

8 Chemical dangers

Chemicals surround us. They are in our homes, our schools, our work, and in our water and air. We get so used to them that sometimes we forget about them and ignore them. Other times, we fear them.

What we really need to know is: If a chemical can harm our health, what can we do to make ourselves safer? The answer depends on:

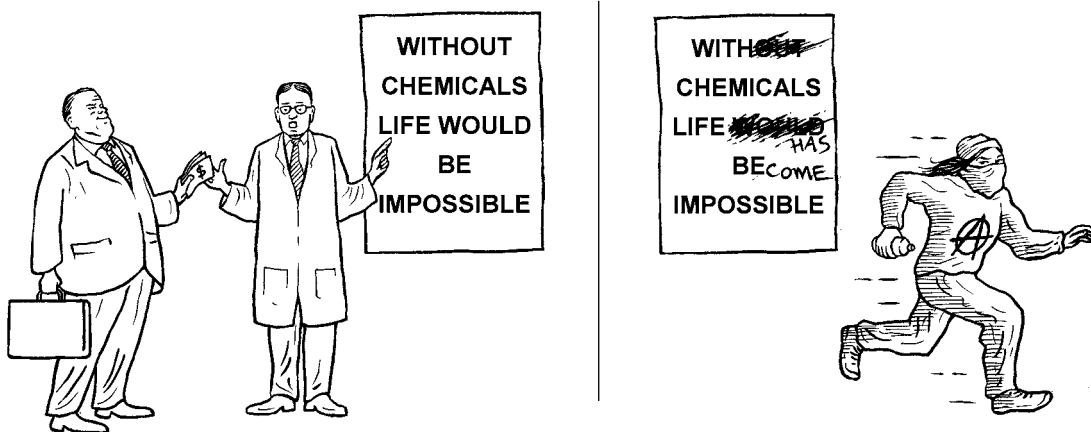
- What chemical is it?
- What form do you use it in?
- How does it get onto or into your body?
- To how much and for how long are you exposed?

No chemical is more important than a human being. We have the right, as workers and consumers, to live free from the illnesses caused by the use of dangerous chemicals.

Why would anybody use chemicals that can harm, disable, or kill people? Chemical companies and factory owners say chemicals can be “easily” controlled and used safely. But when the controls fail, do not protect enough, or are not used in the first place because the bosses think they cut into profits, it is the workers or people in surrounding communities who pay with their health.

To protect workers, the environment, and the community, we have to reduce the use of chemicals that harm our health, replace them with safer chemicals used in safer ways, and eliminate and ban toxic chemicals.

For information on specific chemicals, see Appendix B: Common chemicals and materials. For our sources for chemical information, see pages 463 to 464.



Safe chemicals: Who's responsible?

Thousands of chemicals are created and used each year. But as important as they are to our economies, the laws and practices about chemicals do not protect people enough from their harmful effects. Chemical companies, governments, factory owners, and others who oversee their development, sale, and use are part of a system that has harmed people all over the world.

- **Chemical companies should prove a chemical is safe before it can be sold and used.** Only a few thousand chemicals have been studied for their effects on people and the environment. Almost none have been studied for how they interact with other chemicals in the body. If testing is carried out, it often does not include all health effects.
- **Companies and governments must take responsibility for chemicals in use.** The company that sells or uses the chemical should be responsible for making it safe for workers and consumers. If people get sick from a chemical, governments must move quickly to regulate or ban it.
- **Chemicals should be safe for people inside and outside the factory.** “Safe” exposures for workers are set higher than what is considered safe outside the workplace. We all deserve to be safe from toxic chemicals. Employers should use the same, most protective standards in and out of the factory.
- **Use fewer chemicals in the workplace.** Many products release some of the toxic chemicals used to make them after they leave the factory, as they are used, discarded, or recycled. Products should be designed to use fewer chemicals in their manufacture so they will cause fewer problems “from cradle to grave.”
- **A chemical should only be replaced by a safer chemical, not by another toxic one.** Many companies want to stop using toxic chemicals. However, they often replace one toxic chemical with another one that has not been well studied for health and environmental effects. The new chemical is often just as dangerous, but because its problems have yet to be discovered, it is considered “safer” or “greener.”



Safe chemicals in the workplace

If a chemical is to be used in a workplace, it is the employer's responsibility to choose one that:

- is essential to the product, which could not be made without it.
- is safer than other possible alternatives.
- is used in smaller amounts than other alternative chemicals.
- can be used and disposed of without harming the workers or the community.

It is the boss's responsibility to give you chemical information in a language you understand. Workers who do not read well can learn about chemicals from pictures, videos, demonstrations, explanations, and hands-on practice. When you start a new job or are assigned new work, your supervisor should train you on the safe use of the chemicals you work with, their health effects, and what to do if there is an accident.



To work as machine operators, we are trained in how to work with and use chemicals. We learn how to mix them, how to store them, and how to clean the machines. But when we saw our co-workers getting sick, we realized the trainings didn't teach us about the chemicals' health effects.

Exposure to chemicals

The chemicals used in a factory can affect your health when they get onto or into your body. Chemicals in some forms are more dangerous than others. For instance, solids and heavy liquids stay in one place and are less likely to get in the air unless grinding, heating, and sawing generates dust and fumes. Powders, sprays, or gases, as well as the dust, smoke, fumes, and mists created when using some chemicals, are more dangerous because they can quickly get in the air. They are also small enough to get in the nose and lungs. As chemicals spread and settle on floors, windows, work surfaces, and inside machines, vacuums, and ventilation ducts, it is more likely that you will come in contact with them.



Caution! Do not sniff, taste, or touch chemicals to find out what they are.

Signs of exposure

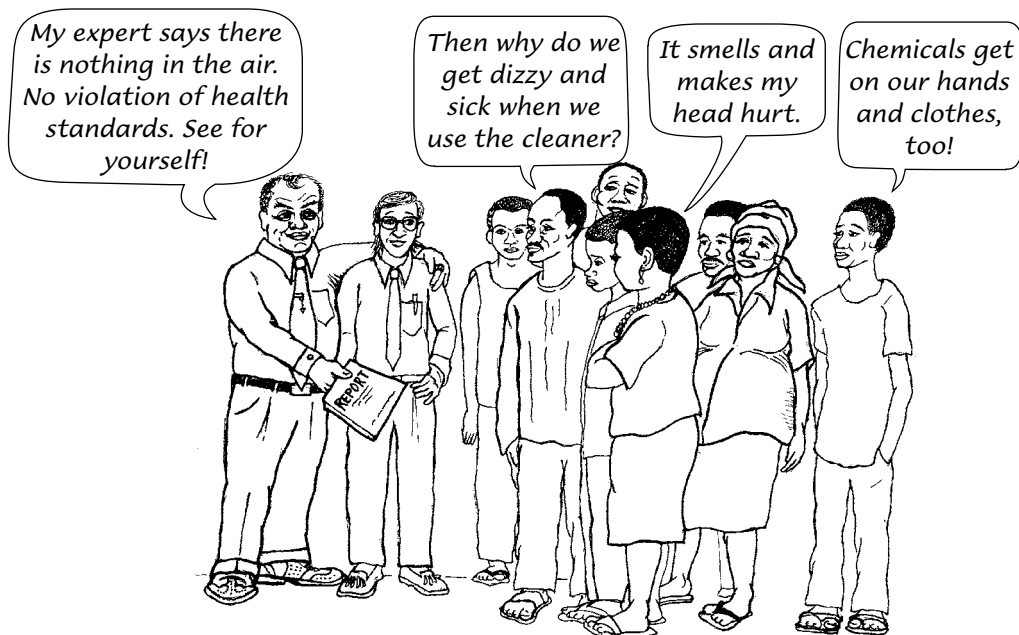
You can know you have been exposed to chemicals when:

- You have irritation of the nose, throat, or lungs, or trouble breathing.
- You feel a chemical on your skin, especially if it burns or itches. You might also get a rash or other skin problem where the chemical touched you.
- You have a chemical taste in your mouth, either from breathing, ingesting, or absorbing it through the skin.
- You feel the effects of the chemical, such as feeling dizzy, confused, irritable, or ill.

If you have any of these signs, get away from the chemical and tell your co-workers and supervisor there is a problem.

Since signs of many health problems take a long time to develop, especially for reproductive problems and cancers, if you are worried there is exposure, tell your co-workers and supervisor, and act to prevent the problem from getting worse (see pages 164 to 172).

Occupational safety and health (OSH) professionals are often asked to investigate and limit chemical exposures. When asking about chemical exposures, they should hold private interviews with several people from each factory area so no one can guess who gave what particular information.



Who knows best?

How chemicals get on or in your body



Through breathing through your nose and mouth. When you smell a chemical, you are breathing it. But some chemicals do not have any smell, or you get used to the smell and no longer notice it.

Through your skin and eyes when the chemical gets on you, or through cuts on the skin. Sometimes you can see mists, droplets, fumes, and gases. If they are not removed by extractors or another type of ventilation, they can be absorbed through the skin and watery area of your eyes, as well as through the nose and mouth.



Through your mouth. This does not happen because you intend to eat it, but it can happen when the chemical is on your hands or clothes and you touch food or a cigarette that goes into your mouth. Chemical dust or a splash can get on your lips or inside your mouth. You also swallow chemicals that are already in cigarettes, food, or water. This happens more often than you would think.



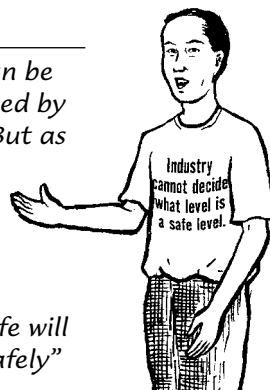
Most workers use more than one chemical at their workstation. Those chemicals might react with others already in the materials they are working on. When leading trainings about chemicals and health effects, keep in mind that sometimes workers' health problems are related to the combination of many chemicals at a time — not just one!

Measuring exposure

If you get a little chemical on you and wash it off very quickly, this may not be much exposure. If you are splashed with a chemical and breathe it, this may be a lot of exposure. Different chemicals are dangerous in different amounts.

When there are accidents in factories, usually workers and employers all know there was exposure. But often the exposures that harm workers most are those that happen every day and are so routine that no one pays attention to them. And although you might be exposed to only a very small amount, if that exposure happens every day for a long time, it can cause serious problems.

OSH professionals are taught that most chemicals can be used safely. They learn that a person will not be harmed by a chemical if they are not exposed to too much of it. But as researchers prove that some chemicals are dangerous even at very low levels — levels that used to be considered safe — it becomes clear that some “safe use” standards were not safe at all. For example, BPA (bisphenol-A), phthalates, and lead cause harm at very low levels. As we learn more, levels considered safe will be lowered again and again. But who wants to be “safely” exposed the day before the levels change?



Your employer and your government are responsible for monitoring chemicals in the workplace and for taking action to reduce exposures that can harm people's health. Unfortunately, many companies do not measure exposures and do not do enough to prevent them. And government agencies are often understaffed, unequipped, or too corrupt to enforce safety standards.



The boss says it's all safe and it won't make us sick. But we don't see him measuring it and we can't do it ourselves!

For many chemicals, levels considered to be safe still hurt workers' health. If you are worried or believe you are getting exposed to something that makes you sick, ask an OSH professional, other workers, a union or environmental group, or a health worker to help you find out as much as you can about the chemicals you work with. Many OSH professionals can tell you if they think the standard, while legal, does not protect enough, and help you track your symptoms and those of your co-workers in a health notebook (see page 47). Workers who did not give up have fought employers, chemical companies, and even governments to stop the use of chemicals that harm people's health.

Testing for chemicals

There are 2 ways to measure how much of a chemical you are exposed to. The best way is to measure the amount of chemical in the air around you and compare it to levels of exposure considered safe. The second way of measuring chemicals is to measure the amount of chemical in your body and compare it to levels that are considered safe. Most of these tests are expensive and companies only do them when a government agency forces them to.

Measuring chemicals inside your body

Some companies test all worker's blood and urine when they are hired (baseline testing) and then again later so they can tell if the workplace is creating problems. Obviously, it is much better to use safer chemicals and better processes in the first place. Even so, these tests can prove useful if health problems develop years later.

Safety Data Sheets (SDS) usually include information about what amounts of chemicals are considered safe, and sometimes include information about how to test for a chemical.

Measuring chemicals in the air

Small, specialized pumps are used to trap samples of air from the workplace at different times of day. The filters inside the pumps are then sent to a laboratory to test the amount of chemical inside. The laboratories *can* test for many chemicals, but they *will* only test for the chemicals they have been told to look for. There are also ways to test workplace air on site for a specific chemical or chemical families.

If you work with radiation, your boss should also make sure that your work area is tested for radiation. The factory should install meters in the work area or make sure all workers wear badges or personal meters to monitor their radiation exposure.

Health problems caused by chemicals

Chemicals affect people in different ways. Some people might have headaches, dizziness, skin rashes, and other short-term problems right away. Others develop problems that do not show up right away, or happen inside the body where you cannot see or feel them. Some chemicals may cause only one type of health problem, while others may cause several types of problems.

Acute health effects

When a chemical touches your skin or enters your nose, mouth, or belly, it can cause health problems right away. This is called an acute effect.

Burns, trouble breathing or seeing, coughing, feeling dizzy or fainting are examples of acute effects. Acute health effects should be treated quickly to prevent long-term damage.

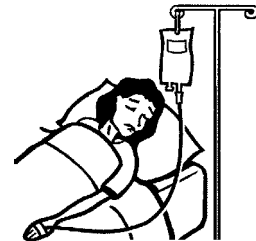


Acute effects happen right away.

Chronic health effects

When chemicals get on or inside your body for many months or years, they can cause *chronic* health problems. Getting exposed to a lot of a chemical all at once can also cause chronic health problems.

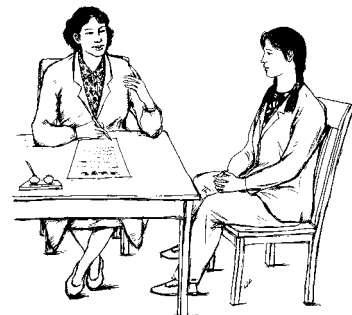
Cancer, liver and kidney damage, and nervous system illness and brain damage are examples of chronic problems. They can take months or years to develop. Some chronic problems are treatable (some cancers) or manageable (kidney damage). Some chronic problems can be permanent (nerve and brain damage).



Chronic effects take a long time to show.

Tell your health workers about the chemicals you use

If you go to a health worker for a problem caused by chemicals, try to bring the label from the chemical container, or write down the name of the chemical or the product. Describe what the chemical looks like, how it smells, and what it is used for. Explain why you think the chemical is causing your illness or injury. Even though most doctors do not know much about chemicals, they do have access to resources to learn about their health effects.



Chemicals irritate skin, eyes, nose, and throat

When you work with chemicals, your eyes might get red and itchy. You might get a skin rash, sneeze or cough, or have a sore throat, runny nose, or difficulty breathing at or after work. The irritation usually improves when you are away from the chemical. Irritation can be the first sign you are being harmed by a chemical. To find out more about the chemicals in your workplace, see Appendix B: Common chemicals and materials.



Record rashes, sore throat, and other problems in your health notebook, noting when they started, when they got better or worse, and anything that might help you find out what chemical caused them.



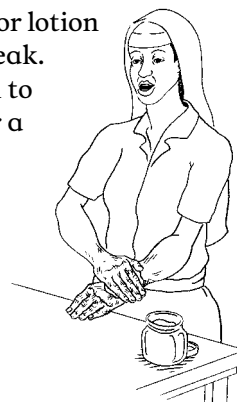
Health Info

What to do if you have a rash

Skin rashes are uncomfortable and can be a sign of health problems caused by chemicals. Tell your employer if chemicals at work are causing problems, and see a health worker. If you continue to be exposed, you will continue to suffer.

To reduce some of the problems caused by a rash:

- Cover the irritated skin to keep the chemical liquid or mist away from your skin. Gloves might help, but make sure you are not allergic to latex gloves (see page 265).
- Wash your hands with mild soap and water. Strong soaps and chemical cleaners can irritate or damage your skin.
- After washing hands, put on a protective cream or lotion before and after work, and during your lunch break. Try a lotion containing antihistamine or cortisol to reduce itching and redness. Unfortunately, after a while these creams stop working.
- Make a compress using oatmeal water. Boil oatmeal or another starch in water and let it cool. Dip a clean cloth in the water and apply where it is itchy. Ask people in your community if they know of other remedies.
- Wear loose clothing that will not rub against the rash but will keep dust, chemicals, and germs off it, unless you work around machines with moving parts that could catch the cloth. The rash will heal better with fresh air, so uncover it when you get home.



Rub olive or another safe oil or lotion into skin after you wash to prevent dry or cracked skin.

Chemical burns

Mild chemical burns make the skin red but heal quickly. Serious burns cause blisters. Severe burns can go through the skin, such as burns from concentrated bleach or ammonia. Burns from hydrofluoric acid do not show or hurt right away, but burn deeply. Some burns make the skin feel cold and numb, for example, burns from dopant gases (see pages 482 to 484).

If you get splashed with even a small amount of a chemical, wash it off immediately, rinse with clean water for 15 minutes, and remove and replace your protective equipment and clothing.

Chemicals cause allergies

An allergy is when your body reacts to a chemical by developing skin rashes, eye or nose irritation, itching, eyes that water, or coughing or breathing problems. An allergic reaction to a chemical starts after you begin working with it and often improves when you stop using it. Other workers in your work area might not have a reaction, while you do. Allergies can develop at any time.

Once you are allergic to a chemical, you will always be allergic to it. A chemical allergy gets worse if you continue using the chemical and it can kill if you do not get immediate medical help. A worker who develops an allergy should be given a different job that will not harm him. He should not be fired.



If you develop an allergy

At the first sign of an allergic reaction, talk to your supervisor.

Ask to switch to a different job where you are not exposed to the chemical you are allergic to. If you cannot change jobs, ask your employer for protective equipment (see chapter 18: Personal protective equipment).

Diphenhydramine (*Benadryl*) or another antihistamine can help calm an allergic reaction quickly.

Seek medical attention. The health worker might give you emergency medicine, for example, a salbutamol inhaler, in case you have an asthma attack or another allergic reaction.

See *Where There is No Doctor*, page 167, for information about what to do in case of an asthma attack and how to treat asthma.



Health
Info

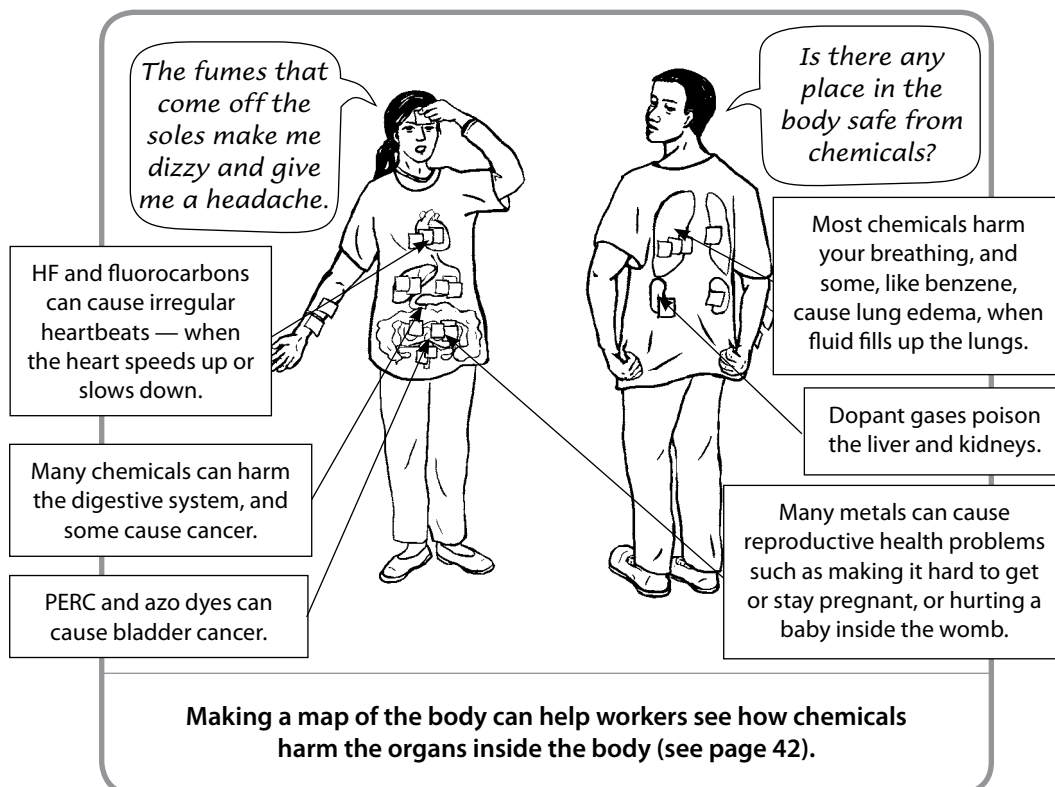
Chemicals cause asthma and other breathing problems

Asthma happens when the breathing tubes of the lungs are inflamed, making it difficult to get enough air. Shortness of breath, tightness in the chest, and wheezing are all signs of asthma. Asthma can be a short-term health problem that stops when you are away from the substance that causes it. But most asthma is chronic, meaning it will last a long time, perhaps your whole life.

Some people are born with asthma, others develop it from allergies, and some get it on the job. Breathing small particles of materials used in factories, such as cotton, sand, epoxy resins, isocyanates, and some dyes and chemicals can cause asthma. If you have asthma, breathing these materials worsens it.

Chemicals harm internal organs

Some chemicals slowly poison and destroy specific parts of the body, such as the brain, nerves, liver, kidneys, or lungs. Swallowing or breathing some chemicals can cause immediate poisoning or burns inside the body. They can kill you if you do not get medical help right away. Other chemicals can cause slow poisoning over time that can make you very ill and kill you. Chemicals can also weaken your body's ability to resist infections and other illnesses.



Chemicals cause sexual and reproductive health problems

Most women can get pregnant, have healthy pregnancies, and deliver healthy babies. But chemicals used in the workplace can cause different kinds of reproductive health problems for both men and women. Some chemicals cause only one kind of problem, others can cause several.

Problems with menstruation: One of the first signs that chemicals may be harming her reproductive system is when a woman's menstruation changes. Irregular periods (no period, too few, or too many), when she was regular before, is a sign of problems. Too much stress and other social dangers can also lead to changes in menstruation.

Problems with sex: Some chemicals lessen the desire in both men and women to have sex. They can also lead to problems for men in getting an erection.

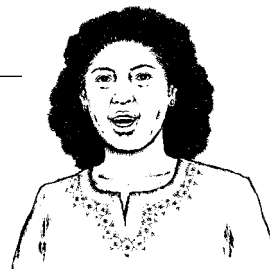
Fertility problems: Some chemicals reduce or affect men's sperm or testicles, and a woman's eggs or reproductive organs. They can lead to difficulty getting pregnant, carrying a pregnancy to term, or can cause infertility.

Miscarriage: Most miscarriages are normal and are not caused by chemicals. However, if you or your partner have had several miscarriages while or after working with chemicals, there might be a connection to the chemicals in your factory. For more information about miscarriages, see *Where Women Have No Doctor*, pages 234 to 235, and speak with a health worker.

Problems with the baby inside the womb: Some chemicals affect the baby inside the womb by stopping the baby from growing well. These babies are born small or with low birth weight. Some chemicals cause birth defects, including physical or mental disabilities that might be visible at birth or might take time to show. Chemicals that cause birth defects are called "teratogenic" chemicals. SDS sheets might include how likely a chemical is to cause birth defects. Some chemicals affect the baby's brain and will cause difficulty learning. Many chemicals can pass to a child in her mother's breast milk.

Sex and sexual health are hard to talk about. In many communities, women with fertility problems are discriminated against, so they might be unwilling to talk about these issues.

But writing down your own sexual and reproductive health problems, or those of workers in your factory, can help identify and fight chemical exposures. Talking in small, informal, same-sex groups might be better than a large meeting. You can also invite people to send you notes, texts, or emails anonymously, and agree to keep them confidential.



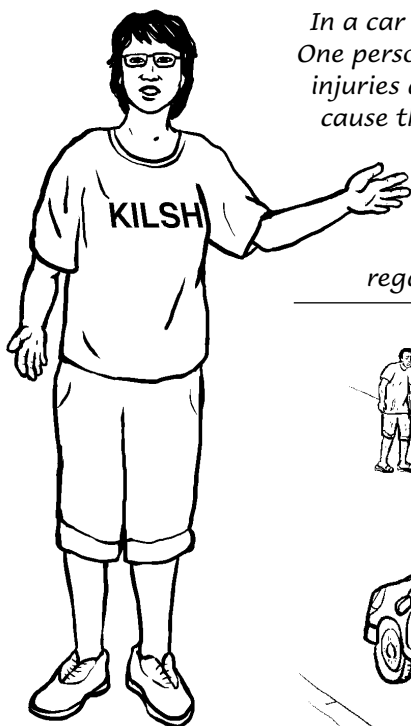
Chemicals cause cancer

Cancer is a serious illness that attacks cells in the body and changes the way they grow. Cancer cells grow into lumps that can appear anywhere in the body: on the skin, lungs, liver, blood, bone marrow, brain, and other parts. Some cancers you can feel when you touch that body part, such as breast cancer. Some are inside the body and are harder to discover.

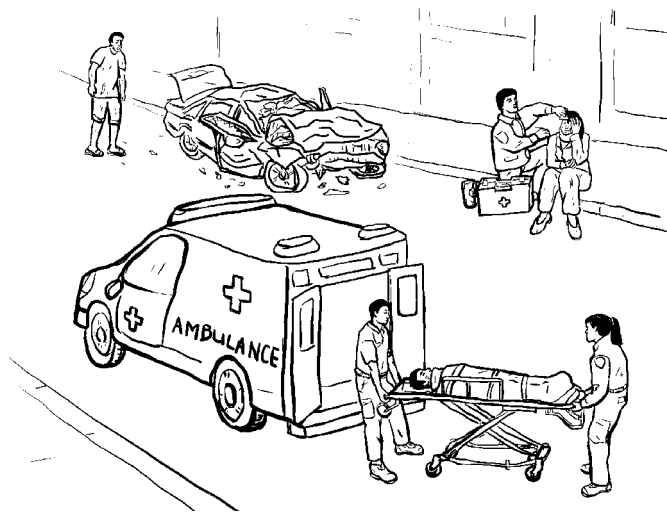
If cancer is found early, it often can be cured. But some cancers can be hard to cure and will kill a person.

There are many reasons people get cancer. One of them is exposure to chemicals. Because we are exposed to so many chemicals at work, at home, and in the community, it is often very hard to know and prove that a cancer was caused by a chemical at work.

Most cancers develop slowly, and signs of illness do not appear for years after exposure to the substance that caused the cancer. For many workers, this means that they get cancer many years after working with the chemical that caused it.



In a car accident, people are often injured in different ways. One person is only bruised, another is killed. Even though their injuries are different, nobody would say the car crash didn't cause them. But when one worker in an electronics factory gets cancer from chemicals while another worker is fine, the company says the chemicals didn't cause the disease. But we know, and science and the law agree, that the cancer was caused by chemicals regardless of which worker gets sick and which doesn't.



Cancers caused by some chemicals

- **Bladder cancer:** arsine (page 483), azo dyes (page 486), tetrachloroethylene (PERC) (page 524), X-rays (page 515).
- **Blood cancer (leukemia):** benzene (page 522), formaldehyde (page 497), tetrachloroethylene (PERC) (page 524), X-rays (page 515).
- **Brain cancers:** lead (page 504).
- **Kidney cancer:** arsine (page 483), lead (page 504), cadmium (page 504), trichloroethylene (TCE) (page 524).
- **Liver cancer:** arsine (page 483), azo dyes (page 486), dichloropropane (page 524), polychlorinated biphenyls (PCBs) (page 489), tetrachloroethylene (PERC) (page 524), trichloroethylene (TCE) (page 524), vinyl chloride (page 512), X-rays (page 515).
- **Lung cancer:** arsine (page 483), cadmium (page 504), chromium hexavalent (page 504), lead (page 504), nickel (page 504), trichloroethylene (TCE) (page 524), and X-rays (page 515).
- **Nose and throat cancers:** formaldehyde (page 497), nickel (page 504), tetrachloroethylene (PERC) (page 524), X-rays (page 515).
- **Prostate cancer:** cadmium (page 504).
- **Skin cancer:** arsine (page 483), UV light (page 515).
- **Stomach cancer:** lead (page 504).
- **Testicular cancer:** phthalates (page 509), polychlorinated biphenyls (PCBs) (page 489).

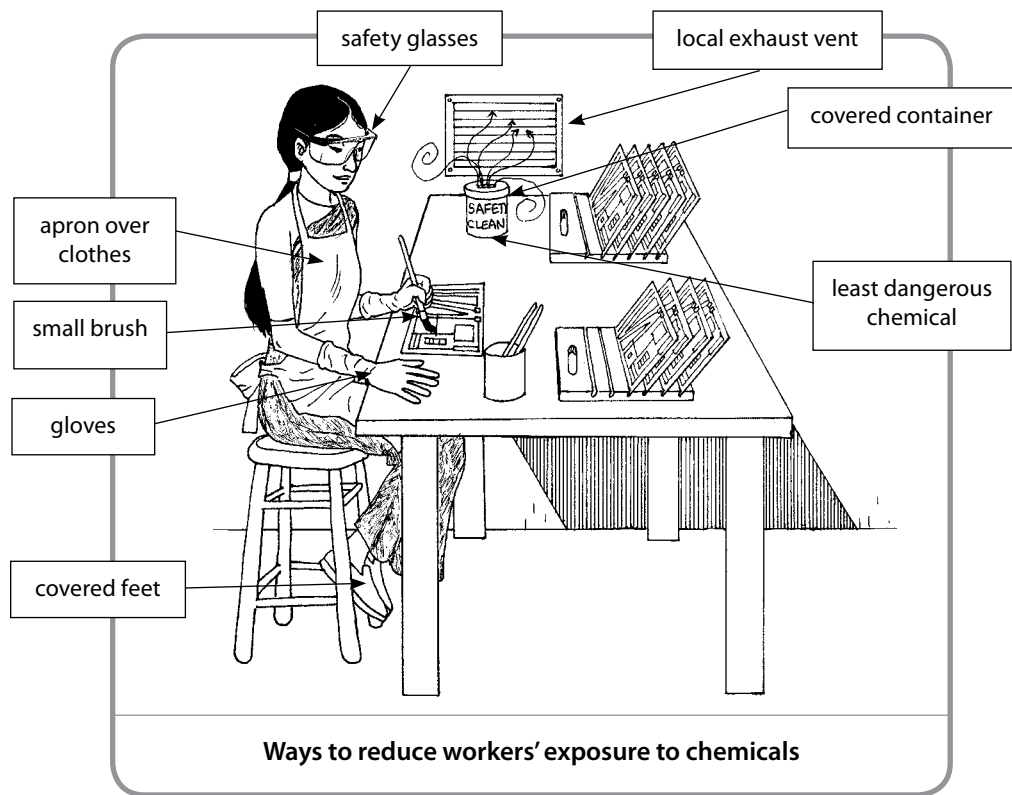
These cancers caused by chemicals are only the ones we are certain that are caused by the chemicals mentioned in this book. Other chemicals in this book may cause cancer, and certainly there are many other chemicals we have not included that can cause cancer too.

For chemicals that cause reproductive health problems, see page 382. For information on how to detect reproductive system cancers, see page 384.

For more information about chemicals that harm reproductive health, see Appendix B: Common chemicals and materials.

Protect workers from chemicals

Using fewer and less dangerous chemicals is the best way to make sure workers, the community, and the environment are not harmed. While working to achieve these long-term changes, we can organize our work in other ways to reduce chemical dangers.



Keep chemicals off your skin and eyes

When machines and equipment are not properly set up or in good working order, they leak and cause spills and accidents. The boss is responsible for providing the right equipment and hiring and training enough workers to protect you from chemical leaks, splashes, and accidents. But even if conditions in your factory are not ideal, workers can often arrange their work areas and job tasks to prevent chemicals from splashing, dripping, or leaking.

Use tools to handle chemicals

Avoid touching chemicals with your hands. Use brushes, ladles, and long-handled tools to mix, measure, or apply chemicals. The boss should supply these tools, but workers can sometimes adapt an existing tool or make a new one for a specific job. Also, use tools that fit your body. If a tool is too large or too heavy, it is bound to lead to more spills and waste.

Use protective clothes and equipment

Cloth, leather, and rubber gloves and aprons, long sleeves, and covered legs and feet can keep dust, paste, powder, and other solid chemicals off your skin. These can also protect you from very small splashes of liquid chemicals. (See chapter 18: Personal protective equipment.) If protective equipment is used, the boss should provide you without charge the correct protective clothing for the dangers you face, and he should replace it at no cost when it is worn or damaged.

Protective equipment does not eliminate the dangers you face — it only limits the harm these dangers can cause you. Protective clothes can be hot and uncomfortable, and gloves, aprons, masks, or goggles can be dangerous if they do not fit properly. If they are too large or too loose, they may not protect you at all. Gloves that are too big make it difficult to handle tools and do precise work. Long, loose clothing can get caught in machinery or cause you to trip and fall.

If chemicals get into your clothes, remove the clothes and wash your skin right away.



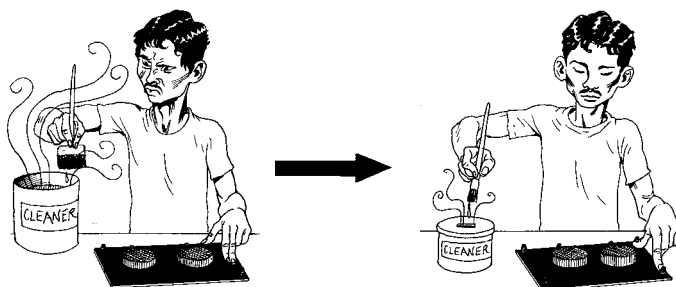
Several controls protect workers better.

Reduce the amount of chemicals in the air

When there are chemicals in the air, we can easily breathe them into our lungs. Mists and dusts can get onto skin, be absorbed through eyes, and get into mouths. Even if we can't completely get rid of chemicals in the air, there are ways to limit how much gets into our bodies.

Reduce fumes and vapors from open containers

Keep vapors out of the air by covering containers when they are not being used. Make openings smaller to fit the tools you are using. Try using a smaller tool that applies just the amount of chemical you need. The less chemical you use, the less vapor goes into the air you breathe.

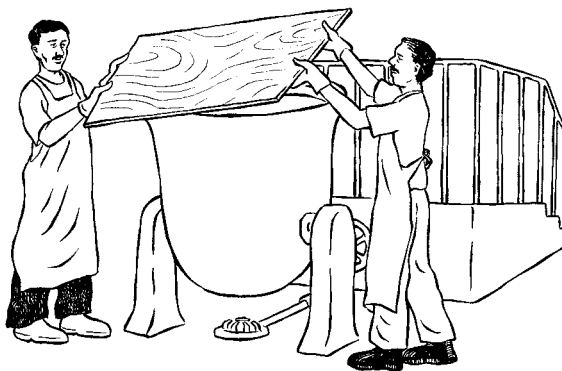


Breathing too much chemical vapor is dangerous.

Cover containers and use a small amount of the chemical.

Reduce fumes from chemical baths

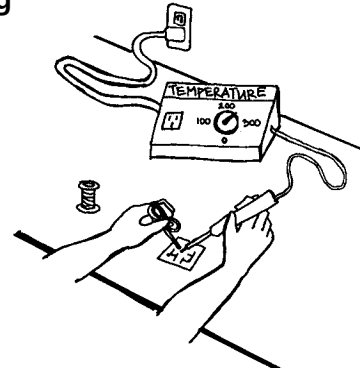
Chemical baths release mists and vapors which can get inside your nose, eyes, mouth, and skin. When baths do not have rim ventilation, some factories add anti-foam agents to the baths to reduce misting. Others cover the surface of the baths with plastic chips or balls to lessen the amount of mist that escapes. Fewer vapors escape when heated baths are kept from getting too warm and are cooled when not in use.



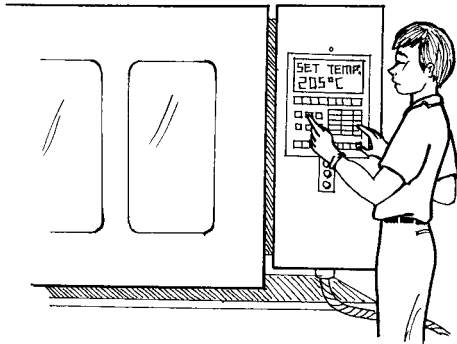
Covering a chemical bath you are not using keeps vapors out of the air.

Reduce fumes from soldering and plastic molding

Solder and flux make fumes and smoke when soldering irons or wave soldering machines are too hot. If there is lead in the solder, the fumes are very dangerous. Local exhaust ventilation can remove fumes at the source. Workers can control the temperature on newer soldering irons and soldering machines to prevent overheating the solder. Fumes are less dangerous when soldering and welding are done at lower temperatures.



A maximum soldering heat of 200° to 250°C prevents lead fumes.

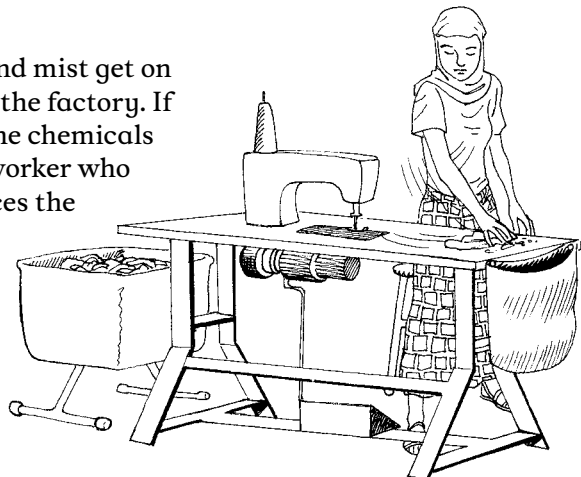


To keep plastic from creating dangerous fumes, workers need time to adjust and maintain their machines.

Plastic processing machines melt plastic and push or blow it into a mold. To reduce fumes, plastic should be heated only enough to melt and mold it. Machines should be set up for each new batch of plastic and maintained carefully to control the heat and processing times.

Clean work areas regularly

Chemicals in the form of dust, soot, and mist get on work tables, walls, and floors all over the factory. If they are not cleaned up right away, the chemicals can get on the skin or clothes of any worker who touches them. Regular cleaning reduces the amount of chemicals in the whole factory. Cleaning is especially important where toxic substances are used.



Reduce mists and dusts

When you spray a chemical, a lot of it is wasted in the air or on other surfaces below or behind the part you spray. If you must use spray to paint or coat parts, use the least amount to cover the part. A spray booth will help keep the chemical out of other work areas.

Spraying flammable chemicals can create explosive vapors which can explode or catch fire. Only spray flammable chemicals in a spray booth or workstation with strong exhaust ventilation.

Do not use flammable chemicals around processes that can spark or are very hot, such as soldering, hot baths, ovens, or plastic molding machines.



Spraying puts a lot of chemical into the air.

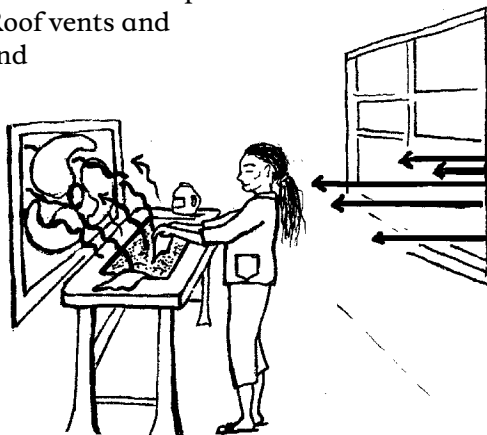


Use a brush or sponge to put the chemical only where it is needed.

Ventilation reduces chemicals in the air you breathe

You may not be able to prevent chemicals from getting into the air in the factory. But ventilation can help reduce the amount of chemicals you breathe. Local exhaust vents or extractors remove chemical vapors before they spread inside the factory. Roof vents and exhaust fans help move air with dust and chemicals out of the factory building.

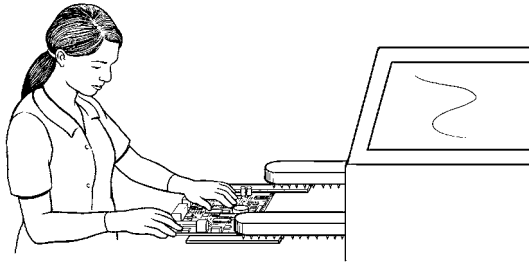
While this ventilation helps protect workers in the factory, if it is not filtered and cleaned it just dilutes and moves the chemical danger to the surrounding community. (For more information, see chapter 17: Ventilation.)



Enclose machines

Large machines that produce a lot of chemical vapor, mist, or fumes, are safest when they are enclosed in a large, ventilated box. The box stays closed when the machine is working, and is opened to load, adjust, clean, and repair the machine. Exhaust ventilation removes vapors and fumes from the machine and the factory. Some boxes collect the vapors instead of venting them, and filter the air before releasing it.

Many machines in electronics, shoe, and garment factories are enclosed, such as automated soldering machines, plastic processing and molding machines, and ovens. These machines collect fumes, mists, and solids. They should be cleaned by workers trained in how to clean and dispose of the waste. Maintenance workers need to use the highest level of protective equipment available for these chemicals in order to protect themselves from exposure.



Use respirators if you must

Respirators may sometimes be necessary, but they are not the best way to protect against inhaling chemicals. The best ways are to use only chemicals that are not dangerous to breathe, to enclose machines so they do not give off fumes, and to have good ventilation. If you must use a respirator, the ones that protect most completely are respirators with filters or separate air supply. They are hot, uncomfortable, and make breathing difficult. Their filters and other parts need to be cleaned and replaced often.

Respirators are the last resort. Only use them if you think you might be exposed to chemicals in the air. Maintenance workers and workers who handle the more dangerous chemicals need respirators with the correct filters or with air supply. See the various types of respirators and their uses on pages 266 to 270.



Respirators have to be tested on you to see if they fit you well. See Check that your respirator fits and works, pages 269 to 270.

Prevent chemicals from getting in your mouth and belly

No worker tries to get toxic chemicals in her mouth. But it is easy for chemicals to get on your hands or clothes, and from there into your mouth. Even if you wear gloves, you can get chemicals on your hands when you take the gloves off or if they leak. When chemicals get on your hands, they can also get on anything you touch.

To keep chemicals out of your mouth, wash your hands before you touch food, dishes, or cigarettes. This is especially important for workers exposed to lead, asbestos, pigments, solder, and toxic dust from grinding, foundries, and metal casting.



Wash off chemicals with plain soap and water.

Our water is poison

Tap water is supposed to be safe to drink in the United States. But in Silicon Valley, California, drinking water was polluted by the sloppy practices of the electronics industry. When electronics companies began making semiconductors here in the 1980s, we didn't know much about them. Neither did the government. So the companies did whatever they wanted. They dumped toxic waste into the water, and storage containers leaked thousands of liters of chemicals into our soil.

First they claimed it wasn't happening. Then they said it was not a problem — the chemicals didn't spread and weren't toxic. But we discovered the chemicals poisoned the water. We fought hard for the companies to take responsibility. Government and independent agencies tested the water and found many problems. Silicon Valley had more toxic areas than anywhere in the USA. After 30 years, it has some of the most toxic water in the country, solvents in the water are leaching upward, and cleaning up will take decades.

People drink bottled water because they don't trust that tap water is safe. But bottled water is not a solution; the plastic pollutes and is not sustainable.



Keep chemicals out of drinking water

Good health depends on drinking enough water. But when chemicals get in the water or on the cups you use, drinking water can become a source of illness.

- Make sure the factory provides you with enough clean water to drink.
- Keep water containers covered so chemicals and dust cannot get in.
- Put water bottles in a safe place. Wash your hands before opening them.

Never put a chemical in a container that is used for food or drinks, or that looks like a food or drink container. People expect a soft drink bottle to contain soft drink, not a dangerous chemical. Someone may drink from the bottle by mistake.

Never put food or drink in a container used for chemicals. Even if the container has been washed, it may still have small amounts of chemicals inside that can get into the food or drink – and you!

When you smoke, chemicals get in your mouth

Smoking cigarettes in the workplace adds dangerous chemicals to the air all workers breathe, whether they smoke or not.

Chemicals from work get on cigarettes

If you have chemicals on your hands and you pick up a cigarette, the chemicals get on the cigarette. When you put the cigarette with chemicals on it in your mouth, you ingest some of the chemicals. When you smoke a cigarette with chemicals on it, the chemicals burn and you breathe them in.



Cigarette smoke is dangerous

Cigarette and cigar smoke contain dangerous chemicals from the burning tobacco, paper, and the chemicals with which they are treated. The smoke carries small particles that irritate the eyes and throat. When breathed in, the chemicals go deep into the lungs and cause lung cancer, emphysema, asthma, and other serious diseases, and worsen health problems from other causes. Millions of workers die from smoking every year and the big tobacco companies make millions of dollars causing their deaths.

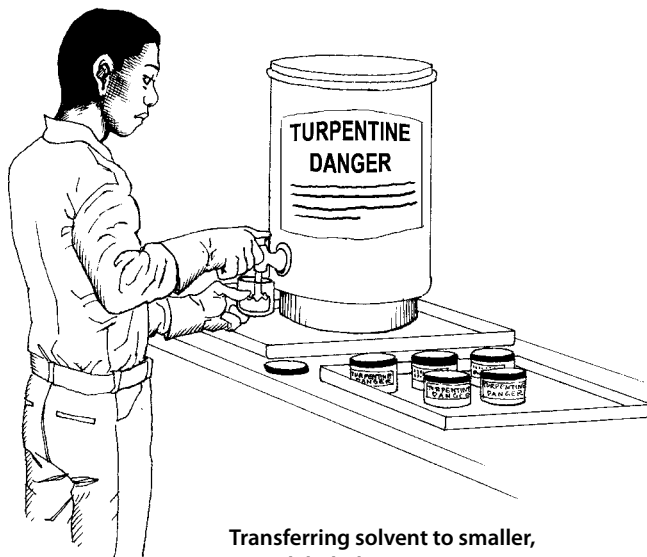


*Cigarettes are a blight on the whole human race.
A man is a monkey with one in his face.
Take warning, dear friend.
Take warning, dear brother:
There's a fire on one end and a fool on the other.*

Prevent spills and leaks

It is easier and safer to prevent chemical spills than to clean them up.

- Design chemical storage and mixing rooms to be fireproof, well ventilated, temperature controlled, and easy to clean.
- Transport chemicals in closed containers that cannot break or shatter. If you move containers of liquids or powders on carts, use carts with sides and spill trays to catch leaks.
- Use small containers of chemicals in work areas. Preventing and stopping leaks is easier when bulk chemicals and large containers are kept in a separate storage area.
- Store chemical containers so openings or valves are at the top.
- Transfer chemicals from one container to another by using drip-preventing spouts for liquids, and scoops or other tools for solids, such as pastes, powders, and pellets. Use a tray under the containers to catch leaks and spills.
- Put static control mats throughout the area where flammable solvents are stored to prevent static electricity from causing them to explode. When transferring solvents, you can also prevent explosions by connecting a ground wire to each container. Or only ground one container and attach a wire from it to other containers as a common ground.
- Control heat during plastic processing. When melted plastic gets too hot, it can leak or overflow.
- Inspect and maintain containers, pipes, pumps, valves, and machines that could leak chemicals, especially their manual and automatic shutoffs. When damage and worn parts are noticed early, they can be repaired or replaced before causing a leak.



Transferring solvent to smaller, labeled containers.

How to

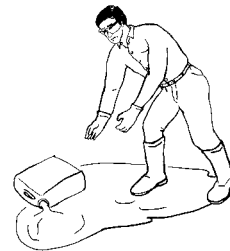
Clean up a small chemical spill

The most important thing after a chemical spill is to protect yourself and your co-workers. If you cannot safely clean up the spill, help everyone leave the area.

- If someone is more prepared than you to clean up a spill — if there is a person trained to do this work — call that person first.
- Always wear protective clothing, including rubber boots, safety glasses, and gloves, to clean up a chemical spill.

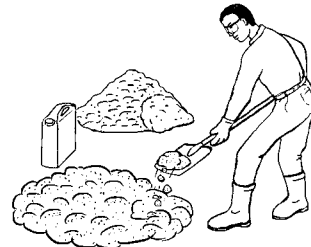
1. Control the spill

Find the cause of the spill and stop it. Shut down leaking equipment. Turn a tipped-over container upright. Put a leaking container inside another.



2. Contain the spill

Absorb the chemical by putting soil, sand, sawdust, clay, or similar material on the spill. If the material may blow away, cover it with a plastic sheet.



3. Clean up the spill

Scoop the material into metal drums or thick plastic containers. Label clearly with the chemical's name and "Waste!" Do not wash the chemical away with water. This will spread the chemical and make the problem worse. The boss is responsible for disposing of chemical waste properly. If he does not, report him (anonymously) to local environmental authorities.



What should be available in your factory:

- training to clean up spills
- evacuation practice
- a place where tools, protective equipment, clean-up materials and containers can be kept close to where chemicals are stored or used
- telephone numbers of the agency to report a spill or accident, and emergency services to call for help



First aid for chemicals

Despite our best attempts to prevent them, accidents happen in every factory. When they do, serious injuries may still be prevented if employers make sure workers receive regular trainings in first aid and have the materials they need. One or more workers in every area (and for every shift) should be trained to take charge in an accident, to get people out safely, to give first aid, and to get more help if needed. Make someone responsible to check regularly that first aid supplies are fresh and fully stocked, and that equipment, such as showers and eye wash stations, are clean and functional.



First Aid

First aid when you breathe in a chemical

If a person has difficulty breathing, feels dizzy, confused, or nauseous, or if you see, smell, or feel a chemical release:

1. Remove the person from the work area or factory so they can get fresh air. Make sure your workplace has a plan about what to do if a worker cannot move or loses consciousness.
2. Help the person stay calm and comfortable.



3. Give oxygen from an oxygen tank if the person has inhaled chemicals that:
 - cause a severe asthma attack, such as isocyanates and some dyes.
 - cause liquid to build up in the lungs (pulmonary edema), such as ammonia and chlorine.
 - reduce oxygen in the air, such as methane and nitrogen.
 - reduce oxygen in the blood, such as carbon monoxide and methylene chloride.
 - make it hard for the body to use oxygen, such as cyanide and hydrogen sulfide.

4. Take the person to a health worker, even if they feel better.
5. If the person has stopped breathing, begin rescue breathing (mouth-to-mouth breathing). Make sure your factory holds regular trainings on how to do rescue breathing.

First aid when a chemical touches your skin or eyes

Every work area where chemicals are used should have an emergency body shower and an emergency eye wash station with enough water to flow for at least 15 minutes. Most important, workers should be trained in first aid for the chemicals they work with.



**First
Aid**

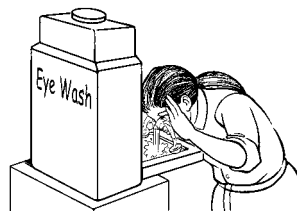
For chemicals on the skin:

1. Wash chemicals off immediately using lots of water for at least 15 minutes. The faster you begin pouring water over the area and the longer you do it, the more you will limit harm.
2. Chemicals that catch fire or absorb quickly through the skin must be washed for a longer time, 30 minutes to 1 hour.
3. After washing the chemicals off the skin, take the person to a hospital or clinic even if there are no signs of harm. Bring information about the chemical.
4. Burns from HF (hydrofluoric acid) must be treated with calcium gluconate (see page 66).



For chemicals in the eyes:

1. Stay calm.
2. Rinse the eye or both eyes immediately. Use lots of water and continue rinsing for at least 15 minutes.
3. If you have an emergency eye wash, turn it on and use your fingers to hold your lids open as you flush them.
4. If you have to splash water on your eyes with your hands, hold your eyes open as you splash them. Ask for help keeping them open.
5. If you are unable to stand, a person can pour water on your eyes. If only one eye is affected, tilt your head so the water runs from the bridge of the nose, over the eye, and towards the ear. Don't let the water run from one eye to the other. If both eyes were splashed, lie down and tilt your head back, while the person pours water over the bridge of your nose so it runs down both eyes.
6. See a health worker as soon as you can.

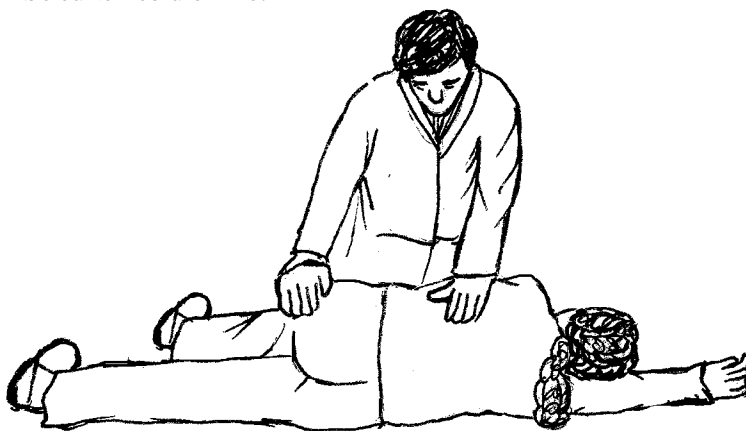




First Aid

First aid when chemicals get in the mouth

1. Help the person stay calm.
2. Find the chemical label or any information about the chemical. Usually the label will include a first aid section, with instructions about “ingestion.” There you will find whether the person should vomit up the chemical or not. It is very important to follow that advice.
3. The label may list an antidote if the chemical is ingested. If you have that antidote, give it.
4. Activated charcoal is a common and inexpensive treatment to help someone who has been poisoned. Unless the chemical label or SDS says not to, you can give the person activated charcoal.
5. Unless the label says not to, you can give a glass of water or milk. But do not give more.
6. After following the instructions on the label as best you can, quickly take the person to a clinic or hospital. Bring the name, the label, and any information about the chemical with you.
7. If the person is unconscious, lay her on her side so she does not choke on her vomit. Check her breathing. Quickly get help so she can be taken to a clinic.



Lying on the side keeps the person's airways open.

What should be available in your factory

- A first aid committee and trainings so workers know how to respond to chemical emergencies, including how to give rescue breathing, how to operate emergency showers and eye washes, and how to get workers immediate medical attention.
- First aid supplies for the chemicals used in your factory, such as oxygen tanks, activated charcoal, and calcium gluconate or other treatments needed for chemical burns.
- Telephone numbers to quickly bring an ambulance and notify a clinic or hospital and the safety and health authorities in case of an accident.
- Emergency showers and eye wash stations in all work areas where there are chemicals.
- Air monitors with alarms to alert when chemical levels are high.
- Clean water to drink.
- Personal protective equipment for everyday use as well as in case of accident and for clean-up. There should also be extra clothing and shoes in a variety of sizes in case someone has to completely change their clothing.

If there is no eye wash, pour clean water from the inside of the eye toward the outside of the eye near the ear.

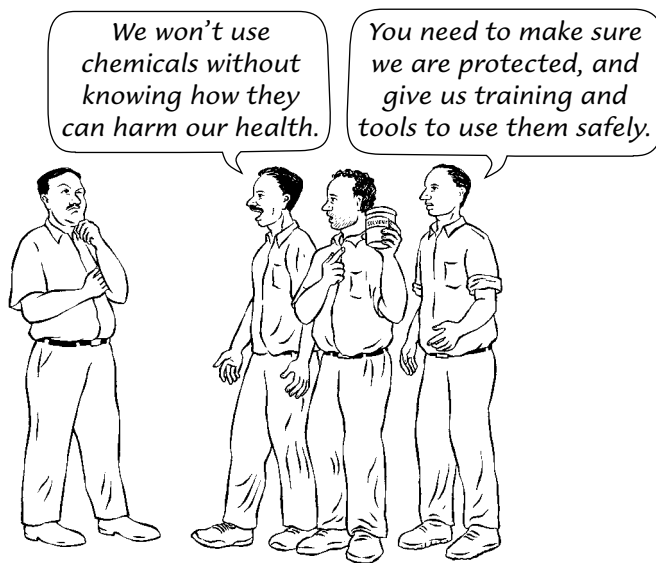


**First
Aid**

Learn about chemicals used in your factory

Many workers do not know what chemicals they work with. You might receive chemical containers without labels or know a chemical by what it does (“glass cleaner”) or by a name given to it (“yellow stinky”), not its real name.

You have a right to know what chemicals you work with. By learning more about the chemicals, you can seek medical or professional help, you can organize for safe chemicals with your co-workers, and together you can work with your employer to reduce exposures and eliminate toxic chemicals from production.



Talk to other workers

Ask workers what they know or can find out about the chemicals in the workplace. Collect all the chemical names: brand names, generic names, and even nicknames. Write down any characteristics that can help identify the chemical, such as how and where it is used, its color, smell, and any instructions the employer gave about how to handle the chemical (“Always put the chemical into water, not the other way around!”). Talk with the workers in the shipping and receiving areas, and the people who inventory, store, mix, and dispose of the chemicals and their containers. They often know the names of the chemicals, or can find out.

Write down any health problems you or others feel while working with or transporting the chemicals. Ask: Do you feel ill at work or after work? Are some work areas better or worse than others? Do you feel better when you are away from work for a few days?

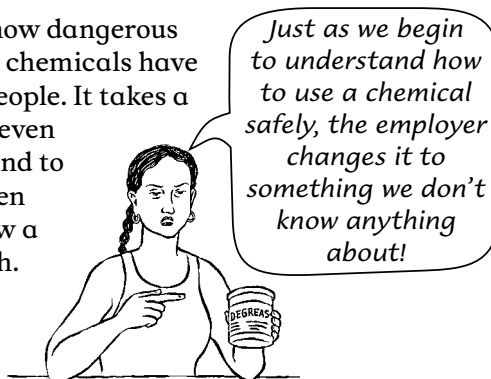


Show others how to keep a health notebook and how to look for patterns: Do you get sick more often when you work in certain areas? When you work with certain chemicals? Immediately, or after you leave work?

What chemical is it?

If you know the name of the chemical, you can usually find out about its health effects by looking up information about it. But if you don't know its name, you may be able to find out what it is by its color, smell, what it is used for, and other qualities. For help in doing this and to understand the dangers of specific chemicals, see the Appendix B: Common chemicals and materials.

But the truth is that nobody knows how dangerous many chemicals are because not many chemicals have been studied fully for their effects on people. It takes a long time to do scientific research and even more to make laws to protect people. And to make it even more complicated, it is even more unusual for scientists to study how a mix of chemicals affects peoples' health. And how often do you use only one chemical? That is why it is important for companies to use only chemicals that are already proven to be safe.



Read the label

Every chemical container should have a label on it, written in a language people in your factory can understand. If the containers you are working with do not have labels, ask the supervisor to provide you with this information. You can also ask the shipping department workers if they could share with you the information on the label of the larger container the chemical came from, or you can try to find out more information yourself. In some countries, these labels are required by law to provide information in many languages.

ISOPROPANOL (IPA)

Contains: Isopropyl alcohol70%
Inert: Water30%

DANGER!

Highly flammable liquid and vapor. Splashes will cause serious eye irritation. May cause drowsiness or dizziness if inhaled.

Precautions during use: Keep away from heat, sparks, and open flames. No smoking. Keep container tightly closed. Avoid breathing in vapors. Use in a well-ventilated area. Wear eye protection.

First aid: If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a doctor if you feel unwell. Eyes: Rinse cautiously with water for several minutes. Remove contact lenses if it is possible. Continue rinsing. If eye irritation continues, see a doctor.

Emergency: In case of fire, use water spray, alcohol-resistant foam, dry chemical or carbon dioxide to put it out.

Manufactured by: Greedist Chemicals Co. 111 Only Drive, Onlyville, Iowa, 11111 USA.

CAS #67-63-0

Get the Safety Data Sheet (SDS)

Companies that make chemical products publish an information sheet for each product they make. These used to be called Material Safety Data Sheets (MSDS) but are now called Safety Data Sheets (SDS).

We form groups and each group reads one section. We ask each other when we don't understand a term or a number. Then we go through the whole thing together.



An SDS is often long and difficult to understand. Though each sheet must use the same categories, the content in the SDS for different companies' sheets may be very different, even for the same chemical. To get more information, read several SDS from different manufacturers of the same chemical.

How to

Get and read an SDS

The factory administration should have an SDS for every chemical used in the factory. Your boss should make copies of these SDS available to you and other workers in your language (see *The right to know about chemicals*, on page 183).

While you organize to make your boss provide you up-to-date SDS, you can try to get them in other ways:

- Ask the workers who receive, sign for, and store the chemical containers if they have the SDS and could get you a copy.
- Find the name and contact information for the company that produces the chemical from the label on the container and request they send you an SDS in your language.
- Ask staff in unions, worker centers, environmental organizations, or universities for help in finding the SDS or chemical information.
- Research the chemical on the Internet. Search by the name and the CAS number. Look on websites of the companies that produce the chemicals as well as sites that provide SDS from many sources. Compare the different SDS, they might have different information!

On page 464 you will find links to websites where you can find more information about chemicals. But many of the websites with chemical information are as hard to read as SDS themselves!

SAFETY DATA SHEET (SDS) for ISOPROPYL ALCOHOL

1. Product name and company that makes it:

Isopropyl Alcohol	Poy Son Yu, Inc
Other names: 2-propanol, Isopropanol, IPA	P.O Box 555 Colinas Sucas, CA, USA (900) 800-0008

Even secret trade mixes need to list the chemical ingredients (components) that are toxic.

Chemicals may have many different names but have only one CAS number. The CAS number is the best way to identify a chemical.

2. Composition or information on ingredients

Isopropyl Alcohol	100%	CAS # 67-63-0
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Component information:
This product is considered to be hazardous according to CFR 1910.1200.

This is a summary of the chemical's health and fire dangers. More information will be in Sections 4, 5, and 11. If health effects are not mentioned, it does not mean the chemical is safe.

3. Hazard identification

This product is a clear, volatile, flammable liquid. Highly flammable.
 Acute effects: Irritation of the skin and/or upper respiratory tract. Drowsiness, headache.
 Chronic effects: Slightly hazardous in case of skin contact (sensitizer). Carcinogenic effects: A4 (Nor classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human) by IARC.
 Inhalation: Mild irritation of eyes, nose, and throat.
 Ingestion: Drowsiness, headache.
 Dermal Contact: Dry, cracking skin.

For skin, see if flushing with water is enough or if another treatment is recommended.
For ingestion, see if vomiting is recommended or not.

4. First aid measures

Eyes: Flush with water, for at least 15 minutes. Obtain medical attention.
 Skin: Wash with soap and water. Take off contaminated clothing and shoes. Obtain medical attention.
 Inhalation: Remove victim to fresh air. Give oxygen if breathing is difficult. Seek medical attention.
 Ingestion: Do not vomit. Seek medical attention.

5. Fire fighting measures

Flammability of the product: **Flammable.**
 Flash point: 12 °C (53.6 °F)
 Auto ignition temperature: 339 °C (750 °F)
 Fire Hazard: Highly flammable when there is a **spark or heat.**
 CAUTION: MAY BURN WITH NEAR INVISIBLE FLAME.

See if the chemical is flammable and what can make it burn or explode. Following these instructions can prevent factory fires.

What to do and use to contain and clean-up a spill. See section 8 for information about protective and clean-up equipment.

Explosion hazards: **Explosive** when there is a **spark or heat.**
 Fire Fighting Instructions: Water may be ineffective. Do not use a solid water stream because it may spread the fire. Cool containers exposed to fire or heat with water.
 SMALL FIRE: Use DRY chemical powder.
 LARGE FIRE: Use alcohol-resistant foam, carbon dioxide, water spray, or fog.

See what material or chemicals will put out a fire. If you do not have the right supplies, you will not be able to stop the fire.

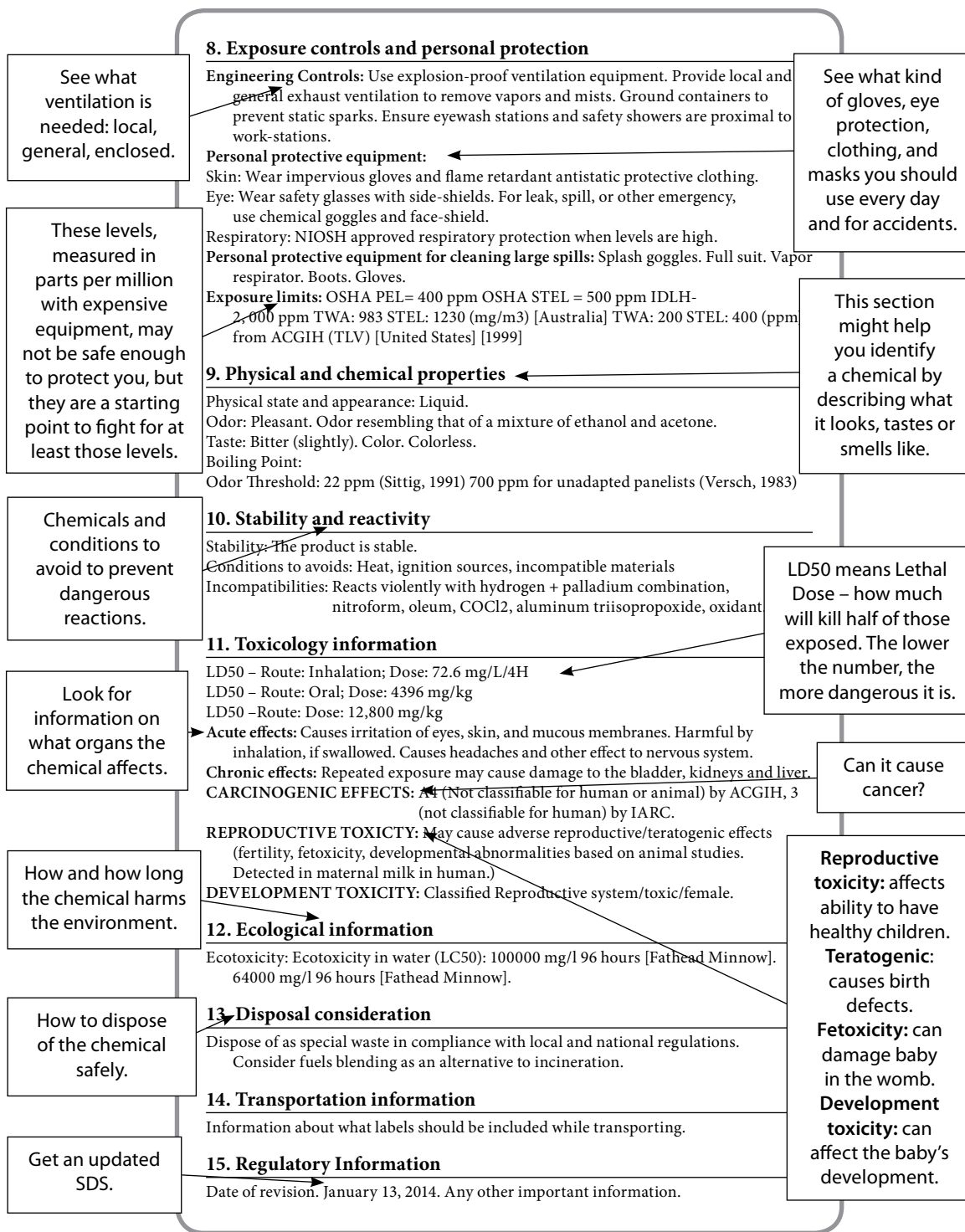
6. Accidental release measures

Small spill: Dilute with water and mop up. Put in disposal container.
 Large spill: Keep away from heat and sparks. Use dry earth or sand to absorb it.

Prevent factory fires and accidents with safe handling and storage of chemicals. Find more information in section 10.

7. Handling and storage

Precautions: Keep away from heat. Keep away from oxidizing agents and acids. Ensure all equipment is electrically grounded.
 Storage Recommendations: Keep in a cool area with good ventilation. Keep in a segregated area. Store in tightly closed containers.





The right to know about chemicals

The **ILO Chemicals Convention (No. 170)** supports the protection of workers and the environment from harmful chemicals. It says employers must provide:

Information: The factory owner must provide information and the chemical data sheets for all the chemicals used in the factory to anybody that requests them. Workers have the right to request that information from the boss.

Protection: The factory owner is responsible for the safety of workers in the factory and must monitor chemical levels to make sure they are within the law. The owner should also provide workers with safety clothing and equipment at no charge and replace any that is no longer safe.

Safe disposal: The factory owner is responsible for safely disposing of all dangerous chemicals and containers.

Training: Factory workers must be trained in how to handle and dispose of chemicals and what to do in emergencies.

First aid and emergency care: Any factory that uses chemicals needs to have emergency showers and rinses in the areas where the chemicals are used. All workers and supervisors should know what to do in case of emergency.

If you fear you or others are at immediate and serious risk to your safety or health, you have the right to leave the area. You should inform your supervisor. This convention protects workers who do this from being punished.

The **ILO Occupational Cancer Convention (No. 139)** states governments must:

- Replace cancer-causing chemicals with non-carcinogenic chemicals.
- Prevent workers from being exposed to chemicals known to cause cancer.
- Inform workers of the dangers of cancer-causing chemicals and how to protect against them.

The roles of the UN, ILO, and other international organizations that promote workers' rights are explained in Appendix A.

Community resources

Labor unions, women's groups, and environmental organizations may be able to help you get information. If you know the name of a chemical, you can find information in libraries and on the Internet. But even if you do not know the name, you can sometimes find out the name with other information, such as use, color, smell, and so forth. Any information can be helpful.

We demand to know what chemicals are being used in the factory

In the early 1980s, a group of workers, environmental activists, and community members in New Jersey, USA got together to demand that the government pass the “Right to Know” law. This law would give workers the right to know what chemicals were used in their workplaces.

Workers and their unions had long demanded that employers tell them exactly what chemicals they worked with. But employers fought back, with the law on their side. Even after workers got rashes or had trouble breathing, employers didn’t have to tell workers what was in the mixes. They said, “If we tell workers or health inspectors, our ‘trade secrets’ will be known and we won’t be able to compete.” They would rather let workers die than disclose those chemicals.

Although workers were at the front line of chemical exposures, they were not the only ones getting sick from chemicals they knew nothing about. Pollution of air and water, burial of toxic waste in the community, and accidental toxic releases and fires were exposing people in New Jersey to all kinds of chemicals. And they were getting angry, too!

Connecting workers inside the factory with people outside was a very successful strategy. It brought together activists from different sectors: mothers, politicians, environmentalists, and union members, all under one single banner: We have the Right to Know!

Environmental crises pushed even more people to support and organize for a new law. In 1983, the Right to Know bill was passed.



We didn't think we could do much to change anything in the workplace. It was like, you take a job and you know there are some really toxic chemicals, but you have no power to change that. Take it or leave it. It never occurred to us that people outside the factory could cause a dramatic change in policy inside the workplace.

The Right to Know law was a big advance, but it has not protected workers and the community enough from chemical exposures. While industry attacks the law, people continue to organize for public disclosure and safe handling of chemicals used at work, for safe disposal of chemicals, and for policies to stop accidents from happening and training to handle them when they do.

Protect our families and communities

Using safer chemicals is the best way to protect workers and their families. But if dangerous chemicals are used in your factory, you do not have to bring them home. Protect your family by changing clothes and washing your skin and hair before going home. If you work around chemicals and dusts, the factory should provide you with a place to wash yourself and your clothes.

What should be available in your factory:

- a clean place to store clothes and change clothes after your shift
- a place to shower with soap and warm water
- a service that safely cleans your work clothes and protective equipment every day

If you use a chemical to clean stains from your clothes, follow the same precautions for using chemicals at work. Take off the stained clothes, wear gloves, work in a well-ventilated area or outdoors, use a very small amount of the chemical, and wash the clothes well with soap and water before you wear them again.



At home, wash work clothes separately to prevent getting chemicals on other family clothes.

Handling chemical waste

Many factories dump chemical containers and other waste directly into sewers, water sources, and local garbage dumps. This is very dangerous for the community and sometimes for the region that uses the water downstream from the factory. For more information about the dangers of pollution from factories and ways to organize for safer waste disposal, see chapter 33: Pollution from factories.

If you handle chemical waste, use protective clothing and a respirator to prevent breathing in chemical dust or vapors, or getting chemicals on your skin and clothes.

Empty chemical containers are dangerous. Empty chemical containers should not be reused, taken home, dumped in open areas, or piled outside.

Washing empty chemical containers does not make them safe to use. A container that looks clean can still have enough chemical in it to cause harm. Chemical containers should never be used to hold food, drinks, or water.

Clean containers for community water

In our community, at least one person in every family works in a nearby export factory. There is plenty of water in all the factories, but we do not have running water or electricity in our homes. We have to carry water from a common tap and store it at home in big barrels.

A lot of people in the community used to have skin rashes and stomach problems. Some of us thought these problems were caused by something in the water. In our mothers' group, we decided to survey families to learn more about health in the community. We found out that everyone used water from the same source, but we used different kinds of barrels to store the water.

We asked more questions and learned that most of the families with the same health problems stored their water in empty barrels taken from a pile outside a factory. We did not know what the barrels had contained, because the labels were written in a language we cannot read.

We asked some workers in that factory to find out what was in the barrels before they were thrown out. They told us that the barrels had contained dangerous chemicals.

The mothers' group decided to find safer water containers for all the families. We went

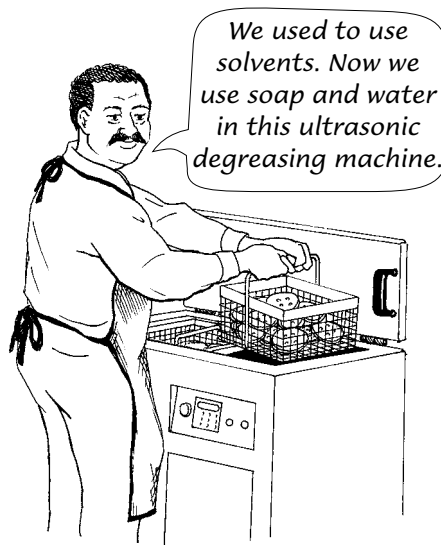
to a local food factory and asked the boss to give us empty barrels that had contained cooking oil. He was glad we could use his empty barrels, and he makes sure they are washed clean for us. We are now delivering clean barrels with lids to each home, and people do not have to use old chemical barrels anymore.



Reduce and remove toxic chemicals

The best way to prevent harm from a toxic chemical is to stop using it and replace it with something safe. But if you cannot immediately remove a toxic chemical from your workplace, you can try to use less of it (as well as protect yourself from it). Workers may be able to convince their bosses that using less and fewer chemicals is better for everyone, is less wasteful, more efficient, and less costly. For example:

- Steam and detergent may work as well as chemical cleaners or solvents.
- Cleaner, more efficient processes and techniques can reduce the need to use chemicals for cleaning and degreasing.
- Low solvent/high pigment paints and low solvent coatings can coat the same number of parts with less solvent. These coatings also dry faster.
- A brush, roller, syringe, sponge, ladle, or other tool can help a worker to apply the smallest amount of chemical to the smallest area. When the worker uses less chemical, there is less waste and less mess to clean up.
- Cleaning up excess chemical right away protects other workers from exposure. For example, wiping excess oil from machined parts keeps oil from spreading to other surfaces that will later have to be cleaned.
- Spot cleaning uses less cleaner or solvent than cleaning the whole piece.



Find a safer chemical

Your factory should use the mildest, safest chemical products needed to get the job done. For example:

- Use non-chlorinated hydrocarbon solvents instead of chlorinated solvents like methylene chloride or TCE (trichloroethylene).
- Use water-based cleaners, glues, paints, dyes, and coatings instead of products that contain a solvent.
- Use weaker-strength acid and alkaline baths and washes. They often work just as well as stronger ones. Use small plastic or metal pellets instead of sand as a blasting material to eliminate silica dust.
- Use vehicles with electric motors indoors instead of those that produce toxic fumes because they burn diesel, gasoline, or compressed gas.

We now use a safer chemical

Our factory in Mexico makes plastic drinking straws shaped to spell people's names. They are kind of a silly product, but there was nothing silly about what they did to our health.



We all had the same health problems. We suspected these problems were caused by the chemical we used to fuse the straws together. The containers we used did not have labels, so we asked the storeroom workers for a label from one of the large containers.

I talked to my neighbor Miriam, who always knows what to do. She brought us and the label to the office of the Comité Fronterizo de Obreras (CFO), an organization that works with workers in our area. The CFO had a whole box of chemical information sheets. We found the sheet for methylene chloride. It was very hard to understand. The CFO organizer explained what all the scientific terms meant and we learned methylene chloride does more than just give us sore throats and headaches. It can harm the liver and cause cancer!



This chemical is very dangerous! It makes us sick, and it can kill us!



When the boss refused to do anything about it, we took the information about methylene chloride to the local office of the national environmental protection agency, PROFEPA. We asked them to inspect the factory.

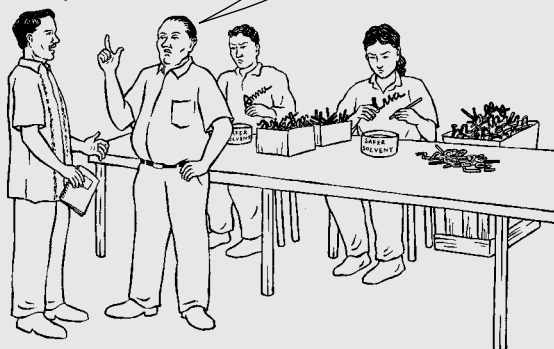
We had to pressure them several times. The inspectors finally came, but they told the boss ahead of time. Just before the inspection, the boss replaced the methylene chloride with another chemical.

The boss claimed he didn't want to pollute the air outside, but he did not care if we breathed dangerous chemicals all day inside the factory!

PROFEPA never required the boss to install the local exhaust fans. But after the inspection, the boss kept buying the less dangerous solvent, even though it was more expensive.

I don't see any methylene chloride, but you must install local exhaust vents at each workstation.

We didn't put vents in because we do not want to pollute the air outside.



Ban the most dangerous chemicals

Some chemicals are too dangerous to use in factories or anywhere else. Thanks to years of protest by workers, OSH professionals, doctors, and health advocates, many countries prohibit the use of:

- lead and other toxic metals in pigments, dye, paint, and other coatings
- rosin or colophony flux for soldering
- solvents such as glycol ethers, methylene chloride, benzene, and carbon tetrachloride
- diesel and gasoline burned in engines used indoors, such as in forklifts
- sand for sand blasting

Manufacturers have developed safer products and processes that do not depend on these most dangerous chemicals. And workers, environmentalists, and responsible businesses are lobbying to ban:

- lead, chromium hexavalent, and cadmium in electronics, including solder
- chlorinated and fluorinated (halogenated) hydrocarbon solvents
- plastic made from vinyl chloride (PVC)
- brominated flame retardants

Banning very harmful chemicals not only protects production workers, it also protects recycling workers and consumers, and keeps pollution out of our air and water.

Companies help each other use safer chemicals

NGOs and businesses formed BizNGO to promote responsibility about the chemicals used in products. They developed these steps:

1. Know what chemicals are used to make your products. If you require your suppliers to report what chemicals are used in their factories, you can know what chemicals are in yours.
2. Stop using the most toxic chemicals first.
3. Test and substitute for other problem chemicals.
4. Tell workers, customers, and consumers what is in your products and what your company is doing to reduce the use of toxic chemicals.

Companies making shoes, electronics, and other products have found these steps useful. BizNGO provides conscientious people working in industry a way to support changes to benefit families, friends, and neighbors—because we all share the same planet.