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Chapter 1
Standard Precautions

Glossary

**AIDS** - Acquired Immunodeficiency Syndrome; caused by, or associated with, the Human Immunodeficiency Virus (HIV) which attacks the immune system and leaves the patient susceptible to opportunistic infections.

**Blood** means human blood, human blood components and products made from human blood.

**Blood-borne pathogens** means pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).

**Clinical laboratory** means a workplace where diagnostic or other screening procedures are performed on blood or other potentially infectious material.

**Decontamination** means a procedure that eliminates or reduces microbial contamination to a safe level with respect to the transmission of infection. Sterilization and disinfection procedures are often used for decontamination.

**Disinfect** means to inactivate virtually all recognized pathogenic microorganisms but not necessarily all microbial forms (e.g., spores) on inanimate objects.

**Exposure** means skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that results or may result from the performance of an employee’s duties.

**Exposure incident** means a specific eye, mouth, other mucous membrane, nonintact skin, or parenteral contact with blood or other potentially infectious materials that results from the performance of an employee’s duties.

**Germicide** is a general term indicating an agent that kills pathogenic microorganisms.

**Incident report** is generated when an event occurs in a health care facility that is not consistent with the normal operations of the facility. Examples include bloody body fluid exposure, wrong results reported on a patient, etc.

**Infectious waste** means blood and blood products, contaminated sharps, pathological wastes, and microbiological wastes.

**Other potentially infectious material** means: 1) the following body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, and any body fluid that is visibly contaminated with blood; 2) any unfixed slide, tissue or organ (other than intact skin) from a human (living or dead); 3) HIV or HBV-containing cell or tissue cultures, organ cultures and culture medium or other solutions; and blood, organs or other tissues from experimental animals infected with HIV or HBV.

**Parenteral** means exposure occurring as a result of piercing the skin barrier (e.g., subcutaneous, intramuscular, intravenous routes).
**Patient** means any individual, living or dead, whose blood, body fluids, or organs may be a source of exposure to the employee.

**Personal protective equipment (PPE)** is specialized clothing or equipment worn by an employee to protect him/her from a hazard.

**Phlebotomist** means any health care worker who draws blood samples.

**Sharps** means any object that can penetrate the skin including needles, scalpels, and broken capillary tubes.

**Standard Precautions** — a list of safety precautions for health care workers published by the Centers for Disease Control and Prevention (CDC), a method of infection control in which all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV and other blood-borne pathogens.

**Sterilize** means the use of a physical or chemical procedure to destroy all microbial life including highly resistant bacterial endospores.

**Transmission-Based Precautions** are to be used for patients known or suspected to be infected by epidemiologically important pathogens spread by airborne or droplet transmission or by contact with dry skin or contaminated surfaces.

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**Introduction**

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/immunizations.php](http://www.austincc.edu/health/immunizations.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 needlesticks, 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.

Standard Precautions

The Centers for Disease Control and Prevention (CDC) published precautions entitled **Standard Precautions**. This is a general list for all health care professionals to follow to avoid biological hazards. If a medical laboratory professional follows this list carefully, the risk of contracting infections is greatly reduced. Clinical laboratories are strongly encouraged to follow the standard precautions guidelines strictly:

- Consider all patient blood and body fluids to be biohazardous.
- Always wash hands or use hand sanitizer before and after contact with patients.
- Wear gloves when handling blood, body fluids, tissue, or contaminated surfaces.
- Masks or goggles should be worn whenever there is the potential for splattering or splashing of blood or body fluids.
- Dispose of all needles in puncture-proof boxes, which must be accessible in all 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.
- Clean blood and body fluids spills with a solution of bleach (10% or more) and water or with a hospital disinfectant.
- Immediately report all needle sticks, accidental splashes, contamination of wounds, or body fluids.

Transmission-Based Precautions

These Precautions are designed for patients documented or suspected to be infected with highly transmissible or epidemiologically important pathogens for which additional precautions beyond Standard Precautions are needed to interrupt transmission 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** are designed to reduce the risk of airborne transmission of infectious agents. Airborne transmission occurs by dissemination of either airborne droplet nuclei (small-particle residue of evaporated droplets that may remain suspended in the air for long periods of time) or dust particles containing the infectious agent. Microorganisms carried in the manner can be dispersed widely by air currents and may become inhaled by or deposited on a susceptible host within the same room or over a longer distance from the source patient, depending on environmental factors; therefore, special air handling and ventilation are required to prevent airborne transmission. Airborne Precautions apply to patients known or suspected to be infected with epidemiologically important pathogens that can be transmitted by the airborne route.

**Droplet Precautions** are designed to reduce the risk of droplet transmission of infectious agents. Droplet transmission involves contact of the conjunctivae or the mucous membranes of the nose or mouth of a susceptible person with large-particle droplets containing microorganisms generated from a person who has a clinical disease or who is a carrier of the microorganism. Droplets are generated from the source person primarily during coughing, sneezing, or talking and during the performance of certain procedures such as suctioning and bronchoscopy. Transmission via large-particle droplets requires close contact between source and recipient persons. Because droplets do not remain suspended in the air, special air handling and ventilation are not required to prevent droplet transmission. Droplet Precautions apply to any patient known or suspected to be infected with epidemiologically important pathogens that can be transmitted by infectious droplets.

**Contact Precautions** are designed to reduce the risk of transmission of epidemiologically important microorganisms by direct or indirect contact. Direct-contact transmission involves
skin-to-skin contact and physical transfer of microorganisms to a susceptible host from an infected or colonized person, such as occurs when personnel turn patients, bathe patients, or perform other patient-care activities that require physical contact. Direct-contact transmission also can occur between two patients (e.g., by hand contact), with one serving as the source of infectious microorganisms and the other as a susceptible host. 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 (presence of microorganisms in or on patient but without clinical signs and symptoms of infection) with epidemiologically important microorganisms that can be transmitted by direct or indirect contact.

Application of Standard Precautions

Standard Precautions apply any time the following specimens are handled:

1. blood
2. tissues
3. body fluids containing blood
4. semen
5. vaginal secretions
6. saliva or sputum
7. breast milk
8. The following fluids regardless of visible blood contamination:
   - cerebrospinal
   - synovial
   - pleural
   - peritoneal
   - pericardial
   - amniotic
   - feces
   - nasal secretions
   - tears
   - urine
   - vomitus

*Saliva and breast milk have been reported to contain low concentrations of HBV and HIV in the absence of visible blood contamination. Gloves are recommended when handling these specimens.

Standard Precautions do not apply to sweat unless it contains visible blood:
Protective Techniques

Acquisition of HBV and HIV are totally preventable when the proper protective techniques are followed.

Hand Hygiene (handwashing)

Frequent handwashing is the most important safety precaution which should be practiced after each contact with patients and laboratory specimens.

Hands should be washed:
- whenever there is visible contamination with blood or body fluids
- after the completion of work and before leaving the laboratory
- after removing gloves
- before eating, drinking, smoking, applying makeup, changing contact lenses, and using lavatory facilities
- before all other activities which entail hand contact with mucous membranes, eyes or breaks in the skin
- after every patient contact

Hand Hygiene Technique

Only use sinks properly designated for handwashing.

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.

Using a moisturizing cream may reduce skin irritation caused by frequent handwashing. 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.

Hand sanitizers may be used if soap and running water are not available but are not as effective as good handwashing.

Barrier Protection

Impervious gloves (such as latex, nitrile or vinyl) shall be worn by laboratory personnel whenever there is the potential for direct skin contact with blood, body fluids, other potentially infectious materials, mucous membranes, non-intact skin of patients and when handling items or surfaces soiled with blood or body fluids.

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 should be used.
Gloves should be disposable and changed frequently. Gloves should be changed if they become visibly contaminated with blood or body fluids, or if physical damage (e.g., rips, punctures) occurs. 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 shall not be washed or disinfected for reuse. Gloves must be removed and hands washed before leaving the laboratory area.

All students must wear gloves when performing phlebotomy. Gloves must be changed between patient contacts. All employees/students must wear gloves when performing capillary punctures.

Students are required to provide their own gloves for use in the student laboratory. Information on purchasing these gloves is provided on the first day of each semester for laboratory sections.

**Facial Barrier Protection**

Facial barrier protection should be used if there is a significant potential for spattering blood or body fluids. Spattering is usually accidental, but it may be unavoidable in some instances. Facial protection should be worn if mucous membrane or conjunctival spattering with blood or body fluids is anticipated.

Plastic wrap-around safety glasses should be worn when removing rubber stoppers from tubes. Spattering may be minimized by covering tube with gauze or pads with plastic backing while removing the stopper. Gloves may become visibly contaminated with blood while removing stoppers but need not be changed until completion of the tasks.

Ordinary prescription glasses are not adequate eye protection. The instructor will point out the location of safety goggles/glasses during the first laboratory session.

Full face shields made of light-weight transparent plastic (shaped like those worn by welders) are the preferred means of facial protection. They offer excellent protection of entire face and neck region. These may be provided for use at some clinical sites.

Another method of preventing splash exposures is through the use of portable table-top splash shields. These will be provided in the MLT Laboratory.

**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. An occlusive dressing for other areas may be fashioned by cutting a portion of a glove large enough to cover the skin defect. The cover should be taped to the skin taking care to seal the edges of the dressing.

Band-Aids and tape are located in the phlebotomy area.
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 with a closed front. Disposable paper gowns/coats will be assigned to each student on the first day of lab.

Laboratory coats must be removed when the worker leaves the laboratory area for any reason (e.g., restroom, snack bar).

Laboratory coats should be changed if visibly contaminated with blood or body fluids to prevent blood seeping through and contaminating clothing or skin. They should be changed at appropriate intervals to ensure cleanliness.

Laboratory coats are kept in plastic bags or student mail boxes in the MLT Laboratory when not in use.

Sterilization, Disinfection and Decontamination

Work surfaces (including contaminated equipment) shall be decontaminated with 1:10 dilution of bleach solution:

- after completion of procedures
- when surfaces are overtly contaminated
- immediately after any spill of blood or other potentially infectious material
- at the end of the work shift

The bleach solution shall be of a 1/10 dilution made daily by the assigned student. It is to be stored in the properly labeled squirt or spray bottles which are kept by the sink.

The following procedure is recommended for decontaminating spills of blood, body fluids, or other infectious materials.

1. Wear gloves and laboratory coat. If the spill contains broken glass or other objects, these should be removed and discarded without contact with the hands. Rigid sheets of cardboard used as a “pusher” and “receiver” may be used to handle such objects and discarded with the objects into an appropriate biohazard container. REMEMBER: **Never** handle broken glass with hands and **always** place broken glass into a sharps container.

2. 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 prior to disinfection.

   Absorb the spilled material with disposable absorbent material (e.g., paper towels, gauze pads or Kimwipes). 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 should be discarded as biohazard waste.

3. Clean the spill site of all visible spilled material using an aqueous detergent solution (located under the sink). The intent is to dilute the spilled material, lyse red blood cells, and further remove proteins from the contaminated area. Absorb the bulk of liquid prior to disinfection to prevent dilution of the disinfectant.

4. Disinfect the spill site using a 1:10 dilution of household bleach. Flood the spill site or wipe down the spill site with disposable towels soaked in disinfectant to make the site “glistening wet.”
5. Absorb the disinfectant solution with disposable material or allow to air dry.
6. Rinse the dried spill site with water to remove noxious odors. Dry the spill site.
7. Disposal - Place all disposable materials in the appropriate biohazard containers.

Procedure for Blood or Body Fluid Exposure

First Aid

In the event of a parenteral (needlestick) or mucous membrane exposure, perform first aid immediately. If it is a needlestick or cut, wash skin site with soap and water and then, if appropriate, 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. If splash is in eyes, go to eye wash station and rinse eyes for a minimum of fifteen (15) minutes.

Notification

After completion of first aid, notify the ACC faculty member and/or on-site supervisor immediately and follow the body fluid exposure procedure in Appendix A.
Chapter 2
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, 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 pipets used for transferring blood or body fluids
- test tubes used for performing tests on blood or body fluids (dump excessive volume in appropriate container or sink first)
- paper items saturated with blood or body fluids
- agar culture plates
- full sharps keepers

The following are wastes which can go into regular trash.

- latex gloves used for performing tests
- paper items lightly soiled with blood or body fluids
- paper towels used for drying hands
- emptied urine containers
- fecal specimens

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. Instructors will show students the appropriate level of fullness. 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:

- disposable glass pipets
- microhematocrit tubes
- glass slides
- used lancets
- any type of broken glass - do not pick up with hands, gloved or not
- wooden applicator sticks
- plastic pipet tips
- contaminated cotton applicator sticks

Do not place any wastes that have been designated for orange bags or regular trash into sharps keepers. Used needles must be discarded in an impervious-sided container that is approved for used needle disposal, not in the above described sharps containers.

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. If the top cannot be closed due to the presence of overlong disposable glass pipets, obtain second sharps container and carefully place it over the top. This is to prevent the pipets from puncturing the orange biohazard bags.

Needles

After use, the safety device on the needle must immediately be activated to reduce the risk of accidental needlestick. It is of critical importance that needles used for phlebotomy only be placed in the special 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.
Chapter 3
Chemical Safety

Glossary

The following terms are used as part of the Chemical Hygiene Program.

**Acute** - an adverse effect with symptoms of high severity coming quickly to a crisis

**Carcinogen** - a substance capable of causing cancer

**Chemical agents** - a wide variety of fluids that have a high potential for body entry by various means. Some are more toxic than others and require special measures of control for safety and environmental reasons.

**Chronic** - an adverse effect with symptoms that develop slowly over a long period of time or that frequently recur

**Combustible** - able to catch on fire and burn

**DOT** - Department of Transportation

**EPA** - Environmental Protection Agency

**Flammable** - capable of being easily ignited and of burning with extreme rapidity

**Infectious Agents** - sources that cause infections either by inhalation, ingestion, or direct contact with the host material

**Laboratory Scale** - work with chemicals that can easily and safely be manipulated by one person excluding the commercial production of chemicals for sale

**Laboratory Use** - a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis

**LC 50** - the concentration of a substance in air that causes death in 50% of the animals exposed by inhalation. A measure of acute toxicity

**LD 50** - the dose that causes death in 50% of the animals exposed by swallowing a substance. A measure of acute toxicity

**MSDS** - Material Safety Data Sheets

**Mutagen** - capable of changing cells in such a way that future cell generations are affected. Mutagenic substances are usually considered suspect carcinogens

**OSHA** - Occupational Safety and Health Administration, the regulatory branch of the Department of Labor concerned with employee safety and health

**PEL** - Permissible Exposure Limit. This is the legally allowed concentration in the workplace that is considered a safe level of exposure for an 8-hour shift, 40 hours per week.
pH - a measure of how acidic or caustic a substance is on a scale of 1 to 14. A pH of 1 indicates a substance is acidic; a pH of 14 indicates that a substance is basic.

Physical Agents - workplace sources recognized for their potential effects on the body. Heat exposure or excessive noise levels are examples of this risk group

Sensitizers - agents to repeated exposure over time creating an allergic reaction at some point in time

Sterility - changes made in male or female reproductive systems resulting in inability to reproduce

Teratogens - a substance that causes a deformity in newborns if a significant exposure exists during pregnancy

TLV - Threshold Limit Value. The amount of exposure allowable for an employee in an 8-hour day.

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.

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

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

Avoid 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 contact lenses, or applying cosmetics or lip balm in areas where laboratory chemicals are present. Wash hands before conducting these activities.
• Avoid storing, handling or consuming 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.
• Avoid the use of contact lenses in the laboratory.
• 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.

**Chemical Inventory**

A 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.

Chemicals are listed alphabetically according to the most commonly used name (e.g., bleach). A catalog number may be required by some manufacturers for Material Safety Data Sheets (MSDS). The average quantity in storage on a monthly basis, as well as the physical state (e.g., solid, liquid, gas) is included. The NFPA hazard classification, if known, is listed along with the manufacturer's name and complete address. A comment section is provided to further identify the chemical's location (e.g., under the sink, third shelf in safety cabinet, etc.).

Inventories are computerized whenever possible to provide the capability of sorting according to manufacturer. A complete chemical inventory is located in the MLT Department Chair office as well as the local fire department.
Material Safety Data Sheets (MSDS)

The objective of the material safety data sheet (MSDS) is to concisely inform users of chemicals about the hazards of the materials with which they work. The information on the MSDS is a summarization of facts from many sources. The knowledge and understanding of the technical data in an MSDS provides the user with the necessary information to safely deal with occupational exposure to hazardous materials.

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

When chemicals are transferred from the primary labeled container into other containers, the other container must be appropriately labeled with the hazards unless it is intended for immediate use. A generally excepted hazard warning label for labeling the transferred hazardous chemical from the National Fire Protection Agency is depicted below.
It 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. The preferred reading order is: Health (blue), Flammability (red), Reactivity (yellow) and Special (white). It also specifies if two specific hazards exist.

The label is filled in with the appropriate numbers specifying the hazard level within the category and affixed to the container. This provides the user with a general idea of the hazards associated with the chemical so appropriate precautions can be followed. MSDS are stored in the MSDS binder in the MSDS Information center in the Eastview Campus MLT student laboratory.

A Hazardous Identification poster (on the wall in the student laboratory) explains in detail the labeling system for hazardous chemicals.

**Chemical Storage**

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.

**Labeling**

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 with the following information:

- Identity of the hazardous chemical
- Appropriate hazard warnings
- Name and address of manufacturer

Each hazardous chemical transferred outside the laboratory that is not in its original container must also be labeled. These workplace labels must contain:

- Identity of hazardous chemical
- Route of entry (e.g., nose, mouth, eyes, skin)
- Health hazard
- Physical hazard
- Target organ affected

**Safety Controls**

The safety shower and eyewash stations, located at the Eastview Campus, are inspected and tested annually and records are maintained in the MLT office.

Fire extinguishers are inspected annually by the official designated by the ACC Physical Plant staff.

All chemical storage cabinets are adequate and well-ventilated. A flammable storage cabinet is located in the Biotechnology Prep Room.
Chapter 4
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 Equipment

Fire Extinguisher
The MLT laboratory is equipped with an “ABC” dry chemical type of fire extinguisher located on the support wall to the left of the door of the Eastview Campus MLT lab as you enter the room. This type of extinguisher is suitable for Class A (ordinary combustible materials such as wood or paper), Class B (flammable liquids), and Class C (electrical fires). Be familiar with the location of these extinguishers.

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.

A good way to remember the steps is to think PASS (Pull the ring, Aim the hose, Squeeze the lever, and Spray)

The fire extinguishers are checked annually by the Physical Plant Services.

Fire Blanket
The fire blanket is located in the Eastview MLT laboratory. A fire blanket is used to put out flash fires of clothing. (Chemical extinguishers may be harmful to skin.) To use the fire blanket, open the cylinder by pulling down on the handle located on the bottom. Pull the blanket out and wrap 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.

The fire blanket is checked annually by MLT staff and students.
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 the front and rear of the Eastview MLT laboratory. These showers are easily activated by pulling down on the ring handle located on a chain under the shower head. This is a continuous flow type of shower, and the water will continue to run until the level bar located near the ceiling is pressed back up.

Be sure to know the locations of the emergency showers. Check to be sure you are able to reach the ring handle. If you cannot reach the handle, notify a member of the MLT staff.

The fire shower is checked annually by MLT staff and students.

Fire Escape Routes
In the event of a fire or other danger requiring the evacuation of the building, there are two routes available from the Eastview MLT laboratory. The first is through the main entrance door into the hallway. From this point, you may turn either right or left to access the exit doors. The second exit route is through the MLT Prep Room at the rear of the laboratory. In the Prep Room, there is an exit door that opens to the exterior of the building.

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. Notify Austin emergency departments - Call 911 and one of the following:
   - the instructor or her designated substitute
   - the closest faculty or house staff member
   - campus security (223-5120 at Eastview)
   - the office of the Campus Manager (223-5102 at Eastview)
4. 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.
Appendix A

Student Accident Procedures

Student Accident Insurance
The college carries student medical accident insurance for students participating in designated college sponsored laboratory/clinical activities. The maximum medical benefit is $10,000 per student with a $25.00 deductible. The student is responsible for the $25.00 deductible.

The student medical accident policy provides insurance coverage only while participating in specified laboratory/clinical classes. It does not extend to accidents involving automobiles and incidents outside the laboratory/clinical/classroom.

Accident Procedures
I. Provide first aid for the student sufficient to get the situation under control.
II. If the accident occurs on campus, campus police are notified.
III. If the accident occurs in the clinical area, faculty responsible for the course in which the student is injured must be notified immediately of the incident.
IV. If it appears that a physician should see the student, he or she may chose to see his/her own physician, go to a minor emergency center, or be transported to a hospital. The student can pay the bill at the time of treatment or assign benefits and request reimbursement from ACC's insurance company.
V. The injured student will use the designated claim form. All components of the claim form must be completed. The completed form must contain the signatures of (1) the faculty/supervisor, and (2) the student/claimant and submission of an itemized medical bill before reimbursement will be made. Reimbursement requests along with completed claim form should be sent to:
   Austin Community College
   Risk Management Department
   9101 Tuscany Way
   Austin, TX 78754
   Phone: 223-1015 Fax: 223-1035

VI. The student submits a copy of the completed insurance form and HIPAA release form to the Assistant Dean of Health Sciences immediately after the incident.
VII. The Faculty submits TWO copies of the Supervisor’s Injury and Illness Analysis and Prevention Report within 48 hours of the event.
   □ One copy to the Department Chair
   □ One copy to the Assistant Dean of Health Sciences

The Assistant Dean of Health Sciences will communicate the official notification of the claim to the Risk Management Department who confirms insurance coverage with the carrier & medical provider.

FORMS ARE AVAILABLE ON THE WEB USING AN ACC ON-CAMPUS COMPUTER:
http://accweb.austincc.edu/accforms/forms/HZCM004studentaccidentclaim.pdf
http://accweb.austincc.edu/accforms/formsfrontpage/supersinjuryrep.html
(select view form)

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