



Occupation and Cancer



Basic description

Occupational exposure to cancer-causing substances (carcinogens) is thought to account for about 4% of all cancers in the United States. Although occupational exposure to carcinogens has been reduced in recent decades, current statistics may reflect occupational exposures that occurred long in the past and are just now being identified.

It is known that certain chemicals (e.g., benzene, nickel compounds, vinyl chloride), dusts (e.g., leather or wood dusts, silica, asbestos), radiation (e.g., sunlight, radon gas, industrial, medical, or other exposure to ionizing radiation), and industrial processes (e.g., aluminum production, iron and steel founding, underground mining with exposure to uranium or radon) are occupational exposures that can cause cancer. In the United States, nearly all of these exposures are regulated, but potential exposure can occur through accidents, breaches in regulation, or unrecognized hazards.

Strength of evidence

Several ongoing systematic review processes determine whether an occupational exposure should be considered carcinogenic.

The International Agency for Research on Cancer (IARC) has developed a way of classifying exposures based on strength of evidence. The IARC classifies chemicals, industrial processes, and naturally occurring radiation to which a worker might be exposed as either: carcinogenic (causes cancer in humans), probably carcinogenic (probably causes cancer in humans, but more research is needed to be certain), possibly carcinogenic (some research indicates potential for human cancer, but more research is needed), not classifiable (based on lack of evidence), or probably not carcinogenic.

The National Toxicology Program, operated by the US National Institute of Environmental Health Sciences, also classifies exposures, listing them as either “known to be human carcinogens” or “reasonably anticipated to be human carcinogens.”

Although new substances and exposures are always being developed, these classification systems allow scientists, physicians, and regulators to summarize the current scientific evidence and to limit worker exposure to carcinogens. These scientific summaries are periodically updated as new information emerges. The possibility of accidents and negligence requires constant attention to workplace cancer safety by workers, employers, and regulators.

Cancers affected

A number of cancers have been associated with chemicals and chemical compounds, industrial processes, and naturally occurring radiation in the workplace. Examples of these cancers and the substances or processes with which they are associated are summarized in the table on the next page.

Opportunities for risk reduction

All cancers of occupational origin are preventable. Strong regulatory control, worker education, and constant attention to safe occupational practices are needed to minimize workplace exposure to carcinogens.

The US Food and Drug Administration, the Environmental Protection Agency, and the Occupational Safety and Health Administration all have regulatory responsibilities for developing safety standards for chemical or radiation exposure.

In addition, tobacco smoking greatly magnifies the risk of many occupational carcinogens. For instance, among workers exposed to asbestos, smokers have a lung cancer risk many times greater than that of people who are not exposed to asbestos and do not smoke. Quitting the use of tobacco can dramatically reduce a worker's risk of developing occupationally caused cancers.

Emerging trends

Emerging trends in the area of occupational exposure and cancer research include:

Identifying and classifying newer occupational exposures As technologies continue to evolve, typical American workplace exposures may change as well. Researchers continually look to identify these new exposures and determine what risks they may present.

Interactions between occupational and lifestyle risk factors The risks of some cancers due to occupational exposures may be magnified (or reduced) by interactions with lifestyle factors such as smoking or physical activity. Researchers are looking to understand such interactions, such as the effects of environmental tobacco smoke and indoor radon exposure at work on the risk of lung cancer. Scientists are also investigating the possible protective relationship between occupational physical activity and the risk of colon cancer.

Cancers associated with various occupations or occupational exposures

Cancer	Examples of substances or processes
Lung	Arsenic, asbestos, beryllium, cadmium, coke oven fumes, chromium compounds, coal gasification, nickel refining, foundry substances, radon, soot, tars, oils, silica, vinyl chloride, diesel exhaust
Bladder	Aluminum production, rubber industry, leather industry, textile industry, 4-aminobiphenyl, benzidine
Nasal cavity and sinuses	Formaldehyde, isopropyl alcohol manufacture, mustard gas, nickel refining, leather dust, wood dust
Larynx	Asbestos, isopropyl alcohol, wood dust
Pharynx	Formaldehyde, mustard gas
Mesothelioma	Asbestos
Lymphatic and hematopoietic	Benzene, ethylene oxide, herbicides, radiation
Skin	Arsenic, coal tars, mineral oils, sunlight
Soft-tissue sarcoma	Chlorophenols, chlorophenoxy herbicides
Liver	Arsenic, vinyl chloride
Lip	Sunlight

Additional resources

To learn more about occupational exposure and cancer and the American Cancer Society's programs, please call our toll-free number at 1-800-227-2345 or visit our Web site at www.cancer.org.

Additional information on occupational exposure and cancer may be found at:

- National Cancer Institute**
Cancer Information Service
 Toll-free number: 1-800-422-6237
 Web site: www.cancer.gov
- Environmental Protection Agency**
 Telephone: 202-272-0167
 Web site: www.epa.gov
- Occupational Safety and Health Administration**
 Toll-free number: 1-800-321-6742
 Web site: www.osha.gov

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Bottom line

Most occupations in the United States do not present a major risk for developing cancer. However, there are some industries – such as certain types of chemical manufacturing, mining, coal production, and iron and steel founding – in which cancer risk is higher for certain workers. Research has identified a range of carcinogens that can present a hazard to workers in these industries if they are exposed to them over time. Therefore, protection from cancer risk in the workplace is essential and involves a combination of aggressive, scientifically based regulation, worker education, and surveillance.



We **save lives** and create more birthdays
by helping you stay well, helping you get well,
by finding cures, and by fighting back.

cancer.org | 1.800.227.2345