Respiratory health surveillance for mineral mine and quarry workers

Worker information booklet

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Resources Safety & Health Queensland

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About this booklet

This booklet provides information to Queensland mineral mine and quarry workers about respiratory health surveillance.

Respiratory health surveillance is the regular monitoring or testing of a person's respiratory system to check for damage to the lungs, including changes in lung function, because of exposure to respiratory hazards at work.

Undertaking respiratory health surveillance does not remove the requirement to implement and constantly review control measures to reduce exposure to respiratory hazards.

This booklet should be read alongside the following Resources Safety and Health Queensland (RSHQ) worker booklets:

- ***Airborne dust exposure in mines and quarries*** – information about controls to protect from dust exposure.
- ***Health assessment information for coal mine workers*** – explanation of the health assessment process under the Coal Mine Workers' Health Scheme.

The key to managing mine dust lung disease is early detection, which is why regular health surveillance is important to preserve respiratory health.

Protecting Queensland's mineral mine and quarry workers

Mine and quarry workers can be exposed to a range of respiratory hazards, such as mineral dust from development, production and processing as well as welding fumes and diesel engine exhaust emissions.

Occupational exposure to harmful levels of respiratory hazards can lead to a range of lung diseases; these include forms of pneumoconiosis (e.g. silicosis), chronic obstructive pulmonary disease and lung cancer.

Mine dust lung disease may take ten years or more to develop. However, in some instances, signs of disease may appear earlier.

The risk of developing lung disease might be higher if you are sensitive to the effects of dust or are a smoker.

Lung damage is irreversible, however if the damage is detected early, the progress to more severe stages of disease may be prevented or slowed.


RESCUE

What is mine dust lung disease?

Mine dust lung diseases include:

- pneumoconiosis (pronounced 'NEW-mo-co-nee-O-sis'), including:
  - coal worker's pneumoconiosis (CWP)
  - silicosis
  - mixed dust pneumoconiosis
- chronic obstructive pulmonary disease (COPD), which includes:
  - chronic bronchitis
  - emphysema
- diffuse dust-related fibrosis (DDF)
- asbestosis and asbestos pleural disease, and
- lung cancer.

A worker with mine dust lung disease may often have more than one of these diseases. For example, a worker could have pneumoconiosis and emphysema.

Asbestos and asbestiform fibres, and crystalline silica are carcinogenic and may increase the risk of lung cancer.

Pneumoconiosis

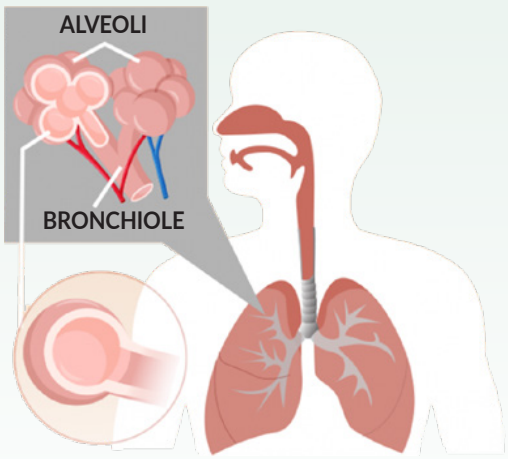
Pneumoconiosis is the result of the body repeatedly trying to heal irritations caused by breathing in respirable coal, crystalline silica or mixed dusts.

Respirable dust is so small that, when breathed in, the particles can travel past the body's initial defence mechanisms (such as sneezing and coughing). The smallest particles are able to reach the deepest parts of the lungs (the alveoli), where they are deposited and may remain.

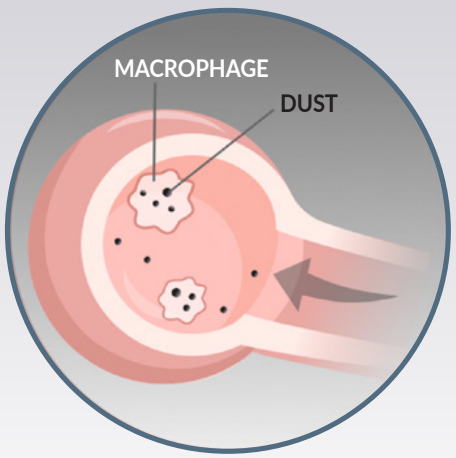
If a worker is exposed to harmful levels of respirable dust over several years, the accumulated damage results in scarring of the lung tissue which reduces the ability of the lungs to get oxygen from the air into the bloodstream. The scarring may show up as small, nodular or irregular shapes on a chest X-ray.

Figure 1 *(page 6)* shows how pneumoconiosis, such as **CWP** and **silicosis**, develop.

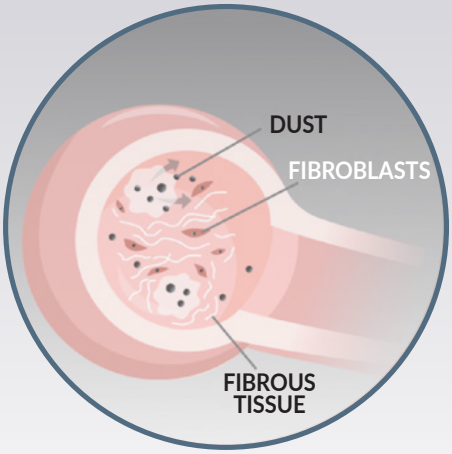
Figure 1: Continued overexposure to respirable dust can result in development of pneumoconiosis, such as CWP and silicosis.



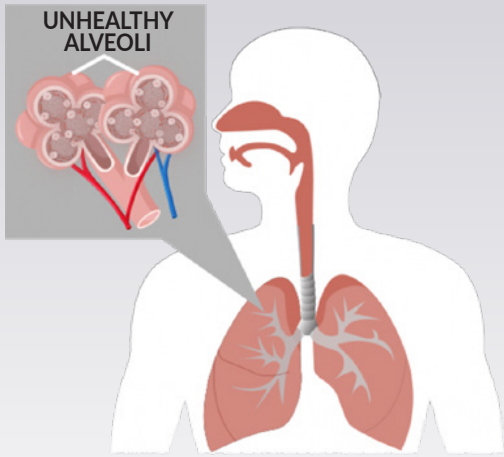
Alveoli are tiny air sacs responsible for exchanging oxygen and carbon dioxide with the blood. A typical pair of lungs contain approximately 700 million alveoli.



When dust particles reach the alveoli, macrophages (a type of white blood cell) engulf the dust particles to clear them away.



If there is too much dust, fibroblast cells come to the aid of the macrophages. Fibroblasts knit together and form scar tissue around the particles.



With continued dust exposure, the alveoli are overcome with scar tissue and cannot function normally. The scarring becomes extensive and it gets hard to breathe deeply. Oxygen entering the bloodstream is reduced.

Coal workers' pneumoconiosis (CWP) is caused by long-term occupational exposure to harmful levels of respirable coal dust.

CWP can progress from simple pneumoconiosis (small scars) to complicated pneumoconiosis, also called progressive massive fibrosis (PMF), with scars greater than 10mm in diameter.

In early stages, symptoms may not prevent a person from working or carrying out most normal activities, but can cause significant symptoms like shortness of breath.

Silicosis is similar to CWP and is caused by prolonged exposure to respirable crystalline silica.

Silicosis may also present in simple or complicated forms and can progress to PMF.

There are three forms of silicosis based on the duration and severity of exposure:

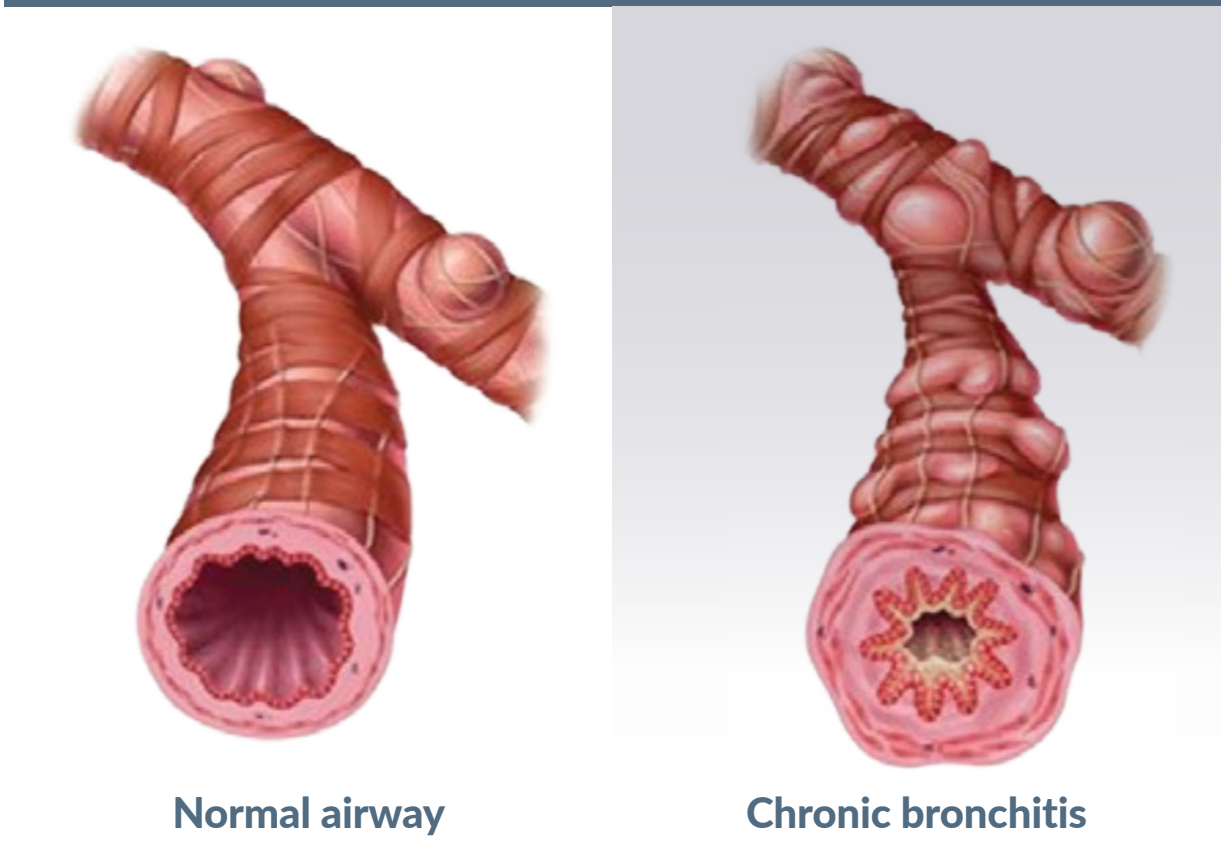
- *Chronic silicosis* – the most common form in mine and quarry workers where fibrosis occurs more slowly over ten to thirty years.
- *Accelerated silicosis* – where there is a rapid increase of scarring in the lung within less than ten years of first exposure.
- *Acute silicosis* – the lungs fill with fluid which causes severe breathlessness. This form of silicosis is rare but can develop from very short duration and heavy exposure.

Chronic obstructive pulmonary disease (COPD)

COPD is a condition that causes shortness of breath by blocking the flow of air out of the breathing tubes of the lungs. The two most common forms of COPD are **chronic bronchitis** and **emphysema**.

Chronic bronchitis is an inflammation of the lining of the bronchial passages that causes the mucus glands in these airways to produce a lot of extra mucus (**Figure 2**). This causes the person to cough and produce phlegm. Dust is a common cause of chronic bronchitis in mine and quarry workers. Another common cause is smoking.

Figure 2: A normal airway (left) and an airway affected by chronic bronchitis (right).



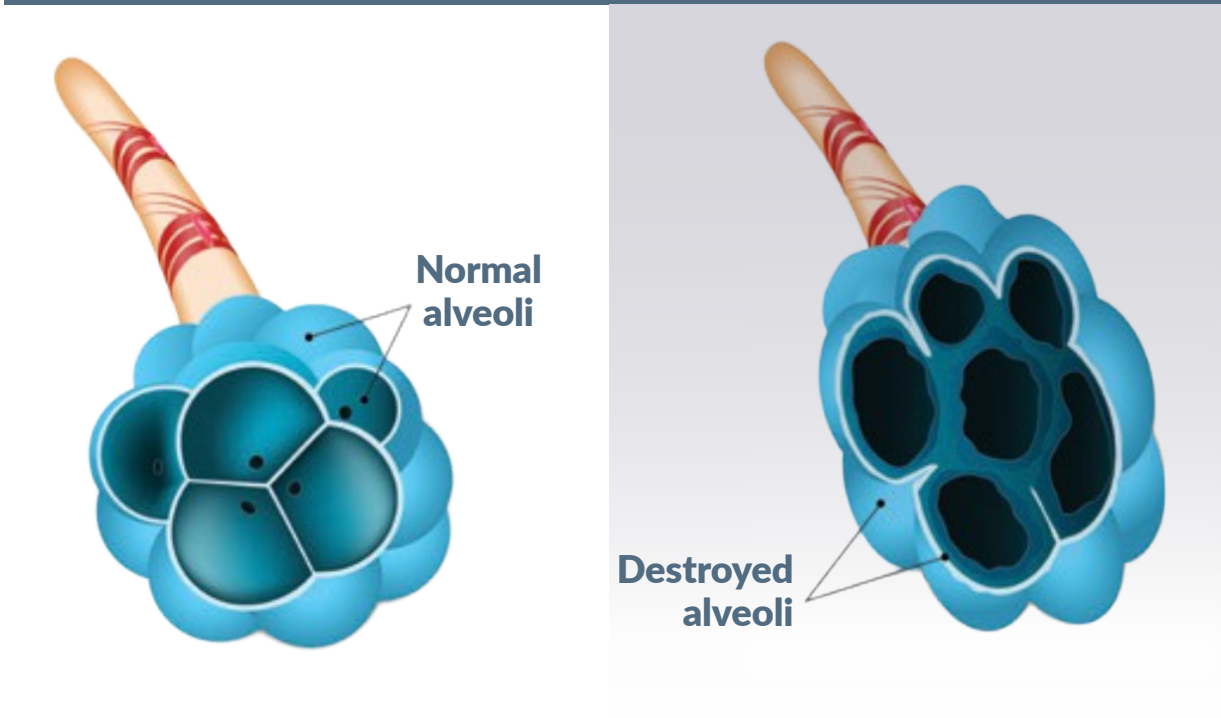
Normal airway | Chronic bronchitis

Emphysema (**Figure 3**) is the destruction of the walls of air sacs in the lung, known as alveoli, resulting in enlarged spaces or holes in the lungs like Swiss cheese. This causes shortness of breath in two ways:

- there are fewer air sacs to do the work of getting oxygen into the body
- the damaged lung cannot support the airways normally and they collapse easily.

Dust is a common cause of emphysema in mine and quarry workers. Smoking is another common cause. Inhalation of silica, asbestos, and mixed dusts may also cause emphysema.

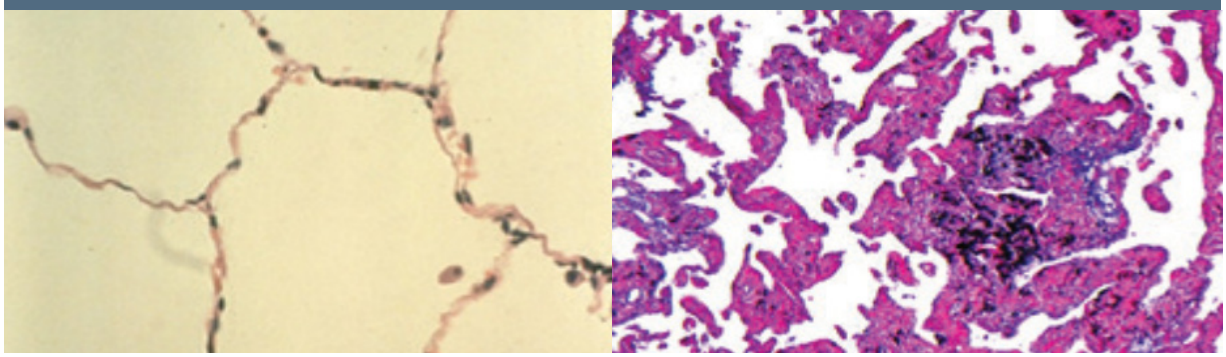
Figure 3: Normal air sacs of the lung, known as alveoli look like clusters of grapes. In emphysema, these alveoli are damaged and form abnormally large holes. Breathing is impaired as a result of the emphysema.



Diffuse dust-related fibrosis (DDF)

This form of mine dust lung disease is another type of scarring disease (**Figure 4**). In chest X-rays, the scars appear as irregular linear scars. This is important because some doctors may not be familiar with this form of mine dust lung disease and confuse it with other scarring diseases of the lungs found in the general public.

Figure 4: In a normal lung, the air sacs have thin walls (left). In an individual with diffuse dust-related fibrosis, the walls of the air sacs become thickened or scarred.



Normal lung | Diffuse dust-related fibrosis

Asbestosis and asbestos pleural disease

Mine and quarry workers may be exposed to asbestos and asbestiform mineral dust in the form of naturally occurring asbestos (NOA) or asbestos in insulation in older buildings and preparation plants.

Asbestos can cause lung disease with irregular scars that are often found in the lower parts of the lungs. This may look very similar to diffuse dust-related fibrosis. Asbestos can also affect the lining of the lung, known as the pleura, causing thickened plaques, fluid around the lung, or even cancer of the pleura, known as mesothelioma.

What respiratory health surveillance am I entitled to?

Under the Mining and Quarrying Safety and Health Regulation 2017 (the Regulation), the site senior executive must ensure respiratory health surveillance is carried out for each person who becomes, is or stops being a worker at a mine or quarry.

Respiratory health surveillance is required:

- when joining the industry and before you start working at a mine or quarry
- at least once every five years, and
- when permanently leaving the industry at your request.

Employers must pay for your respiratory health surveillance and any reasonable associated travel expenses.

When respiratory health surveillance may not apply?

The default requirement of the Regulation is that respiratory health surveillance is required for all workers.

However, the site senior executive may determine that respiratory health surveillance is not required if your exposure to respiratory hazards is so minimal that it can be effectively managed without respiratory health surveillance.

The site senior executive can only make this decision through a risk assessment that considers current and previous exposure.



Your chest X-ray is sent to specially trained readers who determine the presence of any abnormality.

The ILO classification provides a rigorous process for reporting on the presence of an abnormality and describing its features.

What can I expect from my respiratory health surveillance?

How it works

A doctor will undertake, or supervise, the required examinations. The Regulation refers to this doctor as an 'Appropriate Doctor' who is appropriately qualified and has demonstrated knowledge of the risks associated with activities performed by workers.

RSHQ has an online register of doctors qualified to supervise examinations.

The medical examinations for respiratory health surveillance must include:

- Chest examination—this is a physical examination of the chest and includes listening to your lungs.
- Chest X-ray—this is dual-read to the International Labour Organization (ILO) International Classification of Radiographs of Pneumoconioses.
- Spirometry test—this is a standard test used to detect conditions that affect lung function. You will be required to breathe forcefully into a machine called a spirometer. The doctor will compare your results with previous spirometry results, if available.

Based upon the results of the examinations, the Appropriate Doctor will then apply the *Mine Dust Lung Disease Clinical Pathways Guideline* (the guideline).

The guideline documents the recommended process for follow-up investigation and referral to medical specialists for workers with abnormal results on the screening tests. Specialist tests may include a high-resolution computed tomography scan, laboratory lung function tests and referral to a respiratory physician.

Your employer must pay for these follow-up specialist tests, including reasonable travel expenses.

Outcome of the health surveillance

When the respiratory health surveillance is complete, the Appropriate Doctor will provide you with a copy and explanation of the health surveillance report. This report does not include any records from the medical examinations. It provides the doctor's findings about your respiratory health and any remedial action that may be required.

The Appropriate Doctor also provides a copy of the report to the site senior executive.

Medical records

Your medical records obtained through the respiratory health surveillance must be kept by the Appropriate Doctor.



Level of service

Medical examinations are to be completed by an appropriately qualified medical provider.

Mine and quarry operators can use doctors and medical providers who have registered with RSHQ, having demonstrated they are qualified, experienced and meet relevant standards.

The register is available online and assists in ensuring appropriate providers are used.

Only an Appropriate Doctor can complete and sign the health surveillance report.

What if I'm planning to retire soon?

Exit respiratory health surveillance

Any mine or quarry worker who is permanently leaving the industry and has worked in the mining or quarrying industry for at least three years has an opportunity to voluntarily undergo an exit respiratory health surveillance assessment. This includes spirometry and chest X-ray examinations.

Employers must organise and pay for the exit respiratory health surveillance, including reasonable travel expenses, for any eligible mine or quarry worker who requests one.

Assessment process

You can ask for an exit respiratory health surveillance assessment conducted by an Appropriate Doctor up to three months before you permanently stop working or three months after.

You will not be eligible for an exit respiratory health surveillance assessment if you have undergone respiratory health surveillance within the previous three years.

Retired and former workers

Workers who have permanently stopped working in the industry are eligible for a free lung check, including spirometry and chest X-ray examinations. Any follow-up investigations of abnormal results are also provided.

You may qualify for a free lung check if you meet all of the following criteria:

- you have worked in the industry for at least three years, with at least six months in Queensland
- you have permanently ceased working in a mineral mine or quarry, and
- at least five years have passed since your last respiratory health examination.

Note: your most recent assessment can be less than five years ago if a doctor has recommended a sooner assessment, as shown in your last respiratory health surveillance record or a medical certificate.

If you qualify, RSHQ will arrange and pay for your respiratory health surveillance including reasonable travel and accommodation costs.

To apply, contact the Mine Dust Health Support Service on **1300 445 715** or email **info@minedusthealthsupport.com**


PHILIPS

What if I'm diagnosed with lung disease?

Workers diagnosed with any lung disease should avoid additional exposure to respiratory hazards, especially mine dust, and have their respiratory health monitored on an ongoing basis by a specialist physician.

It is important to note that with early detection and appropriate management, some mine dust lung diseases are unlikely to be life-threatening and workers can live a normal life.

You should discuss the management of your ongoing exposure with your workplace and the Appropriate Doctor. Your general practitioner can also guide you with ongoing health care.

The Mine Dust Health Support Service can provide free advice on accessing support.

Mine Dust Health Support Service

Current or former Queensland mine and quarry workers can contact the Mine Dust Health Support Service.

The service provides confidential support to help you understand:

- your rights
- the screening and diagnosis process
- compensation pathways if diagnosed with a mine dust lung disease, and
- how to access ongoing support, including psychological support.

MINE DUST HEALTH SUPPORT SERVICE
1300 445 715 info@minedusthealthsupport.com

Workers' compensation

If you develop a mine dust lung disease because of your employment, you may be entitled to workers' compensation.

Entitlements can include:

- weekly compensation for lost wages
- medical expenses
- counselling and pulmonary rehabilitation services
- travelling expenses
- lump sum compensation (depending on your degree of permanent impairment), and/or
- additional lump sum compensation for those diagnosed with pneumoconiosis.

Mine and quarry workers diagnosed with any mine dust lung disease can submit a claim for compensation to WorkCover Queensland or the relevant self-insured employer.

Learn more about making a workers' compensation claim and the support available for workplace injuries at **www.worksafe.qld.gov.au** or contact the Mine Dust Health Support Service.

More information

To keep up to date with the latest advice on airborne dust exposure and other mine safety and health information, visit the RSHQ website at **www.rshq.qld.gov.au**

Keep up to date and stay informed – follow RSHQ social media channels:



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