

Overview of Interim Findings

Review of Respiratory Component of the Coal Mine Workers' Health Scheme

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Background

As of February 2016, six confirmed cases of coal workers' pneumoconiosis (CWP) had been identified among coal miners in Queensland. As these cases had not been directly detected within the existing coal mine workers' health scheme, a review of the design and operation of the respiratory component of the scheme was commissioned by the Queensland Department of Natural Resources and Mines (QDNRM). A team from Monash University and the University of Illinois at Chicago has been engaged to conduct the review.

The aims of the review are to:

- 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 disease among Queensland coal mine workers, estimating the extent and providing feedback and, if not,
- 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.

The review team identified the following areas for review:

- 1. Health Assessment Form
- 2. Nominated Medical Adviser
- 3. Chest X-ray (CXR) quality and reading
- 4. Spirometry quality and reading
- 5. Queensland medical capacity in respect of the scheme
- 6. Medical form data collection, storage and security at QDNRM

To date, QDNRM has provided the following to the review team for the review:

- 1. Health assessment scheme data for the confirmed CWP cases
- 2. A spreadsheet of data from 91 completed health assessments drawn from the QDNRM database
- 3. A list of current nominated medical advisers (NMAs)
- 4. 398 Chest X-rays, radiologists' reports and related NMA reports
- 5. 252 Spirograms and related NMA reports

Main findings

Purpose

The current focus of the health assessment scheme among stakeholders is to assess general fitness for work, e.g. pre-employment and periodic health assessments. Respiratory health is among the many aspects of health assessed, but there is not a focus on medical screening for cases of early CMDLD or overall health surveillance for the industry. The review team considers that the respiratory component of the health scheme should provide systematic respiratory health monitoring in coal miners to:

- 1. Detect early changes indicative of coal mine dust lung disease (CMDLD) over time, with appropriate referral for follow-up, diagnosis, clinical management and reduction in ongoing coal dust exposure.

2. Assess respiratory fitness for work, including the assessment of the suitability of miners to wear personal protective equipment (PPE), in particular respiratory protective equipment (RPE).
3. Collect and analyse data over time to provide ongoing surveillance of CMDLD and to help inform whether dust exposure should be reduced across the industry.
4. Inform the individual coal miners about the risk of CMDLD

The review team would like to emphasise medical surveillance of CMDLD is only useful for secondary prevention and identifying where there may have been excessive exposure. However, because of the long latency in the development of CMDLD, it is not a substitute for primary prevention, which should be in the form of coal mine dust monitoring and control.

Confirmed CWP cases

The main purpose of the review of the confirmed CWP cases was to identify deficiencies in the health assessment scheme which could have led to delayed detection in these cases. This was done by accessing and reviewing the respiratory component of the available health assessment form(s) performed under the scheme for these miners. For the six confirmed CWP cases the review team identified several notable deficiencies.

- There was poor documentation regarding follow-up or referral where abnormal spirometry or CXR results had been found during the health assessments.
- Where abnormalities were detected, suitable recommendations to mitigate further workplace exposure for the individual were not made.
- In some cases, the medical evaluations for the health scheme were performed less frequently than required and with fewer than the required/necessary tests.
- The International Labour Organisation (ILO) classification for pneumoconiosis was not used on the CXR reports for these cases. In a case where interstitial x-ray changes were noted in the report, this was not adequately followed up.
- The NMAs were not able to access previous health information collected under the scheme for these miners, resulting in one case where a clinically significant decline in lung function in the serial spirometry was not detected.
- There was misattribution of the cause of obstructive abnormalities on spirometry to tobacco smoking alone.

Content of current health assessment form

The current form is lengthy (seven pages) and the respiratory components are dispersed throughout the form, which reduces the focus on the respiratory system. There are several ambiguously-phrased and duplicate questions. There is no specific reference to the absence/presence of CMDLD symptoms and/or signs, and no opportunity to identify changes in symptoms, signs, lung function or x-ray findings over time.

The current form lacks:

- Sufficient questions about respiratory medical history
- A comprehensive respiratory questionnaire
- A dedicated section for type of respiratory protective equipment and frequency of use
- Adequate smoking history questions

Quality and completion of current health assessment forms

The employer's section of the form, especially the Similar Exposure Groups (SEGs), was poorly completed. Only four of 21 forms had the generic SEGs completed and none had the Company SEGs completed. The mine name was not completed in about one-third of forms.

There were inconsistent entries for duplicate/overlapping questions and responses did not correspond in about one-third of forms.

The criteria for "at risk of dust exposure" are unclear, so that the NMAs have little guidance on who should have a CXR. The form may be completed for an individual seeking employment, such as through a contractor, which means that "at risk of dust exposure" is unknown.

Criteria for being "at risk of dust exposure"

Only those miners who are determined "at risk of dust exposure" are required to receive a CXR. SEGs are one way in which those "at risk of dust exposure" can be identified, but in addition to the problem highlighted above of missing SEG information in the completed health assessment forms, it is not clear which SEGs would be regarded as resulting in the worker being at risk of dust exposure" and hence requiring a CXR. A simpler system and better guidance is needed for when a coal mine worker is considered "at risk of dust exposure".

NMA appointments

The large number of NMAs (237) means that it is difficult to maintain a register of them, coordinate meetings and provide NMA training. A review of the current list of NMAs found that they have diverse qualifications (62% GPs, 12% Occ. Physicians, 26% other) and practise in a variety of medical settings, most of which are a considerable distance from the coal mines.

The appointment of the NMAs depends on the employer and QDNRM has no involvement in the process. Currently no minimum qualifications and/or experience are required (apart from being a registered medical practitioner) and no formal training is undertaken by new or ongoing NMAs and there is no auditing process in place.

The role and required qualifications of the Examining Medical Officer (EMO) is undefined in the scheme under the Regulations and there is no appointment process and no qualification/training requirements.

The 18-page NMA information kit mainly outlines administrative procedures for conducting health assessments, rather than medical guidelines. There are no means of ascertaining NMAs' (or EMOs') understanding of the NMA information kit, its appropriate application, or whether they have a good knowledge of a coal mine worker's work environment for the purpose of adequately performing the respiratory component of the health assessment scheme.

Data collection, storage and security at QDNRM

Currently, the QDNRM receives hard copies of the health assessment forms by mail. Not only is sending and receiving health assessments by ordinary mail outdated, costly and has potential for health assessments being lost, but manually entering the data at QDNRM is time

consuming and there is potential for data entry errors. The health records can be incomplete and NMAs do not always submit original CXR films or spiromograms.

The health records are currently stored at three different locations and after checking are meant to be scanned and key variables entered into an Access database and the data kept on an SQL server. Current status is that:

- Before the mid-1990s all forms were data entered onto a database
- Since then forms have been scanned and some data manually entered into the database at SIMTARS
- The hard copy forms and analogue x-rays are stored in cardboard boxes

Resources to enter data into the database did not increase when the number of health assessments increased during the mining boom. Currently, there is a large backlog of about 100,000 health assessment forms awaiting entry into the QDNRM database. A proportion of the forms have been scanned and logged into the database but the complete data have not been entered onto the database. Manual checking of documents for completeness and accuracy is slow, cumbersome and also prone to human error. Sequential health records for individual coal miners are not usually stored together, but can be manually identified from scanned data. Security procedures appear adequate.

The purpose of the database for key variables is unclear and it is not currently being used for surveillance purposes. For the respiratory data to be used for ongoing surveillance, the necessary data fields should be identified and the database interrogated regularly for overall reporting purposes.

Chest X-Ray film and spirogram reviews

Analogue films (n=268) have been provided by QDNRM and a protocol has been developed for their review which will assess the quality of the CXR and its interpretation according to ILO criteria. The de-identification of digital images has proved problematic because of the variety of software used. However the review team at the University of Illinois at Chicago are developing a solution in coordination with the QDNRM. Five CXR reviewers have been identified in the USA and one of two required CXR reviewers in Australia has been identified.

To date QDNRM has provided 252 spiromograms to the review team. A protocol has been developed to assess spirogram quality and review the reporting of lung function tests and 2 reviewers have been identified. In addition, a short survey of the spirometry equipment, training and quality control procedures has been developed and is to be completed by NMAs.

Local Queensland medical capacity

Contact has been made with relevant specialist Medical Organisations. The Royal Australian and New Zealand College of Radiologists (RANZCR) and the Thoracic Society of Australia and New Zealand (TSANZ) have identified members in Queensland who are interested in providing expertise in the field of CMDLD. Information on CMDLD among coal miners has been distributed to Queensland General Practitioners.

Draft Interim Recommendations

Purpose of the Coal Mine Workers' Health Scheme

- The scheme should be more focused on the early detection of CMDLD and ongoing surveillance across the industry and these purposes should be clarified to employers, coal mine workers, NMAs and other stakeholders.
- An information pack for workers on the risks of exposure to coal mine dust causing CMDLD should be developed.

Content of health assessment form

- The respiratory components of the health assessment form should be consolidated to facilitate the identification of respiratory abnormalities.
- The respiratory symptom questionnaire and past medical history need to cover all relevant symptoms and respiratory conditions.
- A section on type and frequency of use of RPE required for the current job should be included.
- In Section 4 a specific reference to the absence or presence of symptoms/signs consistent with CMDLD, the follow-up required and frequency of subsequent health assessments should be included.
- In the occupational history, tick box options for job categories or industries where coal dust and/or mixed dust exposure is likely to occur should be included.
- The questions about smoking history should be revised and expanded to better identify current/former/never smokers and cumulative smoking exposure (pack-years).
- Ambiguous questions should be reworded and duplicate questions removed.
- The form should identify whether the worker is a sub-contractor.
- The form should include a determination of work capacity for individuals with CMDLD, including use of RPE.
- The revised form should be reviewed after two years to ensure that it continues to be fit for purpose and to identify possible improvements.

Process of the Scheme

- NMAs should complete the respiratory health assessments themselves, apart from spirometry, which should be undertaken by an appropriately trained technician, and the CXR, which should be undertaken by a trained radiologist using the ILO classification to report the films.
- The respiratory component of the health examination scheme should be done by a trained NMA and EMOs should not carry out these assessments.
- The occupational history should be checked by the NMA with the miner so that changes in mine site or jobs are updated and a CXR performed in situations where previous jobs were "at risk of dust exposure".
- Spirometry printouts should be submitted with all completed health assessment forms.
- A clinical pathway for follow-up and referral of suspected CMDLD cases should be added to the scheme.
- Surveillance of coal mine workers should be continued for those who have been, but are no longer, "at risk of dust exposure" either because of changing jobs or because of retirement.

Criteria for being “at risk of dust exposure”

- The criteria for “at risk of dust exposure” for underground and open cut miners should be made more explicit within the scheme for the purpose of deciding which mine workers require a CXR.
- Section 1 of the form should be redesigned to provide a clearer determination of “at risk of dust exposure”, with a simpler classification than the current generic and company SEGs classification.

NMA appointment and training

- Appointment of NMAs to assess the respiratory health of those miners at risk of dust exposure should become a QDNRM function, but consideration will need to be given to the minimum numbers and geographical spread to ensure that miners, including those who are fly-in-fly-out, have easy access to an NMA.
- Minimum requirements to be met in terms of medical training and experience relevant to undertaking the respiratory component of the coal mine health assessment when medical practitioners apply to become an NMA should be developed.
- A formal induction training and ongoing audit program for these NMAs should be developed and this should be completed by NMAs prior to undertaking respiratory assessments in the coal mine workers’ health assessment scheme.
- This training program should include:
 1. Information about the primary purpose of the respiratory component of the health assessment scheme, in particular health protection, prevention and early detection of CMDLD
 2. Information about the spectrum of diseases included in CMDLD
 3. How to conduct and interpret quality spirometry
 4. An introduction to the ILO CXR classification of pneumoconiosis
 5. Information about coal dust and silica exposure associated with the coal mining industry in Queensland
 6. A visit to a mine(s), with a focus on inspecting those jobs “at risk of dust exposure”
 7. Training in how to complete each section of the respiratory component of the health assessment form and identify abnormalities
 8. Training in the use of clinical guidelines for follow up and appropriate referral in cases where respiratory abnormalities are found
- An experienced Medical Officer should be responsible for the ongoing training and audit of those NMAs undertaking respiratory assessments.
- This training should utilise effective methods of modern communication, such as webinars, for training/auditing where geographical constraints make travel difficult.

Data collection, storage and security at QDNRM

- There is a need to design and implement an electronic system of data entry.
- Electronic data collection and data storage, with suitable security arrangements and the facility to link and access all records for the one mine worker, should be instituted.
- Existing health assessments that required a chest X-ray should be prioritised, scanned and linked to electronic entries for future health assessments.
- Imaging and spirometry for the coal miners’ health scheme should be digital, facilitating the transfer, storage and access of the images electronically.

- There should be regular medical review of the respiratory health assessments to audit quality, examine trends and take action as appropriate.

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