



Laboratory Safety Training

Revised January 8, 2013

Introduction



Safety is an important part of the Clinical Laboratory culture.

Because our laboratory utilizes numerous chemicals, procedures, and operations, extensive safety precautions are required.

This presentation provides an overview of some of the safety precautions you can practice in order to create a safe Laboratory environment for yourself, your colleagues, and our students.

Course Contents

The Laboratory staff must be actively involved with all areas of safety and they are as follows:

- I. Safety Chemical Hygiene Plan
 - Monitoring Safety
 - Eye Washes
 - Safety Showers
- II. Safe Work Practices
- III. Personal Protective Equipment (PPE)
- IV. Hand Hygiene
- V. Chemical Safety
- VI. Fire Safety
- VII. Electrical Safety
- VIII. Safe transport of specimens
- IX. Waste Disposal
- X. Reporting Device Related Adverse Patient Events to the FDA



I. Safety/Chemical Hygiene Plan



Whether you are a new or seasoned Technologist or student, it is good policy to know your Laboratory's Safety/Chemical Hygiene plan. Knowing the Safety/Chemical Hygiene plan and the location of safety equipment could prevent a minor emergency from turning into a major one.



Everyone should know the location of the following:

- Safety Showers
- Safety Eye Washes
- Emergency Exits
- Fire Extinguishers
- Spill kits
- Health First Code Quick Reference & Kardex
- Emergency Bypass phone- Black phones for use in Emergency situations.



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Monitoring Safety

Three ways safety is monitored

- Safety Portal
- Incident Reporting
- Audits

Eye Wash stations

- Outside the door of each Laboratory section, that has an eyewash station, is a sign that looks similar to this-



- The eye wash station locations are marked with these signs inside the section.



- There are different types of eye wash stations within the lab but they all work the same way.

Eye Wash instructions

1. Remove any contact lenses immediately if a chemical or other substance gets into your eye. The contact can hold the substance to the eye, causing major amounts of damage.
2. Forcibly hold your eyes open and place them on the designated spot on the eyewash station. This is probably the hardest thing to do but also the most important.
3. Continue to hold your eyes open and, if possible, have someone else turn the water on. Flush eyes for at least 15 seconds or until thoroughly rinsed. Stations are designed to deliver continuous flushing under gentle pressure to ensure that the substance is flushed from your eye.



Safety Showers

- The Laboratory has signs indicating the location of the safety showers. They are similar to this example:



- To activate the shower, simply pull the handle which will then release several gallons of water.



II. Safe Work Practices

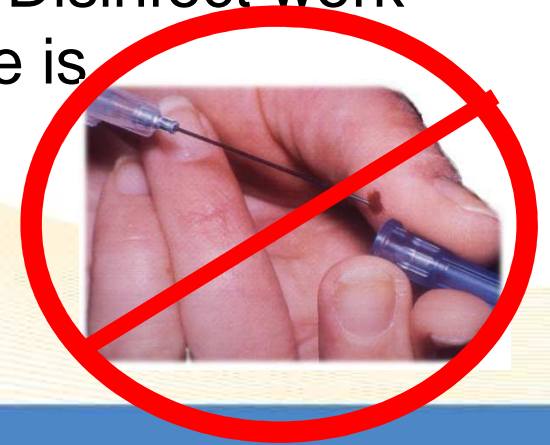


General Guidelines

- Eating, drinking, chewing gum, smoking, applying cosmetics or lip balm, and handling contact lenses in work areas is not permitted.
- Long hair is to be tied back to avoid contamination with work areas.
- Long earrings (longer than 1 inch), bracelets and other dangling jewelry is prohibited as well as flowing scarves.
- Store clean clothing such as sweaters, coats and jackets separate from “dirty” lab coats.
- Wash hands after accidental contact with blood or body fluids and before leaving the Laboratory. Phlebotomists must wash before and after contact with each patient.
- Hepatitis B immunization is provided to associates who may be exposed to blood and body fluids.

General Guidelines, cont'd

- Needles- never shear, recap, bend or break needles after use. Use the safety devices provided and activate after use.
- Pneumatic tubes- gloves are to be worn when opening the biohazard carriers.
- Keep work areas clean and uncluttered. Disinfect work areas after each shift and whenever there is contamination.



General Guidelines, cont'd

- Keep access to emergency shower and eye wash clear at all times.
- Keep access to fire extinguishers clear at all times.
- Keep work areas free of clutter.
- Keep all aisles, and corridors free of equipment, boxes, chemicals, and debris.
- Store food and drink in a refrigerator that is designated for that purpose, not in one where chemicals/blood are stored.
- Wear safety glasses or work behind a safety shield when working with open containers of blood or body fluids.

Glassware

- Accidents involving glassware are one of the leading causes of laboratory injuries.
- To reduce the chance of cuts or punctures, use common sense when working with glassware



Glassware, cont'd



General rules to follow when handling glassware:

- Prevent damage to glassware during handling and storage.
- Inspect glassware before and after each use. Discard or repair any cracked, broken, or damaged glassware.
- Thoroughly clean and decontaminate glassware after each use.
- Never use laboratory glassware to serve food or drinks.



Glassware, cont'd

Guidelines for disposing of broken glass:

- Do not pick up broken glass with bare or unprotected hands.
- Use a brush and dust pan to clean up broken glass.
- Remove broken glass in sinks by using tongs for large pieces and cotton held by tongs for small pieces and slivers.
- Place all the recovered broken glass into a sharps container.

III. Personal Protective Equipment (PPE)

- Lab coats
- Gloves
- Eye protection
- Respirators



We don't require you to wear Personal Protective Equipment (PPE) just because we want you to look GOOFY. It is there to give you added protection against any accidents that may occur while working in the lab.

Site specific & appropriate to the task - Refer to area's site specific written standard operating procedures

Face and Eyes

- Mask
- Glasses (with side shields)
- Goggles
- Face Shield
 - With mask

Body – Examples

- Coats
- Gowns
- Aprons
- Sleeves
- Head
- Shoe Covers



According to the CDC, the correct order for donning personal protective equipment is:

1. Cover gown

- Fully cover torso from neck to knees, arms to end of wrist

2. Mask

- Fit flexible band to nose bridge
- Fit snug to face and over chin, covering nose

3. Goggles, safety glasses with side shield or face shield

4. Gloves

- Extend to cover wrist of cover gown

According to the CDC, the correct order for removing personal protective equipment is:

1. Gloves

- Outside of glove is contaminated!
- When removing, grasp outside of glove with opposite gloved hand and peel off

2. Goggles, safety glasses with side shield or face shield

- Outside of goggles is contaminated!
- Remove by grasping ear piece

3. Cover gown

- Gown front and sleeves are contaminated!
- Unfasten ties
- Pull away from neck and shoulders, touching inside of gown only
- Turn gown inside out and roll into a ball then discard

4. Mask

- Front of mask is contaminated – DO NOT TOUCH!
- Grasp bottom, then elastics and remove

Lab Coats

- Lab Coats must be worn when working at the bench. They must be knee length and completely buttoned.
- Replace when soiled or worn.



OSHA (Occupational Safety and Health Administration) Requires training on how to don (put on) and doff (take off) a lab coat

To Don a Lab Coat:

- Remove the lab coat from its location.
- Insert one arm into the sleeve.
- Insert the other arm into the other sleeve.
- Adjust the shoulders and sleeves until comfortable.
- Close the front of the coat completely. Button all buttons. The coat must be knee length. Do not cut the hem to shorten to a jacket length.

To Doff a Lab Coat:

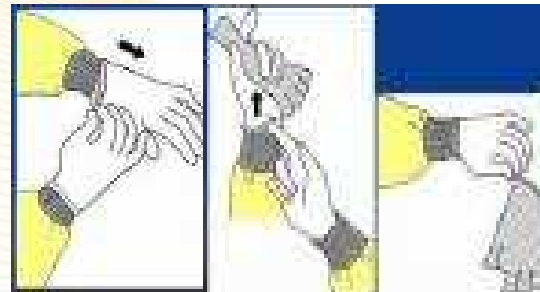
- Release the closures and open the front.
- Slide the fingers of one hand under the cuff of the opposite sleeve. Pulling the arm from the sleeve.
- Pull the arm completely from the sleeve.
- Slide the fingers of the freed hand under the cuff of the remaining sleeve and pull the arm from the sleeve.
- If the coat is not soiled, hang the coat for future use.
- If the coat is soiled, turn inside out and discard. If the coat is soiled with blood and/or body fluids, discard into red bag trash. Otherwise, they can be disposed of into regular trash.

Gloves

- Gloves are a crucial component in keeping biohazardous materials from contaminating your skin. But be careful! Just because you have gloves on doesn't mean you're safe.
- Choose properly fitting gloves
- Avoid oversized rings that might puncture gloves exposing the hand to possible contamination.
- Avoid long nails, especially artificial nails, since they can puncture gloves exposing the hand to possible contamination.
- Discard when soiled. Do not reuse.
- Laboratory gloves are latex free. Health first has a latex free policy located on the intranet.
- Gloves are to be worn for the following activities:
 - **during phlebotomy**
 - **during other specimen collection procedures**
 - **during all specimen handling**
 - **when handling reagents produced from blood or other potentially infectious body fluids**
 - **whenever direct contact with blood or other body fluids is expected to occur**
 - **when working with contaminated instruments**

Gloves, cont'd

- **Proper removal of exam gloves**
- **Step 1:** Peel one exam glove off by grasping under the the cuff and rolling the glove off your hand — so it comes off inside-out. This keeps most of the contamination inside.
- Avoid snapping the gloves. If gloves are contaminated, snapping can result in aerosols of the contaminants.
- **Step 2:** Hold the used glove in your opposite gloved hand. Carefully slip your exposed fingers under the cuff of your gloved hand, being careful not to touch the contaminated glove surface. Peel the exam glove off, inside-out, rolling it over the other used glove to form a “baggie” of used gloves — with contamination inside!
- **Step 3:** Dispose the exam gloves properly and safely. Wash hands after removal.
- Images courtesy of CDC



Eye Protection



- Goggles/Safety glasses protect your eyes from vapors, dust, and splashed chemicals from getting into your eyes.
- Safety shields are to be used when working with open containers of blood or body fluids.

Respirators



- Respirators are worn by Histology associates when disposing of hazardous chemicals in the outside storage area.
- A log of each use is maintained to determine the next cartridge change.

REMEMBER TO USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION

- Keep hands away from face
- Limit surfaces touched
- Change gloves between patients, when worn/torn or heavily contaminated
- Perform hand hygiene

IV. Hand Hygiene

Why Wash Your Hands?

- Common everyday activities can result in contamination of hands with organisms or germs that can be transferred to another patient or healthcare worker
- Handwashing is the single most effective means to prevent infection
- Handwashing can significantly reduce infections by removing these organisms or germs
- Glove use does not replace handwashing



Hand Hygiene Technique

- Handrubs
 - Apply to palm of one hand, rub hands together covering all surfaces until dry
 - Volume: based on manufacturer
- Handwashing
 - Wet hands with water, apply soap, rub hands together for at least 40-60 seconds
 - Rinse and dry with disposable towel
 - Use towel to turn off faucet

V. Chemical Safety

Chemical safety procedures are set to protect the employees, student, and the environment from possible harm. Some of the procedures that help accomplish this are:

- Proper labeling
- Proper storage
- MSDS locations
- Spill procedure





Proper Labeling

Proper labeling ensures that you receive the correct chemical and prevents you from getting harmed by one that is not labeled correctly.

- Primary container labels shall not be removed or defaced.
- Secondary container labels shall include the chemical identity, appropriate hazard warning, and date of transfer. The appropriate hazard warning shall include as a minimum the key word(s) of the chemical hazard (e.g., flammable, corrosive, poison, etc., and if the chemical is a carcinogen or radioactive).
- Safety Data Sheets, SDS's, (formerly known as MSDS's) and/or primary container labels shall be available for chemical specific information when chemical transfer to secondary containers is performed.
- Use of precautionary labels, such as the NFPA 704 and HMIS Systems, is allowed for showing hazard warnings.

Chemical Storage

- There are storage requirements for separating hazardous chemicals because an alphabetical storage system may place incompatible chemicals next to each other. Group chemicals according to their hazard category (i.e., acids, bases, flammables, etc.)
- Separate acids from bases. Store these chemicals near floor level.
- Separate highly toxic chemicals and carcinogens from all other chemicals. This storage location should have a warning label.
- Separate acids from flammables.

NFPA (National Fire Protection Association) Symbol

The diamond is subdivided into four general categories:

Health (blue)

Flammability (red)

Reactivity (yellow)

Special (white)



Safety Data Sheets, SDS's

(formerly known as Material Safety Data Sheets, MSDS's)



- Know the location of the SDS's.
- Before using any chemical, especially new chemicals, read the container label and the appropriate SDS. Container labels and SDS's are good sources of information for chemical safety.

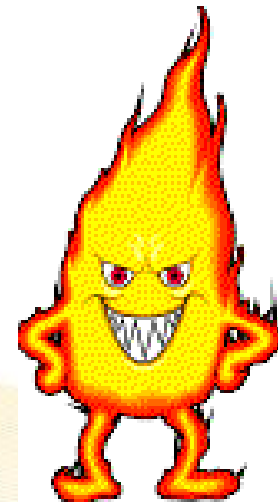
Spill Procedure



- For small chemical spills, use the spill kits located in each section of the Laboratory. Follow the SDS for the chemical spill for proper disposal.
- For large spills, close all doors and evacuate/secure the area.
 - Provide first aid to anyone who may have been splashed or received exposure.
 - Contact the call center (88).
 - When the spill team arrives, inform them of the exact location and approximate amount of the spill, provide the MSDS for the spilled chemical and any actions taken to minimize the spill.

VI. Fire Safety

The best method of fire fighting is taking precautions to prevent one from occurring in the first place and being prepared if a fire in the lab should occur.



Fire Prevention

Ways to prevent fires are:

- Have good housekeeping practices.
- Use the smallest amount of flammable solvents possible.
- Keep the flammable solvents away from ignition sources.
- Store flammables in a flammable storage cabinet

Fire Procedure

If and when a fire should occur don't panic, just simply RACE:

- **R**escue patients/persons in immediate danger.
- **A**ctivate the nearest alarm (Pull the nearest station, call #9-911 & call center (CBX) "88" and inform the operator of the location of the smoke or fire)
- **C**ontain the fire & smoke (close windows and doors)
- **E**xtinguish the fire if you can do so safely. always stay on the exit side of the fire.
- **E**vacuate/relocate horizontally to the next adjacent smoke compartment as appropriate.

Fire Procedure, cont'd



To use the fire extinguisher simply PASS

P- Pull the pin

A- Aim the nozzle at the base of the flame

S- Squeeze the trigger while holding the extinguisher upright

S- Sweep the nozzle from side to side to extinguish the flame.

VII. Electrical Safety



- Report frayed electrical cords or cords with wire showing to your immediate supervisor. Damaged cords are hazardous and can create fire or shock.
- When unplugging equipment, do not pull on the cord itself, pull by the plug.
- When using extension cords, do not put heavy equipment, furniture or chair mats over the cords.
- Equipment/appliances brought in from home must have the U/L approval label on them. Your supervisor should approve such equipment before being placed into use.

VIII. Safe Transport of Specimens



- All specimens being hand carried in and out of the laboratory are to be placed in the biohazard ziplock transport bags.
- All specimens sent to and from the Laboratory using the pneumatic tube system are to be placed in the biohazard ziplock transport bags (double bagged) before being placed into the pneumatic tube carriers.

IX. Waste Disposal



- Infectious/biohazard waste (contaminated with blood/body fluid) goes into the red bagged trash.
- Needles and sharps goes into the red plastic sharps containers
- Regular trash- waste from laboratory that poses no health or environmental risk. Gloves may go into this trash as long as they are not grossly contaminated with blood or body fluids.



X. Reporting Device-Related Adverse Patient Events to the FDA

When information reasonably suggests that any laboratory instrument, reagent or other device has or may have caused or contributed to a patient death or serious patient injury, the FDA requires hospitals and outpatient diagnostic facilities to report the event. The FDA also has a procedure for medical personnel to voluntarily report serious adverse patient events that may be related to a medical device that were noted spontaneously in the course of clinical care.

When an adverse patient event is identified, the employee should:

- Save the device, packaging, and all related parts, and note the device's clinical engineering number or serial number.
- Telephone Risk Management immediately.
- Place a "Defective . . . Do Not Use" tag on the device and remove it from use.
- If applicable, notify the patient's physician or refer the employee to Employee Health.
- The device, when applicable, should be turned over to Risk Management during normal working hours.
- Notify Security during off hours to have the device sequestered.
- File a report via the Safety Zone Portal immediately following the device-related incident.

References

- Health First Code Quick Reference & Kardex
- Laboratory General Policy 8.30, Safety/Chemical Hygiene Plan
- Complete Guide to Laboratory Safety, second edition, Terry Jo Gile, 2007
- <http://www.tarleton.edu/~safety/labsafety/page6.html>

Images courtesy of:

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