

Understanding Chemical Hazards

How Do Chemicals Get Into the Body?

In order to cause health problems, chemicals must enter your body. There are three main “routes of exposure,” or ways a chemical can get into your body.

- **BREATHING (INHALATION):**

Breathing in chemical gases, mists, or dusts that are in the air.

- **SKIN OR EYE CONTACT:**

Getting chemicals on the skin, or in the eyes. They can damage the skin, or be absorbed through the skin into the bloodstream.

- **SWALLOWING (INGESTION):**

This can happen when chemicals have spilled or settled onto food, beverages, cigarettes, beards, or hands.



Once chemicals have entered your body, some can move into your bloodstream and reach internal “target” organs, such as the lungs, liver, kidneys, or nervous system.

What Forms Do Chemicals Take?

Chemical substances can take a variety of forms. They can be in the form of solids, liquids, dusts, vapors, gases, fibers, mists and fumes. The form a substance is in has a lot to do with how it gets into your body and what harm it can cause. A chemical can also change forms. For example, liquid solvents can evaporate and give off vapors that you can inhale. Sometimes chemicals are in a form that can’t be seen or smelled, so they can’t be detected.

Detecting some forms of chemicals can be difficult. Solids and liquids are easier to recognize since they can be seen. Dusts and mists may or may not be visible, depending upon their size and concentration. Fumes, vapors, and gases are usually invisible.

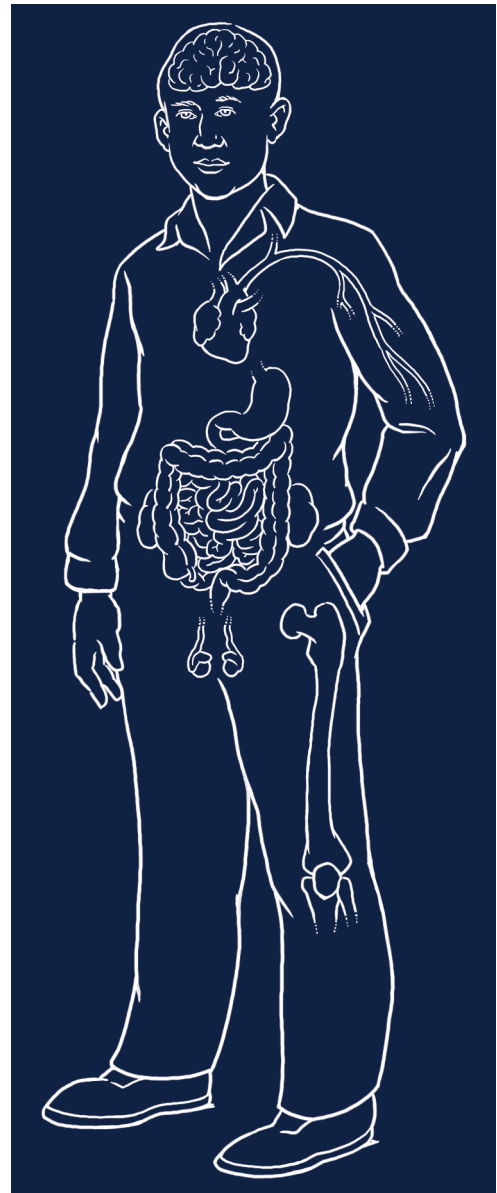
What Health Effects Can Chemicals Cause?

The effects of a toxic chemical on your body may be either *acute* or *chronic*.

Acute (short-term) effects show up immediately or soon after exposure to the chemical. They may be minor, like nose or throat irritation, or they could be serious, like eye damage or passing out from chemical vapors. What all these effects have in common is that they happen right away.

Chronic (long-term) effects may take years to show up. They are usually caused by regular exposure to a harmful substance over a long period of time. These effects are usually permanent.

Some chemicals cause both acute and chronic effects. For example, breathing solvent vapors might make you dizzy right away (an acute effect). But breathing the same vapors all the time for many years might eventually cause liver damage (a chronic effect).



What Symptoms May be Caused by Chemicals at Work?

	SYMPTOMS	COMMON CAUSES
Head	Dizziness, headache	Solvents, paint, ozone, smoke (including tobacco)
Eyes	Red, watery, irritated, grainy feeling	Smoke, gases, various dusts, vapors from paint and cleaners
Nose and Throat	Sneezing, coughing, sore throat	Smoke, ozone, solvents, various dusts, vapors and fumes from paint and cleaners
Chest and Lungs	Wheezing, coughing, shortness of breath, lung cancer	Metal fumes, various dusts, smoke, solvents, vapors from paint and cleaners
Stomach	Nausea, vomiting, stomachache, diarrhea	Some metal fumes, solvents, paint vapors, long-term lead exposure
Skin	Redness, dryness, rash, itching, skin cancer	Solvents, chromium, nickel, detergents and cleaners, paint on skin
Nervous System	Nervousness, irritability, sleeplessness, tremors, loss of balance or coordination	Long-term solvent exposure, long-term lead exposure
Reproductive System	For men: low sperm count, damage to sperm For women: irregularities in menstruation, miscarriage, damage to egg or fetus	Lead, toluene, some other solvents, ethylene oxide gas

What Factors Affect Your Risk?

1. How toxic the chemical is.	The more toxic the chemical, the more likely it will cause health problems, even in small amounts. Asbestos and cyanide are considered highly toxic because a very small quantity can cause health effects.
2. How the chemical gets into the person's body (route of exposure).	The way a chemical enters your body affects your risk. Some chemicals, like the pesticide parathion, are very toxic whether they get into the body through the skin, by breathing, or by swallowing. On the other hand, asbestos is only harmful when inhaled or swallowed. A house may have asbestos insulation, but unless the asbestos is disturbed and becomes a dust in the air, it can't be breathed in, so it won't cause harm.
3. The amount of the chemical that you are exposed to (dose).	For some chemicals, the higher the amount, the greater the damage. For example, acetone is an industrial solvent that is also found in nail polish remover. It is more dangerous to the worker who uses large amounts than to the person who uses a little nail polish remover.
4. How long you are exposed to the chemical (duration).	The longer the exposure, the greater the danger. For example, someone may work with a chemical for half an hour per day, while another person is exposed for eight hours a day. Also, someone may be exposed for one month, while another person may have 20 years of exposure.
5. Reaction and interaction with other chemicals.	Some chemicals in combination can create a different chemical that is more hazardous than the original ones (reaction). For example, ammonia and bleach used together can produce a highly toxic chemical. Some chemicals, in combination, can increase the likelihood of harm. For example, workers who have been exposed to asbestos increase their likelihood of getting lung cancer if they smoke cigarettes.
6. Individual differences (like heredity, body size, age, smoking, drinking, allergies, sensitivities, or previous exposures to other toxic chemicals).	Chemicals can be more harmful to some people than to others. Lead is much more harmful to small children than adults because it affects their developing brain and nervous system. If two people work with asbestos and one of them smokes, the smoker is more likely to develop asbestos-related lung cancer than the non-smoker.