Welcome to the Hazard Communication training module. Feel free to pause and rewind as you go through the content. There will be questions throughout. For more information about this course, click here.

Chemicals are used in most every type of work environment at Duke; for cleaning, teaching, research, healthcare, maintenance, and others.

Many are potentially hazardous and can affect your health if you don’t control your exposure.

You should know the signs of overexposure, and what to do if you are exposed.

Understanding the information located on chemical labels and in safety data sheets will help you better protect yourself from chemical hazards in your workplace.
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Chemical Hazards | Resources | Detecting Hazards | Controlling Hazards

**Chemicals can affect your health in many ways:**
- Toxic or "poisonous"
- Cause cancer
- Harm the unborn child
- Burn your skin
- Harm your lungs or other organs
- Cause allergy or asthma symptoms
- Cause drowsiness or dizziness

**Chemicals can also present very serious physical hazards such as:**
- Catching fire
- Exploding
- Reacting under certain conditions
- Causing or intensifying fires
- Corroding of metals

**Toxic Hazards**
Chemicals can enter the body through many ways.
One of the most common ways is through *inhalation* of a chemical gas, vapor, mist, or dust.

**Toxic Hazards**
Another common way is by contact to the skin or eyes. The skin normally acts as a protective barrier to help keep out chemicals, but many can pass through into the bloodstream, causing internal poisoning.
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**Chemical Hazards**

Toxic Hazards
A less common way to be exposed at work is ingestion.
This is possible if you have food or drink with you when you are working with chemical products.

**Chemical Hazards**

Toxic Hazards
Injection is also a possible way for substances to enter the body. This can happen from being stuck by a syringe containing drugs or other chemicals, or getting cut from contaminated glass.

**Chemical Hazards**

Toxic Hazards
Acute vs Chronic
A hazardous chemical may cause acute health effects, chronic health effects, or both. Acute health effects are those that affect you right away, typically after a large short-term exposure. As an example, exposure to bleach can cause severe eye, nose, and throat irritation.

**Chemical Hazards**

Toxic Hazards
Chronic health effects result from prolonged or repeated exposures to a chemical over many days, weeks, months, or years. Symptoms of exposure may not be immediately apparent so you may not know you are being harmed until much later.

**Chemical Hazards**

Toxic Hazards
Local vs Systemic
A health effect can also be local or systemic, depending on where it affects you after exposure.

**Chemical Hazards**

Toxic Hazards
Chronic health effects are often difficult to recover from. Examples of chronic health effects are liver damage or cancer.
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Physical Hazards

Corrosive chemicals, such as strong acids and bases, can potentially destroy and damage other substances that they contact.

**WARNING**

Corrosive material
Wear protective clothing

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NOTES:

Physical Hazards

Gases under pressure pose several different hazards. When released suddenly, gas can expand quickly and displace oxygen in the air, expose users to toxic levels, or ignite in the presence of a spark or flame.

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NOTES:

Physical Hazards

If a cylinder ruptures, it can accelerate to speeds great enough to penetrate concrete walls.

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NOTES:

How do you know what chemical hazards exist in your work area? Your supervisor is your first source for information.

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NOTES:

Your supervisor will tell you what chemicals you will be using, the hazards associated with these chemicals, and how to work with them safely.

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NOTES:

If you are using a chemical for the first time, be sure to read the label to see what hazards are listed and what precautions should be taken to handle it properly.

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NOTES:
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Labels

- Most hazardous chemicals will have a Signal word on the label to alert users to the severity of the hazard. The Signal word will be either Danger or Warning, with Danger indicating the more severe hazard.

- If there are Pictograms associated with the chemical, they will all be present on the label. Pictograms will be further covered in the next section.

Precautionary Statements are standardized phrases that provide measures for users to follow to prevent exposure or what to do in case of an emergency. They include statements on:

- Prevention
- Response
- Storage
- Disposal

Hazard Statements are standardized phrases that provide specific hazard information.
Employees should check multiple chemical information sources to ensure that they are aware of all of the hazards of a particular chemical before beginning work.

Section 3 shows details about the hazardous ingredients of the chemical product. Note that the GHS hazard classification is shown for each ingredient.

Section 4 contains information for the initial first aid to be provided to someone who is showing an adverse effect from exposure to the chemical.

Finding SDSs:
Go to the OESO website.
Navigate to Occupational Hygiene & Safety, and SDSs. There you will find a wealth of links and resources.

Detecting Chemicals:
There are several ways to detect the presence or release of hazardous chemicals in the work area.
Being familiar with the properties of the product will help you detect anything unusual like strong odors or color changes.
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Detecting Chemicals
In some work areas which use large amounts of particular chemicals, continuous monitoring systems may be installed to signal potential leaks of hazardous chemicals. These systems will alarm when preset levels are detected.

Controlling Hazards
There are a number of techniques to control hazard exposure in the workplace. Some of these methods are more effective than others.

To control exposures to chemicals we always try to apply the most effective control first.

Hierarchy of Controls

Controlling Hazards
There is a “hierarchy of controls” for preventing exposure.

All these techniques should be considered to mitigate exposure.

Elimination
The best option is to eliminate the hazard. If the process allows it. One example is to eliminate mercury in the workplace by using non-mercury substitutes.

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Controlling Hazards
If this is not possible, the next best option is to substitute with a less hazardous substance.

In this example a non-corrosive griddle cleaner shown on the bottom right has been substituted for a highly corrosive cleaner shown at the top.

Elimination
Substitution

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Controlling Hazards
If you must work with a hazardous substance, use engineering controls to prevent their release into the air.

Examples of engineering controls are fume hoods and exhausted biosafety cabinets.
Controlling Hazards

Elimination
If you must work with a hazardous substance, use engineering controls to prevent their release into the air. When maintained and used properly, these are very effective at removing airborne chemicals away from you.

Substitution

Engineering Controls

Admin Controls

Controlling Hazards

These include:
- reducing the amount of time exposed
- keeping chemical containers closed and stored properly when not in use
- good housekeeping practices and
- following standard operating procedures

Controlling Hazards

YOU are ultimately responsible for your safety and those around you by following proper procedures. Poor housekeeping and chemicals don’t mix and can ultimately lead to an exposure.

Controlling Hazards

Personal protective equipment (PPE) is typically used together with other methods of chemical exposure controls. PPE alone as a means of exposure control is not ideal.

The available PPE should be appropriate for protection against the chemical. Don’t assume that the gloves you use for one product are effective for another.
Controlling Hazards

When respirator use is required it is critical to wear the correct respirator and cartridges for the airborne hazard. Because of this, it is important to contact OESO if you use, or plan to use respirators.

Responding to Emergencies

Be familiar with any emergency response procedures specific for your worksite. In the event of an emergency, refer to the Emergency Response and Incident Reporting guide that should be located in your immediate area.

Responding to Emergencies

There is a great deal of information within this guide including:

- Chemical spill procedures
- Emergency contact numbers
- Numbers for the different safety divisions within OESO.

This guide is your first resource for an emergency.

Chemical spills in your immediate area can, in many cases, be cleaned up by area personnel.

If the spills are large or particularly hazardous, the Duke Chemical Spill Response Team can be activated. In some cases, outside professionals may be required for cleanup.

You have completed the module. For further questions you can review or contact Occupational Hygiene and Safety at 919-684-5996.

If finished, acknowledge completion.