Australian Government
Asbestos Safety and Eradication Agency

Chrysotile Asbestos

This fact sheet contains information on the dangers of chrysotile (white) asbestos, the movement for a global ban and common questions relating to chrysotile asbestos

Key Facts

- Chrysotile is asbestos.*
- Chrysotile is the most common type of asbestos and the major commercial form.
- It has been proven that all forms of asbestos, including chrysotile, cause asbestosis, mesothelioma and cancers of the lung, larynx and ovary.
- There is also evidence in humans that asbestos causes cancers of the pharynx, stomach and colorectum.
- Globally, it is estimated that 219 000 deaths annually can be attributed to occupational exposure to asbestos.
- It is estimated that asbestos-related diseases contribute to approximately 4000 deaths in Australia each year.
- There have been attempts to diminish the danger of chrysotile as a cancer-causing agent, leading to the continued mining of chrysotile and its application as a building material in some low and middle-income countries.
- As a result, it is expected that deaths due to asbestos related cancers such as mesothelioma will continue to rise in these countries in the coming decades.
- Safe and effective substitutes are now possible for all products previously containing asbestos.
- A total global ban of chrysotile and all forms of asbestos is supported by Australia and international organisations, to alleviate the global burden of asbestos-related diseases worldwide.

*Asbestos is the term used for a group of six naturally occurring mineral fibres. These fibres form two groups – serpentine (which includes chrysotile) and amphibole asbestos.

Why is chrysotile asbestos a problem?

Chrysotile is the **most common type of asbestos** and the major commercial form of asbestos.

Exposure to chrysotile, and all forms of asbestos fibres, causes **fatal diseases** including asbestosis, lung cancer, mesothelioma (cancer of the mesothelium—the protective lining on the inside of body cavities and the outside of internal organs, such as the lungs, heart and bowel) and cancers of the larynx and ovary.**

Globally, it is estimated that **219 000 deaths** annually can be attributed to occupational exposure to asbestos.

It is estimated that asbestos-related diseases contribute to **approximately 4000 deaths in Australia** each year.

Chrysolite asbestos was **banned in Australia in 2003** due to its known cancer-causing properties however, internationally there have been **attempts to diminish the dangers of chrysotile asbestos** to support the ongoing mining of chrysotile and the manufacture of asbestos containing products. This has led to its continued use as a building material in some low and middle-income countries and the false belief that it can be used safely.

Sadly, this means that **deaths due to asbestos will continue to rise** in these countries in the coming decades.

** World Health Organisation (WHO) International Agency for Research on Cancer (IARC) 2012. Monograph Volume 100C: Asbestos (Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite and Anthophyllite). http://publications.iarc.fr/120

MYTH

Chrysotile asbestos can be used safely

All forms of asbestos—including chrysotile—cause asbestosis, mesothelioma and cancers of the lung, larynx and ovary. Continued use will lead to increasing numbers of asbestos related deaths

FACT

Is further research required to confirm the dangers of chrysotile?

No. There is unequivocal evidence of the causal link to all forms of asbestos—including chrysotile—and human disease, specifically mesothelioma and other cancers, as well as chronic lung disease (asbestosis) (IARC, 2012; Egilman & Menendez, 2011; Frank et al, 1998; Stayner et al, 1996; Suzuki & Yuen, 2006; Kohyama & Suzuki, 1991).

While there have been attempts to diminish the danger of chrysotile as a cancer-causing agent, the fundamental conclusion to be drawn from the existing epidemiological evidence is that **all forms of asbestos, including chrysotile, are hazardous to human health.**

Any new research should be future-focussed aimed at better understanding the level of exposure associated with asbestos containing materials (ACM) in situ; the underlying mechanisms of asbestos-related diseases to improve treatment options; or developing novel asbestos disposal solutions that go beyond current land-fill options (e.g. thermal or chemical conversion of asbestos), to ensure a sustainable long-term resolution to this problem.

What are the global health impacts?

Globally, asbestos has been responsible for the **greatest number of deaths of any occupational carcinogen** with chrysotile being the primary commercial form of asbestos used.

It is also estimated that **several thousand deaths annually worldwide**, can be attributed to **exposure to asbestos in the home** (WHO, 2014).

In 2016, approximately 219 000 deaths globally, or 63% of all occupation-attributable cancer deaths, were asbestos-related (GBD 2016 Occupational Risk Factors Collaborators, 2020).

High-income regions - Australasia, Western Europe, high income North America and high-income Asia Pacific regions approximately 80% of all occupation-attributable cancer deaths in 2016 were asbestos-related. This reflects past use of asbestos, which peaked three to four decades ago due to the long latency of developing asbestos-related cancers.

Low and middle-income regions - deaths due to asbestos-related cancers such as mesothelioma will continue to rise in some countries in the coming decades, because of ongoing and increasing use of asbestos in those regions. Unless significant steps are taken to prevent current and future asbestos exposure a devastating future global public health burden is predicted given the large size of the workforces in those regions.

The Australian Experience

When and why did Australia ban chrysotile?

Chrysotile was banned in Australia from 31 December 2003.

In 1999 the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) assessed chrysotile as a Priority Existing Chemical (PEC) from an occupational, human health and environmental risk perspective (NICNAS, 1999).

Based on the available science at the time, this report recommended that for the protection of human health, all exposures should be avoided. The same conclusions still hold true today, with the extra evidence that has been gathered since then.

The PEC assessment of chrysotile also dealt with the issues raised around the health effects of alternative products identified at the time and debunked the myth that those materials posed a greater risk to health and safety.

The PEC assessment remains available but the banning of chrysotile in Australia means there is no basis to update it. However, given the legacy of asbestos use in Australia and continued use of ACMs in emerging countries, understanding the risk of exposure from in situ products is an important area of research.

What are the health impacts in Australia from past use of chrysotile?

Even though all asbestos use was banned at the end of 2003, Australia has one of the highest incidences of mesothelioma in the world and deaths from mesothelioma continue to rise because of past and ongoing exposure.

Between **700 and 800** people are diagnosed with mesothelioma each year, with symptoms typically appearing 20–40 years after a person has been exposed.

Even in Australia, where universal health care exists, survival from mesothelioma is lower than for other cancers, with the average Australian living only 11 months after diagnosis.

There were an estimated **4233** deaths due to all asbestos-related diseases including mesothelioma, asbestosis, lung cancer and cancer of the larynx and ovary. It is projected that around **19 000** cases of mesothelioma will be diagnosed in Australia between 2015 and the end of the century.

Non-occupational asbestos exposure presents an increasing risk to the Australian public, due to the high volume of ACM remaining in the built environment. As a result, the proportion of asbestos-related diseases associated with exposure to asbestos in situ, continues to rise.

The increasing proportion of mesothelioma cases relating to non-occupational exposures is a serious public health problem in Australia. These cases are generally associated with relatively low doses of asbestos exposure and include some individuals who will be unaware that they have been exposed to asbestos.

Global Ban

Is a global ban needed?

Yes. A total global ban is needed to eliminate asbestos-related diseases worldwide.

The global burden of asbestos-related diseases is high and will continue to increase with ongoing use. There are clear lessons from the experience of countries like Australia.

Australia began restricting the use of asbestos in the 1960s and implemented a total asbestos ban on 31 December 2003. Despite this, there has been a rising trend in mesothelioma cases since the early 1980's and an increasing proportion of cases across the Australian community due to the ACM remaining in our built environment.

A major concern in those countries where chrysotile continues to be used (and where chrysotile was used in the past), is that chrysotile-containing building products (e.g. roof tiling, water pipes) become damaged and release asbestos fibres into the environment during the course of building maintenance, demolition and disposal of building waste, and as a consequence of natural disasters.

Such exposure would be expected to occur later than the original installation, and the risk can be wholly averted by ceasing to use such products.

Is controlled and safe use feasible?
No. Chrysotile is hazardous to human health, as it can cause cancer and other diseases.

No threshold level of asbestos exposure has been established below which all individuals would be free from cancer risk (WHO, 2014)—including those exposed to chrysotile (Lemen, 2004).

The greater the exposure, the greater the risk of developing any asbestos-related disease, therefore all exposure should be eliminated or kept as low as possible.

As there is no level of exposure that would prevent the likelihood of cancer occurring, this represents an unacceptable risk to human health now and in the future when the asbestos is disturbed or deteriorates.

The level of exposure necessary to induce mesothelioma in certain individuals is well below the level necessary to induce asbestosis or other asbestos-related diseases (IPCS–UNEP/ILO/WHO, 1998).

With no known safe level of exposure, use in 'controlled' environments is not feasible, as the risk of exposure cannot be eliminated.

Measures can and should be put in place in both homes and workplaces, that minimise exposure risk, using a hierarchy of controls, but these will not completely prevent exposure unless the asbestos (or the hazard) is eliminated.

The existence of old ACMs (and new use of ACM in some countries) in the built environment (homes or workplaces), places the broader community at risk also (in both occupational and non-occupational settings), as building materials require maintenance (renovation or demolition) over time, which inevitably includes surface treatment or complete removal, and the potential release of asbestos fibres.

Disaster events (cyclones, earthquakes, hurricane, tsunamis, and floods) also preclude a 'controlled' approach to the maintenance or safe removal of asbestos-containing materials in the built environment.

Are there safe and cheap alternative products?
Yes. In Australia, alternatives to chrysotile have been in place since prior to 1999. This use includes in major industries covering the building and construction, automotive, and railways sectors. Chemical characteristics, advantages and limitations, and the known health effects of these substitutes have been previously summarised (NICNAS, 1999).

In light of the devastating health effects that asbestos use—including chrysotile—causes, asbestos substitutes have been extensively researched over many decades.***

Information on substitute materials and products that can be used safely is available from national, regional and international organizations. The use of non-asbestos products will not impact quality of life in emerging countries, as there are safe and effective alternatives that can be used by anyone.

Safe and effective substitutes are now possible for all products previously containing asbestos.
While a single chemical cannot replace asbestos, both technologically and economically viable alternatives (including fibrous [e.g. cellulose] and non-fibrous [e.g. plastics and metals] substitutes, depending on the end-use) do exist and are being used commercially throughout the world and particularly in the countries that have banned use of chrysotile asbestos over the last nearly 50 years.

All chemicals have different properties that may cause harm to human health, depending on how they are used. Safe use of chemicals can be defined by evaluating both hazard and the potential for exposure, to determine overall risk. Neither hazard, nor exposure, can be viewed in isolation to determine overall risk.

The WHO is committed to providing information and economic stimulus for replacing asbestos with safer substitutes (WHO, 2014).

Information on substitute materials and products that can be used safely is available from national, regional and international organizations. The use of non-asbestos products will not affect quality of life in emerging countries, as there are safe and effective alternatives that can be used by anyone.

*** The Institute for Environment and Health (IEH), 2000; the National Institute of Advanced Industrial Science and Technology (AIST), 2007; the US EPA's 'Asbestos Substitute Performance Analysis' report, 1982; the European Union (EU) Scientific Committee on Toxicity, Ecotoxicity and the Environment (CSTEE) report on 'Chrysotile asbestos and candidate substitutes', 1998 and updated in 2002.

Positions of international organisations

World Health Organization

The World Health Organisation

- The World Health Organisation (WHO) considers asbestos as 'one of the most important occupational carcinogens' (WHO, 2014).
- It says asbestos, including chrysotile, causes mesothelioma; cancer of the lung, larynx and ovaries; asbestosis (fibrosis or scarring of the lungs); and pleural disease such as plaques, thickening or effusion (leaking of fluid).
- It recommended that elimination of asbestos-related diseases became a focus from 2003, in the 13th session of the joint International Labour Organization (ILO) / WHO Committee on Occupational Health.
- A World Health Assembly (WHA) Resolution for global campaigns to eliminate asbestos-related diseases was tabled in 2007. The WHO has also defined strategies for the elimination of asbestos-related diseases that include recognising stopping the use of all types of asbestos is the most effective approach (WHO, 2014; IPCS–UNEP/ILO/WHO, 1998).

International Agency Research on Cancer
World Health Organization

The International Agency for Research on Cancer

- The International Agency for Research on Cancer (IARC) classifies all forms of asbestos, including chrysotile, as carcinogenic to humans (Group 1).
- It says in humans, there is convincing evidence that asbestos, including chrysotile, causes mesothelioma; and lung, larynx and ovarian cancer. There are also positive associations between asbestos exposure, including chrysotile, and pharynx, stomach and colorectal cancer (IARC, 2012).

International Labour Organization

The International Labour Organization

- The International Labour Conference adopted a Resolution concerning asbestos at its 95th Session in 2006. It calls for the elimination of the future use of asbestos and the identification and proper management of asbestos currently in place as the most effective means to protect workers from asbestos exposure and to prevent future asbestos-related diseases and deaths.
- The Resolution also underlined that the ILO 162 Convention on Safety in the Use of Asbestos should not be used to provide a justification for, or endorsement of, the continued use of asbestos including chrysotile asbestos.

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