

Chemicals and Cancer

Answers to Frequently Asked Questions

Where are chemicals in our environment found?

More than 100,000 chemicals are used by Americans, and about 1,000 new chemicals are introduced each year. These chemicals are found in everyday items such as foods, personal products, packaging, prescription drugs, and household and lawn care products. While some chemicals can be harmful, not all contact with chemicals is dangerous to your health.

Chemical substances and radioactive materials enter the environment from a source. Examples of outdoor sources include:

- Industrial facilities, e.g., factories and chemical plants
- Landfills
- Hazardous waste sites

Some examples of household sources include:

- Paints and paint strippers
- Household cleaners
- Cigarette smoke

How can I be exposed to a chemical?

In order for you to be exposed to a chemical contaminant, you must come into direct contact with the contaminant through a completed exposure pathway. An exposure pathway is the route a substance takes from its source to its end point, and how people come into contact with it. An exposure pathway is termed complete if it has each of these five components: a source of contamination, an environmental transport mechanism (such as movement through groundwater), a point of exposure (such as a private well), a route of exposure (eating, drinking, breathing or touching) and an exposed population.

State and federal environmental regulatory agencies such as the Ohio Environmental Protection Agency (OEPA) or the U.S. EPA may be contacted for information if environmental contamination is of concern. Your local health department can answer questions regarding health concerns in your community. Also, the Agency for Toxic Substances and Disease Registry, a federal public health agency, can evaluate the public health impact posed by hazardous waste sites and releases of hazardous materials to the environment.

Can exposure to chemicals cause cancer?

Certain chemicals, including benzene, beryllium, asbestos, vinyl chloride and arsenic, are known human carcinogens, meaning they have been found to cause cancer in humans.

Some chemicals are known to cause cancer in animals, but they have not been proven to cause cancer in humans. These chemicals are reasonably anticipated to cause cancer in humans and are sometimes called possible human carcinogens. Chloroform, DDT and polychlorinated biphenyls (PCBs) are examples of possible human carcinogens.

Your risk of developing cancer from exposure to a chemical depends on the following:

- The kind of chemical you were exposed to
- How much contact you had with the chemical
- How long the contact lasted
- How often you were exposed
- When you were exposed
- How you were exposed
- Your general health

The time in your life when you are exposed to a chemical is important because a small exposure in the womb, for example, may be more serious than a small exposure as an adult. The genes that you inherit from your parents also play a role.

Coming into contact with a carcinogen does not mean you will get cancer. It depends on what you were exposed to, how often you were exposed and how much you were exposed to, among other factors.

Determining if a chemical exposure is associated with cancer is difficult, due to unknown levels of exposure, exposures to more than one chemical and cancer's long latency period.

Some factors that increase your risk of developing cancer include behaviors such as smoking, heavy alcohol consumption, on-the-job exposure to chemicals, radiation, sun exposure and some viruses and bacteria. When all these risks are considered together, the role of chemical exposures in causing cancer is small and, as of now, not very clear.

What substances are known to cause cancer?

A carcinogen is a substance or agent known to cause cancer. Several agencies have determined the cancer-causing potential of different substances. The National Toxicology Program (NTP) lists 62 substances “known to be human carcinogens” in its *Report on Carcinogens* (14th Edition, 2016). The report also lists 186 substances that are “reasonably anticipated to be human carcinogens.” The International Agency for Research on Cancer (IARC), part of the World Health Organization, has the most widely used system for classifying carcinogens.

Cancers Associated with Various Chemicals^{*}

Cancer Site	Examples of chemicals or exposures
Bladder	Arsenic and inorganic arsenic compounds Benzidine Tobacco smoke <i>ortho</i> -Toluidine
Blood (Leukemia, Lymphoma)	Benzene Ionizing radiation 1,3-Butadiene
Brain	Ionizing radiation
Colon	Alcohol Tobacco smoke
Kidney	Arsenic Cadmium and cadmium compounds Trichloroethylene (TCE)
Liver	Alcohol TCE Vinyl chloride
Lung	Arsenic and inorganic arsenic compounds Asbestos (all forms) Beryllium and beryllium compounds Cadmium and cadmium compounds Chromium (hexavalent) compounds Coke oven emissions Radon-222 and its decay products Tobacco smoke
Oral Cavity & Pharynx	Alcohol Betel nut use Tobacco use (smoking and smokeless)
Skin	Arsenic and inorganic arsenic compounds Coal tars Overexposure to the sun Ultraviolet radiation from tanning booths

Sources: 1.) International Agency for Research on Cancer;
2.) National Toxicology Program, *Report on Carcinogens*, 14th Edition;
U.S. Department of Health and Human Services, 2016.

How can I avoid harmful exposures?

Though we do not fully understand why one person gets cancer and another doesn't, we do know that there are some steps you can take that may reduce your risk:

- Don't use tobacco and avoid secondhand smoke.
- Protect yourself from the sun's rays, especially if you burn easily. Use sunscreen and wear protective clothing.
- Be aware of the chemicals in the products you buy for your home. Wear a mask, gloves or other protective clothing to reduce your exposure to household chemicals.
- Store household chemicals such as cleaners, paints/finishes, degreasers and strippers safely and prevent chemicals from spilling, leaking and coming into contact with children and pets.
- Use chemicals in well-ventilated rooms or outside.
- Check your home for high levels of radon.
- Be aware of chemicals you are exposed to on the job.
- Wear personal protective equipment as required.

Resources:

American Cancer Society

www.cancer.org

Agency for Toxic Substances and Disease Registry

www.atsdr.cdc.gov

International Agency for Research on Cancer

www.iarc.fr

National Toxicology Program

www.ntp.niehs.nih.gov

Ohio Department of Health

Cancer Programs

<http://www.odh.ohio.gov/health/cancer/cancprgms.aspx>

^{*} **Note:** Due to limited space, the table presented here lists a select number of chemicals or exposures known to cause cancer. For a full listing of known and possible carcinogens, see the NTP and IARC resources provided.