

Asbestos health risks

Guidance Note

Introduction

Asbestos is the term used to describe a group of naturally occurring minerals whose characteristic feature is that they occur as fibres. The most common types used in Australia have been:

- chrysotile (white asbestos)
- amosite (brown asbestos)
- crocidolite (blue asbestos).

Chrysotile has been the most widely used in Australia, comprising more than 50 per cent of all asbestos used. Other forms of asbestos, namely anthophyllite, tremolite and actinolite are encountered rarely, if ever, in Australia.

The fibres of asbestos can be split by mechanical energy into progressively finer fibres of microscopic size. Respirable fibres are considered responsible for adverse health effects caused by asbestos. To be respirable, a fibre needs to have a diameter of less than three micrometres and a length of greater than five micrometres; and a length to width ratio of greater than 3:1. Fibres of a diameter less than one micrometre are considered the most hazardous.

Uses

Over 3000 uses of asbestos have been described.

Among the most common are:

- asbestos-cement building products, e.g. 'fibro' boards, pipes and roofing materials
- electrical, thermal and acoustic installation, e.g. lagging, asbestos rope and asbestos cloth
- fire resistant insulation, e.g. sprayed 'limpet' asbestos in buildings.



Health effects

There are three diseases clearly related to asbestos exposure. These are:

1. **Asbestosis**—a non-malignant, diffuse fibrosis (scarring) of the lung tissue. It is invariably of occupational origin, usually following many years of exposure. In some cases, short-term exposure (months) to very high airborne fibre levels has been responsible. Low-level environmental exposure would not be expected to cause asbestosis as the minimum threshold of exposure required for clinical disease is unlikely to be exceeded.
2. **Lung cancer**—has been associated with all forms of asbestos. It typically presents 10 to 30 years, or longer, after the onset of exposure. It appears to occur following levels of exposure associated with asbestosis and thus, it would seem to be related to occupational exposure to asbestos. Asbestos workers who smoke are at greater risk of lung cancer.
3. **Mesothelioma**—a highly malignant tumour of the tissue membrane which lines the internal organs. When it occurs around the lungs, it is termed pleural mesothelioma. Such tumours in the abdomen are termed

peritoneal mesotheliomas. The majority of cases occur following occupational exposure to asbestos, particularly to crocidolite. It is a rare disease in the non-occupationally exposed general population. Statistics from the Australian Mesothelioma Registry reveal that 5 to 7 per cent of cases occur in persons with no apparent history of occupational or significant environmental exposure. Smoking has no apparent effect on the risk of this disease.

Another pathological feature of asbestos exposure is the presence of pleural plaques or pleural thickening in the membrane lining the lungs. These can be detected by a chest X-ray. They are rarely of any clinical significance and do not become malignant, however, they do indicate significant previous exposure to asbestos and thus, the risk of malignancy in a person who displays pleural plaques is increased.

A history of heavy asbestos exposure should be self-evident to the person and could be identified by conducting an occupational history check.

Occupational exposure

In the past, asbestos related disease was often connected to occupational exposure, which may have occurred in a diverse range of industries. There is usually a long latency period between first exposure and onset of disease. This period can be more than 40 years in the case of mesothelioma—meaning the disease diagnosed in 2014 typically reflects exposure which occurred many years ago and often before the mid-1970s.

It is recognised that occupational exposure has been more effectively controlled during the last three decades than was the case previously.

Also, occupational exposure standards for asbestos are now more stringent than in the past. It is considered that the current occupational exposure standards effectively control the risk of disease.

Safe Work Australia has adopted the following exposure standards for exposure:

- chrysotile 0.1 fibres/millilitres of air
- crocidolite 0.1 fibres/millilitres of air
- amosite 0.1 fibres/millilitres of air.

Environmental exposure

Asbestos is widespread in the environment at very low levels. This has occurred through fibre release from natural sources and extensive industrial and commercial use of asbestos in the past, meaning everyone is exposed to asbestos fibres throughout their life. This provides us with guidance in accessing the very low exposures that occur in a community setting. Exceptions have occurred where communities located near asbestos mines or mills, e.g. Wittenoom in Western Australia or in the case of residents near asbestos factories, which were producing point-source environmental pollution.

Typical long-term population exposure has been estimated to be about 0.0005 fibres per millilitre in buildings containing asbestos-containing material, and from outdoors. Often, the airborne level is below the limit of detection in such situations.

Based on the extrapolation of the dose-response relationship following occupational exposure, it has been estimated that life-time exposure to this level would represent less than a 1 in 100,000 life-time cancer risk. In deriving this risk, it has been noted that the true risk may be even lower, if not nil, if the dose-response relationship at very low exposure levels is not linear, or if there is a threshold.

Asbestos-cement building products contain up to about 5 to 15 per cent asbestos. Older products contain higher percentages than products produced more recently. Since the mid-1980s, these products have been produced in Australia without any asbestos content. Thus, if the material is thought to be older than 1990, it is reasonable to assume that it contains asbestos and laboratory testing is not generally required.

The asbestos in these products is tightly bound due to the cementitious nature of the material and also because the products are compressed in manufacturing. Typically, the content of fibres in the respirable size range is low. Many studies have shown the spontaneous generation of airborne hazardous fibres to be very low. However, during activities such as power sawing, sanding and drilling, the release of respirable fibres will occur and precautions should be taken at such times.

In buildings comprised of these products, various studies have shown air levels usually below 0.0005 fibres/millilitres, if measurable at all. Also, the greatest proportion of fibres in buildings is usually chrysotile, whereas crocidolite, which is regarded as the most hazardous form, is usually present in far lower amounts.

Occupation of buildings, where the airborne fibre levels are of this concentration, pose no risk of asbestosis and a minor risk of lung cancer and mesothelioma. It is considered that such products can remain safely in place, but appropriate precautions should be taken to control dust exposure during renovations.

Drinking water has often been transported in high pressure asbestos-cement pipes or collected into household tanks from asbestos-cement roofing material. The risk posed by the long-term consumption of such water has been studied extensively. Data from both animal experimentation and human epidemiological studies has shown that the risk of asbestos-related disease is not increased.

Also, studies show that ingested asbestos fibres very rarely penetrate the gastro-intestinal mucosa. Taking into account all of this information, it would appear that the carcinogenic effect of drinking water contaminated by asbestos is very small, if not zero.



Safety precautions

In situations of occupational exposure to asbestos, compliance with the provisions of the *Work Health and Safety Act 2011* and subordinate Regulations is required. The advice of Workplace Health and Safety Queensland should be sought.

For non-occupational situations where activities may cause the release of asbestos fibres from asbestos products, the following principles should be adopted:

- Use methods which minimise dust generation, e.g. hand powered tools, control dust generation by wetting the asbestos product, and avoid unnecessary breakage of asbestos-cement products.
- Wear respiratory protection suitable for asbestos dust, e.g. toxic dust respirator.
- Collect all debris and double wrap in plastic bags or sheeting that is at least 0.2 millimetres thick, seal with adhesive tape, and appropriately label before disposing by burial at approved disposal facilities.
- Shower thoroughly and wash work clothing after completion.
- Keep people who need not be present away from the work area.

Further information

Call 13 QGOV (13 74 68) or visit www.deir.qld.gov.au/asbestos

For legislative requirements visit www.legislation.qld.gov.au/LEGISLTN/CURRENT/P/PubHealR05.pdf