Asbestos and Cancer Risk

What is asbestos?

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

Asbestos fibers 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 in factories, schools, homes, and ships, as well as in making automobile brake and clutch parts, roofing shingles, ceiling and floor tiles, cement, textiles, and hundreds of other products.

There are different types of asbestos fibers (including chrysotile, crocidolite, amosite, tremolite, actinolite, and anthophyllite), and all of them have been linked with cancer.

How are people exposed to asbestos?

People can be exposed to asbestos mainly by:

- **Inhaling asbestos:** Most exposures come from inhaling asbestos fibers in the air. This can occur in people mining or processing asbestos, when making asbestos-

containing products, or 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 can float in the air and be inhaled. Some of these fibers can reach the ends of the small airways in the lungs or penetrate the outer lining of the lung and chest wall (known as the **pleura**).

- **Swallowing asbestos:** Asbestos fibers can also be swallowed. This can happen when people eat or drink 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, which comes from rocks that have broken down over time. 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 have worked in asbestos industries, such as shipbuilding and insulation.

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 break down 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).

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 limit their exposure.

As it has become clear over time that asbestos exposure can lead to health problems

(including an increased risk of some cancers), measures have been taken to reduce people's exposure, including establishing standards and laws that limit or ban the use of asbestos in construction materials. This has led to a dramatic decrease in the use of (and exposure to) asbestos in the United States since the mid-1970s. 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.

Although asbestos use has declined in the United States, people can still be exposed, especially in some types of workplaces. For example, Americans working in construction can still 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.

What about asbestos in talc products?

The main ingredient in talcum powder (and some other cosmetic products) is talc, a mineral that is mined from the earth. In its natural form, talc can sometimes contain asbestos. Since the mid-1970s, all talc used in cosmetic products in the United States is supposed to have been free from detectable levels of asbestos. However, concerns have been raised about a possible increased risk of ovarian cancer among women who have regularly applied talc-based powder in the genital area. For more on this topic, see Talcum Powder and Cancer[1].

Does asbestos cause cancer?

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

- **Studies in people** (epidemiologic studies)
- **Lab studies** (studies done using lab animals or cells in lab dishes)

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

Studies in people

Lung cancer

Inhalation of asbestos fibers has been linked to an increased risk of lung cancer[2] 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 develop at least a decade after first exposure to asbestos.

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

Mesothelioma

Mesothelioma[3] is a fairly rare form of cancer that most often affects the thin linings surrounding 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 some types appear to cause this cancer with less exposure than others.

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 communities 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 people who smoke.

For an illustration of the lungs and a description of their functions, visit our Anatomy Gallery[4].

Other types of cancer

Studies have also found clear links between workplace exposure to asbestos and cancers of the larynx (voice box)[5] and ovaries[6].

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 evidence for a link between these cancers and asbestos is not as strong as it is for the other cancers discussed here. 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 types of rodents, using different methods of exposure, have confirmed that asbestos causes cancer in animals. All forms of asbestos have caused 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 the available evidence.**

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 all forms of asbestos as "carcinogenic to humans," based on their ability to cause mesothelioma and cancers of the lung, larynx (voice box), and ovaries.

The US **National Toxicology Program (NTP)** is an interagency program of 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 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 Determining if Something Is a Carcinogen[7] and Known and Probable Human

Carcinogens[8].)

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 can 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.

While some people may not have serious symptoms from asbestosis, others may be seriously disabled by breathing problems, which can get worse over time.

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 or limit my exposure to asbestos?

If there is a chance you might be exposed to asbestos at work, such as during renovating old buildings, 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 might include 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 for 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 and watch for if I've been exposed to asbestos?

If you've been exposed to asbestos, it's important to understand the extent 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, it you were exposed at high levels or for long periods of time, you may be at higher risk of certain cancers or the other diseases discussed above. You can monitor and help protect your health in several ways:

- If you smoke, it's very important that you try to stop. Research 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 smoke. 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. Symptoms include 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 right away for any respiratory illness.
- Ask your doctor about getting vaccines against flu, pneumonia, COVID-19, and other respiratory infections.

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/risk-prevention/chemicals/talcum-powder-and-cancer.html
2. www.cancer.org/cancer/types/lung-cancer.html
3. www.cancer.org/cancer/types/malignant-mesothelioma.html
4. www.cancer.org/cancer/understanding-cancer/anatomy-gallery/respiratory-system.html
5. www.cancer.org/cancer/types/laryngeal-and-hypopharyngeal-cancer.html
6. www.cancer.org/cancer/types/ovarian-cancer.html
7. www.cancer.org/cancer/risk-prevention/understanding-cancer-risk/determining-if-something-is-a-carcinogen.html
8. www.cancer.org/cancer/risk-prevention/understanding-cancer-risk/known-and-probable-human-carcinogens.html

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