

Asbestos

By Eva Bauer, Student Intern

What is it?

Asbestos is a commonly used material which has been used for centuries. Asbestos includes 6 naturally occurring minerals, including amosite, chrysotile, crocidolite, and the fibrous varieties of tremolite, actinolite, and anthophyllite. These minerals have fibers which can be easily spun into various materials, and are strong, yet flexible and resistant to heat but good for insulation. Because of these properties, asbestos was intentionally added to countless, every day materials. Asbestos has no recommended intake, in fact, usage of asbestos in America has been greatly restricted since the early 1970's.¹ As more research is done, more limitations are placed on the usage of asbestos, although it is still used for countless different goods, including:²

- Sheetrock taping
- Mud and texture coats
- Vinyl floor tiles, sheeting, adhesives and ceiling tiles
- Plasters and stuccoes
- Roofing tars, felts, siding and shingles
- "Transite" panels, siding, counter tops and pipes
- Acoustical ceilings
- Fire proofing
- Brake pads
- Putty
- Caulk
- Gaskets
- Clutch plates
- Stage curtains
- Fire blankets
- Interior fire doors
- Stage curtains

What are the health impacts?

Health effects vary, but the majority occur years after initial exposure. The most common health effects are:

- [Asbestosis](#): A long term disease of the lungs, which makes breathing difficult due to scarring of tissues in the lungs^{3 4}
- [Mesothelioma](#): Cancer of the lining of the lungs, which has been proven to be almost exclusively associated with asbestos exposure.^{5 6}

Asbestos leads to countless symptoms, but in many cases, these symptoms do not appear for 10-20 years after initial exposure. Symptoms⁷ can include:

- Shortness of breath
- A persistent and productive cough
- Tightness in chest
- Chest pain

There is [strong evidence](#) to link asbestos to diseases including⁸:

- Asbestosis

- Laryngeal cancer
- Lung cancer
- Mesothelioma
- Ovarian cancer
- Pleural disease, including effusions, plaques, and thickening
- Pneumoconiosis
- Pulmonary fibrosis

In comparison, there is [good evidence](#) which links asbestos to health outcomes such as:⁹

- Autoimmune antibodies (Positive ANA, anti-DNA, RF, etc.)
- Immune suppression
- Renal (kidney) cancer
- Stomach cancer

Groups especially at risk:

Those especially at risk are groups with existing lung conditions, and cigarette smokers. Exposure to both cigarettes and asbestos together leads to a high risk of lung cancer.¹⁰

Children exposed to asbestos at a young age are also at a higher risk of developing asbestos related diseases, as they have more time to develop the diseases because they have more years of life ahead of them.

People who work in industries with asbestos and their families are at a greater risk of asbestos exposure. This is because workers can carry home the asbestos fibers on their skin, clothes and hair, bringing them into their homes for their families to intake.¹¹ For full list of industries, see section “How are we exposed?” under work environments

How are we exposed?

Populations can be exposed to asbestos through various sources, as asbestos has been used in our manufacturing industry, with production of many products but also within our communities.

Sources of exposure can include:

- Building materials used for homes, schools and commercial buildings¹²
- Work environments such as:¹³
 - o Asbestos product manufacturing
 - o Mining operations
 - o Automotive repair
 - o Construction sites
 - o Power plants
 - o Steel mills
 - o Maritime operations
 - o Offshore rust removals
 - o Sand or abrasive manufacturers
 - o Ship yards, ships and shipbuilders

Due to the usage of asbestos in America for so many years, there is a high chance that all air we breathe has a low amount of asbestos in it, leading us to all be exposed to a very low level. The most typical routes of asbestos exposure include inhalation and ingestion, yet dermal exposure can also lead to secondary ingestion or inhalation.¹⁴ For example, having asbestos

particles on your hands after work, and not fully cleaning them, can lead to later ingestion when eating food. Thinner and smaller fibers have the greatest potential to be inhaled, due to the small size, and are said to be most dangerous.¹⁵ These particles have the greatest potential to be inhaled most deeply, leading to inflammation and scarring deep in the lungs.

As the harmfulness of asbestos is further researched and better understood, more regulation is placed to limit exposure levels to be incredibly low. In the United States, there has been much legal and regulatory action. Asbestos is completely banned in 52 countries, and is slowly being replaced with safer products in many other countries as well.¹⁶

Prevention of asbestos exposure

Safe work practices are critical to reduce the worker's exposure to asbestos, but also exposure of their family. There are proper cleaning procedures outlined by the [EPA](#), which explicitly explain the safest way to clean the work environment after working with asbestos, to reduce the presence of loose asbestos. Proper training of all those working with asbestos is critical, as being educated on the dangers and safe practices helps reduce the risk of accidental exposure.¹⁷

Proper protective clothes are critical to reduce the inhalation, ingestion and dermal exposure to asbestos. Disposable coveralls, head and foot covers made of a special synthetic fabric stops asbestos from passing through. Proper removal of contaminated clothes and covers is critical. Anything that is contaminated should not be brought back into a home environment, as it can increase possible exposure of other family members.¹⁸

The risks of asbestos exposure can also be reduced if those who are exposed to it stop smoking, as smoking cigarettes exponentially multiplies the risk of harm. This is especially important for those with pre-existing lung conditions.¹⁹

Asbestos in products which are in good condition is usually harmless, as it is not releasing asbestos fibers. Tampering with products containing asbestos can lead to risk of exposure to harmful fibers. Any damaged materials which may contain asbestos should be left alone, until professionals can assist safely. During renovation and remodeling, if asbestos is present, the help of professionals is critical.²⁰

History and ethics

The harmful effects of asbestos have been known for over a century. Asbestos inhalation has been shown to be associated with very serious lung disease since the early 1900s. By 1924, as more people were dying from asbestos exposure, this "very serious lung disease" was named asbestosis and was explained in medical journals by various English doctors. As time progressed, and more was known about asbestos by the 1930's, the dose-related response and length of exposure were well known in developed parts of the world. Finally, in the 1960's, symptoms of those exposed to asbestos during World War Two were seen and the link was evident.²¹ By the early 1970's, asbestos had finally become a topic with attention from the Occupational Safety and Health Administration and the Environmental Protection Agency. This was the start of regulation and change, when in 1971, the Clean Air Act regulated emission standards. Then in

1979, the EPA tried to use the Toxic Substance Control Act to limit asbestos, and has been trying ever since. In 1989, after millions of dollars and hours were invested in studying asbestos, the EPA announced that it will be banning all products containing asbestos as it phases in new alternatives. This announcement was greatly opposed by many, including Canada, the largest exporter of asbestos, and various manufacturers and industries. Since then, various studies have been held and further measures have been pushed, yet asbestos is still not fully banned and is still negatively impacting millions.²² Finally, in June 2016, the [Frank R. Lautenberg Chemical Safety for the 21st Century Act](#)²³ was signed into law, allowing for revised regulation of harmful chemicals.

Recent studies released by the [Institute for Work & Health](#)²⁴ explains that new cases of asbestos related cancer cost Canada \$1.7 billion per year. Asbestos is the leading cause of occupational death, with about 150,000 workers exposed throughout various work environments. Many groups in Canada are urging the government to fully ban asbestos, yet they still allow exporting and importing asbestos—with last year being the highest level in six years.²⁵ America still has areas where asbestos' impact can be seen. One example of many is [Libby, Montana](#). Libby is a town where asbestos mining has occurred since 1919. In 1963, W.R Grace & Company took over the operation of the mines, even though the owners knew of asbestos dangers. They allowed for mining to continue, which lead to hundreds of Libby residents to be ill and pass away from asbestos related complications. This town was left without government intervention until the EPA stepped in, in 1999. The EPA pushed for various measures, which included the cleanup of houses and businesses to reduce further exposure.²⁶ To this day, people are left struggling with the consequences of years of unregulated asbestos exposure.

According to the [WHO](#)²⁷, nearly 125 million people around the world are exposed to asbestos in their work environments. The United States National Institute for Occupational Safety and Health has estimated that even with current limitations on asbestos, there will be five deaths from lung cancer, per every one thousand workers exposed during their lifetime and an addition two deaths per one thousand workers exposed from asbestosis. Annually, there are about 20,000 cases of lung cancer and 10,000 cases of mesothelioma, which are said to be related to asbestos, across Western Europe, Scandinavia, North America, Japan and Australia.²⁸

This document is student work. CHE makes no claim that all the information has been verified.

- 1 Gilbert, Steve G. Asbestos. Toxicology. May 31, 2014. <http://toxipedia.org/display/toxipedia/Asbestos>, 6/19/2016.
- 2 Gilbert, Steve G. Asbestos. Toxicology. May 31, 2014. <http://toxipedia.org/display/toxipedia/Asbestos>, 6/19/2016.
- 3 Center for Disease Control and Prevention. Asbestos. April 1, 2008. www.atsdr.cdc.gov/asbestos/asbestos/health_effects/ 6/19/2016
- 4 Center for Disease Control and Prevention. Asbestos. April 1, 2008. http://www.atsdr.cdc.gov/asbestos/asbestos/health_effects/#asbestosis , 6/19/2016
- 5 Gilbert, Steve G. Asbestos. Toxicology. May 31, 2014. <http://toxipedia.org/display/toxipedia/Asbestos>, 6/19/2016.
- 6 Center for Disease Control and Prevention. Asbestos. April 1, 2008. http://www.atsdr.cdc.gov/asbestos/asbestos/health_effects/#asbestosis , 6/19/2016
- 7 Center for Disease Control and Prevention. Asbestos. April 1, 2008. http://www.atsdr.cdc.gov/asbestos/asbestos/health_effects/#mesothelioma 6/19/2016
- 8 CHE. About the toxicant and disease database. 2011. www.healthandenvironment.org/tddb_about. July 27, 2016
- 9 CHE. About the toxicant and disease database. 2011. www.healthandenvironment.org/tddb_about. July 27, 2016
- 10 Center for Disease Control and Prevention. Asbestos. April 1, 2008. www.atsdr.cdc.gov/asbestos/asbestos/health_effects/ 6/19/2016
- 11 Center for Disease Control and Prevention. Asbestos. April 1, 2008. http://www.atsdr.cdc.gov/asbestos/more_about_asbestos/what_is_asbestos/ 6/19/2016 v
- 12 LaDou, Joseph, Castleman, Barry, et al. The case for a global ban on asbestos. Environmental Health Perspectives. <http://ehp.niehs.nih.gov/1002285/> 6/20/2016
- 13 Center for Disease Control and Prevention. Asbestos. April 1, 2008. http://www.atsdr.cdc.gov/asbestos/more_about_asbestos/what_is_asbestos/ 6/19/2016
- 14 National Institute of Environmental Health Sciences. Report on carcinogens, thirteenth edition: asbestos. <http://ntp.niehs.nih.gov/ntp/roc/content/profiles/asbestos.pdf> 6/21/2016
- 15 National Institute of Environmental Health Sciences. Report on carcinogens, thirteenth edition: asbestos. <http://ntp.niehs.nih.gov/ntp/roc/content/profiles/asbestos.pdf> 6/21/2016
- 16 LaDou, Joseph, Castleman, Barry, et al. The case for a global ban on asbestos. Environmental Health Perspectives. <http://ehp.niehs.nih.gov/1002285/> 6/20/2016
- 17 US Environmental Protection Agency. Safe work practices. www.epa.gov/asbestos/safe-work-practices 6/25/16
- 18 US Environmental Protection Agency. Safe work practices. www.epa.gov/asbestos/safe-work-practices 6/25/16
- 19 Center for Disease Control and Prevention. Asbestos. April 1, 2008. www.atsdr.cdc.gov/asbestos/asbestos/health_effects/ 6/19/2016
- 20 Consumer Product Safety Commission. Asbestos in the home. <http://www.cpsc.gov/en/Safety-Education/Safety-Guides/Home/Asbestos-In-The-Home/>, 6/27/16
- 21 Gilbert, Steve G. Asbestos. Toxicology. May 31, 2014. <http://toxipedia.org/display/toxipedia/Asbestos>, 6/19/2016.

22 Environmental Working Group. Asbestos: think again: asbestos is still not banned. March 4, 2004. www.ewg.org/research/asbestos-think-again/asbestos-still-not-banned

23 Congress.gov. Frank R. Lautenberg Chemical Safety for the 21st Century Act. 3/10/15. www.congress.gov/bill/114th-congress/senate-bill/697/all-info 6/27/16

24 Grant, Tavia. Asbestos-related cancer costs Canadians billions. The Globe and Mail. June 26, 2016. www.theglobeandmail.com/news/national/asbestos-related-cancer-costs-canadians-billions/article30621739/, June 27, 2016.

25 Grant, Tavia. Asbestos-related cancer costs Canadians billions. The Globe and Mail. June 26, 2016. www.theglobeandmail.com/news/national/asbestos-related-cancer-costs-canadians-billions/article30621739/, June 27, 2016.

26 The Mesothelioma Center. Libby. <http://www.asbestos.com/jobsites/libby/> , 6/29/16

27 WHO. Asbestos. http://www.who.int/ipcs/assessment/public_health/asbestos/en/ , 6/26/2016

28 LaDou, Joseph, Castleman, Barry, et al. The case for a global ban on asbestos. Environmental Health Perspectives. <http://ehp.niehs.nih.gov/1002285/> 6/20/2016