

5.Safety and First Aid

A. Safety in Specimen Collection

1. Goal is to recognize and eliminate hazards and provide information on safety education so employees can have a healthy, safe environment.
2. OSHA Act of 1991 mandates the provision of a safe working environment.
3. Safety in specimen handling is critical to avoid acquisition of infection.

B. Personal hygiene in the work environment.

1. Put nothing in your mouth.
2. Wash hands frequently.
3. Never apply cosmetics.
4. No eating or drinking.
5. Tie back long hair.
6. Button lab coat.
7. No food in lab fridge.
8. No loose, dangling clothing or jewelry.
9. Opened toed shoes usually prohibited

C. Laboratory safety

1. Correct handling of specimens
 - a. Specimens should be covered at all times
 - b. Centrifuge specimens using appropriate precautions.
 - c. Dispose of samples in appropriate biohazardous containers.
 - d. Cover needles by properly utilizing the safety equipment which require a one-handed method of permanently covering the end of the needle.
2. Safety advisory has been issued for the use of glass capillary tubes to reduce the risk of injury due to breakage and include the following:
 - a. Avoid using capillary tubes made of glass.
 - b. Use capillary tubes wrapped in puncture-resistant film.
 - c. Utilize products which do not require manual filling of end with sealant.
 - d. Utilize products that allow measurement of hematocrit without centrifugation.
3. Correctly dispose of biohazardous waste.
 - a. Double bag
 - b. Sharps keeper for sharps and broken glass.
 - c. When disposing of specimens in sink, turn water on *gently*.
 - d. Urine specimens poured down drain.
 - e. Blood can be poured down drain if local ordinance permits, most facilities put in biohazard trash.

4. Decontaminate work area daily and as needed.
 - a. Use a 1:10 dilution of bleach, must be prepared daily.
 - b. Blood or body fluid spills must be handled carefully.
 - 1) Place paper towels over spill.
 - 2) Flood with bleach solution
 - 3) Allow to sit for 15 minutes before cleaning up.
 - c. Special encapsulating powders are available which gel the liquid.
5. Colored biohazard labels must be placed on all containers used to store, transport or ship blood or body fluids.
6. If accidental exposure occurs:
 - a. Use appropriate safety equipment ie, if in eyes go to eye wash station.
 - b. If it is a puncture wound **immediately** apply first aid, then report.
 - c. If employee, report to employee health immediately, if student, follow exposure plan you receive during clinical orientation. Take this packet to clinical EVERY DAY.
 - d. Employee and patient (if known) should be evaluated for HIV and HBV.
 - e. Employee should receive HBV vaccine and initial dose of AZT within 1 hour.
 - f. HCW should be counseled and evaluated for HIV infection at periodic intervals.

D. Fire safety

1. Phlebotomist responsibilities
 - a. All employees are responsible for safety.
 - b. Know the location of fire extinguishers and learn how to use them correctly.
 - c. Know the procedure for reporting a fire.
 - d. Know where the fire blanket is.
 - e. It is mandatory to attend periodic safety programs to review.
2. **Components of a fire:**
 - a. Fuel
 - b. Oxygen
 - c. Heat
 - d. Necessary chain reaction
3. Classification of fires
 - a. **Class A** fires occur with ordinary combustible material such as wood, rubbish, paper, cloth and many plastics.
 - b. **Class B** fires occur in a vapor-air mixture over flammable solvents such as gasoline, oil, paint, lacquers, grease and flammable gases.
 - c. **Class C** fires occur in or near electrical equipment.
 - d. **Class D** fires occur with combustible metals such as magnesium, sodium, and lithium

4. Fire extinguishers
 - a. **Class A** contains soda and acid or water used to cool fire (think Ashes).
 - b. **Class B** contains foam, dry chemicals or CO₂ used on fires composed of vapor, air mixtures or solvents (think Barrels).
 - c. **Class C** contains nonconducting extinguishing agents such as dry chemicals or CO₂ used on fires which occur in or near electrical equipment (think Current).
 - d. **Class D** used on fires ignited by combustible metals like magnesium, lithium and sodium. Very rarely encountered (think Dangerous).
 - e. **ABC** multipurpose extinguisher is very popular and frequently used, reduces confusion about what type of extinguisher to use.

5. Proper use of fire extinguisher = **PASS**
 - a. **P**ull Pin
 - b. **A**im Nozzle
 - c. **S**queeze Trigger
 - d. **S**weep Nozzle

6. Procedure to follow when a fire is discovered-**RACE-Rescue, Alert, Confine, Extinguish**
 - a. Evacuate the area (rescue)
 - b. Immediately pull alarm (alert)
 - c. Call designated number posted on or near phone
 - d. Close all doors/windows. (Confine)
 - e. If fire is small, use fire extinguisher. (Extinguish)
 - f. If evacuation is necessary use stairs.
 - g. If clothing on fire, stop, drop, and roll.
 - h. If caught in a fire, **crawl** to exit, get wet towel if possible.
 - i. Do not block entrance or try to reenter the building.
 - j. Do not panic or run.

E. Electrical Safety

1. Potential major hazard is the possibility of electric current passing through a person.
2. Know the location of circuit breakers to assure fast response during electrical fire or shock.
3. Preventive maintenance on equipment.
 - a. Periodically inspect cords for fraying.
 - b. Control switches and thermostats should be in good working order.
 - c. Unplug equipment when performing preventive maintenance and when cleaning up spills in equipment.

4. Procedure to follow when coworker has contact with electrical current.
 - a. **Unplug equipment first or turn off power.**
 - b. ***Do not touch the victim.***

- c. To remove electrical contact, use asbestos gloves, which cannot conduct electricity or place hand in glass beaker to push power supply away from the victim
- d. Call for medical assistance and start CPR immediately if needed.
- e. Do not move the victim
- f. Place fire blanket or other warm clothing over victim.

F. Radiation safety

1. Three principles to protect yourself
 - a. **Time** - radiation is cumulative and length of exposure should be minimal.
 - b. **Shielding** - lead apron or behind lead shield
 - c. **Distance** - to reduce amount of exposure.
2. Know radiation sign and use caution.
 - a. Areas where radioactive materials/reagents are stored must be labeled with radiation hazards sign.
 - b. Exposure for phlebotomists may be collection of specimens in nuclear medicine or x-ray department or taking specimens to RIA department in lab.
 - c. In clinic settings, phlebotomist may be asked to assist with proper placement of patient.
3. Be knowledgeable about institutions policy pertaining to radiation safety, especially if employee/student is pregnant.

G. Mechanical safety

1. Correct use of equipment is critical
 - a. Carrier in centrifuge in correct position and can swing freely.
 - b. Must use correct head/cups specifically designed for centrifuge used.
 - c. Unbalanced load can lead to dangerous problems.
2. Schedule preventive maintenance on a regular basis.

H. Chemical safety

1. Injury in the laboratory can occur due to exposure to poisonous, volatile, caustic or corrosive agents such as strong acids or basis.
2. Different chemicals and reagents can present different types of hazards.
 - a. Inhalation of fumes can damage lungs (sulfuric acid).
 - b. Some are corrosive to the skin (phenol).
 - c. Some are caustic (acetic acid).
 - d. Some are volatile (some solvents).
 - e. Some present a combination of hazards.
3. All chemical and reagents should be stored in original container, tightly closed and in an appropriate, well ventilated storage area, ie, flammable cabinet.

4. **Hazard communication manual**, mandated by OSHA in 1986 and known as the “**Right to Know Act**”, requires that employers maintain documentation related to all hazardous substances and must include the following:
 - a. Written communication program.
 - b. Documented training of employees.
 - c. Sophisticated tracking and documentation of hazardous substances and Material Safety Data Sheets (MSDS).

5. OSHA hazard communication standard (Right to Know) is designed to ensure that lab orders are fully aware of hazards associated with chemicals in the workplace.
 - a. Each site must have a comprehensive plan to implement the practice of safety measures throughout the lab.

 - b. A **chemical hygiene** plan for each lab must include:
 - 1) Outline the specific work practices and procedures necessary to protect worker from any health hazards associated with hazardous chemicals.
 - 2) Provide information and training regarding hazardous chemicals to all lab worker.

 - c. All hazardous chemical labels must contain the following information:
 - 1) appropriate warning, ie, corrosive
 - 2) explain nature of hazard, ie, flammable
 - 3) special precautions to eliminate risks
 - 4) explain first-aid treatment for exposure

6. Information about signs and symptoms associated with exposure to hazardous chemicals used in the lab must be communicates to all.
 - a. Reference materials for this information are included in the **material safety data sheets (MSDS)** provided by all chemical manufacturers and suppliers.

 - b. This information concerns hazards, safe handling, storage, and disposal of hazardous chemicals used in the lab.

7. Material Safety Data Sheets (MSDS)
 - a. Information provided by chemical manufacturers about each chemical.
 - b. Each lab must have on file all MSDSs for the hazardous chemicals used in the lab.
 - c. Use of MSDSs is a common way that potential product hazard information is made available and OSHA requires this provision by all chemical manufacturers.
 - d. The health care facility is required to provide this information to its workers.
 - e. Each MSDS contains basic information about the specific chemical or product including:
 - 1) Trade name, chemical name and synonyms.
 - 2) chemical family
 - 3) Manufacturer’s name, address and phone number for further information.
 - 4) hazardous ingredients.
 - 5) Physical data, fire and explosion data.
 - 6) Health hazard and protection information.

8. Hazard Warning
 - a. A hazard identification system was developed by the National Fire Protection Association. http://atsdr1.atsdr.cdc.gov/NFPA/nfpa_label.html
 - b. This system provides at a glance, in words, symbols, and pictures, information on the presence of potential **health, flammability, chemical reactivity and special hazards information**.
 - c. The hazard identification system consists of four small, diamond-shaped symbols grouped into a larger diamond.
 - 1) Top diamond is **red** and indicates a **flammability** hazard.
 - 2) Diamond on right is **yellow** and indicates a **reactivity-stability** hazard, these materials are capable of explosion or violent chemical reactions.
 - 3) Diamond on the left is **blue** and indicates a possible **health hazard**.
 - 4) Diamond on the bottom is **white** and indicates **special hazard information** such as radioactivity, special biohazard, and other dangerous elements.
 - 5) The system indicates the **severity** of the hazard using numerical designations from **0 to 4, with 0 being no hazard and 4 being extremely hazardous**.
9. Routine safety precautions when handling chemicals.
 - a. Read labels for potential hazards prior to use.
 - b. Use appropriate PPE when handling.
 - c. Use special carriers for transport.
 - d. Rooms/cabinets used for storage must be labeled with caution sign at entrance specifying chemicals present.
 - e. Never store chemicals above eye level.
 - f. Explosives/flammable stored in specially designed cabinet.
 - g. If chemical is transferred from original container, the new container must be labeled with chemical name and hazard identification diamond.
10. Chemical spill or exposure.
 - a. Know the location and proper use of the eye wash station and safety shower.
 - b. If clothing involved go to safety shower, remove clothing, rinse for 15 minute.
 - c. If eyes are splashed go to eye wash station, remove contact lenses, rinse 15 minutes.
 - d. For spills on surfaces obtain chemical clean up kit from clinical chemistry department.
 - 1) Special supplies which absorbs/neutralizes acid, alkali, mercury and other chemicals.
 - 2) Type used will depend on type of chemical involve.
 - 3) Has indicator system that identifies when spill has been neutralized and can be cleaned up.
11. Disposal of chemical
 - a. Acids/alkalis that are soluble in water can be flushed down sink with lots of cold water.
 - b. Pour alkalis into large amount of water first.
 - c. **NEVER** add water to acid, may result in explosion, add acid to water

I. Equipment and Safety in Patient's Rooms

1. Properly dispose of all specimen collection supplies.
2. Leave bed rails in position they were in when you entered.
3. Report unusual odors
4. Check for spill on floor
5. During blood collection, do not touch electrical instruments, patient may become grounded and receive a shock.
6. If patient has an IV report to the nurse if the site is red and swollen, if blood is backing up, the IV container is empty or the IV alarm is sounding.
7. If the patient is in unusual pain or is unresponsive, notify the nursing station immediately.
8. Be aware of signs/symptoms of latex allergies in patients: ***skin rash, hives, respiratory problems, or shock.***

J. Patient Safety Outside the Room

1. Travel with care as trays, carts, ladders may be placed in unusual places.
2. Pick up items on the floor to prevent individuals from slipping.
3. *Avoid running*, as others may become alarmed and run also, or you may run into someone.

K. Disaster emergency plan

1. Most institutions have developed procedures to follow in case of: hurricane, flooding, earthquake, bomb threat and local major disasters.
2. Must become knowledgeable about your role in disaster plan procedures.
3. Many places have annual or semi-annual city wide disaster drills involving all emergency service departments and appropriate health care facilities.

L. Emergency procedures

1. Detach yourself from the situation to the degree necessary to perform well and deliver best possible care.
 - a. Be prepared to act if an accident occurs in your presence.
 - b. Prevent severe bleeding, maintain airway, prevent shock and further injury.
 - c. Get assistance immediately, but do not leave patient.
2. Bleeding aid
 - a. Place a clean cloth over the site and apply pressure.
 - b. If none available use your hand until one is available.
 - c. Elevate the extremity to decrease blood flow, raise above the heart.
 - d. Do not use a tourniquet unless limb is mangled, crushed or amputated to the extent that there is profuse bleeding.
3. Breathing aid
 - a. When breathing stops lips, tongue and fingernails become blue.
 - b. This is an indication for immediate mouth to mouth resuscitation.
 - c. Delay in artificial respiration may result in brain damage or death.

4. Circulation aid can only be achieved by proper training in a CPR class.
 - a. Most large institutions offer classes and refresher courses periodically.
 - b. TAKE ONE.

5. Preventing shock
 - a. May be the result of excessive bleeding, extensive burns, lack of oxygen or other traumatic events.
 - b. Signs include: pale, cold, clammy skin, weakness, rapid pulse, increased shallow breathing and frequently nausea and vomiting.
 - c. Main objective is to improve circulation, get sufficient oxygen in the maintain body temperature.