Safety Manual

For

Programs of the Medical Laboratory Technology Department

Revised 7/17/2017
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# ACC EMERGENCY PROCEDURES OVERVIEW

## Campus Police Dispatch

222 from an ACC phone or 512-223-7999 from any phone

When emergencies arise, contact ACC Campus Police and listen for instructions

<table>
<thead>
<tr>
<th>Emergency Type</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Emergency</td>
<td>- If someone experiences a medical emergency:</td>
</tr>
<tr>
<td></td>
<td>- Remain calm</td>
</tr>
<tr>
<td></td>
<td>- Notify Campus Police Dispatch</td>
</tr>
<tr>
<td></td>
<td>- Do NOT move victim</td>
</tr>
<tr>
<td>Fire Emergency</td>
<td>- If you detect smoke or fire:</td>
</tr>
<tr>
<td></td>
<td>- Activate the nearest alarm</td>
</tr>
<tr>
<td></td>
<td>- Evacuate</td>
</tr>
<tr>
<td></td>
<td>- Notify Campus Police Dispatch</td>
</tr>
<tr>
<td>Evacuation</td>
<td>- Leave through the nearest exit, do NOT run</td>
</tr>
<tr>
<td></td>
<td>- Do NOT use elevators</td>
</tr>
<tr>
<td></td>
<td>- Close doors behind you, do NOT lock them</td>
</tr>
<tr>
<td></td>
<td>- Report to an assigned rally point – you must be accounted for</td>
</tr>
<tr>
<td></td>
<td>- Wait for administrator-in-charge to give verbal OK to reenter</td>
</tr>
<tr>
<td>Severe Weather</td>
<td>- When the decision is made to take shelter in place:</td>
</tr>
<tr>
<td></td>
<td>- Listen for instructions</td>
</tr>
<tr>
<td></td>
<td>- Take shelter in designated place</td>
</tr>
<tr>
<td></td>
<td>- Do NOT use elevator</td>
</tr>
<tr>
<td></td>
<td>- Do NOT go outside</td>
</tr>
<tr>
<td>Gunman on Campus</td>
<td>- Notify Campus Police Dispatch</td>
</tr>
<tr>
<td></td>
<td>- Turn off lights: close and lock doors</td>
</tr>
<tr>
<td></td>
<td>- Get on floor, out of line of fire</td>
</tr>
<tr>
<td></td>
<td>- Remain quiet</td>
</tr>
<tr>
<td></td>
<td>- Wait for ‘all clear’ from police or authorized ‘known’ voice</td>
</tr>
</tbody>
</table>
WHAT TO DO IF THERE IS AN INJURY ON AN ACC CAMPUS.

FIRST--ASSESS THE LEVEL OF INJURY

MAJOR INJURY

Any injury that involves the head or eyes or any injury requiring EMS or medical treatment; call ACC Campus Police Dispatch (222 or 512-223-7999)

MINOR INJURY

Injuries you can treat with the first aid kit.

BLOOD/BODY FLUID EXPOSURE

Although not considered a ‘major injury’, a blood or body fluid exposure requires immediate medical attention. Immediate cleansing and first aid of the wound site must be followed by notification of an ACC MLT instructor and clinical supervisor (if applicable) and obtaining medical advising from a licensed healthcare provider knowledgeable in treatment of body fluid exposures. Review additional information found on page 13 of this document and obtain the forms listed below.

SECOND--OBTAIN STUDENT ACCIDENT CLAIM AND HIPPA FORM

Note this form is found under “Accident Forms” at:
http://sites.austincc.edu/health/facstaff/resources/#accident-forms

THIRD--OBTAIN SUPERVISOR’S INJURY AND ILLNESS ANALYSIS AND PREVENTION REPORT FORM

Note this form is found under “Accident Forms” at:
http://sites.austincc.edu/health/facstaff/resources/#accident-forms

FOURTH--NOTIFY THE APPROPRIATE PROGRAM OFFICIAL FOR FURTHER INFORMATION AND GUIDANCE.

ACC EMERGENCY ALERT

Austin Community College strongly encourages all students, staff and faculty to sign-up for ACC Emergency Alert. This service utilizes ACCMail account, cell phone voice and text messaging to efficiently distribute critical information in the event of an extreme emergency including threatening severe weather, intruder alert, and evacuation mandates. More information and sign-up procedures can be found at:
http://www.austincc.edu/emergency-information/acc-emergency-alert
ESTABLISHING A CULTURE OF SAFETY.

The safety of students and workers in the laboratory is a major concern of regulation and accreditation agencies as well as faculty and employers. If unchecked, potential threats in the laboratory include biological, mechanical, chemical, fire, and electrical hazards. To minimize these threats, students enrolled in laboratory-based courses are expected to learn, understand and comply with ACC environmental, health and safety procedures and agree to follow the safety policies outlined by their respective program and course instructors. With this in mind, any student who thoughtlessly or intentionally jeopardizes the health or safety of themselves or another individual will be immediately dismissed from the activity and is in danger of being withdrawn from the class. Additional sanctions may be implemented at the discretion of the program officials.

Accidents do happen. Any injury occurring in the lab, and all spills or breakage of equipment or glass must be immediately reported to the class instructor to ensure prompt and appropriate treatment or proper clean-up and repair is performed.

BIOLOGICAL HAZARDS

Though attention to all aspects of safety is important in the clinical laboratory, a primary focus is prevention of infection by biohazardous materials. Biohazardous materials can be found in a variety of settings both in and outside the laboratory setting. The level of the threat varies from minimal (where materials can be easily decontaminated) to serious (where materials must be autoclaved or incinerated). Tissue, blood and body fluids are all considered biohazardous.

ORIGINS OF STANDARD PRECAUTIONS

The Center for Disease Control and Prevention (CDC) began establishing guidelines for safe practice in the collection, handling and disposal of biohazardous materials with the introduction of “Universal Precautions” in 1985. The primary focus of Universal Precautions was/is to prevent the health care worker from being exposed to human immunodeficiency (HIV) and hepatitis B (HBV) viruses by wearing non-porous articles, such as medical grade examination gloves, lab coats, goggles or face shields whenever exposure to a body fluid is a possibility, or whenever handling body fluid specimens. It was soon found that implementing Universal Precautions did not eliminate the need for other isolation precautions, such as droplet precautions for influenza, airborne precautions for pulmonary tuberculosis or contact precautions for methicillin-resistant Staphylococcus and in 1996, the CDC published revised guidelines, the “Standard Precautions” for isolation precautions in hospitals. “Standard Precautions” guidelines must be followed by all health care workers when dealing with blood, all body fluids, secretions and excretions (except sweat), non-intact skin and mucous membranes.
STANDARD PRECAUTIONS

Standard Precautions are designed to reduce the transmission of microorganisms from both recognized and unrecognized sources of infection in hospitals. The components of Standard Precautions include Hand Hygiene, Surface Disinfection and use of Personal Protective Equipment (PPE). In following Standard Precautions, healthcare professionals must:

- Consider all patient blood and body fluids to be biohazardous.
- Always wash hands or use hand sanitizer before and after contact with patients. (Washing with soap and water is preferred and recommended.)
- Wear gloves when handling blood, body fluids, tissue, or touching of contaminated surfaces.
- Wear masks / goggles or use other protective shielding whenever there is the potential for splattering or splashing of blood or body fluids.
- Dispose of all needles in puncture-proof containers – which must be accessible in all patient rooms.
- Minimize need for mouth-to-mouth resuscitation by keeping mouthpieces readily available on crash carts and in all areas where this need is possible.
- Immediately clean blood and body fluids spills using a 10% bleach solution or approved germicidal disinfectant.
- Immediately report all needle sticks, accidental splashes, contamination of wounds, or exposure to body fluid.

Standard Precautions apply any time the following specimens are handled:

- Blood and Body Fluids containing blood
- Cerebrospinal fluid (CSF)
- Serous fluids (pleural, peritoneal and pericardial fluids)
- Seminal fluid (semen)
- Vaginal secretions
- Amniotic fluid
- Synovial fluid
- Urine and feces
- Vomitus
- Tissue samples
- Sputum
- Saliva
- Breast milk
- Nasal secretions & tears

**Standard Precautions do not apply to sweat unless it contains visible blood.**
TRANSMISSION-BASED PRECAUTIONS

In addition to Standard Precautions used for all patients a second level of protection - the Transmission-Based Precautions, are used for patients known or suspected to be infected with highly transmissible or epidemiologically important pathogens spread by airborne or droplet transmission or by contact with dry skin or contaminated surfaces. These additional precautionary measures are needed to interrupt transmission of infection in hospitals.

There are three types of Transmission-Based Precautions: Airborne Precautions, Droplet Precautions, and Contact Precautions. They may be combined for diseases that have multiple routes of transmission. When used either singularly or in combination, they are to be used in addition to Standard Precautions.

AIRBORNE PRECAUTIONS

Designed to reduce the risk of airborne transmission of infectious agents by patients infected with epidemiologically important pathogens that can be transmitted airborne by way of very small droplets (measuring 5 um or less) or dust particles containing the infectious agent. These very small droplets are able to remain suspended in the air for long periods of time allowing microorganisms carried in this manner to be dispersed widely through air currents. The microorganism may become inhaled by or deposited on a susceptible host with the same or nearby room; therefore, special air handling and ventilation (Airborne Infection Isolation Room / AIR room must have negative pressure ventilation and exhaust directly to the outside or through a HEPA filtration system) are required to prevent airborne transmission. PPE includes use of high efficiency mask which must be disposed of after leaving patient area and before returning to general area. Wash hands after interaction with the patient.

DROPLET PRECAUTIONS

Designed to reduce the risk of transmission of infectious agents by patients infected with epidemiologically important pathogens that can be transmitted by infectious droplets (larger than 5 µm in size). Droplet transmission involves contact conjunctiva or the mucous membranes of the nose or mouth often as a result of the source person coughing, sneezing, or talking or as the result of the performance of certain procedures such as suctioning and bronchoscopy. Transmission via large-particle droplets requires close contact between source and recipient persons. (“Close contact” is defined as being within 3 feet of the patient.) Because droplets do not remain suspended in the air, special air handling and ventilation are not required to prevent droplet transmission. PPE includes mask for any person in close contact with the patient. PPE are disposed of after leaving patient area and before returning to general area. Wash hands after interaction with the patient.

CONTACT PRECAUTIONS

Designed to reduce the risk of transmission of epidemiologically important microorganisms by direct (skin to skin) or indirect contact such as might occur with patient care activities, performing phlebotomy, etc. Indirect-contact transmission involves contact of a susceptible host with a contaminated intermediate object, usually inanimate, in the patient’s environment. Contact Precautions apply to specified patients known or suspected to be infected or colonized with epidemiologically important microorganisms than can be transmitted by direct or indirect contact. PPE - gloves and gown are required, but masks are not. Wash hands after interaction with the patient.
Transmission-Based Precautions may be combined for diseases that have multiple routes of transmission. When used either singularly or in combination, they are to be used in addition to Standard Precautions. Articles from the patient’s room (gloves, gowns and masks, etc.) must be appropriately disposed of before leaving the isolation area. Blood and other specimens must be transported in properly prepared isolation bags and handled cautiously.

**PROTECTIVE TECHNIQUES & PPE**

Acquisition of HBV and HIV are totally preventable when the proper protective techniques are followed. First, all healthcare workers must be immunized against hepatitis B as a requirement of employment in the healthcare field. Hepatitis B immunization has now been added to the list of routine immunizations given to infants and children, so hopefully in the near future, hepatitis B will not be the prevalent risk it currently is.

**HAND HYGIENE (HANDWASHING)**

Frequent properly performed handwashing is the most effective means of preventing the spread of infectious microorganisms from patient to patient. Handwashing is also an important safety precaution for the healthcare worker. For maximum effectiveness, handwashing must be performed following each contact with a patient and/or their laboratory specimens.

Hands should be washed:

- whenever they are visibly soiled or potentially contaminated with blood, body fluids or tissues.
- after every patient contact.
- before eating, drinking, smoking, applying makeup, changing contact lenses, or any activities that involve hand contact with mucous membranes, eyes or breaks in the skin.
- periodically throughout the day when routinely handling and testing body fluids.
- after using lavatory facilities or changing diapers

**HAND HYGIENE TECHNIQUE**

Properly performed hand-washing removes potential pathogens.

- Soap removes oils that may hold bacteria to the skin’s surface.
- Warm running water washes away debris and lathers the soap.
- Friction loosens and removes dead skin, oil and microorganisms.

Only use sinks properly designated for hand-washing.

1. Turn water on and wet hands.
2. Apply liquid soap and wash vigorously for twenty (20) seconds. Give special attention to areas around nails and rings.
3. Rinse well from wrists to fingertips in a downward direction.
4. Dry hands with paper towel.
5. Turn off faucet with paper towel & discard paper towel in regular trash.
Using a moisturizing cream may reduce skin irritation caused by frequent hand-washing. Lotions purchased over-the-counter may only be used in non-patient or non-product contact areas. These lotions are frequently contaminated with gram-negative organisms. Over-the-counter lotions are acceptable for use in the clinical laboratory.

**Note:** Hand sanitizers may be used if soap and running water are not available but are not as effective as good hand-washing.

**BARRIER PROTECTION**

**GOWNS AND LABORATORY COATS**

While in the laboratory, all laboratory workers must wear a long-sleeved laboratory coat which is buttoned closed or long-sleeved gown/apron with a closed front. Disposable fluid-resistant gowns/coats must be worn when there is potential risk for splashing or spraying of blood, body fluids or other harmful liquids.

Laboratory coats are not to be worn outside the laboratory area. Lab barrier protection / lab coats must be removed, along with other PPE and hands must be washed before leaving the laboratory area for any reason.

Laboratory coats should be changed if visibly contaminated with blood or body fluids to prevent blood seeping through and contaminating clothing or skin. Fresh lab coats must be used whenever preparing for patient contact, i.e. lab coats worn in the laboratory area are never worn when working with patients.

At the beginning of program activities, lab coats will be provided to students to be used during laboratory sessions. These laboratory coats are to be kept in plastic bags or student mail boxes in the assigned MLT Laboratory area when not in use.

**GLOVES**

Medical grade latex, nitrile or vinyl gloves are a critical part of the personal protective equipment (PPE) routinely used in the clinical laboratory. Which type of glove used is often a matter of preference of the technician, but the type of activity or expected exposure must be part of the consideration as does cost and availability. While most laboratory personnel wear gloves continuously throughout the day, it is critical that gloves be worn whenever there is any chance of coming in contact with tissue, blood or other body fluids.

Things to know about gloves:

- **Always use medical grade gloves.** FDA regulates medical grade gloves and dictates specific requirements about how they are manufactured and intended to be used.

**NOTE:** Some people exhibit allergic reaction to latex. Some of the symptoms of a latex allergy include contact dermatitis, urticaria, and anaphylaxis. If a health care worker or patient exhibits one or more of these symptoms, non-latex gloves and tourniquets must be used. For the patient’s protection, always ask about latex allergies.
Glove Materials. Latex and nitrile gloves are recommended for high-risk situations involving potential pathogen exposure, such as phlebotomy procedures or when handling potentially infectious materials. Latex gloves come in a wide variety of sizes and provide protection as well as good dexterity. Nitrile gloves are also a comfortable option because of their softness and flexibility, although they tend to be stiffer than latex. Nitrile has the advantage of being very strong and resistant to solvents, and cause less skin irritation. Vinyl gloves are naturally soft and comfortable, but provide a looser fit and are only suitable for lower risk situations or for short periods.

- **Comfort.** In addition to providing barrier protection, medical gloves should also offer comfort. Gloves that fit comfortably and properly can improve performance and reduce hand fatigue.

- **Size.** Choosing the correct size is very important and is often a matter of trial and error. Gloves should be snug enough to provide good tactile feel but not so tight as to be uncomfortable. Keep in mind that size may vary slightly from manufacturer to manufacturer.

- **Cost.** Cost is another issue of major concern when selecting medical gloves. Latex and vinyl gloves are generally more affordable than nitrile and other types of synthetic gloves. Choosing the cheapest medical glove may not be best for your situation, yet more expensive products may not fit your budget. The best approach is to choose the highest quality medical glove that fits your needs at the best value.

- **Put your gloves on clean, smooth, dry hands**
  - Dirty or oily hands may compromise the integrity of the glove, leaving you without the level of protection you are depending on.
  - While it is advisable to wash your hands before putting your gloves on, be sure your hands are well dried before donning the gloves. Any residual wetness will make the glove application much more difficult leading to possible micro-tears - compromising the protection that the glove is supposed to provide.
  - Keep hand, ring and finger jewelry to a minimum to prevent tearing the glove or reducing its effectiveness.
  - Glove application: Roll the glove cuff down and slip the glove onto the fingers. Slide the glove up to cover the palm area of the hand. Pull the cuff up and over the cuff of the lab coat.
  - Glove removal - Note: while the written explanation of this activity is complicated, the activity is itself very simple. Students first learning how to remove gloves should practice the activity using clean gloves until they are comfortable with the procedure. Watching an instructor demonstrate the process is highly recommended.

- **Glove removal**
  - Dirty / contaminated gloves must be removed in such a manner as to prevent contamination of the skin or surfaces. It doesn’t matter which glove, right hand or left is removed first. For the purposes of discussion, let’s say we use the right hand to remove the left hand’s glove. Using the right thumb and forefingers, pinch the palmer surface of the left hand to grasp the left glove. Gently pull the left glove off the hand being careful to avoid creating aerosols. Wad that glove up in the still gloved right hand. Now, slide the bare fingers of the left hand under the cuff of the right hand’s glove – taking care not to touch the outside of the glove. Continue sliding the finger up the right hand’s palm, gently pulling the right hand’s glove up and turning it inside out (with the left glove still inside).

- **Gloves are disposable; they MUST NOT be washed or disinfected for reuse.**
- **Fresh gloves must be worn with each new patient.**
• Gloves must be changed if they become visibly contaminated with blood or body fluids or if they show signs of wear including punctures or tears. Note: Gloves need not be changed during laboratory activities which routinely result in contamination of gloves (e.g., preparing blood smears). Gloves should be changed when these tasks are completed.
• Gloves and other PPE must be removed and hands washed before leaving the laboratory area.

OCCLUSIVE DRESSINGS

All skin defects (e.g., exudative lesions, dermatitis, cuts or abrasions) should be covered with a water-impermeable occlusive bandage. This includes defects on arms, face and neck.

The fingers and hands are best protected with 'band-aids' covered with gloves. A well secured telfa dressing should be used to cover skin defects of the arms, face and neck followed by the appropriate lab coat and facial barrier protection.

FACIAL BARRIER PROTECTION

Masks and facial protection devices should be used if mucous membrane or conjunctiva spattering with blood or body fluids is possible. Full face shields made of light-weight transparent plastic are the preferred means of facial protection. They offer excellent protection of entire face and neck region. Another method of preventing splash exposures is through the use of portable table-top splash shields.

PROCEDURE FOR BLOOD OR BODY FLUID EXPOSURE

An exposure includes cuts or punctures with blood contaminated needles or sharps, and/or body fluid splashes to the eyes, nose, mouth and/or broken skin.

1. WOUND CARE FIRST AID

In the event of a parenteral (needle stick) injury, wash the area thoroughly with foaming / sudsy soap and running water. Apply antiseptic, if available and bandage the site.

Contaminated mucosal (such as in the mouth or nose) or conjunctival (eye) sites should be washed immediately with large quantities of water, or sterile saline. If splash is in eyes, go to eye wash station and rinse eyes for a minimum of fifteen (15) minutes.

2. NOTIFICATION OF MENTOR

After completion of first aid, immediately notify:
A. ACC FACULTY MEMBER

The ACC faculty member will be able to assist with obtaining the Student Accident Claim and HIPPA form which is found under “Accident Forms” at: http://sites.austincc.edu/health/facstaff/resources/#accident-forms

And the ACC Supervisor’s Injury and Illness Analysis and Prevention Report form found under “Accident Forms” at: http://sites.austincc.edu/health/facstaff/resources/#accident-forms

B. CLINICAL SITE SUPERVISOR (IF AT A CLINICAL SITE).

If the injury occurred at a clinical site, the site mentor/supervisor will likely have site-specific documentation paperwork to complete.

3. MEDICAL TREATMENT

If medical treatment, specifically for blood or body fluid exposures, is needed between the hours of 8 -5 pm, the student will report to St. David’s Occupational Health Services (918 E. 32nd Street, Austin, TX. 78705). If medical treatment is needed for injuries other than needle sticks, the student can report to the nearest emergency department or his/her physician to be assessed, advised and be provided treatment for the injury. If prophylactic anti-viral medication is to be prescribed, the ‘standard of care protocol’ dictates that it be initiated within 2 hours of the exposure.

Tips:
1. If possible, identify and document the body fluid source.
2. If the wound is deep and the amount of fluid introduced is large, a request should be made that the source individual’s blood be tested for significant infectious diseases (HIV, HBV, HCV) – if state/local law and facility protocol permit.

METHODS OF DECONTAMINATION

Several methods are used to decontaminate materials and surfaces in the clinical laboratory. Each method has benefits and limitations or restrictions.

STERILIZATION

According to Bailey and Scott, sterilization is a process whereby all forms of microbial life, including viruses, fungi, bacteria and their transmissible spores are killed. Sterilization can be achieved by various means including heat, high pressure, irradiation, chemicals and filtration, depending on the surface or fluid to be sterilized. In the clinical laboratory setting, sterilization of media, glassware, reagents and biohazardous trash is usually accomplished by autoclaving.
DISINFECTION

Disinfection is a process whereby pathogenic organisms, but not necessarily all microorganisms or spores are destroyed (Bailey and Scott). Disinfection can be accomplished by physical or chemical means. Floors, countertops, and surfaces of analyzers, blood drawing chairs, etc. are routinely cleaned using a chemical disinfectant. One of the most common disinfectants used in the clinical laboratory is a simple 10% solution of household bleach. Other include aldehydes, such as formaldehyde, phenols, quaternary ammonium compounds, iodophors, oxidizing agents and alcohols. Some disinfectants can be skin, respiratory or eye irritants, so PPE and good ventilations should be used when working with them.

ANTISEPSIS

Antiseptics are laboratory disinfectants antimicrobial chemicals used on skin and tissue to inhibit the growth of microorganisms; reducing the chance for infection. One of the most commonly used antiseptic is 70% isopropyl alcohol. It has been classified as both a disinfectant and antiseptic and is approved for disinfectant / antiseptic of skin before phlebotomy procedures, skin injections, etc.

LABORATORY METHODS FOR STERILIZATION, DISINFECTION AND DECONTAMINATION

Work surfaces including countertops, phlebotomy workstations and contaminated equipment must be disinfected with either a chemical germicide or a solution of 1/10 dilution of household bleach (sodium hypochlorite):

- at the beginning and end of each work shift / lab session.
- after completion of procedures utilizing blood or body fluids.
- when surfaces are become overtly contaminated.
- immediately after any spill of blood or other potentially infectious material.

Fresh 10% bleach solution or chemical germicides will inactivate HIV viruses in 2 minutes and HBV viruses in 10 minutes. When using a bleach solution, the bleach solution should be made up fresh at least every 3 days and must be stored in the properly labeled squirt or spray bottles. The liquid solution should remain in contact with the surface to be disinfected for a minimum of three minutes; longer if there is the presence of organic matter, such as whole blood.

RECOMMENDED PROCEDURE FOR DECONTAMINATING SPILLS OF BLOOD, BODY FLUIDS, OR OTHER INFECTIOUS MATERIALS.

1. **Notify laboratory instructor** of the spill. The instructor will determine whether student will be allowed to proceed with the clean-up process. INSTRUCTOR MUST BE PRESENT DURING THE CLEAN-UP PROCESS! Students must follow instructor’s specific directions.

2. **Mandatory PPE**: gloves and impermeable laboratory coat that is buttoned-up. Other materials needed include disposable paper towels, a biohazard waste container and fresh 10% bleach solution or a chemical germicide.
3. **Spills that contain broken glass or other sharps:** If the spill contains broken glass or other objects, drench the spill and nearby surrounding area with either a chemical germicide or a 10% bleach solution, drape with a paper towel and allow to sit undisturbed for a minimum of three minutes; longer if more than ½ mL blood has been spilled. During that time, obtain the biohazard sharps keeper and bio-waste bucket/container. Use forceps, or tongs to pick up the glass or other sharps; disposing of them in the sharps keeper. If there are numerous pieces of small glass fragments, use a rigid sheet of plastic or cardboard to push the sharp fragments onto another sheet and disposed of them in the sharps keeper as well. **REMEMBER:** Never handle broken glass with hands and always place broken glass into a sharps container.

3. **Absorb the spill.** Since most disinfectants are less active, or even ineffective, in the presence of high concentrations of protein as are found in blood and serum, the bulk of the spilled liquid should be absorbed into paper towels and disposed in the biohazard container prior to disinfecting the spill site. If the spill is large, granular absorbent material such as is used to absorb caustic chemical spills may be used to absorb the liquid. After absorption of the liquid, all contaminated materials must be discarded as biohazard waste.

4. **Clean the spill site** of all visible spilled material using an aqueous detergent solution (soapy solution). The intent is to dilute the spilled material, lyse red blood cells, and further remove proteins from the contaminated area. Note: This is a useful step, but not critical to the decontamination process.

5. **Disinfect the spill site** using an appropriate disinfectant or a 1/10 dilution of sodium hypochlorite (household bleach). Flood the spill site or wipe down the spill site with disposable towels soaked in disinfectant to make the site “glistening wet.” Keep the site wet with the disinfectant for a minimum of 3 minutes.

6. Absorb the disinfectant solution with disposable material, such as paper towels. Wet it down again with disinfectant and wipe dry or allow to air dry.

## DISPOSAL OF BIOHAZARDOUS MATERIALS

### ACC POLICY

It is the policy of Austin Community College to dispose of infectious wastes safely and cost-effectively in compliance with existing regulations.

### LABELS

At right is the universal biohazard label. This warning label is attached to, or is an integral part of, containers used for infectious waste, refrigerators and freezers containing blood and other potentially infectious materials and other containers used to store or transport blood or other potentially infectious materials.

The labels are usually fluorescent orange or orange-red with lettering or symbols in a contrasting color.
BIOHAZARD BAGS

Due to the special processing of the biohazard bags and the cost of disposal, it is very important that only appropriate wastes go into these receptacles, which are either red or orange and are appropriately labeled.

The types of waste which must go into biohazard bags include the following:

- tubes or vials of blood
- plastic pipettes used for transferring blood or body fluids
- test tubes used for performing tests on blood or body fluids
- paper items/lab mats saturated with blood or body fluids
- agar culture plates
- fecal samples
- full sharps keepers/full biohazard pipet keeper containers
- plastic slides with blood or body fluids (such as Kova slides)

The following are wastes which can go into regular trash.

- gloves used for performing tests, UNLESS they are saturated with blood
- paper items/Kim wipes/lab mats lightly soiled with blood or body fluids
- paper towels used for drying hands
- emptied urine containers
- plastic pipettes used to test urine

Biohazard bags are located throughout the student laboratory area.

Biohazard bags should not be allowed to become too full because they will then not fit into the disposal boxes. Generally speaking, a bio-hazard bag that is 2/3 full should be replaced. Once the fill level is reached, remove the bag, twist the bag top, and place in the biohazard box with a red liner.

SHARPS CONTAINERS

Sharps containers are specially designed cardboard, plastic, or other impervious material receptacles bearing the biohazardous waste symbol. They are located on all workbench counters convenient to each student.

The following types of waste must be placed into sharps containers:

- microhematocrit tubes
- glass slides
- DIFF-SAFE Blood Dispenser
- Used needles
- used lancets
- any type of broken glass – do not pick up with hands, gloved or not
- wooden applicator sticks
- plastic pipet tips that have been in contact with blood or body fluids.
- contaminated cotton applicator sticks

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Sharps containers should not be allowed to become overfilled. Visually inspect the sharps keeper for fullness, carefully close the top of the container and place in orange or red biohazard bag.

Biohazard Pipet Keeper Containers will be used to dispose of glass or plastic pipettes that do not fit in the sharps containers. Erythrocyte Sedimentation Rate tubes and vials will also be placed in this device prior to placing the container in a large biohazard box. This is to prevent the pipets from puncturing the biohazard bags.

### NEEDLES

After use, the safety device on the needle must immediately be activated to reduce the risk of accidental needle stick. It is of critical importance that needles used for phlebotomy only be placed in the special sharps containers supplied for this purpose. These containers are made of rigid plastic to prevent puncture of the container. The full containers are placed in the large biohazard boxes lined with red bags.

Needle containers are located in phlebotomy area and on student workbench during phlebotomy activities. Notify the instructor or lab assistant if a sharps container has become full. NEVER attempt to force a sharp into the container, as injury may result.

### SELECTED INFECTIOUS AGENTS

While there are many potential threats to clinical laboratory personnel, this section will briefly address two specific agents: hepatitis B virus (HBV) and Human Immunodeficiency Virus (HIV).

Hepatitis B Virus (HBV) and Human Immunodeficiency Virus (HIV) as well as other blood-borne diseases can be transmitted in a variety of epidemiological settings including clinical laboratories. HBV can be found in blood and blood products at much higher concentrations than HIV. HIV has been isolated from blood, semen, vaginal secretions, saliva, tears, breast milk, cerebrospinal fluid, amniotic fluid, alveolar fluid and urine. Only blood, semen, vaginal secretions and breast milk have been implicated in the transmission of HIV to date. Clinical laboratory workers are among a high-risk group for exposure to and acquisition of job-related HIV and HBV infection.

Because the potential for infectivity of any patient’s blood and body fluids cannot be known, Standard Precautions (also known as Blood and Body Fluid Precautions) should be adhered to for all patients. These precautions should be followed regardless of any lack of evidence of the patient’s infectious status.

HBV exposure is a major risk for health care workers. HBV infection is prevented by taking the immunization series. All students and employees are REQUIRED to take the immunization series for HBV. Please see [http://www.austincc.edu/health/AllOthers.php](http://www.austincc.edu/health/AllOthers.php) for further information on immunizations.

Hepatitis B Virus (HBV) and, less frequently, Human Immunodeficiency Virus (HIV) may be acquired through direct contact with blood and body fluids, with grave consequences occurring. Due to the constant exposure of clinical laboratory workers to blood and body fluids it has become imperative to devise methods to protect them from blood and body fluid related diseases.

It is extremely important for all laboratory workers to become knowledgeable about the appropriate protection techniques in all areas of the clinical laboratory and practice them faithfully. Most laboratory exposures occur because the laboratory worker was not following the recommended safety procedures.
TRANSMISSION OF HBV AND HIV—HIV AND/OR HBV VIRUS CAN BE TRANSMITTED IN THE FOLLOWING WAYS.

DIRECT CONTACT

- Percutaneous – parenteral inoculation of blood, plasma, serum or body fluids as occurs by accidental needle sticks, scalpel cuts, etc., and by transfusion of infected blood or blood products.
- Non-intact skin transfer of infected blood, plasma, serum or body fluids in the absence of overt puncture of the skin, through contamination of preexisting minute cuts, scratches, abrasions, burns, weeping or exudative lesions, etc.
- Mucous membranes – contamination of mucosal surfaces with infected blood, plasma, serum or body fluids as may occur with mouth pipetting, splashes, spattering or other means of oral or nasal mucosal or conjunctival contact.

INDIRECT CONTACT

- HBV can be transmitted from such common environmental surfaces as telephones, test tubes, laboratory instruments, and other surfaces contaminated with infected blood, plasma, serum or body fluids, which can be transferred to the skin or mucous membranes by hand contact. HIV may be similarly transmitted, but no environmentally mediated transmission of HIV has been documented.
- Nail biting, smoking, eating, drinking and other hand-to-nose, hand-to-mouth, and hand-to-eye actions may contribute to indirect transmission and should not be done in the laboratory. Contact lenses must not be handled or inserted into eyes in the laboratory.

CHEMICAL SAFETY

CHEMICAL HYGIENE STANDARD OPERATING PROCEDURES

Because few laboratory chemicals are without hazards, general precautions for handling all laboratory chemicals should be adopted to include minimizing exposure. It is assumed that any mixture of hazardous chemicals is more toxic than the most toxic component.

The following procedures are to be used when working with chemicals:

ACCIDENTS AND SPILLS

- **Eye or Facial Contact** – Go to one of the eye wash stations and turn on water. Lean over so that eyes or contaminated area of face is in contact with the water. Flush eyes or skin with water for a prolonged period (15 minutes). The instructor will determine whether additional medical attention is necessary.
- **Skin Contact** – Promptly flush the affected area with water and remove any contaminated clothing. If contact is extensive, go to safety shower, firmly pull down handle, and remove contaminated clothing to allow direct contact of water with contaminated skin for 15 minutes. The instructor will determine whether additional medical attention is necessary.
• **Ingestion** – Encourage victim to drink large amounts of water and direct/assist them in obtaining medical attention.

• **Clean Up** – Promptly clean up spills, using appropriate protective apparel and equipment and proper disposal.

• **Report** all accidents and spills to the instructor.

## AVOIDING UNNECESSARY EXPOSURE TO CHEMICALS

• **Do not** smell or taste chemicals.

• Inspect gloves for defects before use.

• Use only those chemicals for which quality of the available ventilation system is appropriate.

• Avoid eating, drinking, smoking, chewing gum, handling/using contact lenses, or applying cosmetics or lip balm in areas where laboratory chemicals are present. Wash hands before conducting these activities.

• Do NOT store, handle or consume food or beverages in storage areas, refrigerators, glassware or utensils that are also used for laboratory operation.

• Handle and store laboratory glassware with care to avoid damage. **Do not** use damaged glassware, dispose of immediately in an appropriate manner.

• Wash areas of exposed skin thoroughly before leaving the laboratory.

• Avoid practical jokes or other behavior that might confuse, startle or distract another student or employee.

• Never pipette by mouth, use appropriate bulbs.

• Confine long hair and loose clothing.

• Do not wear sandals, open-toed shoes, perforated shoes, or any shoes made of canvas.

• Keep the work area clean and uncluttered with chemicals and equipment properly labeled and stored. Clean up the work area on completion of an operation or at the end of each day.

• Ensure that appropriate eye protection is used when necessary.

• Wear a buttoned laboratory coat. Remove it before leaving laboratory area.

• Seek information and advice about hazards, plan appropriate protective procedures, and plan positioning of equipment before beginning any new procedure.

• Know where the emergency exits are in case of accidents or power failure.

• Be aware of unsafe conditions and report them immediately for correction.

## WORK AREA CHEMICAL INVENTORY (WACI)

A review of chemical inventory is performed annually, listing all of the hazardous chemicals in the laboratory. Chemicals listed are those classified as hazardous by the Department of Transportation (DOT), the Environmental Protection Agency (EPA), or displaying a 2 or greater number in any section of the National Fire Protection Association (NFPA) diamond.

The majority of the chemicals are listed alphabetically. A catalog number may be required by some manufacturers for Safety Data Sheets (SDS). The maximum expected quantity in storage during a semester, as well as the physical state (e.g., solid, liquid, gas) is included. The NFPA hazard classification, if known is provided along with the normal location of the chemical during storage.
The MLT WACI inventory is stored on an MLT faculty’s computer, and a copy is submitted to David Watkins, Environmental Health and Safety (EHS) Coordinator (rwatkin1@austincc.edu or 512-223-1034). Since the EVC and RRC campus have identical programs, Mr. Watkins has been informed that the WACI represents duplicated materials at each campus. A copy of the WACI has been sent to the RRC campus faculty for comparison.

**SAFETY DATA SHEETS (SDS)**

The objective of the safety data sheet (SDS) is to concisely inform users of chemicals about the hazards of the materials with which they work. The information on the SDS is a summarization of facts from many sources. The knowledge and understanding of the technical data in an SDS provides the user with the necessary information to safely deal with occupational exposure to hazardous materials. All workers, including students and faculty have the right to know of the risks presented by chemical materials routinely used in their area. More and more frequently, however, the SDS sheets are stored on-line or kept electronically to provide quicker access to most up-to-date hazard and safety related information.

**THE PURPOSE OF AN SDS IS TO DESCRIBE:**

- The identity of the hazardous chemical, including the chemical and common names (e.g., sodium hypochlorite, bleach).
- The physical and chemical characteristics of the hazardous chemical (such as vapor pressure, flash point).
- The physical hazards of the hazardous chemical, including potential for fire, explosion and reactivity.
- The health hazards of the hazardous chemical, including signs and symptoms of exposure, primary route of entry, and any medical conditions which are generally recognized as being aggravated by exposure to the chemical.
- First aid treatment to be provided when exposed to a hazard.
- The level of protective gear needed to prevent exposure.
- Instructions for clean-up of spills or disposal of the hazardous chemical.

**SDS RIGHT-TO-KNOW STATION**

- Name, address and telephone number of the manufacturer preparing the SDS who can provide additional information about the hazardous chemical and appropriate emergency procedures, if necessary.

SDS are stored in the SDS binders in the SDS Information centers located in MLT student laboratories.
An NFPA hazard warning label is a visual color-coded system that provides a general idea of the inherent hazards and their severity relating to fire prevention, exposure and control. All chemicals and regents that pose a health or fire risk must be properly labeled. If such chemical is transferred into another container, it too must be labeled with the hazards warning unless it is intended for immediate use. An example of the labels is shown below.

The warning label, also known as the NFPA Diamond, has three color coded areas. Each area is color coded: blue for health, red for flammability, and yellow for reactivity. A white box for special or specific hazard information finishes out the diamond. A numerical rating between “0” and “4” is provided within each of the colored boxes. Zero ratings pose minimal, if any health, fire or reactivity threat; while a “4” level warns of extreme danger. At a glance, firemen or other emergency personnel are able to determine the immediate level of risk so appropriate precautions can be followed.

Labeling must be done on all hazardous chemicals that are shipped and used in the workplace. Labels must not be removed or defaced. Chemical manufacturers, importers and distributors must make sure that each container of hazardous chemicals is labeled, tagged, or marked. In addition, any chemical that is transferred from the original container must also be labeled with the below information:

- Identity of the hazardous chemical
- Appropriate hazard warnings
- Name and address of manufacturer
- Route of entry (e.g., nose, mouth, eyes, skin)
- Health hazard
- Physical hazard
- Target organ affected
CHEMICAL STORAGE

In-house chemical storage is kept as small as practical. Storage on bench tops may cause potential exposure to fires and spills. Flammable chemicals are stored in the Biotechnology Prep Room off the MLT Laboratory.

All chemicals are inspected annually during the annual inventory. All outdated or obviously deteriorating chemicals are disposed of by following the appropriate instructions for disposal. Chemicals that require extensive disposal procedures are referred to the ACC Risk Manager.

Cylinders of compressed gas are strapped or chained to a wall or bench top and are capped when not in use.

SAFETY CONTROLS

1. All chemical storage cabinets are adequate and well-ventilated. All acids / bases and flammables with more than 100 mL volume are routinely stored in the flammable storage cabinets located in the Biotechnology Prep Areas.
2. Fire extinguishers are inspected annually by the official designated by the EHS office.
3. **Emergency Shower & Eyewash Station** -- The Emergency Shower / Eyewash Stations are inspected and tested annually by the Environmental Health and Safety (EHS) office and the records are maintained in the EHS office.

EYEWASH PROCEDURE

In the case of a chemical or biological splash to the eyes, nose or mouth mucosal tissue, it is important to wash the area with copious amounts of water. The Emergency Showers located at the EVC and RRC campuses include an Eyewash Station. Following a splash, proceed to the closest eyewash station (if unable to see, immediately ask the nearest classmate or instructor for assistance). Once at the station, activate the water flow by pushing on the paddle. For splashes to the eye(s), hold the eyelids open using the thumb and forefingers. Rinse back and forth across the eyes. If possible ‘roll’ the eyes around to ensure full rinsing. The rinsing should be continued for about 15 minutes. If contact lenses are worn, they must be removed and the rinsing process continued.

EMERGENCY SHOWER PROCEDURE

Emergency showers are located at designated areas within the MLT laboratories. These showers are easily activated by pulling down on the ring handle located on a chain under the shower head. Once activated, the water will continue to run from the shower head until the level bar located near the ceiling is pressed back up.

ACCIDENT CLAIM FORMS

If medical assistance is required as a result of a covered incident included those addressed above, the laboratory instructor will assist with obtaining the following forms:

**Student Accident Claim Form** found at: [http://sites.austincc.edu/health/facstaff/resources/#accident-forms](http://sites.austincc.edu/health/facstaff/resources/#accident-forms)

**Supervisor’s Injury and Illness Analysis and Prevention Report** form found at: [http://sites.austincc.edu/health/facstaff/resources/#accident-forms](http://sites.austincc.edu/health/facstaff/resources/#accident-forms)
FIRE SAFETY

INTRODUCTION

All laboratory personnel must be responsible for fire prevention and control. This includes students, faculty, and staff. Three factors must come together before a fire can begin – fuel, oxygen, and a source of ignition. If any one component of this “fire triangle” is missing, the fire cannot start. For the safety and well-being of all, everyone must be conscious of the need to keep this potentially deadly combination from coming together in an uncontrolled situation.

FIRE EXTINGUISHERS

The MLT laboratories are equipped with an “ABC” dry chemical type of fire extinguishers at marked locations throughout the lab and prep areas. All students, as well as faculty and staff, are expected to learn the specific location of these extinguishers as well as their basic operating instructions. ABC extinguishers are suitable for Class A (ordinary combustible materials such as wood or paper), Class B (flammable liquids), and Class C (electrical fires).

Instructions for using the fire extinguishers are as follows:

1. Remove the extinguisher from its support bracket and pull the ring pin located at the top of the extinguisher just forward of the handle.
2. Keep the extinguisher in an upright position and remain approximately eight (8) feet from the fire.
3. Take a firm grip of the extinguisher’s hose aiming it at the base of the fire.
4. Squeeze the handle-lever and sweep the spray from side to side of the fire’s base.

The fire extinguishers are checked annually EHS and records maintained at that office.

FIRE BLANKETS

Fire blankets are at designated locations throughout the ACC MLT laboratories. A fire blanket is most useful to put out flash fires of clothing. (Chemical extinguishers may be harmful to skin.) When using the fire blanket, wrap it around the victim tightly to extinguish any flames. It may be necessary to get the victim down on the floor to roll and further block the oxygen source to the fire.

A good way to remember the steps is to think PASS

- Pull the ring
- Aim the hose
- Squeeze the lever
- Spray
EMERGENCY SHOWER

A shower of water may be used to extinguish a clothing or hair fire, or to remove corrosive chemicals spilled on a large area of the body. Emergency showers are located at designed areas within the MLT laboratories. Additional information on the Emergency Shower can be found in Safety Controls above.

FIRE ESCAPE ROUTES

Fire / Evacuation routes are posted near the classroom / laboratory doorways in accordance with local fire ordinances. All students are advised to review the evacuation route and rally point for each campus location.

FIRE ACTION PLAN

It is difficult to develop a fire action plan that would be applicable to all situations, but there are a number of general steps that must be followed:

1. Remain calm.
2. If there is immediate danger, evacuate the area immediately. Assist others as needed.
3. Activate the nearest alarm.
4. Notify Campus Police Dispatch (dial: 222 from an ACC phone or 512-223-7999 from any phone)

Be prepared to

- Identify yourself by name and position (student, work-study, faculty, etc.)
- State the exact location of the emergency. Example: Austin Community College, Eastview Campus, 3401 Webberville Road, Building 9000, MLT Laboratory, Room 9101
- Give your best assessment of the situation.

NOTE: Do NOT dial 911 directly. Due to the structure of the ACC phone system, the 911 operator will not be able to locate the source of the call and getting help will be unnecessarily delayed. If there is a fire or medical emergency it is critical that you call the Campus Police Dispatch. They are prepared to make the decisions necessary and provide emergency workers correct information to bring aid ASAP.
REFERENCES


5. Prevention of Nosocomial infections.

www.therightdiagnosis.com


www.austincc.edu/ehs/

10. Austin Community College, SciSafe – Safety in the Sciences

www.austincc.edu/sci_safe/

11. Austin Community College, Health Sciences Division, Immunizations

www.austincc.edu/health/immunizations.php

12. Wikipedia, the free on-line encyclopedia

www.wikipedia.org