

## Introduction

Welcome to the Using PPE the Laboratory (OHS101) Course Material. This course covers conducting a hazard assessment, choosing the right Personal Protective Equipment (PPE), and correctly using, maintaining, or disposing of PPE.

## Objectives

After this course, participants should be able to:

1. Conduct a hazard assessment.
2. Select the correct PPE for the hazards you are working with or around.
3. Don and doff PPE correctly.
4. Implement the proper maintenance and disposal procedures.

## PPE Standard

The [OSHA Personal Protective Equipment \(PPE\) Standard \(29 CFR 1910.132\)](#) requires employers provide PPE and ensure it is used wherever “hazardous materials, processes or environment are encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact [29 CFR 1910.132(a) and 1910.132(h)].”

## Responsibilities

Employers are responsible for:

1. Conducting a hazard assessment to identify the appropriate PPE.
2. Making PPE available to employees.
3. Training employees in the use and care of the PPE.
4. Having a PPE maintenance program (including replacing worn or damaged PPE).

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Employees are responsible for:

1. Properly wearing the PPE.
2. Attending all training sessions.
3. Taking care of the PPE.
4. Notifying the supervisor of the need for new or additional PPE.

### ***4 Components of Laboratory PPE Program***

1. Hazard Assessment - This is the process of assessing the workplace, determining if hazards are present, or is likely to be present, necessitating the use of PPE. Hazard assessments look for both physical and health hazards in the workplace. Examples of physical hazards include moving objects, high/low temperatures, high-intensity lighting, and sharp objects. Examples of health hazards include chemicals, infectious material, or radiation. You should perform a walkthrough of the entire work area to identify hazards.
2. PPE Selection
3. Employee Training - Supervisor should ensure that employees demonstrate the ability to properly wear and use PPE before they can perform work using PPE. Retraining is required if the work conditions change or the employee fails to demonstrate the proper use of the assigned PPE. Employers are required to train employees on:
  - When to use PPE.
  - What type of PPE is required.
  - Proper donning and doffing of the PPE.
  - The limitations of the PPE.
  - Proper care, maintenance, and disposal of PPE
4. Record keeping - Employer must document each employee's training required to wear or use PPE, including the name of each employee trained, the date of the training, and the subject of the training.

### PPE Selection

All individuals, including visitors, who enter areas where hazardous materials are used or stored, must wear appropriate Personal Protective Equipment (PPE). PPE is the “last line



It is your responsibility to protect your exposed skin, eyes, and respiratory system using the appropriate PPE.

of defense” against potential exposures. It is never a substitute for engineering controls and prudent work practices but should be used in conjunction with these controls to ensure everyone's safety and health.

Wearing the proper personal protective equipment (PPE):

- Act as a barrier between you and infectious substances, chemicals, radioactive materials, and flying objects.
- Help delay the transfer of hazardous materials to your clothes and skin.
- Protect your clothes from possible contamination.
- Protect lab equipment, materials, specimens, patients, and animals from contamination from you.

The supervisor should use the information gathered during the hazard assessment process to select the proper PPE required for the lab or the planned experiment. It is always advised to select PPE, providing a higher level of protection than the minimum necessary to protect employees from the identified hazards. PPE must be:

- Safe design and construction.
- Should fit comfortably.
- Comes in multiple sizes and pick the size that fits the employee. If the fit is not right, it can expose the employee.
- Must be of the right material (e.g., polyester/cotton blend lab coat is not right for a lab working with flammable material. Use 100% cotton or flame-resistant lab coat).

PPE must meet the American National Standards Institute (ANSI) standards.

### Types

#### *Lab Coats or Disposable Gowns*

Always wear a clean buttoned lab coat (or disposable gown) when working with hazardous materials. Lab coats or disposable gowns do the following:



PPE should remain in the area being used and not be worn outside of the area, no matter where you are going. By doing this, you protect you, your co-workers, your work, and others from the possibility of contamination.

- Act as a removable barrier between you and spills, splashes infectious substances, chemicals, hazardous materials.
- Help delay the transfer of hazardous materials to your clothes and skin.
- Protect your clothes from possible contamination.
- Prevent the spread of contamination outside the lab (provided they are not worn outside the lab)

Each supervisor is responsible for ensuring that his/her workers (employees, students, and visitors) use the appropriate lab coat while working in the lab.

Lab coats are available in a variety of materials and provide varying degrees of protection. Examples include splash resistant coats, static-free coats, chemical resistant coats, and flame resistant coats. Please ensure that the coat you are selecting provides the type of protection appropriate for your needs.

Select lab coat/apron using the following recommendations:

- Length - At least knee length or longer for most effective coverage.
- Wristband - lab coat with a fitted wristband/cuff could reduce the potential for splashes up the arm and fire hazards.
- Top button - a high top button at the neck can provide the most effective protection.

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- Fire resistance-Lab coats made of polyester-cotton blends (no less than 35% cotton) are acceptable in labs where no open flames are present. Lab coats must be made of 100% cotton or flame-resistant material in labs where open flames are used (such as alcohol burners) or store large quantities (>10gallons) of flammable liquids outside a flammable storage cabinet.
- Do wear a lab coat when a Hazard Assessment of the laboratory determines hazards to the body or is likely to be present. A good rule of thumb is to wear a lab coat when working in a lab.

### Things to remember:

- Wear a lab coat of appropriate size and fits you perfectly.
- Chose a lab coat based on the types of workplace hazards. Lab coats can be disposable or reusable. Consider a disposable lab coat when using high hazard materials.
- Keep lab coats completely “buttoned” up. Snap closures are preferred over buttons or zippers to keep the body covered and allow quick removal in an emergency. Immediately remove a lab coat if on fire or there is obvious hazardous contamination.
- Never wear disposable lab coats for more than eight hours or if it has become contaminated.
- DON'T wear lab coats made of synthetic fabrics if there is a potential for fire. Synthetic fabrics burn, melt, shrink, and stick to the skin.
- Never roll up the sleeves on lab coats for comfort or ventilation.
- DON'T wear lab coats outside the lab.

### Hand protection

Hand protection is needed if there is a potential for skin absorption of harmful substances, chemical or thermal burns, electrical dangers, bruises/cuts/punctures, fractures, and amputations. The type of PPE required includes gloves, finger guards, and arm coverings, or elbow-length gloves.

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### Types of Gloves

One type of glove does not work for all types of hazards.

**Latex Gloves** are suitable for wearing while working with some of the biological hazards and infectious materials. Latex can cause allergy problems in some individuals.



- **Nitrile Gloves** are three times more puncture resistant than rubber and provide superior resistance to many kinds of chemicals. Identifying the right type of glove for chemical use refer to [ChemRest](#) or [Ansel 8th Edition Chemical Resistance Guide](#)

SDS and other reference documents are helpful too.

**Leather Gloves** are often found in construction areas, cut-resistant, and useful when working with abrasive materials.



**Neoprene Gloves** are made from synthetic rubber that is highly liquid-proof and chemical-resistant. They are great for specialized chemical applications involving acids, caustics, oils, alcohols, and solvents, but are not very flexible.

**Butyl Gloves** are highly flexible, made from cheap rubber, and useful for handling some types of strong corrosives, acids, or solvents.



**Heat Resistant Gloves** can be found at UAB's in areas using autoclaves and other heat or steam cleaning machines.

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**Cryogenic Gloves** have thermal protection built in since they are designed to work in ultra-cold temperatures. They can be water-resistant or waterproof. This type of glove is required when handling Liquid Nitrogen.



Gloves should be inspected before each use to ensure that they are not torn, punctured, or made ineffective. Discoloration or stiffness may also indicate deficiencies caused by excessive use or degradation.

### Donning Nitrile and Latex Gloves

Before donning your gloves, you may want to remove any jewelry that could puncture the gloves.

1. Gently pull the glove on to avoid tearing or ripping it.
2. Make sure that the fingers and thumb of the glove fit correctly.
3. Pull the glove up around the wrist.
4. Both gloves should feel like they fit properly without being too loose or too tight. If you are a lab coat or a disposable gown, the top of the glove should go over the gown's cuff area to provide complete protection.

### Doffing Your Gloves

1. To remove or doff your gloves, gently pick up the edge between two fingers and pull down.
2. Place your gloved fingers under the edge (shown in this picture) and continue to pull the glove off.
3. Keep pulling until the glove is off and inside out on your remaining gloved hand.
4. Stick one finger from the ungloved hand down into the glove. Remember to hang on to the glove you just removed in your gloved hand!
5. Grab the underside of the glove with the fingers of your ungloved hand.
6. Gently pull until the glove covers the first glove you removed.
7. Continue to gently pull until the glove covers the first glove you removed.
8. Both gloves should be inside out.



[Click here](#) to watch a video on how to remove your gloves properly.

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9. Place the gloves in the proper waste receptacle. Slinging or tossing them could spread contaminated materials.
10. Always wash your hands before donning and after doffing your gloves. Washing your hands eliminates most contaminants.



### Eye and Face Protection

If you are exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, potentially infected material or potentially harmful light and radiation, wear the appropriate protective gear.



**Goggles** are primary protectors intended to shield the eyes against liquid or chemical splash, irritating mists, vapors, and fumes.

**Safety glasses** are also primary protectors usually worn when performing tasks such as chipping, grinding, machining, masonry work, riveting, sanding, and when working with materials that may break or explode posing a danger to the eyes. Safety glasses are sturdier than regular glasses or goggles, and some are heat resistant.



**Face shields** are secondary protectors intended to protect the entire face against exposure to splashes.



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Welding glasses, laser safety goggles, etc. are other forms of eye protection and are required if you are dealing with those hazards.

**Prescription lenses** will not provide adequate protection against hazards that can impact eyes and face. People with corrective lenses must wear eye protection that incorporates the prescription into the design or wear additional protection over their prescription glasses.



Reusable goggles, safety glasses, and face shields should be cleaned using the appropriate cleaner regularly and especially after every exposure. Replace them when they become too scratched, marked, or damaged to use safely.

### **Head Protection**

Head protection is needed if any of the following conditions exist:

- Falling objects that can strike on the head
- Possibility of bumping the heads against fixed objects
- Possibility of accidental head contact with electrical hazards

Hard hats can protect employees from impact, penetration hazards, electrical shock, and burn hazards.

### **Foot and Leg Protection**

Employees working with hot substances or corrosive or poisonous materials must have protective gear to cover legs and feet.

### **Respiratory Protection**

A respirator is a protective device to guard the wearer against hazardous atmospheres. Depending on the performed task, a respirator may be required for your job whenever engineering and work practice control measures are not adequate to prevent atmospheric contamination.

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The two most common types you may find in research areas are N95 masks and tight-fitting half masks respirators, which cover the mouth and nose.



- If your job requires a respirator, including N95, you must have medical clearance according to the [EH&S Occupational Medicine Program](#). The respirator must be fit-tested on an annual basis or if the type or manufacturer of respirator changes.
- The N95 mask is designed to reduce exposures to airborne particles – not to eliminate them. They have a filtration efficiency of at least 95% against solid and liquid particles that do not contain oil. So, you should be protected against most airborne particles, chemical splashes, and biological agents.

**Half mask respirators** prevent the inhalation of harmful fumes, vapors, and dust.

### Hearing Protection

When should you wear ear protection? Employees may be exposed to a noise level of 90 dB for 8 hours per day before hearing protection is required. Listen to your conversations during the noise.



[Click here](#) to watch a video on staying protected in the lab.

- When noise levels are above 80 decibels (dB), people must speak very loudly.
- When noise levels are between 85 and 90 dB, people must shout.
- When noise levels are higher than 95 dB, people must move close together to hear each other and speak loudly.

There are two types to choose from – the earmuffs or soft internal plugs.

- The earmuff type should completely cover the ear and block most of the noise. Glasses, facial hair, long hair, etc. may reduce the protective value of earmuffs.
- If you use soft single-use earplugs, they should be put in with clean hands and appropriately inserted.



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## Reusable VS. Disposable PPE

- Reusable PPE must be cleaned and stored correctly after each use until damaged.
- Disposable PPE must be thrown out after the workday or if soiled or damaged.



## Signage

Due to the nature of some animal research, door postings for PPE and other considerations are necessary. Before entering an animal area with this type of posting, make sure that you read and follow the instructions carefully. If you have questions, contact the [UAB Animal Resources Program](#) or your supervisor or manager.

|   |                  |  |                  |
|---|------------------|--|------------------|
|    | OH&S<br>Use Only | OH&S<br>Use Only   | OH&S<br>Use Only |
| <b>Potentially Hazardous Materials, excluding anesthetics</b>   |                  |  |                  |
| <b>Agents (no abbreviation)</b>   |                  | <b>Route of Administration</b>   |                  |
| Temozolomide (Temodar, Temodal, Temcad)   |                  | Gavage   |                  |
| <b>Special Precautions/Instructions</b>   |                  |  |                  |
| <input checked="" type="checkbox"/> <b>Chemical hazard:</b> Handle cage bedding at a chemical dump station. Incinerate bedding.   |                  |  |                  |
| <input type="checkbox"/> <b>Biological hazard:</b> Autoclave cage and cage parts before handling and disposal. ( <input type="checkbox"/> Mark here if bedding must be incinerated after autoclaving.)  |                  |  |                  |
| <input type="checkbox"/> <b>Mixed biological and chemical hazard:</b> Autoclave cage and cage parts before cleaning and disposal. Handle cage bedding at a chemical dump station. Incinerate bedding.   |                  |  |                  |
| <input type="checkbox"/> <b>Radiation hazard:</b> Cage, cage parts, and carcasses must be changed, stored, packaged, and manifested <b>by PI's staff</b> (per rad material license)<br>(Some radioisotopes are "decay in place." For "decay in place" radioisotopes, PI must remove this form and hazard stickers after holding period) |                  |  |                  |
| <input type="checkbox"/> <b>Special handling or other instructions</b> (including EPA hazardous wastes, special immunizations, et cetera):  |                  |  |                  |
| <b>Biological Safety Cabinet</b>  |                  | <b>Fume Hood (chemical hazards and radioisotopes)</b>  |                  |
| <input type="checkbox"/> Required for ALL animal handling and cage change   |                  | <input type="checkbox"/> Required for ALL animal handling and cage change                            |                  |
| <input type="checkbox"/> Required ONLY for administration of hazard   |                  | <input type="checkbox"/> Required ONLY for administration of hazard                                  |                  |
| <b>Additional Personal Protection Equipment</b>   |                  |  |                  |
| In addition to normal animal care entry/handling requirements (see ARP Outerwear Requirement Sheet), the following additional personal protection equipment (PPE) must be worn/used in the room when handling affected animals:   |                  |  |                  |
| <input type="checkbox"/> Face Shield  |                  | <input type="checkbox"/> Closed front gown with long sleeves and elastic cuffs ( <b>over</b> scrubs) |                  |
| <input type="checkbox"/> Goggles  |                  | <input type="checkbox"/> Other:  |                  |
| <input type="checkbox"/> Safety Glasses   |                  |  |                  |
| <input type="checkbox"/> N-95 or Equivalent Fitted Respirator (annual fit test required)  |                  |  |                  |

PPE never goes out. Always remember PPE must be kept inside the work area. All protective wear (lab coats, gloves, etc.) used in the lab should be kept inside the lab to minimize the possibility of spreading contaminants to public areas, including eating or office space.

## Disposal

A designated trash container should always be located near the exit to a lab or facility. That way, possibly contaminated disposable PPE can be removed and disposed of before leaving the area. UAB Sustainability and [UAB EH&S](#) have partnered with Kimberly-Clark to offer to recycle of nitrile gloves. [Click here](#) to participate in Kimberly-Clark's "RightCycle" glove program.

There should also be a place to put non-disposable PPE, such as lab coats, for laundering. Never take your lab coat home to wash it! This could contaminate you, your clothes, vehicle, family, and other clothes in the washing machine.

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Different areas have different rules for what should be done with dirty or contaminated clothing. Check with your manager or supervisor for more information.

### Conclusion

This concludes Using PPE in the Laboratory (OHS102) Course Material. You should now take the assessment. 90% or higher is required to pass. You have three chances to complete the assessment successfully.

### EH&S Decision Tree

EH&S has many training courses available to all active UAB Employees and Students [including topics such as radiation, biosafety, chemical safety, building life, waste (hazardous, medical, and universal), PPE, hazard communication, etc. EH&S developed a [decision tree](#) to help you choose the right course to match the knowledge or skills you may need at work every day. If you have any questions, contact UAB's Department of Environmental Health and Safety (EH&S) at (205) 934-2487.