

Accelerated Silicosis FAQs

What is the issue?

In September 2018, health surveillance of workers cutting and polishing artificial stone benchtops in Queensland found that 12 of 35 workers from just two businesses had a severe and rapidly progressive type of silicosis known as accelerated silicosis. WorkCover Queensland had also confirmed another 10 cases from across the State, totalling 22 cases in just three weeks. Case reports have been coming from NSW and Victoria since 2015. This means there may be hundreds of similar workers affected across Australia and New Zealand.

Who is affected?

The cases have been identified in workers and stonemasons using artificial stone (also known as engineered, reconstituted or manufactured stone, and quartz conglomerate), which contain a high proportion of crystalline silica. Artificial stone is used to make kitchen, bathroom and laundry stone bench tops.

Why is this an issue?

The new build and renovation of kitchens, bathrooms and laundries using artificial stone is widespread throughout Australia and New Zealand. Although the number of workers in the industry is currently unknown, the number of registered businesses undertaking kitchen benchtop manufacture in Queensland suggests there may be at least 1000 workers at risk of accelerated silicosis in that State alone. The number of workers across Australia and New Zealand who are at risk is obviously significant.

What is silicosis?

Silicosis is a fibrotic disease of the lungs caused by the inhalation and deposition of respirable crystalline silica in the lung tissue. It falls into the group of diseases known as pneumoconioses. Silica exposure has been a well-known occupational hazard in sandblasting, tunnelling and mining among other workplaces for many years. Although silicosis is preventable, it remains prevalent worldwide, particularly in developing countries. Cases of silicosis were not common in Australia or New Zealand however there has been a recent significant increase in cases associated with the artificial stone industry.

What are the types of silicosis?

There are several clinical and pathologic varieties of silicosis, based on the time taken to accumulate a Total Lung Burden of crystalline silica sufficient to trigger a nodular fibrotic reaction in the lung parenchyma. There are three major forms:

- Chronic (Nodular) Silicosis – classic silicosis; exposure for more than 10 years.
- Accelerated Silicosis – exposure over 1 to 10 years but usually only 3-10, historically rare.
- Acute Silicosis – exposure for less than 1 year (used to be less than 3 years), historically very rare.

The development of different forms of silicosis is also dependent on the concentration and the surface texture of the crystalline silica particles. Chronic (nodular) silicosis is the most frequent form of the disease, often manifesting 10-20 years (but can be up to 40) after first exposure. Although acute and accelerated silicosis are less common (particularly in

developed countries), accelerated silicosis develops within only 5 to 10 years after the initial exposure to silica dusts, while acute silicosis develops within a few months or years.

What is the natural history of silicosis?

The minimum Total Lung Burden of respirable crystalline silica needed to trigger accelerated silicosis or chronic silicosis is not known. The rate of change in lung function deterioration for workers with accelerated silicosis is on average 10 times faster than the normal age-related deterioration. Even in the absence of further exposure, silicotic nodules may continue to develop and coalesce resulting in the development of pulmonary massive fibrosis (PMF). If a worker has had sufficient exposure to silica dust, the disease may even become first evident after the worker has left the industry.

With what symptoms may these workers present?

In the early stages, workers will be asymptomatic. Symptoms may appear years later, even after exposure has ceased. Early symptoms of silicosis include shortness of breath after exercising and a harsh, dry cough. Patients may develop increasing dyspnoea as the disease progresses. Patients with advanced silicosis may have trouble sleeping and experience a productive cough, loss of appetite and weight loss. Progression of the disease may vary considerably between individuals for reasons not yet understood. Some individuals who develop PMF may require lung transplantation.

What has been the nature of their exposure?

Cutting, grinding and polishing of artificial stone exposes workers to very fine 'respirable' silica dust. Unlike natural stone such as granite, which typically contains only up to 30 per cent silica, artificial stone can have silica concentrations of over 90 per cent.

How can these workers be protected?

All efforts must be made to reduce the levels of dust when working with artificial stone.

ALL workplaces must undertake independent assessments of personal workplace respirable crystalline silica dust levels.

Important notes:

- The use of negative pressure half face respirators is associated with poor compliance.
- Disposable paper dust masks are not effective.

What is the recommended exposure limit?

The current Time Weighted Average Workplace Exposure Standard (TWA WES) in Australia and New Zealand is 0.1mg/m³ of respirable crystalline silica for eight hours, five days per week for 40-45 years. However, this standard was derived from the chronic silicosis literature when acute and accelerated silicosis was rare. This limit is currently higher than in some other countries.

The Faculty of Occupational and Environmental Medicine (AFOEM) of the Royal Australasian College of Physicians (RACP) and the Thoracic Society of Australia and New Zealand (TSANZ) recommend the following:

- The TWA WES to be immediately reduced to 0.05mg/m³ with active investigation to adopt the 0.025mg/m³ level recommended by the American Council of Government Industrial Hygienists (ACGIH).
- An excursion limit or “interim Short Term Exposure Limit” (iSTEL) of 0.15mg/m³ (following the principle of 3 times the TWA WES) with no excursions above 0.25mg/m³ over 15 minutes.
- In practical terms, respirable crystalline silica dust should not be evident in the breathing zone. Active airflow management may be necessary to entrain dust and direct wet spray away from the breathing zone.

What can I do?

Medical practitioners and occupational health nurses are requested to be aware that workers with a history of working with artificial stone may be at risk of accelerated silicosis.

Pending further guidance, AFOEM and the TSANZ therefore recommend a full occupational screening history be sought from all building industry workers:

- Have you undertaken any work that involves cutting, grinding, polishing or otherwise shaping the material used to make stone benchtops? If ‘yes’, how long have you undertaken such work?
- What measures were in place to control the dust produced from these activities?
- What masks were used to protect your lungs ?
- Smoking history.
- Respiratory symptom history (see https://www.safeworkaustralia.gov.au/system/files/documents/1702/crystalline_silica.pdf)

All workers who have undertaken work with artificial stone should be assumed to have been exposed to silica dust and even in the absence of symptoms should be screened.

Workers should undergo spirometry, diffusing capacity of the lungs for carbon monoxide (DLCO) testing and an ILO chest x-ray per below. Suspected cases should be referred to a respiratory physician and/or an occupational and environmental physician who are able to address all the relevant issues including workplace assessment and suitability for employment. Treatment and ongoing health monitoring must be co-ordinated by a respiratory physician.

Telemedicine may be an important vehicle to support workers and their doctors who are geographically isolated from the appropriate specialists. Specific action will depend on the results of initial specialist assessment. Although it does not specifically refer to accelerated silicosis, the Fact Sheet from the Lung Foundation available at <https://lungfoundation.com.au/wp-content/uploads/2017/07/Silica-factsheet.pdf> may be useful.

What investigations are appropriate?

Even if symptom-free, if the occupational history indicates that artificial stone dust exposure has occurred lung function testing (spirometry and gas transfer (DLCO)) and an ILO chest x-ray should be undertaken.

The ILO chest x-ray provides a standard classification of radiographic pneumoconiosis abnormalities. X-ray requests should indicate exposure to silica dust and smoking status. If the lung function results are low normal but there is a significant history of exposure and vague respiratory symptoms, or if the chest x-ray is abnormal or suggestive of an abnormality, then a non contrast high resolution chest CT is indicated.

Spirometry needs to be undertaken to the standard promulgated by the TSANZ. This is available at https://www.dnrm.qld.gov.au/data/assets/pdf_file/0003/1274421/tsanz-spirometry-standards.pdf. Spirometry performed in a non-laboratory setting is associated with a significant false negative rate and may falsely reassure practitioners and patients. Diffusion Capacity (DLCO) is considered a more sensitive biomarker of early disease.

What are the radiological changes on the ILO chest x-ray?

'Classic' uncomplicated chronic silicosis is typically characterised by multiple nodular opacities with predominance in the upper lobe and posterior part of the lung. It is believed with increased duration and intensity of exposure, the silicotic nodules expand and become confluent, however this process can occur without further exposure. With chronicity, enlargement of hilar and mediastinal lymph nodes with calcification at the periphery of the node is common. Accelerated silicosis may be radiologically similar to chronic silicosis, with more rapid development of changes following initial exposure. However, it may also possess features typical of acute silicosis. Patients with accelerated silicosis appear at a higher risk of developing PMF as well as other complications. This may be the result of the resins used in the formation of the artificial stone. Affected workers should be managed by occupational and environmental physicians and respiratory physicians providing individualised advice on a case by case basis.

Should workers diagnosed with accelerated silicosis continue to work?

Evidence indicates reducing exposure from harmful exposures to low exposure settings slows but may not arrest the natural progression of disease. As ongoing exposure to silica dust may contribute to the risk of disease progression, it is prudent to avoid further exposure. Occupational and environmental physicians are best placed to discuss suitability for work with individual workers on a case by case basis.

What treatment is available for cases of accelerated silicosis?

At present there is no known treatment which will arrest the progression of the disease. Progression may vary between individuals for reasons not yet understood. Some workers may eventually need a lung transplant. Clinical research, including drug trials, into potential therapeutic interventions is therefore urgently required.

What is the value of a health surveillance program for silicosis?

Long term regular health surveillance must be conducted for all workers in the artificial stone industry.

The TSANZ and AFOEM are advocating for the funding and development of a national occupationally acquired respiratory disease surveillance program and registry. A national

notification system would allow early awareness of cases and clusters of occupational lung diseases. At present, unlike infectious diseases, there is no system of notification involving medical specialists to advise on early intervention.

Health surveillance should include a respiratory questionnaire, work and exposure history, lung function tests and imaging results.