



Asbestos and Cancer Risk

What is asbestos?

Asbestos is a group of minerals that occur naturally as bundles of fibers. These fibers are found in soil and rocks in many parts of the world. They are made mainly of silicon and oxygen, but they also contain other elements. There are 2 main types of asbestos:

- **Chrysotile** asbestos, also known as white asbestos, is the most common type of asbestos in industrial applications. When looked at under the microscope, chrysotile asbestos fibers wrap around themselves in a spiral, which is why this form of asbestos is also called *serpentine* or *curly* asbestos.
- **Amphibole** asbestos fibers are straight and needle-like. There are several types of amphibole fibers, including amosite (brown asbestos), crocidolite (blue asbestos), tremolite, actinolite, and anthophyllite.

Both types of asbestos have been linked with cancer.

Asbestos fibers can be useful because they are strong, resistant to heat and to many chemicals, and do not conduct electricity. As a result, asbestos has been used as an insulating material since ancient times. Since the industrial revolution, asbestos has been used to insulate factories, schools, homes, and ships, and to make automobile brake and clutch parts, roofing shingles, ceiling and floor tiles, cement, textiles, and hundreds of other products.

During the first half of the 20th century, growing evidence showed that breathing in asbestos caused scarring of the lungs. Exposure to asbestos dust in the workplace was not controlled at that time. Beginning in England in the 1930s, steps were taken to protect workers in the asbestos industry by installing ventilation and exhaust systems. However, in the huge shipbuilding effort during World War II, large numbers of workers

were exposed to high levels of asbestos.

As asbestos-related cancers became better recognized in the second half of the 20th century, measures were taken to reduce exposure, including establishing exposure standards and laws that banned the use of asbestos in construction materials. There has been a dramatic decrease in importing and using asbestos in the United States since the mid-1970s, and alternative insulating materials have been developed. As a result, asbestos exposure has dropped dramatically. However, it's still used in some products, and it's still possible to be exposed to asbestos in older buildings, water pipes, and other settings. Asbestos use has been banned in the European Union since 2005, although the ban did not require removal of asbestos that was already in place. Still, heavy asbestos use continues in some countries.

How are people exposed to asbestos?

People can be exposed to asbestos in different ways:

- **Inhaling asbestos:** Most exposures come from inhaling asbestos fibers in the air. This can occur during the mining and processing of asbestos, when making asbestos-containing products, or when installing asbestos insulation. It can also occur when older buildings are demolished or renovated, or when older asbestos-containing materials begin to break down. In any of these situations, asbestos fibers tend to create a dust made of tiny particles that can float in the air.
- **Swallowing asbestos:** Asbestos fibers can also be swallowed. This can happen when people consume contaminated food or liquids (such as water that flows through asbestos cement pipes). It can also occur when people cough up asbestos they have inhaled, and then swallow their saliva.

Many people are exposed to very low levels of naturally occurring asbestos in outdoor air as a result of erosion of asbestos-containing rocks. The risk of this is higher in areas where rocks have higher asbestos content. In some areas, asbestos can be detected in the water supply as well as in the air. It can get into the water through several sources, such as rock or soil erosion, corrosion of asbestos cement pipes, or the breakdown of roofing materials containing asbestos that then enter the sewers after it rains.

However, the people with the heaviest exposure are those who worked in asbestos industries, such as shipbuilding and insulation. Many of these people recall working in thick clouds of asbestos dust, day after day.

Family members of asbestos workers can also be exposed to high levels of asbestos

because the fibers can be carried home on the workers' clothing, and can then be inhaled by others in the household.

Asbestos exposure is also a concern in older buildings. If building materials that contain asbestos (like older insulation and ceiling and floor tiles) begin to decompose over time, asbestos fibers can be found in indoor air and may pose a health threat. There is no health risk if the asbestos is bonded into intact finished products, such as walls and tiles. As long as the material is not damaged or disturbed (for example, by drilling or remodeling), the fibers are not released into the air. Maintenance workers who sweep up and dispose of the asbestos dust or handle damaged asbestos-containing materials are often exposed to higher levels than other people in these buildings. Removing asbestos from homes and other buildings can also cause some exposure, although modern asbestos abatement workers are trained to use proper protective equipment to minimize exposure.

Although use of asbestos has declined in the United States, people can still be exposed to asbestos in the workplace. In recent years, the US Occupational Health and Safety Administration (OSHA) has estimated that over a million American employees in construction and general industries face significant asbestos exposure on the job.

The mining and use of asbestos is also still a health hazard in some other parts of the world. Mining in the Russian Federation, China, Kazakhstan, Brazil, Canada, and Zimbabwe accounts for almost all of the world production of asbestos. Much of what is produced is used in the Russian Federation (and other countries in the former Soviet Union) and Asia, and its use is on the rise in some areas. In 2005, the World Health Organization estimated that about 125 million people worldwide were exposed to asbestos at work, despite the known links to cancer and other lung diseases for more than 60 years.

Does asbestos cause cancer?

Researchers use 2 main types of studies to try to figure out if a substance causes cancer.

- **Studies in people:** One type of study looks at cancer rates in different groups of people. Such a study might compare the cancer rate in a group exposed to a substance to the cancer rate in a group not exposed to it, or compare it to the cancer rate in the general population. But sometimes it can be hard to know what the results of these studies mean, because many other factors might affect the results.
- **Lab studies:** In studies done in the lab, animals are exposed to a substance (often

in very large doses) to see if it causes tumors or other health problems.

Researchers might also expose normal cells in a lab dish to the substance to see if it causes the types of changes that are seen in cancer cells. It's not always clear if the results from these types of studies will apply to humans, but lab studies are a good way to find out if a substance might possibly cause cancer.

In most cases neither type of study provides enough evidence on its own, so researchers usually look at both human and lab-based studies when trying to figure out if something causes cancer.

Evidence from studies in both people and lab animals has shown that asbestos can increase the risk for some types of cancer.

When asbestos fibers in the air are inhaled, they can stick to mucus in the throat, trachea (windpipe), or bronchi (large breathing tubes of the lungs) and might be cleared by being coughed up or swallowed. But some fibers reach the ends of the small airways in the lungs or penetrate into the outer lining of the lung and chest wall (known as the *pleura*). These fibers can irritate the cells in the lung or pleura and eventually cause lung cancer or mesothelioma.

Studies in people

Lung cancer

Inhalation of asbestos fibers has been linked to an increased risk of [lung cancer](#)¹ in many studies of asbestos-exposed workers. This increased risk is seen with all forms of asbestos (there is no "safe" type of asbestos in terms of lung cancer risk). In general, the greater the exposure to asbestos, the higher the risk of lung cancer. Most cases of lung cancer in asbestos workers occur at least 15 years after first exposure to asbestos.

In workers exposed to asbestos who also smoke, the lung cancer risk is even greater than adding the risks from these exposures separately.

Mesothelioma

[Mesothelioma](#)² is a fairly rare form of cancer that most often affects the thin linings of the organs in the chest (pleura) and abdomen (peritoneum).

Mesothelioma is closely linked with asbestos exposure. All forms of asbestos have been linked to mesothelioma, although amphibole asbestos appears to cause this cancer at

lower levels of exposure than chrysotile asbestos.

Most cases of mesothelioma result from exposure to asbestos at work. There is also an increased risk of mesothelioma among family members of workers and people living in neighborhoods near asbestos factories and mines. Although the risk of mesothelioma increases with the amount of asbestos exposure, there is no clear safe level of asbestos exposure in terms of mesothelioma risk.

Mesotheliomas typically take a long time to develop. The time between first exposure to asbestos and diagnosis of mesothelioma is usually 30 years or more. Unfortunately, the risk of mesothelioma does not drop with time after exposure to asbestos. The risk appears to be lifelong.

Unlike lung cancer, mesothelioma risk is not increased among smokers.

Other types of cancer

Studies have also found clear links between workplace exposure to asbestos and cancers of the [larynx \(voice box\)](#)³ and [ovaries](#)⁵.

Some studies have also suggested that workplace asbestos exposure may be linked to other cancers, including cancers of the pharynx (throat), stomach, colon, and rectum. However, the link between these cancers and asbestos is not as clear as it is for the other cancers discussed here. For cancer of the throat, the link is strongest for the hypopharynx, the part of the throat closest to the larynx (voice box). It's not clear exactly how asbestos might affect risk for these cancers, but swallowed asbestos fibers might somehow contribute to the risk.

Studies done in the lab

Tests on several different rodent species, using different methods of exposure, have confirmed that asbestos causes cancer in animals. All forms of asbestos have produced tumors in animals, but the size and shape of the asbestos fibers influence the incidence of tumors. Smaller, straighter fibers seem more hazardous, perhaps because they are more likely to reach the deepest parts of the lungs.

What expert agencies say

Several national and international agencies study substances in the environment to determine if they can cause cancer. (A substance that causes cancer or helps cancer grow is called a *carcinogen*.) The American Cancer Society looks to these organizations

to evaluate the risks based on evidence from laboratory, animal, and human research studies.

Based on animal and human evidence like the examples above, several expert agencies have evaluated the cancer-causing nature of asbestos.

The **International Agency for Research on Cancer (IARC)** is part of the World Health Organization (WHO). One of its goals is to identify causes of cancer. IARC classifies asbestos as “carcinogenic to humans,” based on its ability to cause mesothelioma and cancers of the lung, larynx (voice box), and ovaries.

The **National Toxicology Program (NTP)** is formed from parts of several different US government agencies, including the National Institutes of Health (NIH), the Centers for Disease Control and Prevention (CDC), and the Food and Drug Administration (FDA). The NTP has classified asbestos as “known to be a human carcinogen.”

The **US Environmental Protection Agency (EPA)** maintains the Integrated Risk Information System (IRIS), an electronic database that contains information on human health effects from exposure to various substances in the environment. The EPA classifies asbestos as a human carcinogen.

(For more information on the classification systems used by these agencies, see [6Known and Probable Human Carcinogens7](#).)

Does asbestos cause any other health problems?

The major health problem caused by asbestos exposure, aside from cancer, is a lung disease called *asbestosis*. When a person breathes high levels of asbestos over time, some of the fibers lodge deep in the lungs. Irritation caused by the fibers can eventually lead to scarring (fibrosis) in the lungs. This can make it hard to breathe. The main symptoms of asbestosis are shortness of breath and a chronic cough.

When asbestosis occurs, it is typically 10 to 20 years after the initial exposure to asbestos. The disease can get worse over time. While some people may not have serious symptoms, others may be seriously disabled by breathing problems. Unfortunately there is no effective treatment for this disease.

Asbestos can also reach the outer lining of the lungs (pleura), where it can cause pleural plaques (areas of hard, scar-like tissue in the pleura), pleural thickening, and pleural effusions (buildup of fluid between the lungs and the pleura). All of these conditions can make it harder to breathe.

How can I avoid exposure to asbestos?

If there is a possibility you might be exposed to asbestos at work, such as during renovating old buildings, you should use the proper protective equipment, work practices, and safety procedures designed for working around asbestos. If you're concerned about asbestos exposure in your workplace, discuss the situation with your employee health and safety representative or your employer. If needed, the Occupational Safety & Health Administration (OSHA), the federal agency responsible for health and safety regulations in most workplaces, can provide more information or make an inspection.

If you live in an older home, it might contain asbestos-containing insulation or other materials. A knowledgeable expert can check your home to determine if there is any asbestos and if it poses any risk of exposure. This may involve testing the air for asbestos levels. (Again, just because asbestos exists in a home does not necessarily mean that it needs to be removed. As long as the material is not damaged or disturbed, for example by drilling or remodeling, the fibers are not released into the air.) If asbestos needs to be removed from your home, hire a qualified contractor to perform this job to avoid contaminating your home further or causing any exposure to your family or to the workers. You should not attempt to remove asbestos-containing material yourself.

What should I do if I've been exposed to asbestos?

If you've been exposed to asbestos, it's important to assess the amount of your exposure. If you were exposed only very briefly, or only at very low levels, your risk of a resulting disease is probably low. However, if you were exposed at high levels or for long periods of time, you may be at increased risk of certain cancers or the other diseases discussed above. You can help protect your health in several ways:

- If you are a smoker, it's very important that you try to stop smoking. Evidence suggests that asbestos-exposed workers who quit smoking can significantly reduce their risk of developing lung cancer.
- Talk to your doctor about whether you should get regular health checkups to look for signs of asbestos-related diseases. This is especially important if you are a smoker. You may want to ask about seeing a doctor experienced with asbestos-related diseases. Some doctors recommend that people with heavy asbestos exposure get regular chest x-rays or CT scans and lung function tests. These tests can't detect asbestos fibers themselves, but they can sometimes find problems, including some cancers, that could be caused by the fibers. In fact, some expert groups advise that asbestos exposure alone is enough to consider getting regular

- CT scans to screen for lung cancer, regardless of a person's smoking history.
- Tell your doctor if you start to have symptoms that might be related to asbestos exposure such as shortness of breath, a new or worsening cough, coughing up blood, pain or tightness in the chest, trouble swallowing, or unintended weight loss. See your doctor promptly for any respiratory illness.
 - Ask your doctor about getting vaccines against flu and pneumonia.

If you've already been diagnosed with an asbestos-related disease, there are some places you may be able to go for financial help with treatment. Some people with asbestos-related illness may be eligible for Medicare coverage. Some people also may qualify for help, including medical payments, under different workers' compensation programs. These can include state workers compensation programs, the Federal Employees' Compensation Program, and the Longshore and Harbor Workers' Compensation Program. Eligible veterans may receive health care at a Department of Veterans Affairs (VA) Medical Center for asbestos-related diseases.

Hyperlinks

1. www.cancer.org/cancer/lung-cancer.html
2. www.cancer.org/cancer/malignant-mesothelioma.html
3. www.cancer.org/cancer/laryngeal-and-hypopharyngeal-cancer.html
4. www.cancer.org/cancer/ovarian-cancer.html
5. www.cancer.org/cancer/cancer-causes/general-info/known-and-probable-human-carcinogens.html
6. <http://www.atsdr.cdc.gov/>
7. <http://www.atsdr.cdc.gov/asbestos/index.html>
8. <http://www.epa.gov/>
9. <http://www2.epa.gov/asbestos>
10. <http://www.cancer.gov/>
11. <http://www.cancer.gov/about-cancer/causes-prevention/risk/substances/asbestos/asbestos-fact-sheet>
12. <http://www.cdc.gov/niosh>
13. <http://www.cdc.gov/niosh/topics/asbestos>
14. <http://www.osha.gov/>
15. <http://www.osha.gov/SLTC/asbestos/index.html>
16. <http://www.cancer.org/>

Additional resources

Along with the American Cancer Society, other sources of information and support include:

Agency for Toxic Substances and Disease Registry (ATSDR) Toll-free number: 1-888-422-8737 (1-888-42-ATSDR) Website: www.atsdr.cdc.gov (<http://www.atsdr.cdc.gov/>)⁸ Asbestos page: www.atsdr.cdc.gov/asbestos/index.html (<http://www.atsdr.cdc.gov/asbestos/index.html>)⁹

Environmental Protection Agency (EPA) Phone number: 1-202-566-0517 Website: www.epa.gov (<http://www.epa.gov/>)¹⁰ Asbestos page: www2.epa.gov/asbestos (<http://www2.epa.gov/asbestos>)¹¹

National Cancer Institute (NCI) Toll-free number: 1-800-422-6237 (1-800-4-CANCER) Website: www.cancer.gov (<http://www.cancer.gov/>)¹² Asbestos exposure and cancer risk: www.cancer.gov/about-cancer/causes-prevention/risk/substances/asbestos/asbestos-fact-sheet (<http://www.cancer.gov/about-cancer/causes-prevention/risk/substances/asbestos/asbestos-fact-sheet>)¹³

National Institute for Occupational Safety and Health (NIOSH) Toll-free number: 1-800-232-4636 (1-800-CDC-INFO) Website: www.cdc.gov/niosh (<http://www.cdc.gov/niosh/>)¹⁴ Asbestos page: www.cdc.gov/niosh/topics/asbestos (<http://www.cdc.gov/niosh/topics/asbestos>)¹⁵

Occupational Safety & Health Administration (OSHA) Toll-free number: 1-800-321-6742 (1-800-321-OSHA) Website: www.osha.gov (<http://www.osha.gov/>)¹⁶ Asbestos page: www.osha.gov/SLTC/asbestos/index.html (<http://www.osha.gov/SLTC/asbestos/index.html>)¹⁷

**Inclusion on this list does not imply endorsement by the American Cancer Society.*

No matter who you are, we can help. Contact us anytime, day or night, for information and support. Call us at 1-800-227-2345 or visit www.cancer.org (<http://www.cancer.org/>)¹⁸.

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