What are Your Chances of Growing Old? Could a National Health Database Give You an Answer!

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Introduction

What are your chances of growing old and remaining healthy if you work in the mining industry in Australia? At the present time, we don't know. This is despite the fact that health data has been collected for many years in Australia – in New South Wales the data for coal miners goes back to 1946; in Queensland since 1983; and in Western Australia since 1961. These databases operate independently and currently there is no process by which the information from these databases can be combined or used at a national level to inform the decision makers, researchers or the community as to the state of health in the mining industry.

We do know that American coal miners appear to have an elevated risk of death from heart attacks (Wlazelek 1999). We know this because the United States maintains a National Occupational Mortality Database and the data can be analysed for trends to identify health needs and problems.

An Australian national health database for the mining industry would benefit health and safety research by enabling the identification of:

- Current health issues;
- Emerging health issues;
- Long term health issues;
- Life expectancy;
- Causes of death;
- Health promotion needs.

A national database would produce a data set relating to the health of the mining population in Australia at a national level rather than a state level and we would not be dependent on other countries to identify potential health problems.

SIMTARS are completing two projects for the New South Wales Joint Coal Board (JCB) Health and Safety Trust investigating:

- The feasibility of establishing a National Mining Health Database. This project is examining the benefits of and barriers to such a program.

- The risk factors for heart disease among coal miners. This project is examining the work and lifestyle factors affecting the risk of heart disease for coal miners. It will use the information gathered in the current databases.

Current State Legislative Basis of Health Databases

In most states in Australia, there is legislation requiring health surveillance to be undertaken for miners exposed to occupational hazards. Table 1 summarises these requirements.

Only the states with centralised systems maintain databases. Where the responsibility for health surveillance lies with the employer, access to collective information is very difficult.

South Australia is in the process of establishing a centralised health surveillance system. This system is being established by the Mining and Quarrying Occupational Health and Safety Committee under Worker's Compensation legislation. The final arrangements are currently the subject of contract negotiations.

Table 1
Summary of State Health Surveillance Requirements

STATE	COAL	METALLIFEROUS, NON-COAL
Queensland	Centralised system required by regulation	Employer responsibility
New South Wales	Centralised system required by regulation	Employer responsibility
Western Australia	Centralised system by Regulation	
Northern Territory	Not applicable	Employer responsibility
Tasmania	Employer responsibility	
Victoria	Employer responsibility	

Health Surveillance in Mining in Australia

The initial objective of health surveillance was to acquire a comprehensive data system that reliably measured the long term health status of the workforce. The change towards duty of care style legislation has introduced the need for employers to ensure their workforce is fit to undertake duties and are not being harmed by exposure to occupational hazards.

Although the health programs in different states appear to have significantly different legislative and historical environments, there is a common thread to their development. In most cases, the health schemes have developed out of the mining-related respiratory disease prevalent up to the 1950s. Since then, advances in dust monitoring and ventilation technology, and changes to legislation have reduced dust exposure. As the prevalence of serious respiratory disease dropped, other occupational health issues became apparent. Issues such as hearing loss and musculo-skeletal injuries were identified.

Many of the disorders suffered by miners also occur in the general population. A key element in health surveillance should be to collect statistical evidence of the prevalence of various disorders to assess whether miners are being harmed by the work environment. Where differences to the general population are detected, contributing factors, exposures and confounding factors need to be identified and assessed.

Recent developments in information technology and the change in the nature of mining have created an opportunity for the development of centralised health surveillance systems. In the states with the larger mining industries, such centralised systems have developed with a degree of cooperation between employers, Unions and the Government.

Key Elements in Current Health Programs

(a) New South Wales

Health surveillance in the coal industry in New South Wales, is undertaken by the Joint Coal Board which is a tripartite quasi-autonomous government authority. Established with broad powers of authority, the JCB operates the coal industry worker's compensation program, health surveillance and general occupational health services. The current health surveillance requirements were established as a guideline called 'Alnewcoal 105' (Joint Coal Board 1989).

The Coal Mining Regulations require persons who undertake statutory functions to be certified that they are medically fit to undertake their duties.

Data captured includes respiratory function, eyesight and hearing testing. The program was expanded in 1989 to include occupational history, blood pressure, urinalysis, musculo-skeletal assessment and basic fitness for work in the industry.

(b) Western Australia

The health surveillance program in Western Australia was shaped by the respiratory problems from asbestos and gold mining.

Testing still focuses on a respiratory questionnaire, spirometry and a chest X-ray and now includes eyesight and hearing testing. A feature of the Western Australian program is that health monitoring is linked to monitoring of exposures to atmospheric contaminants. Maintaining this link is challenging but lies at the core of duty of care principles.

(c) Queensland

Centralised health surveillance was first established by the Queensland Coal Board in 1983 as a pre-employment program. This program focussed on respiratory disorders and included eyesight and hearing testing. The program was expanded in 1993 to include medical and occupational history, blood pressure, urinalysis, musculo-skeletal assessment and fitness for duty. This scheme introduced Nominated Medical Advisers who were appointed by the mines and approved by the Regulators. This Queensland Coal Industry Employees' Health Scheme 1993 established a link between the mine operators and medical practitioners who were obliged to take an interest in the wider aspects of mine workers health management.

The health scheme provided for all workers to have pre-employment and periodic health assessments. These are required at a maximum period of 5 years.

Current use of Data

Given the timeframe over which health data has been collected in Australia, and given the type of data collected, we should have been able to use the data to identify national industry health trends. Due to the parochial nature of the current state systems, we have not been able to do this.

Some example of the limited use made of the current data sets are:

- The Joint Coal Board publishes selected data extracted from the heath database including the age distribution of the workforce. This allows an analysis of injuries and disorders as a percentage by age group.

- A survey of respiratory disorders in Queensland was reported by Rathus and Abraham, (1984). 75 cases of pneumoconiosis were identified from a workforce approximately 3000 strong. Most of those affected were underground workers with many years experience in hand mining.

- Ham (1999) examined the respiratory, hearing and blood pressure data from the Queensland data. The workforce was stratified by age group and smoking status where relevant. In this project, links were established between the health database and the lost time accident database.

- De Klerk and Musk (1998) analysed dust and respiratory data collected from 1961 to 1997 in Western Australia. The results indicated that tobacco smoking contributed significantly to the severity of dust related respiratory disease.

This project has evaluated the strengths and limitations of the centralised health surveillance programs in New South Wales, Western Australia and Queensland. A system that incorporates the strengths of all three systems would represent a significant step forward in mining health and safety.

Strengths of the Current Systems

The strengths of the current systems may be grouped as follows;

(a) Fitness for duties

(b) Transportability of health assessments
(c) Annual employment census
(d) Exposure data linked to health data

The Queensland system has established a close rapport between the mines and their Nominated Medical Advisers. The health assessment includes an assessment of a coal miner's fitness to undertake specific duties. The legislation provides a degree of flexibility for the medical advisers to report work restrictions that result from medical conditions.

The New South Wales system includes a mechanism for tracking the employment of miners through an annual census of all the mines. Reciprocal arrangements exist between health assessments in Queensland and New South Wales.

The Western Australian system has established a link between the exposure and the health surveillance data. Under regulation, data on exposures to atmospheric contaminants is recorded on a standard form with occupation and location data as well as the employee identification number.

Limitations of the Current Systems

Limitations of the current systems may be grouped as follows;

(a) Objectives
(b) Data collected
(c) Data management
(d) Analysis
(e) Reporting

(a) Objectives

Most of the current health databases were developed before the enactment of duty of care legislation. Government authorities need to take a lead in health surveillance particularly where the effects of the occupational exposure are manifest over a long period. Most databases were designed around some specific known disorders, however, under duty of care, the concept of harm is very broad and the databases need to reflect this change.

(b) Data collected

The majority of data collected in health databases is personal medical data. The approach taken in Western Australia shows that the health data can be collected in conjunction with related exposure data to determine potential cause and effect.

(c) Data management

Data management focuses on the handling of data within the database. Common problems that occur include:

- Identification of individuals – persons are entered twice or records come with different names or dates of birth;
- Failure to record contractor information;
- Errors in data entry;
- Missing values in medical or other data;
- Inconsistencies in classification of occupations;
- Failure to effectively record occupation exposure history.

(d) Analysis

Analysis of the data needs to address the various elements, research methods and threats to validity. Without being immersed in a flurry of academic argument, it is sufficient to say that the results should be interpreted with a degree of caution. Possible confounding factors should be considered carefully - generalising may not be valid.

(e) Reporting

The current reporting on the numbers of assessments undertaken is a useful measure of the progress of health assessments but more in-depth analysis is required to demonstrate the potential benefits of research using mining health databases.

The second factor affecting reports from the health databases is the lack of available funding for analysis. In comparison with the media grabbing traumatic injuries and fatalities, long term health issues struggle to gain support to undertake the required work. It should be noted that in a National Occupational Safety and Health Commission study, Foley (1998) concluded that for every traumatic work-related death, there were five deaths caused by work related illnesses.

What is the feasibility of a National Mining Health Database?

Feasibility issues being examined in the National Database project include:

- the similarities and differences in the health data collected in various states;
- type of statistical data that can be extracted;
- opportunities to make comparisons of health profiles between miners and the general community;
- confidentiality and other ethical issues.

The health programs in different states have different legislative frameworks. This provides a significant impediment to developing a common data capture and reporting system.

On a more optimistic note, the type of data stored and the database software tools used have the potential to allow data sets from the various databases to be compiled. This would allow in-depth investigation of the main health parameters captured.

Perhaps the most important hurdles to overcome will be the issues associated with funding, confidentiality and ownership of the national data. Many employers are content to fund the medical component if value can be demonstrated. Whether Government in conjunction with industry has the will and resources to fund the database is a question to be answered. To a large extent, confidentiality is a legislative issue.

Ownership is probably the most contentious issue. The current legislation establishes state ownership of the miners' health data. For this to change to a national ownership, state interests would need to be shown to be better served by national or at least joint ownership to the aggregated data.

Current Models of National Databases

A National Health Information Agreement was signed in 1993 to provide for collective state health system information to be collated by the Australian Bureau of Statistics and the Australian Institute of Heath and Welfare (AIHW, 2000). This has been expanded over the years to include a National Health Information Development Plan and the 'National Health Information Knowledge Base'. A part of the success of these programs has been the inclusion of the International Classification of Diseases and related Health Problems – tenth revision (ICD – 10).

Benefits of National System

The benefits of a national miners health database include the following:

- benchmarking;
- establishing trends – age, exposure;
- assessing the risk of contracting diseases with long development times;
- developing controls (dose limits) to manage risks of long term disorders;
- tracking a mobile workforce and contractors;
- identifying health promotion needs.

For some years, the industry has seen benefits in benchmarking financial and injury parameters. Analysis of health issues shares elements of both of these data sets. Benchmarking health parameters helps identify the needs for health management and then identifies outcome targets.

Some disorders such as occupational bronchitis and emphysema take many years of monitoring to establish statistically significant variations from the general population or control groups (Coggan and Taylor, 1998). The effectiveness of many health promotion strategies may, in time, be assessed by the results of long term studies.

The structural change in the mining industry in the 1990's saw a marked increase in the use of contractors in the mining industry. The mobile nature of the contracting workforce is associated with an increased difficulty in tracking changes in the health status of this group of miners.

Employers taking an active role in promoting the health of their workforce has been discussed by Parker et al (1996) and Matthews et al (1998). They both explored a health promotion model where activities were focussed on needs identified by the workforce. A national mining health database would provide valuable benchmarking information to assist miners and their employers in determining the health priorities.

The concept of a national mining health database is shown in Figure 1.

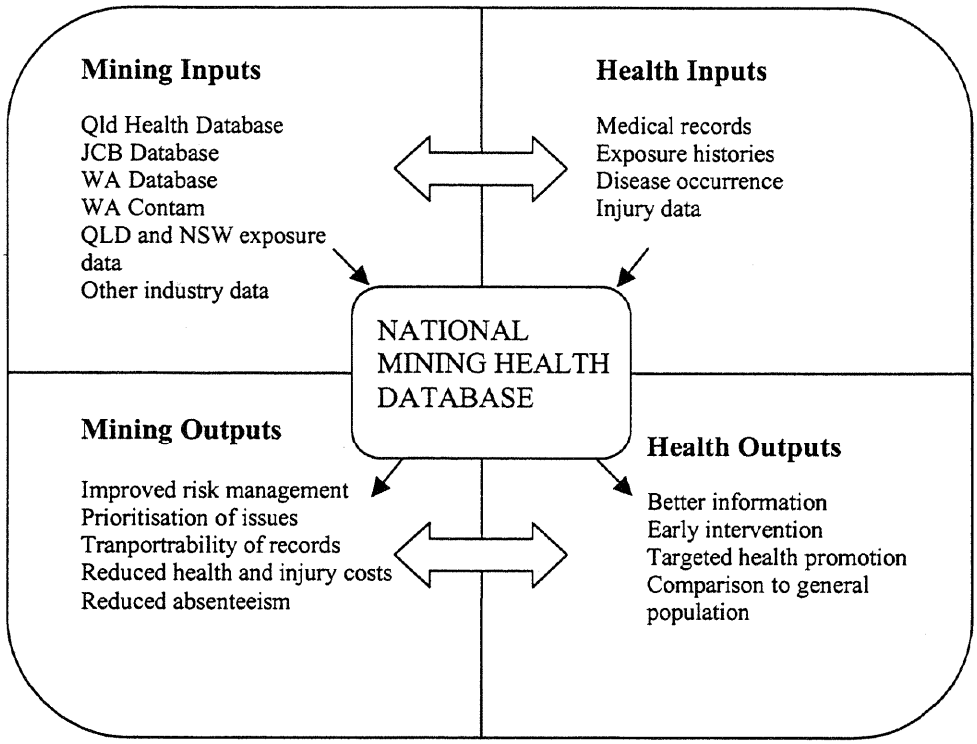

Figure 1
Model of National Database

What are your chances of growing old?

The establishment of a mining health database opens the possibility of comparing general and mining population health and disease databases to determine if miners have health profiles different from the general population. The health risks associated with coal mining could be more easily determined.

Some of the information currently available through analysis of existing data indicates that miners may have a different health profile from the general population. Data from the JCB Health and Safety Trust Cancer Study suggests that coal miners have a lower risk of cancer that the general population. Information from the death register shows coal miners have a higher risk of death from traumatic injuries – particularly road accidents.

The current Heart Disease Risk Factor Study being undertaken by SIMTARS is examining the impact of a career in coal mining on the risk of heart disease. The United States National Occupational Mortality Database has shown that US coal miners have an elevated the risk of heart attacks. Contributing factors are thought to be a combination of lifestyle choices, genetics, environmental factors and stress. We don't know if the situation is the same in Australia. The project is connecting the current coal miners health databases to other databases such as the Cardiovascular Disease Database and the National Death Index. This would be simpler, quicker and more comprehensive if we already had in place a national health database. We would be able to identify trends in health and mortality within the Australian industry and target programs accordingly.

Another important question is whether the workers in some jobs or at some sites more at risk that others. This is very difficult to investigate without a comprehensive employment/exposure database.

Conclusion

The initial objective of health surveillance is to acquire a comprehensive data system that reliably measures the long term health status of the workforce. Using comparisons with community data and an analysis of hazardous exposures, the risks to individuals from working in the mining industry can be assessed. Once the risks are established, employers, individuals and their communities have the opportunity to take the necessary steps to more effectively manage the risks.

The National Health Database project has showed the strengths and limitations of the health surveillance systems in the various states of Australia. This information and subsequent sharing of expertise should draw the current programs closer. A National program that incorporates the best elements of the three State programs would provide an exposure based health surveillance system.

The increasing mobility of the mining workforce increases the need to monitor long-term miner health issues from a national perspective. It is especially important to include exposure monitoring in mining health surveillance requirements.

Advances in technology have created the opportunity to compile health data. Sophisticated data handling techniques facilitate complex manipulation to produce statistics that inform health management programs.

The risk assessment process is firmly entrenched in mining health and safety management legislation in all states. Information and knowledge generated from a National database would assist in the risk management process.

The benefits of developing a comprehensive set of health and hazard exposure data are evident. We need the political will, industry support and resources to achieve this.

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