

Safe Not Sorry

In 2007, ABC News reported on a woman who ordered fizzy apple juice with rum at a bar near Dundee, Scotland, and got something far stronger. Someone had placed a bottle of pipe cleaning solution containing lye (sodium hydroxide) in the bar's refrigerator. The bottle was mistaken for fizzy apple juice. After a single sip of the hazardous "cocktail," the woman collapsed to the floor in pain. Her mouth and throat were so burned by the sip that she could not eat or swallow and had to be fitted with a feeding tube to survive.

Always Read the Label

Almost every home in the United States contains hazardous chemicals. ▶

A hazardous chemical is a chemical that poses some form of danger to humans, domestic animals, or the environment. A product label provides information about whether a material is hazardous and, if so, what kind of hazard it poses. Failure to read a label properly can have serious consequences.

Household chemical labels tell you about chemical hazards and potential risks and actions to be taken in case of exposure. The Consumer Product Safety Commission (CPSC) governs the content of consumer labels for most household chemicals. According to CPSC regulations, the label must prominently state warnings to the consumer about the product hazards, words describing how hazardous the product is, and a list of other pertinent information about the product. The information must be presented in conspicuous and legible type that contrasts in type size or font, layout, or color with other printed matter on the label.

Warning Words: What's the Danger?

Hazardous chemicals are classified into six main types. ▶

Each type is represented by a symbol and one or more special warning words. Many hazardous chemicals fall into more than one of these categories.

▶ **Flammable:** *ignites easily and burns rapidly*

Includes substances that vaporize at room temperature (about 73°F) to form an ignitable mixture with air, such as gasoline, acetone/toluene (commonly found in fingernail products), alcohol, and lacquer thinners. Also includes combustible substances, which don't vaporize as much at room temperature and usually require a higher temperature (around 200°F) to ignite, such as kerosene and vegetable oil.



▶ **Explosive:** *produces a sudden release of pressure, gas, and heat*

Most consumer products found in the home, except fireworks, are not explosive.



▶ **Sensitizer:** *repeated exposure may cause irritation or illness*

Latex (found in rubber gloves) and formaldehyde (found in foam insulation and glues) are examples of sensitizers. Skin sensitization is the most common reaction, resulting in rashes and eczema.

▶ **Corrosive:** *damages living tissue on contact*

Examples include strong acids or bases commonly found in drain cleaners.



▶ **Irritant:** *causes inflammation at the point of contact*

Some examples are toilet cleaners, all-purpose cleaners, and mold and mildew removers.

▶ **Toxic:** *harmful when ingested, inhaled, or absorbed through the skin*

Some chemicals are considered acutely (immediately) toxic and others are chronically (delayed) toxic. Examples of acutely toxic substances include ethylene glycol (antifreeze) and some pesticides. Asbestos is an example of a chronic toxin, usually causing health effects after long and repeated exposure.



Signal Words: How Dangerous?

Signal words are required by law to appear on labels of hazardous products.

▶ **CAUTION or WARNING:** mildly to moderately hazardous; can cause temporary adverse health effects, such as skin irritation or vomiting

▶ **DANGER:** more severely hazardous; can cause serious health effects, such as skin burns or stomach ulcers

▶ **POISON:** hazardous substances defined as highly toxic; used with the signal word **DANGER** and the skull-and-crossbones symbol.

▶ No signal word (no warning): relatively nonhazardous

The Dose Makes the Poison

Toxicity is the degree to which a substance is able to damage a person who has been exposed through absorption, injection, inhalation, or ingestion. ►

In sufficient quantity, any chemical—including common ones like water and table salt—can be toxic. The smaller the dose that is required to produce a harmful effect, the more toxic a chemical is considered to be. Highly toxic chemicals are also called poisons.

Toxic chemicals that produce immediate harm are called *acutely toxic*. Acute toxins can harm or even kill a person after a single dose. Chemicals that do not pose an immediate risk but rather a long-term risk are called *chronically toxic*. These chemicals are not directly harmful in single doses, but they cause harm when organisms are exposed to them over long periods of time. Some products have labels that say “nontoxic,” but this word has no legal meaning except for use on art supplies.

The table below lists various household products, signal words, and the doses required to produce toxic effects on an average-sized adult. The lethal dose may be quite different for younger, smaller, or less healthy people.

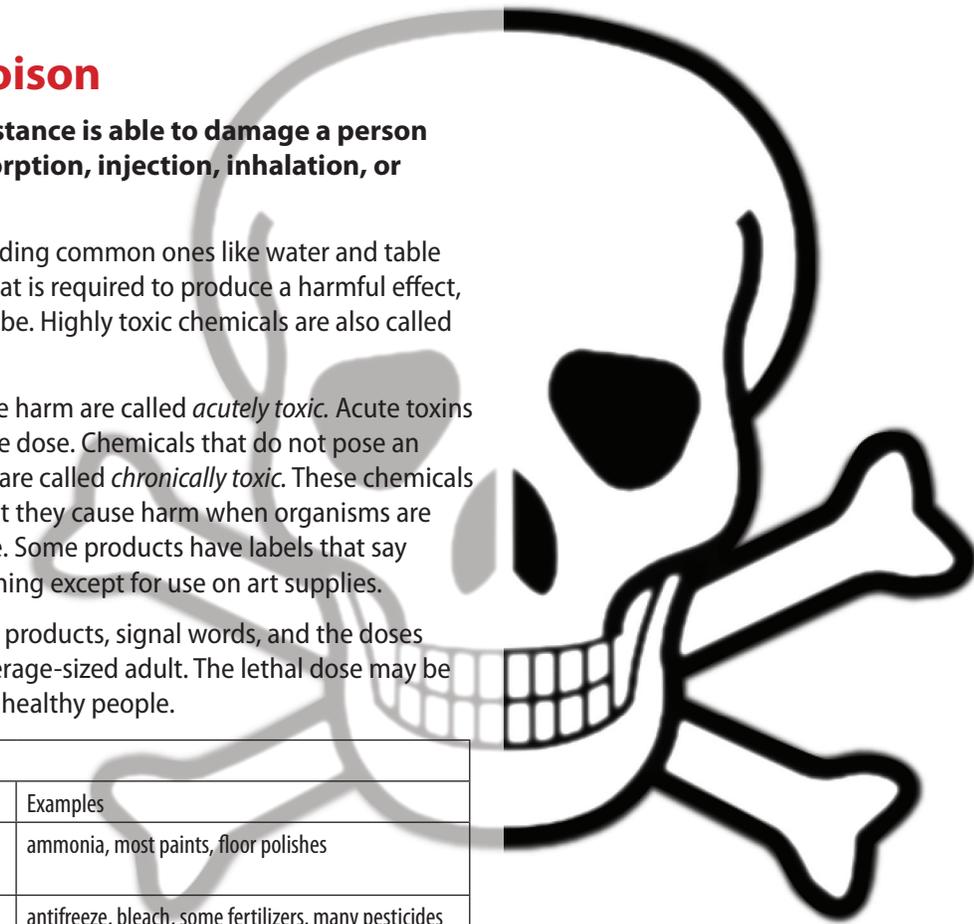
Hazardous Substance Toxicity Chart		
Signal Word	Toxicity*	Examples
CAUTION	moderately toxic lethal dose: an ounce to a pint	ammonia, most paints, floor polishes
WARNING	very toxic; lethal dose: a teaspoon to a tablespoon	antifreeze, bleach, some fertilizers, many pesticides
DANGER	extremely toxic lethal dose: a taste to a teaspoon	rat poison, mercury batteries, some pesticides and weed killers, paint thinner, drain opener, some oven cleaners

Source: Gosselin R.; Smith, R.; Hodge, H.; Braddock, J. *Clinical Toxicology of Commercial Products*; Williams and Wilkins: Baltimore, 1984, pp 1–2.

The table below shows the probable lethal doses for some common household substances if consumed in one sitting.

Probable Oral Lethal Dose for Some Common Substances (150-Pound Human)	
water	about 10 quarts
sugar	2.5 pounds
salt	7 ounces
coffee (caffeine)	100 cups
cigarettes (nicotine)*	1 pack
aspirin	100 tablets
80-proof whiskey (ethyl alcohol)	about 1 liter
spinach (oxalic acid)	about 15 pounds

Adapted from: Ross, J. *The Polar Bear Strategy: Reflections on Risk in Modern Life*; Perseus: Reading, MA, 1999., p. 132.
*Assumes 3 mg nicotine/cigarette at lethal oral dose of 60 mg. (See *Clinical Toxicology of Commercial Products*, 1984, p. III-311.)



Fatal H₂O

According to the medieval physician Paracelsus “It’s the dose that differentiates a poison from a remedy...”

For example, two tablets of Extra-Strength Tylenol® (acetaminophen) may relieve a headache, but 40 tablets taken at once can cause serious liver injury or death. Even plain water can be a fatal poison. In January 2007, a 28-year-old California woman died from water intoxication while competing in a radio station contest to see how much water contestants could drink without going to the bathroom.

When You Need More Information

How can you find out more about the chemical products you're using (or considering using)? ►

You can contact the manufacturer or visit their website and ask for details on the ingredients and how to use the product safely. You can also contact a Poison Control Center and ask them for information. Find the Poison Control Center nearest you at www.aapcc.org.

For even more detailed information, you can look at a Material Safety Data Sheet (MSDS) for that product. MSDSs provide lots more information than you'll find on a product label. Keep in mind, though, that MSDSs are frequently written to describe the hazards of working with much larger quantities or concentrations than a general consumer would ever be in contact with. As a result, control measures that are listed in an MSDS, such as use of personal protective equipment (PPE) or spill cleanup, may be inappropriate in a typical home setting. To find out more, you can check out many MSDSs on the web. One place to start is www.ilpi.com/msds/, which provides links to Internet resources for MSDSs.

How Chemicals Enter the Body

Chemicals can enter your body through four primary routes: absorption through skin or eyes, injection, inhalation, and ingestion. ►

Absorption of hazardous chemicals through the skin or eyes can cause effects ranging from slight irritation to permanent damage. Some toxins that enter the body this way can reach your bloodstream and damage your nerves, liver, kidneys, or red blood cells. Gloves, aprons, and goggles protect against skin and eye absorption.

Injection of a chemical can occur accidentally when handling sharp items such as hypodermic needles or broken glass. Gloves and aprons, depending on what they are made of, provide some protection against injection. Long pants, long sleeves, and shoes without openings also help protect you.

Inhalation of gases, vapors, dust, and fumes can occur when you breathe. Some chemicals damage your lungs directly. Others enter your lungs and then your bloodstream and can affect your body's ability to take up oxygen or damage tissues. Proper ventilation is required to provide protection from inhalation. Special masks or respirators may also be required.

Ingestion of chemicals may occur by eating, drinking, or smoking with contaminated hands or in a contaminated area, or otherwise placing materials in your mouth. This is why you should generally not eat, drink, smoke, or apply cosmetics after working with most chemicals until you've washed your hands.



Protect with PPE

Personal protective equipment (PPE) such as goggles and gloves help protect you against entry of chemicals by inhalation or absorption and provide some protection against accidental injection. Some product labels tell you what type of PPE to wear when using.

Gloves: Chemical protective gloves are made of various materials, each designed for certain situations. Some are impermeable to gases and water vapor; others can't be used in water or water-based solutions. Cloth gloves may protect from extreme temperatures, but won't keep fluids off your skin.

Goggles: Goggles and safety glasses with side shields can protect your eyes from flying objects. Some goggles are also designed to prevent liquids from splashing in your eyes. Only nonventilated goggles can protect your eyes from vapors and fumes.

Masks: Masks and respirators help protect you from inhalation hazards. Some only protect from nuisance dust; others are approved for paint or pesticide applications. You must read the manufacturer's label on the mask or respirator to find the right one for the job you're doing. Certain respirators must be "fit tested" to confirm that the product is protecting as intended.

Not All Chemicals Come Labeled

It's a fact of nature that if you raise animals of any sort, you're going to end up with the animals' waste somewhere. Manure and urine need to be handled carefully. These natural by-products ferment to produce ammonia, methane, hydrogen sulfide, and/or carbon dioxide. If kept in a confined area, these gases can become, at the very least, irritating to you and your animals. The gases could even prove to be fatal if they build up to high enough levels. Manure pits on farms can be especially hazardous because of the large quantities of manure present. If you see someone pass out in a manure pit, do not attempt to rescue him or her. You could end up a victim yourself. Instead, call the fire department or rescue squad personnel, who will have proper protective gear to attempt a rescue in these very dangerous conditions.



Silly Labels— Or Are They?

The labels on some products may seem silly, like the label on a bottle of drain cleaner that advises users not to use it if they can't read or understand the warning label. Michigan Lawsuit Abuse Watch (M-LAW) gives annual awards for the wackiest warning labels. Recent winners include a label on a popular scooter for children that warns *"This product moves when used,"* and a label on an electric food blender that warns *"Never remove food or other items from the blades while the product is operating."*

M-LAW says that ridiculous warnings are a reaction by manufacturers to prevent lawsuits filed by consumers who don't use common sense or take personal responsibility for their actions. These lawsuits cost Americans billions of dollars yearly because companies must defend themselves in court.

We've all seen the warning on top of carry-out coffee cups: *"Caution! Contents are hot!"* Well, of course they're hot. They're supposed to be hot. Why do they need to tell us? Is this just a company's attempt to cover itself from another frivolous lawsuit? Maybe, but according to Great Britain's Department of Health, nearly 1,500 people were injured by hot drinks in 2004, and most of them needed at least one night in the hospital. Clearly, some sort of warning is desirable.

Another type of warning that may seem odd at first occurs on antibiotics labeled with dosing instructions and the words *"Take until gone."* But, when taking antibiotics, you usually feel better much sooner than you run out of medicine. If you stop taking it when you feel better, you may just get sick again—possibly with a drug-resistant strain of bacteria. Other warnings are clearly meant as jokes, such as the Boeing 757 marked *"Do not drop."*

Many labels become wacky through mistranslation of English by foreign manufacturers. Some funny examples include: *"For indoor or outdoor use only"* on a string of Christmas lights; *"Please keep out of children"* on a butcher knife; and *"Excessive dust may be irritating to shin and eyes"* on a powdered chemical.

Even though product labels are occasionally amusing, don't forget the important role labels play in keeping you safe!



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Visit www.cchemu.org/healthrich/activities for free activities on chemical safety.



Sickening Soft Drink

Labels are meant to protect, but they're of no use if you transfer the contents from the original container to another, unlabeled container. Whether through a desire to save space or the eco-friendly habit of reusing containers, people sometimes store hazardous substances improperly. The consequences can be frightening.

In March 2009, the owner of a day care center in Little Rock, Arkansas, grabbed a container of blue "soft drink" and filled cups for 10 children. After a couple of sips, the children realized the "drink" was bad, but they had swallowed enough of what was actually windshield wiper fluid to require hospital treatment. Fortunately, no children died, but they had measurable amount of methanol—a type of alcohol that can cause blindness or coma—in their bloodstreams. The owner of the day care center voluntarily surrendered her license.