Introduction

Welcome to the Working Safely with Sharps at UAB (HS255) Course Material. This course is designed to provide guidelines when it comes to the standards, policies, and procedures for safe handling at UAB. This course is strongly recommended for anyone working with or around anything considered a sharp at UAB. For further assistance or information, contact the Department of Environmental Health and Safety (EHS) at (205) 934-2487 or visit their **website**.

Objectives

At the end of this course, participants will be able to:

1. Recognize the different types of sharps present at UAB.
2. Utilize the proper procedures for avoiding sharps injuries and know what to do if it happens.
3. Execute the proper guidelines when it comes to the proper disposal of unbroken or broken sharps.
4. Properly don and doff the appropriate Personal Protective Equipment (PPE) as needed.

Sharps

Defined

Alabama Department of Environmental Management (ADEM)

ADEM defines a sharp as, “any used or unused discarded article that may cause punctures or cuts and which has been or is intended for use in animal or human medical care, medical research, or in laboratories utilizing microorganisms. Such waste includes, but is not limited to, hypodermic needles, IV tubing with needles attached, scalpel blades, and syringes (with or without a needle attached). Items listed above that have been removed from their original sterile containers are included in this definition. Glassware, blood vials, pipettes, and similar items are to be handled as sharps if they are contaminated with blood or body fluids.”

Occupational Safety and Health Administration (OSHA)

OSHA defines a sharp as "Objects that can penetrate a worker's skin such as needles, scalpels, broken glass, capillary tubes, and the exposed ends of dental wires."

Types

Laboratory Sharps

Needles

- Needles – hollow needles used to inject drugs (medication) under the skin
- Syringes – devices used to inject medication into or withdraw fluid from the body
- Lancets, also called "fingersticks" devices – instruments with a short, two-edged blade used to get drops of blood for testing. Lancents are commonly used in the treatment of diabetes.
- Auto injectors, including epinephrine and insulin pens – syringes pre-filled with fluid medication designed to be self-injected into the body
- Infusion sets – tubing systems with a needle used to deliver drugs to the body
- Connection needles/sets – needles that connect to a tube used to transfer fluids in and out of the body. This is generally used for a patient on home hemodialysis.

Scalpels

The Merriam Webster Dictionary defines a scalpel as "a small knife with a thin, sharp blade that is used in surgery."

Other

There may be other items in your area that could be considered a sharp. Some examples include:

- Wire
- Sheet metal
- Box cutters
- Scissors
- Light bulbs
- Tools
- Blades

Handling

Laboratory Sharps

You should be very careful when handling needles. Remember:

- Do not take out of the package until it is time for use.
- Keep the needle tip pointed away from you at all times.
- Do not attempt to recap a needle unless using a one-handed technique or a recapping device.

Glassware

Proper handling of glassware can reduce breakage that would increase the risk of injuries and accidents.

- Never carry a flask by its neck.
- Always use two hands when carrying any glassware (position one hand under the glass for support).
- Appropriate gloves should be worn when there is a risk of breakage (e.g., inserting a glass rod), chemical contamination, or thermal hazard. When handling hot or cold glassware, always wear insulated gloves.
- Avoid physical stresses to the glassware. Where necessary, stabilize it by using clamps and platforms to relieve pressure. Avoid overtightening clamps. To avoid breakage while clamping glassware, use coated clamps to prevent glass-to-metal contact. Do not use excessive force to tighten clamps. Neck clamps should not be used as sole support for vessels larger than 500 ml.
- Ground-glass joints are crafted for a perfect fit and may stick sometimes. Never force a joint free. It can cause the glass to shatter. Lubricate surfaces or use a Teflon sleeve. A heat gun can gently loosen the joints.
- Never heat or cool glassware unless it is designed for those processes. Round-bottom flasks are best for boiling liquids. Never set hot glass on a cold bench top.

- When storing glassware, remember to:
  - Keep it away from shelf edges.
  - Place glassware toward the back of benches or hoods. (Remember: Fume hoods and biosafety cabinets should not be used for storage).
  - Don't let instruments roll around in drawers. Use drawer pads.

Scalpels and Others

If you will be using a scalpel, you should only hold it by its handle in the proper position.

You should handle anything that is considered a sharp or could cause injury with the highest level of care. This will decrease the chances of injury tremendously.

Disposal

If you are going to be disposing of any medical waste, you are also required to complete the **Medical Waste Management for Labs (BIO301L)** Training Course.

Contaminated

Laboratory Sharps

Needles, either used (contaminated) or unused (uncontaminated), should be disposed of in a red sharps container. These containers should never be more than 75% full. Once the container is 75% full, it should be removed properly.

Glassware

Glassware which may be contaminated with infectious agents, including human blood, should be placed in approved sharps containers. The containers can then be treated as described in the **UAB Medical Waste Management Plan**.

- Place the broken glassware in a rigid, puncture-resistant container (e.g., sharps container).
- For biologically contaminated broken glass, place in a puncture proof container, and properly manifest it for waste disposal.
- For chemically contaminated broken glass, place in a puncture proof container, properly manifest to be tagged as chemical waste.
- Glassware that is contaminated is treated as medical waste.

Scalpels and Others

Scalpels are treated as medical waste and disposed of in a red sharps container. Anything that is considered a sharp could cause a cutting injury, and/or is contaminated should be placed in a red sharps container. If you have questions, call EHS at (205) 934-2487.

Uncontaminated

Laboratory Sharps

Anything that is considered a sharp or that could cause a cutting injury should be placed in a red sharps container. If you have questions, call EHS at (205) 934-2487.

Glassware

Uncontaminated glassware, broken or unbroken, must never be placed directly into the regular trash can. This applies to glass items from medical, research, and teaching labs including containers, pipettes, tubing, glass slides, and cover slips, etc. It must be placed in a rigid container that is puncture resistant (i.e., cardboard boxes, plastic, or metal drums). It should be labeled “Caution-Glass.” When the container becomes full, secure the top of the container with tape. The waste can then be placed in the regular trash.

Injuries

The Centers for Disease Control and Prevention (CDC) defines a sharps injury as: “A penetrating stab wound from a needle, scalpel, or other sharp object that may result in exposure to blood or other body fluids.”

Work Practice Controls

Cleaning and Drying Glassware

Good lab technique necessitates the use of clean glassware. The glass must be physically clean, chemically clean, and in many cases, sterile. Many glassware accidents occur during cleaning. Below are some reminders when washing and drying glassware.

- Wear eye protection and heavy-duty slip-resistant and chemically resistant gloves when washing glassware.
- Wash glassware as quickly as possible after use. The longer it is left unwashed, the harder it will be to clean. If necessary, allow harder to clean apparatus to soak in soapy water.
- Do not overload sinks, dishwashers, or soaking bins.
- Keep glassware clear of the sides of the sink. Rubber sink and counter mats may also help reduce the risk of breakage and injury.
- Never use worn out cleaning brushes. They can scratch or abrade the glass.
- Place articles on towels in a lined basket, or on slip-resistant pads when drying glassware. Be sure to place away from the edge of the bench. Large containers may be hung on secure pegs to dry.
- Wash new glassware before use to remove any residue or loose particles.

When selecting glassware, determine the compatibility of the glassware with the chemicals or process. Some chemicals react with glass or can damage the glass. If your process involves temperature or pressure changes, ensure the glassware can withstand the changes. Before working with glassware, always inspect it for flaws.

If defects are discovered, the glassware should be removed from service. Scratches in glass can grow to cracks. Dispose of flawed glassware properly.

Examples of chemical compatibility and glassware to keep in mind:

- Heat causes expansion of volatile materials. Confinement of expansion results in an explosion. The danger exists even when external heat is not applied.
- Mixing sulfuric acid with water inside a cylinder causes an exothermic reaction to occur, resulting in the heat from the reaction to break the bottom of the vessel. Never mix sulfuric acid inside a cylinder.
- Hydrofluoric acid chemically attacks glass. Hot phosphoric acid and strong hot alkalis also attack glass. Never place these substances in glassware.

Heating and Cooling Glassware

- Check with the glassware manufacturer to determine safe temperature levels. Most glassware can only be exposed to certain high and low temperatures. Usage outside of those ranges may cause damage or breakage to the glassware.
- Always watch evaporation closely. A vessel, heated after evaporation has already occurred, may crack.
- Do not put hot glassware on cold or wet surfaces as it may break with temperature change.
- Never heat glassware that is etched, cracked, chipped, nicked, or scratched.
- Never heat glassware with thick walls (e.g., bottles and jars) over a direct flame. Additionally, do not heat glassware directly on electrical heating elements.
- Do not look down into a vessel being heated.
- Cool all glassware slowly to prevent breakage unless using specifically designed glassware.
- Use care when removing glassware from ultra-low temperature freezers (-70 to -150 C) to prevent thermal shock and cracking.

- For best results, immediately rinse the entire bottle under cold running water until thawing begins.
- Never place bottles directly from the freezer into warm water baths.
- Ensure that the flame should touch the glass below the liquid level when using a Bunsen burner. A ceramic-centered wire gauze will diffuse the burner flame to provide more even heat.
- Always use hotplates that are larger than the bottom of the vessel being heated. Thick-walled glassware (e.g., jars, bottles, cylinders, and filter flasks) should never be heated on hot plates.

Glass Rods or Tubing

Setting up apparatus can involve pushing glass tubes through a cork or stopper. Researchers may also attach a rubber policeman to a glass rod. Sometimes researchers may attach a glass Pasteur pipette to rubber tubing for aspiration. All of these procedures have a high risk of injury to your hands if the glass tube, rod, or pipette break.

When handling glass rods, tubes, or pipettes, remember the following:

- Determine if the holes in the cork or stopper are the correct size for the glass material.
- Never force the glass into place.
- Lubricate the hole and tube. Water, soapy water, or glycerin may be used a lubricant. It is not advised to use oil or grease.
- Wear cut resistant gloves if possible.
- Hold the glass material with a towel.
- Position the glass material close to the insertion point.
- Gently twist the glass material into place.

Vacuum and Pressure Operations

Some glassware and processes can present unusual safety risks. Before starting, be sure you have had the necessary training before working with specialized equipment or processes.

Vacuum or pressure operations can severely test glassware. Container walls must be able to withstand pressure differences. If the container is not strong enough, the container may implode.

Round-bottomed or thick-walled flasks must always be used. Glassware designed for vacuum or pressure operations is rated for specific pressure limits. NEVER place glassware under pressure that it is not designed to withstand.

Glassware shows signs of defects, flaws, or damage cannot be used in a vacuum system. It is more apt to break through thermal shock. Checking for flaws or defects before use is very important.

When setting up a vacuum system, the following protective measures must be taken:

- Place all vacuum apparatus behind a blast shield or inside a fume hood. (Remember to lower the sash of the fume hood.)
- Always wear appropriate protective equipment (e.g., safety goggles, faceshield, and gloves).
- Use PVC coated glassware whenever possible. If not available, cover flasks, dewers, and desiccators with tape or mesh.

Cuts

Small Cuts

Wash the injury thoroughly with water. If the injury is minor, use the first aid kit in the laboratory. The first aid kit contains triple antibiotic ointment and adhesive bandages. You should also fill out an **Incident Report Form**.

Large Cuts

Let your lab manager or PI know immediately. To stop or slow down bleeding, apply pressure to the wound. If the wound is a deep puncture or there is glass or other foreign matter in the wound, then apply pressure around the wound to slow the bleeding. In all cases, a large cut must be attended to by medical professionals.

If you are stuck by a needle or other sharp, get blood, or Other Potentially Infectious Materials (OPIM) in your eyes, nose, mouth, or on broken skin, immediately flood the exposed area with water and clean the wound with soap and water or a skin disinfectant if available. Report this immediately to your employer and seek immediate medical attention.

Spills

Determining the Nature

What is the material that was spilled?

1. Blood
2. Bodily fluids
3. OPIM
4. Non-regulated material
    a. Some body fluids that contained no blood would be an example of non-regulated material (e.g., urine with no visible blood). The spill would be cleaned up just like any other spill.

Determining the size of the spill

1. Small
    a. When the material "sticks" to the surface and generally does not run, it is considered a small spill. An example would be 1-2 ml of fluids (Note: 5 ml is approximately 1 teaspoon so 2 ml would be approximately ¼ teaspoon of fluid.)
2. Large
    a. When the materials is of sufficient quality that it tends to seek its own level. This means that the fluid would run to a low point in the area. If you have any questions, please refer to the **UAB Spill Cleanup Procedures**.

Conclusion

This concludes the Working Safely with Sharps at UAB (HS255) Course Material. Please take the assessment at this time. 90% or higher is required to pass. You make take the assessment two times. If you fail both attempts, you will fail the course and have to take it again.

EHS Decision Tree

EHS has many training courses available to all UAB active employees and students. This includes topics such as in-depth radiation training, biosafety, bloodborne pathogens, chemical safety, controlled substances, building life safety, hazardous and medical waste, universal waste, PPE, hazard communication, etc.

We have a **decision tree** to assist you in choosing the right course to match the knowledge/skills you may need at work every day as well.

If you have any questions or comments, please contact the Department of Environmental Health and Safety (EHS) at (205) 934-2487.