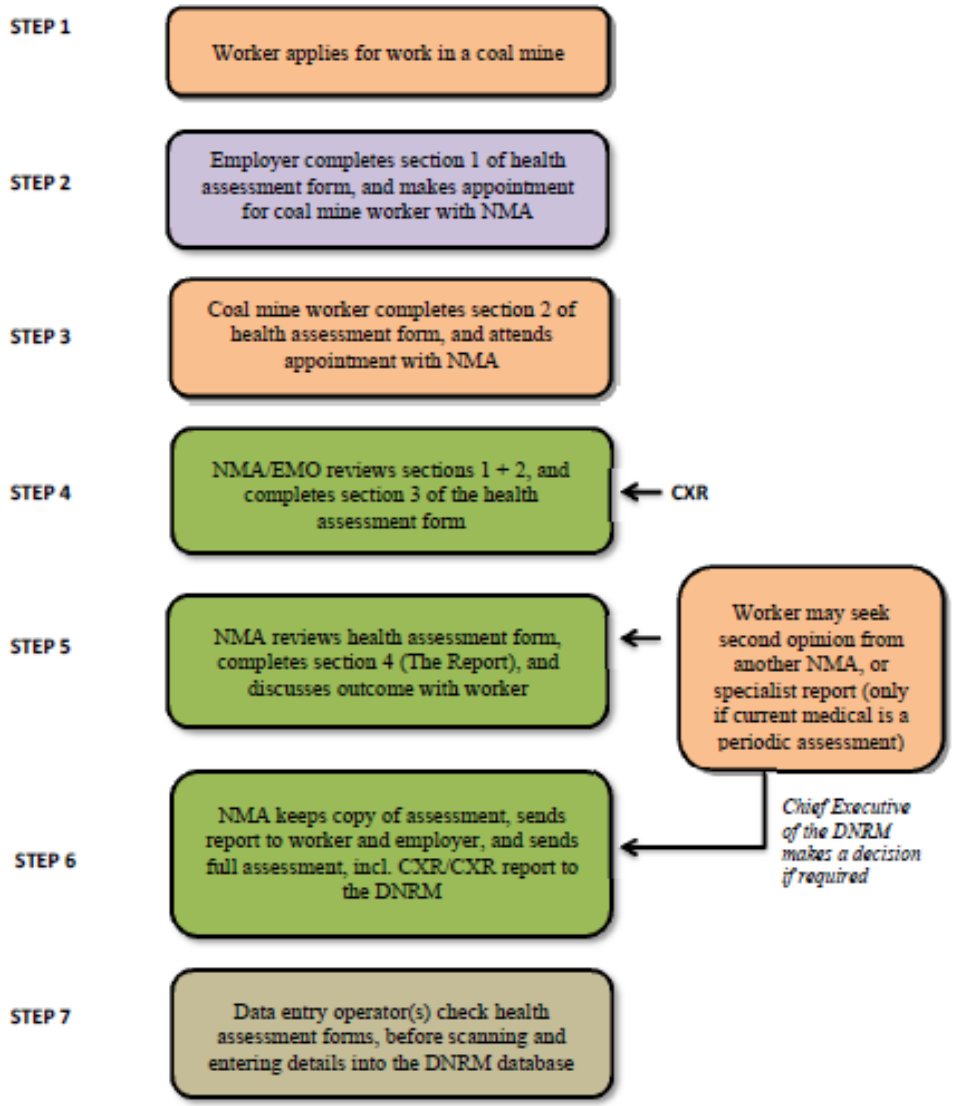


Figure 2: Flow chart of the process of the current Coal Mine Workers' Health Scheme

What did we find?

Main outcomes of the review

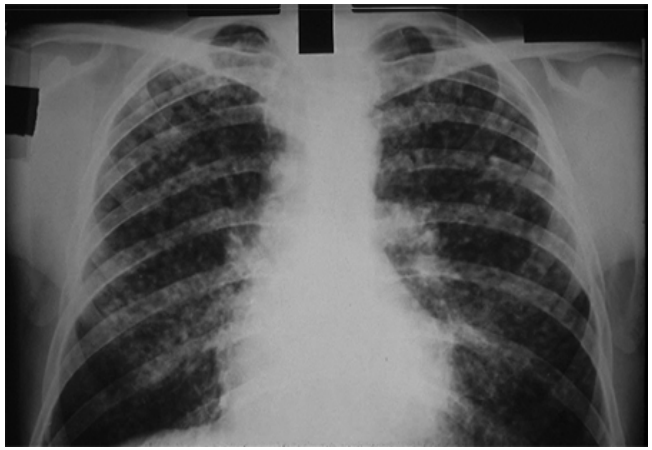
- Focus on respiratory screening for early CWP had been lost: main focus had become fitness for work
- Exposure information from employer and risk assessment of the worker poorly documented
- Too many Nominated Medical Advisers (237):
  - large rise in numbers during the mining boom
  - Lack of credentialing and limited training
  - Most located well away from coal mines

Figure 3: Underground mine and main locations of NMAs in Queensland (Figure

Main outcomes of the review

- Focus on respiratory screening for early CWP had been lost: main focus had become fitness for work
- Exposure information from the employer and risk assessment of the worker poorly documented
- Too many Nominated Medical Advisers (237):
  - large rise in numbers during the mining boom
  - Lack of credentialing and limited training
  - Most located well away from coal mines
- Lack of guidelines for follow-up of respiratory abnormalities: clinical and exposure – referred to GP
- Record keeping very inadequate; large backlog
- Problems with quality of x-rays and spirometry

Chest x-ray review



- CXRs from miners with at least 10 years of coal mine dust exposure
- 257 digital postero/antero CXRs reviewed
- Dual independent reading
- Used ILO classification form
- Compared findings with original radiology reports

CHEST RADIOGRAPH CLASSIFICATION

Reset Form

FEDERAL MINE SAFETY AND HEALTH ACT OF 1977
DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL & PREVENTION

Coal Workers' Health Surveillance Program
National Institute for Occupational Safety and Health
1095 Willowdale Road, MS LB208
Morgantown, WV 26505
FAX: 304-285-6058

OMB No.: 0920-0020
CDC/NIOSH (M) 2.8
REV. 01/2015

DATE OF RADIOGRAPH (mP-dG-\\\\)

[ ][ ] - [ ][ ] - [ ][ ][ ][ ]

EXAMINEE'S Social Security Number

[ ][ ][ ] - [ ][ ] - [ ][ ][ ][ ]

Full SSN is optional, last 4 digits are required.

TYPE OF READING

A [ ] B [ ] F [ ]

FACILITY Number - Unit Number

[ ][ ][ ][ ][ ] - [ ][ ][ ]

Note: Please record your interpretation of a single radiograph by placing an "x" in the appropriate boxes on this form. Classify all appearances described in the ILO International Classification of Radiographs of Pneumoconiosis or Illustrated by the ILO Standard Radiographs. Use symbols and record comments as appropriate.

1. IMAGE QUALITY

[1] [2] [3] [U/R]

(If not Grade 1, mark all boxes that apply)

- [ ] Overexposed (dark)
- [ ] Underexposed (light)
- [ ] Artifacts
- [ ] Improper position
- [ ] Poor contrast
- [ ] Poor processing
- [ ] Underinflation
- [ ] Mottle
- [ ] Other (please specify) _____

2A. ANY CLASSIFIABLE PARENCHYMAL ABNORMALITIES?

YES [ ] Complete Sections 2B and 2C NO [ ] Proceed to Section 3A

2B. SMALL OPACITIES

a. SHAPE/SIZE PRIMARY	a. SHAPE/SIZE SECONDARY	b. ZONES R	b. ZONES L	c. PROFUSION		
				0/-	0/0	0/1
p	s			1/0	1/1	1/2
q	t			2/1	2/2	2/3
r	u			3/2	3/3	3/+
		UPPER				
		MIDDLE				
		LOWER				

2C. LARGE OPACITIES

SIZE [O] [A] [B] [C] Proceed to Section 3A

3A. ANY CLASSIFIABLE PLEURAL ABNORMALITIES?

YES [ ] Complete Sections 3B, 3C NO [ ] Proceed to Section 4A

3B. PLEURAL PLAQUES *(mark site, calcification, extent, and width)*

Chest wall	Site	Calcification
In profile	O R L	O R L
Face on	O R L	O R L
Diaphragm	O R L	O R L
Other site(s)	O R L	O R L

Extent (chest wall; combined for in profile and face on)
Up to 1/4 of lateral chest wall = 1
1/4 to 1/2 of lateral chest wall = 2
> 1/2 of lateral chest wall = 3

[O] [R] [1] [2] [3] [O] [L] [1] [2] [3]

Width (in profile only)
(3mm minimum width required)
3 to 5 mm = a
5 to 10 mm = b
> 10 mm = c

[O] [R] [a] [b] [c] [O] [L] [a] [b] [c]

3C. COSTOPHRENIC ANGLE OBLITERATION [R] [L] Proceed to Section 3D NO [ ] Proceed to Section 4A

3D. DIFFUSE PLEURAL THICKENING *(mark site, calcification, extent, and width)*

Chest wall	Site	Calcification

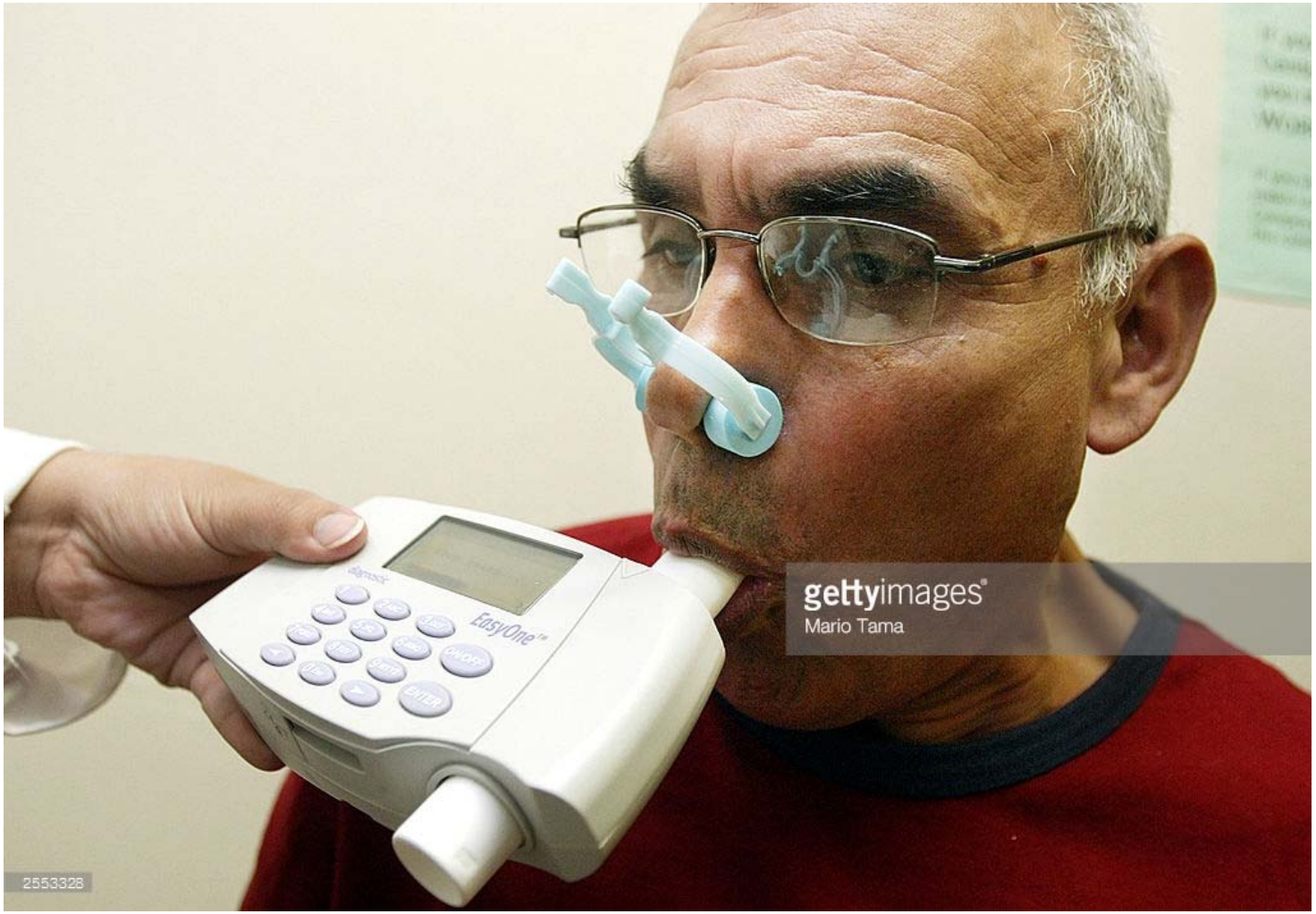
Extent (chest wall; combined for in profile and face on)
Up to 1/4 of lateral chest wall = 1
1/4 to 1/2 of lateral chest wall = 2

Width (in profile only)
(3mm minimum width required)
3 to 5 mm = a
5 to 10 mm = b

Findings from review of 257 CXRs

1. X-ray request form usually for ‘pre-employment medical’
2. 20% minor quality issues, eg positioning
3. No Complicated Pneumoconiosis or PMF
4. No Advanced Category Simple Pneumoconiosis, i.e. 2/1 or greater
5. 18 CXRs had features consistent with Category 1 simple pneumoconiosis – CT scans arranged
6. For two CXRs, the original radiology report had indicated changes consistent with early CWP, but not acted upon

Spirometry



Spirometry survey results – project 1

- Online survey completed by only 30% of doctors
- Poor knowledge of the spirometry equipment:
  - 25% did not know whether their spirometer had automated quality control
  - Almost 50% did not know the reference values used by their equipment
- Poor quality control:
  - 79% of spirometers reported to have had a calibration check, but most (66%) had not been calibrated in 2016
  - Only 1/3rd of spirometry sites participated in ongoing QA programs
- Inadequate and/or out-of-date training:
  - Only two-thirds of spirometry testers had attended a training course, about 25% completed training > 3 years ago

Spirometry review – project 2

Results of reading & quality of 260 spirograms:

- 40% of spirograms could not be interpreted as they had not been performed to ATS/ERS standards
- Only 41% of spirograms provided had been accurately interpreted and reported by NMAs
- 30 spirograms deemed abnormal by the reviewers:
  – 6 showed mild obstructive disease patterns
  – 24 showed possible restriction (21 mild, 3 moderate)
- Only 1 of the abnormal results had been accurately identified in the doctor reports

Main conclusions of the review

1. Complacency at all levels - ‘Wake up call’
2. Overall scheme system failure, not individuals
3. 18 major recommendations and road map
4. Need for fewer, better trained doctors
5. Need to better harness and upskill local medical specialists: Respiratory, Radiology, OPs
6. Need for clinical guidelines for abnormalities
7. Move to electronic data collection and storage: forms, CXR and spirometry, so doctors can access previous medical records
8. Need for better QA systems
9. Need for group surveillance system and regular reporting of trends

The Senate

Select Committee on Health

Fifth interim report

Black Lung: "It has buggered my life"

April 2016

Parliamentary Committees

Inquiry into the re-identification of Coal Workers' Pneumoconiosis in Queensland - Interim Report

Report No. 1, 55th Parliament
Coal Workers' Pneumoconiosis Select Committee
March 2017

Changes since review

- New people appointed by DNRM
- Changes to the health assessment form
- Introduction of the ILO x-ray form
- Dual reading of chest x-rays
- Formation of a collaborative group: College of Radiologists, Thoracic Society, Occ Env Physicians
- Draft of clinical guidelines for follow up of abnormalities
- Development of spirometry standards
- Development of process for surveillance

Medical Practitioners and Health Assessments for the Coal Mine Workers' Health Scheme

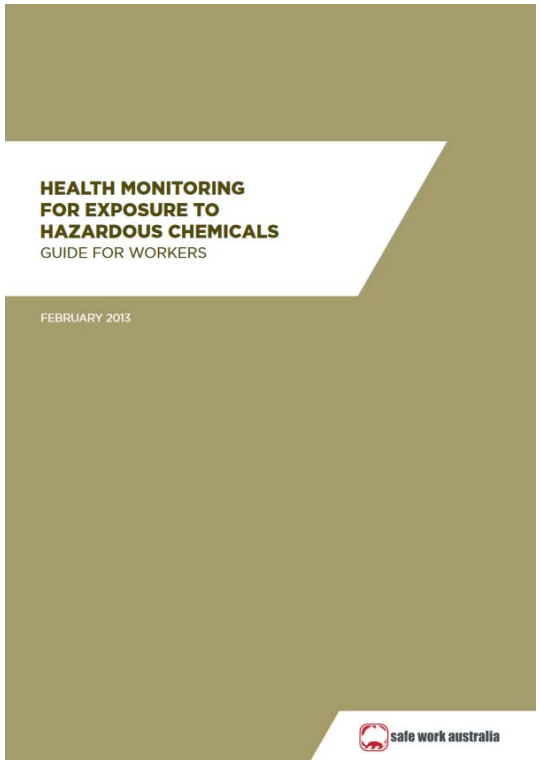
Next steps in planning reform
Consultation paper

May 2017

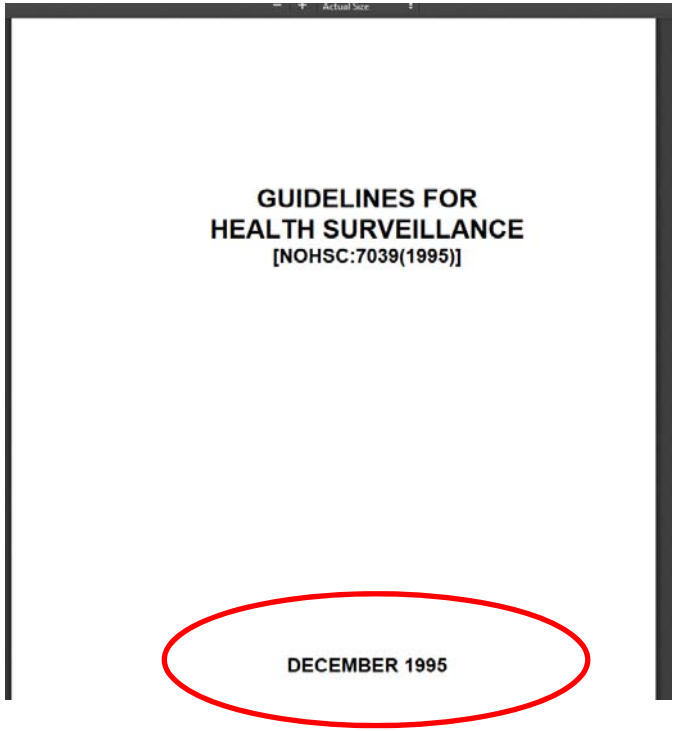
Wider Implications

- Only one example of occ diseases being poorly recognized and screened – If you don't look, you won't find!
- Much wider implications than coal miners in Qld: other hazards and other industries
- Need for better guidelines and QA processes for workplace health surveillance across occupations and industries
- Need for better and more comprehensive national surveillance data on occ diseases [1] – eg US CWP data
- Reintroduction of process in Australia for setting workplace exposure standards – currently wide variation
- For OEPs important role; challenges and opportunities

[1] SIM MR. The need for an occupational disease surveillance system in Australia. Invited paper for Journal of Occ Health Safety - Aust NZ 2007; 23: 557-62.



Focus is on Information for the worker and employer



SEQOHS
Safe Effective Quality Occupational Health Service

Royal College of Physicians

fom
Faculty of Occupational Medicine

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Welcome to SEQOHS

Welcome to the SEQOHS accreditation scheme

Setting standards in occupational health and occupational health physiotherapy

About Accreditation

Find out why your service should become accredited with SEQOHS

Welcome to SEQOHS

SEQOHS stands for Safe, Effective, Quality Occupational Health Service and is a set of standards and a voluntary accreditation scheme for occupational health services in the UK and beyond. SEQOHS accreditation is the formal recognition that an occupational health service provider has demonstrated that it has the competence to deliver against the measures in the SEQOHS standards.

The scheme is managed by the Royal College of Physicians of London on behalf of the Faculty of Occupational Medicine. SEQOHS is available in Ireland and is endorsed by the Faculty of Occupational Medicine, Royal College of Physicians of Ireland.

The website features a range of support tools and links to resources that will assist all OH services and practitioners in improving their services. The Knowledge Management System (KMS) resource has been developed to underpin the SEQOHS standards and to share good practice.

Latest News

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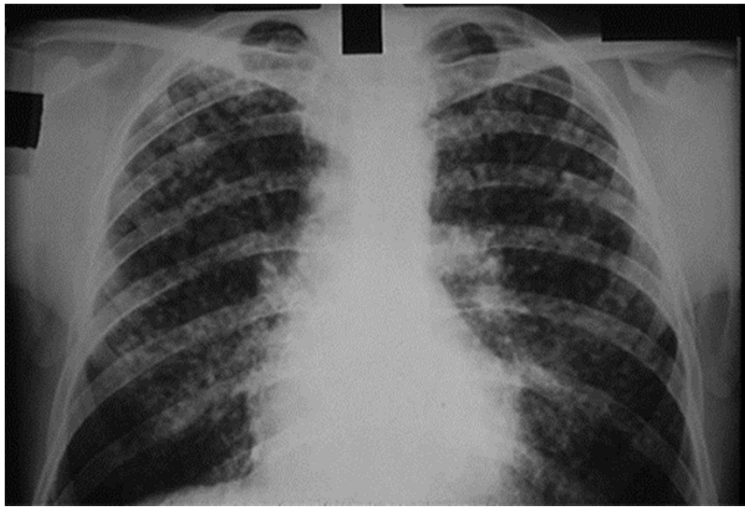
Final messages

- Well designed and implemented <u>respiratory screening</u> is no substitute for <u>effective dust control</u>

- Can provide useful additional information about the effectiveness of control and medical status, but it is a lag indicator

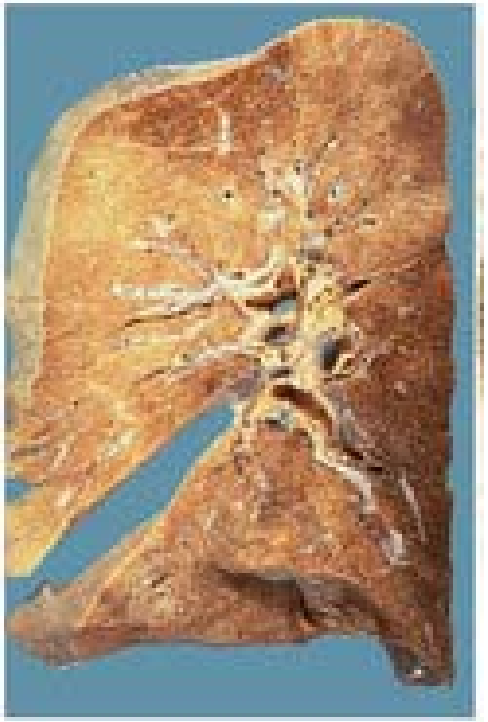
- Needs to be done properly!

Questions?



What is ‘Black lung’?

Coal Workers’ Pneumoconiosis



Other types of pneumoconiosis:
Silicosis, asbestosis