

QUALITY IMPROVEMENT IMPLEMENTATION GUIDE  
EXERCISE 33 – Updated OCT 08

**SUBJECT: LABORATORY SAFETY MANUAL FOR CLIA-WAIVED LABORATORIES**

**PURPOSE:** Various regulatory agencies including the Centers for Medicaid and Medicare (CMS), Occupational Safety and Health Administration (OSHA), Food and Drug Administration (FDA), and Accreditation Association for Ambulatory Health Care (AAAHC) require each clinic laboratory to maintain a laboratory safety manual. The clinical laboratory presents special safety problems and this exercise will provide information which will encourage safety-oriented thought processes. The laboratory safety manual provides a concise reference for orientation of new personnel to the laboratory and a source of information to answer questions in the absence of the regular laboratory staff. This reference should be developed and maintained by the health services (HS) technician assigned to the laboratory.

**DISCUSSION:** Enclosure (1) provides a sample of a laboratory safety manual. Sections required include cover page, table of contents, standard precautions, warning signs and labels, fire prevention and safety, electrical safety, microbiologic safety, spills of infectious material, accident and incident reporting, waste disposal and hazardous materials, hazard communication program, and laboratory safety check list. Using this sample in developing the manual will ensure that the manual meets clinic needs while covering required topics. It will also ensure a standardized format among CG laboratory safety manuals. Specific policies themselves will necessarily vary by clinic and may need a more extensive explanation than used in this sample. CG clinics with laboratories maintaining a CLIA Certificate of Accreditation (moderate and high complexity) must develop a chemical hygiene plan and include sections in the laboratory safety manual on chemical safety, carcinogens, and compressed gas safety. Factors affecting local policies include clinic mission, equipment needs, makeup of beneficiary population, budget constraints, and existing safety guidelines. The manual must be updated annually or more frequently if necessary. Annual revisions shall be dated and signed on the cover page.

**ACTION:** Clinics are required to have a laboratory safety manual which will be updated at least annually. Enclosure (1) may be used as a sample for the content of this document. Once completed, this manual must be stored in the laboratory and be readily accessible to the laboratory work area.

**ENCLOSURE (1): Sample Laboratory Safety Manual**

COAST GUARD HEALTH CLINIC ADDRESS LINE 1 ADDRESS LINE 2  Title: <u>LABORATORY SAFETY MANUAL</u>	Page 1 of 29
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REVIEWED AND APPROVED BY:	
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ANNUAL SOP REVIEW LOG:	
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- I. **PRINCIPLE:** Safe working practices are essential in the laboratory. All healthcare laboratory personnel must incorporate all clinic safety policies and procedures into their everyday work habits. Safety procedures are for the well being of all laboratory professionals.
- II. **PURPOSE:** To prescribe policies and procedures for accident prevention, hazard protection and other safety measures in the laboratory.
- III. **RESPONSIBILITY:** All laboratory professionals.
- IV. **PROCEDURE:**

A. **SECTION I: STANDARD PRECAUTIONS**

- 1. The significant morbidity and mortality associated with certain infections, such as hepatitis viruses (HBV, HCV, HEV, HDV, HGV, HAV), human immunodeficiency viruses (HIV-1, HIV-2), and human T-cell lymphotropic viruses (HTLV-I, HTLV-2) require a cautious and educated approach to the potential hazards they create within the laboratory.
- 2. Because the infectious potential of a patient's blood/body fluid cannot be known, standard precautions should be adhered to for all patients' specimens. These precautions should be followed regardless of any evidence of the patient's infectious status.

Standard precautions apply to all blood, tissue, body fluids, secretions, and excretions (except sweat) and are considered potentially infectious.

ALL SPECIMENS MUST BE TREATED AS POTENTIALLY INFECTIOUS.

- a. HBV, HCV, and HIV (and presumably HTLV I/II) have been shown to be transmitted in the laboratory directly by these routes:
  - (1) Percutaneous: Parenteral inoculation of infectious blood/body fluid as occurs by accidental needle sticks, scalpel cuts, etc., and by transfusion of infectious blood and/or blood products.
  - (2) Non-intact Skin: Transfer of HIV by exposure to infectious blood/body fluid in the absence of an overt puncture of the skin, through the contamination of pre-existing minute cuts, scratches, abrasions, burns, etc.

- (3) Mucous membranes: Contamination of the mucosal surfaces with blood/body fluid as may occur with mouth pipetting (a prohibited activity), splashes or spattering of the oral or nasal mucosa or the conjunctiva.
3. It should be emphasized that attention to basic safety principles is, in most instances, sufficient to prevent infection of personnel. Unrealistic fear (e.g. refusal to accept specimens from patients with HIV) is neither appropriate nor necessary. On the other hand, failure to observe safety guidelines, such as mishandling of hepatitis specimens because one has been vaccinated against hepatitis B, is unacceptable. Since medical history and examination cannot reliably identify all patients infected with HIV or other blood-borne pathogens, blood and body fluid precautions should be consistently used for all patients. Standard Precautions shall be observed by all laboratory personnel.
    - a. Hepatitis (HBV, HCV)
      - (1) Hepatitis is one major laboratory hazard and is associated with significant morbidity and mortality, including chronic active hepatitis. In the laboratory, infection by ingestion, inhalation of aerosols or droplets, or mucous membrane contact of infectious specimens is considered as significant as classic percutaneous inoculation. Most body fluids from persons who are Hepatitis B Surface Antigen (HBSAg) positive are capable of transmitting HBV.
      - (2) All civilian medical personnel who work in a technical/non-clerical status (e.g. technologists, technicians, phlebotomists, etc.) or who otherwise routinely handle clinical specimens and all CG HS personnel are required to have a current and documented hepatitis B vaccination series or evidence of positive serology titers.
      - (3) No vaccine currently exists for the Hepatitis C Virus (HCV).
    - b. HIV

The Acquired Immunodeficiency Syndrome (AIDS) is a condition of impaired cell-mediated immunity, often associated with severe opportunistic infections (i.e. *Pneumocystis carinii*), cancer (i.e. Kaposi's sarcoma) and high morbidity/mortality. HIV is considered the causative agent. Epidemiological studies suggest that transmission of this condition occurs in a manner similar to hepatitis B, namely via the parenteral route (i.e. transfusion of blood products; sharing of dirty needles) and via the intimate contact of mucous membranes with body fluids, excretions and secretions. In recent years, there has been documentation of transmission of HIV to healthcare/laboratory workers.

Note: Refer to COMDTINST M6000.1C, CH13.J.14 (Managing Exposures Bloodborne Pathogen Exposure Control) for follow-up procedures after percutaneous, mucous membrane or abraded skin exposure to blood or body fluids.

4. HAND HYGIENE: Use of an approved alcohol-based hand rub and/or washing with soap and water (at least 15 seconds, vigorously) is satisfactory (any standard detergent is acceptable). Laboratory personnel must wash their hands:
- Prior to starting work
  - After use of the rest room
  - After use of facial tissue
  - Whenever hands become contaminated

Laboratory personnel may use alcohol-based hand rubs:

- Before and after meals
  - Prior to leaving the laboratory area which includes the main laboratory and blood drawing rooms
  - After removal of gloves
5. BARRIER PROTECTION: This manual provides barrier protection guidelines applicable to all laboratory areas. Barrier protection includes, but is not limited to:
- a. Gloves: Gloves provide adequate protection and will be worn when handling any blood/body fluid specimen. Gloves must fit properly, should be examined for visible defects after donning and before commencing work. Gloves should be changed immediately, NOT washed, if they accidentally become contaminated with blood/body fluid or if they become physically or chemically damaged.
- (1) Because HBV can be transmitted from hands to laboratory surfaces, soiled gloves should be removed before handling telephones, uncontaminated laboratory equipment, door knobs, etc.
  - (2) Gloves will be worn when performing any blood collection technique (venipuncture, finger-stick, heel-stick, etc).
  - (3) Double gloving is recommended during situations where gross contamination of gloves with blood/body fluids is anticipated.

Note: To prevent the transmission of potentially infectious agents, OSHA requires hand-washing or antiseptics after glove removal.

- b. Facial protection: Facial protection should be used if there is a significant potential for splattering blood/body fluid.
  - (1) Rubber Stopper Removal: Removing rubber stoppers from specimen tubes frequently causes minor splattering of blood/body fluid. This will be minimized by the use of a splatter shield or by covering the tube with a 4" X 4" gauze pad.
  - (2) Splatter Shields: The shield should be placed so as to provide complete facial protection from splatter of blood or body fluids.
- c. Occlusive dressings: All skin defects (i.e. dermatitis, cuts, abrasions, etc.) located on parts of the body exposed to blood/body fluid should be covered with a water impermeable occlusive bandage (band-aid). The fingers and hands are best protected with gloves.
- d. Protective body clothing:
  - (1) While in the laboratory, all laboratory workers must wear long-sleeved gowns with closed fronts or long-sleeved laboratory coats that are buttoned closed.
  - (2) Laboratory coats must be worn when handling specimens or when handling a hazardous material.
  - (3) Protective clothing, if visibly contaminated with blood or body substances, should be changed immediately to prevent blood seeping through and contaminating garments or skin. To ensure cleanliness, protective clothing should be changed at appropriate intervals.
  - (4) Laboratory staff whose duties take them out of the general laboratory area (main laboratory and blood draw rooms) will remove all protective clothing (including laboratory coats) when they leave. Laboratory coats are not to be worn when performing administrative duties.
- e. Syringes, needles, and other hazardous objects:
  - (1) **SYRINGES AND NEEDLES ARE NOT TO BE RECAPPED, BENT, BROKEN OR CLIPPED.** Immediately after use, discard them into the nearest impervious, rigid-walled container (sharps container).
  - (2) Other sharps (Simplates, glass tubes, pipettes, glass slides, etc.) are to be placed in a sharps container, sealed when 3/4 full, and disposed of as infectious waste to ensure destruction by incineration.

6. SPECIMEN AND REQUISITION HANDLING:

a. Specimen collection:

- (1) Exercise particular caution to avoid accidents. To avoid accidental needle sticks, used needles shall not be recapped, bent or broken.
- (2) Performing phlebotomies: Gloves will be worn when performing any blood collection techniques.
- (3) Wash hands thoroughly after finishing procedures and after degloving.
- (4) Spills are to be promptly disinfected with clinic approved surface disinfectant.
- (5) All absorbent material used for cleaning spills shall be placed in red biohazardous bag for disposal.

b. Transportation of specimens: All blood/body fluid specimens will be placed in small, leak proof transportation containers with a secure lid (ziploc baggies with proper biohazardous markings are acceptable) to protect from leakage and contamination during transportation.

c. Handling/processing:

- (1) Gloves are to be worn at all times when handling blood/body fluids.
- (2) Contaminated specimen containers and/or requisition slips are not to be accepted by the laboratory. These items should be placed in biohazardous plastic bags, disposed of as infectious waste, and the submitting location notified.
- (3) If skin contact with a specimen occurs, the area should be washed thoroughly with disinfectant soap and water as soon as possible.
- (4) Any specimen received by the laboratory with a needle attached will not be accepted. Immediately notify the clinic supervisor or clinic administrator.
- (5) Incidents involving hazardous specimens/materials are to be reported to the clinic supervisor and/or clinic administrator as soon as possible. Completion of a mishap report via the [E-Mishap Report System](#) or a Preliminary Message Report (Refer to CIM 5100.47(series), chapter 3) is required. Route report through the chain of command using this system. Use the most expeditious



mode of contacting the clinic supervisor and/or clinic administrator such as overhead paging system, personal pager or cell phone if available while maintaining the privacy of patients involved.

- (6) If containers of specimens collected in the accessioning area become externally contaminated, the contaminated surface should be wiped clean with clinic approved disinfectant (bleach, etc) so as to not contaminate the specimen. If the specimen container is leaking, it will be rejected and if necessary, a new specimen will be collected. Use good judgment before rejecting any biological specimen.
- (7) Contamination of requisitions during testing is to be avoided. This is unsightly, dangerous and unprofessional. If the requisition is contaminated, a new one should be completed.
- (8) All specimen containers should be sealed when not in use.
- (9) To avoid aerosols:
  - (a) Remove container lids and stoppers slowly. As stated earlier in this section, test tube stoppers should be removed using gauze and/or splatter shields.
  - (b) Do not forcefully expel fluid contents from pipettes or syringes. Expel the last drops slowly or let them drain out. Needles should be removed from syringes prior to expelling contents into open containers.

## 7. ORAL/FACIAL HAZARDS:

- a. Due to microbiological and toxic hazards to laboratory personnel, the following practices are prohibited in all technical work areas:
  - (1) Use of tobacco products. The use of tobacco products is prohibited in all interior areas of this clinic/facility.
  - (2) Eating and drinking. The handling of food from bench to mouth is a route of exposure for both bacteriological agents and certain toxic materials. Eating and drinking are permitted only in office spaces, only if specimens or chemicals are not handled in these spaces.
  - (3) Storing food or drinks in the laboratory refrigerators is strictly prohibited. Refrigerators and freezers should be labeled, "For Medical Use Only, Not For Food".

- (4) Application of cosmetics, including lip balm, is not permitted in the laboratory areas.
- (5) Manipulation of contact lenses. Contact lenses, especially soft lenses, may absorb certain solvents and may concentrate caustic substances against the cornea in the event of a splash. In general, the use of contact lenses is discouraged.
- (6) Mouth pipetting. Pipetting aids are available in every work area. **DO NOT MOUTH PIPETTE!**
- (7) Touching the face, biting fingernails, chewing on pens and pencils, etc.

8. CLOTHING:

- a. Military personnel shall be in the prescribed Uniform-of-the-Day while on duty. CG Grooming and Uniform standards will be enforced by the chain of command.
- b. Civilian personnel should wear neat, clean, comfortable clothing that does not interfere with movement or which could inadvertently come in contact with laboratory specimens, reagents or equipment. Shoes should be comfortable, have non-skid soles and designed to cover the whole foot without open toes or open heels. Jewelry will be permitted only if it does not present a hazard (e.g., dangling items that may be entangled in machinery).

9. HAIR: Hair shall be trimmed or secured to avoid contact with laboratory surfaces or equipment. Microbial organisms are easily passed from work surfaces to workers (and vice versa) via hair. Serious injuries can result if hair becomes entangled in automated equipment.

10. EARPHONE/HEADSETS AND RADIOS:

- a. Earphone/headset music listening devices shall not be worn by staff personnel or visitors at any time while in laboratory spaces.
- b. Radios are allowed; however, radio volume will be kept low.

Note: Noise level in the laboratory is kept at a minimum. Monitoring is indicated to protect personnel against effects of noise exposure when sound levels equal or exceeds 85 decibels.

11. HOUSEKEEPING:

- a. Exits and aisles must not be obstructed in any way. No equipment, chairs, supplies, or trash, are permitted in exit routes or areas. Wheel chair or stretcher patients should be placed where they will not obstruct aisles or exit routes. Doors must not be blocked, bolted, or obstructed in any way to block exits. Evacuation plan is posted in the laboratory area.
- b. All laboratory spaces are to be kept clean and excess trash of any sort will not be allowed to accumulate in any area. Hazardous wastes will be disposed of as described in SECTION VIII: WASTE DISPOSAL AND HAZARDOUS MATERIALS.
- c. Spills are to be cleaned up immediately.

12. DISINFECTION OF WORK AREAS:

- a. Disinfection is the significant reduction of populations of disease causing organisms and often does not destroy spores. Sterilization implies destruction of all organisms including spores.
- b. Many commercial products are available and are acceptable as general laboratory disinfectants. In varying degrees, these are either static (suppressing growth) or cidal (lethal) for bacteria, fungi and viruses. Use only a clinic approved surface disinfectant in biological areas. Most biological cleaning products consist of one or more of the following chemicals:
  - (1) Phenolic compounds (CAUTION: corrosive to skin).
  - (2) Iodophors.
  - (3) 1:10 dilution of household bleach (5.25% hypochlorite solution) (Caution: Corrosive to metal). Prepare fresh solution weekly.
- c. Frequency of disinfection of laboratory work areas:
  - (1) Bench tops: At the end of every shift. Disinfectant should be left on the surface for a minimum of ten (10) minutes.
  - (2) Floors: At least once a week or more often if needed.
  - (3) Spills and splatters should be cleaned up immediately.

## 13. GLASS ITEMS:

- a. All discarded glassware, whether it is broken or not, will be placed into a properly labeled sharps container. Glassware is never to be placed into the regular trash.
- b. Do not leave pipettes sticking out of bottles, flasks or beakers.
- c. Never use excessive force to remove stoppers on glass tubing. If they are stuck, cut them off.
- d. Never use excessive force when assembling glass apparatus or inserting glass tubing in stoppers, etc.
- e. Always use a cloth or heavy glove to protect your hands when assembling or disassembling glassware.
- f. Be sure that centrifuge tubes fit the buckets reasonably well. Place rubber cushions in the bottoms of the buckets.
- g. For centrifuge speeds above 3,000 r.p.m., use round-bottomed tubes, they are stronger than conical tubes.
- h. Carry only as many articles of glassware as can be handled conveniently and safely.
- i. Keep awkward glass items in boxes to minimize the possibility of their tumbling down from a cabinet shelf, etc. Do not stack glassware.

## 14. CENTRIFUGES:

- a. Do not operate centrifuges unless covers are closed. Do not open the lid until the rotor motor has come to a complete stop. Unsecured dangling items (hair, beards, ties, ribbons, jewelry, etc.) that may become entangled in centrifuges are not permitted.
- b. Do not centrifuge uncovered tubes of specimens (blood, urine, sputum) or flammable liquids. Always use caps or parafilm. Centrifugation creates a vacuum and volatilizes liquids (contaminated items become aerosols, flammable liquids become explosives, etc.).
- c. To protect against contamination, gloves, and laboratory coats are required when centrifuging, and removing blood/body fluids from the centrifuge.

- d. Carefully weight-balance tubes prior to centrifugation.
- e. If a tube containing a specimen breaks in the centrifuge:
  - (1) STOP THE CENTRIFUGE as soon as possible.
  - (2) Leave the centrifuge cover closed for 15 minutes after the rotor has stopped.
  - (3) Using gloves, remove all unbroken tubes, wipe them with disinfectant and transfer the contents to new tubes, if necessary.
  - (4) Remove the centrifuge cup with the broken tube(s).
  - (5) Carefully remove the broken glass with a hemostat.
  - (6) Place the broken glass into a sharps container.
  - (7) Wipe the non-removable parts of the centrifuge with clinic approved surface disinfectant. Let the pieces set for 30 minutes, wipe them again with clear water and reassemble the centrifuge.
  - (8) All absorbent material used for cleaning spills shall be placed in red biohazardous bag for disposal.

15. MISCELLANEOUS:

- a. Horse play is never permitted in the laboratory.
- b. All healthcare personnel are required to maintain current Basic Life Support (BLS) certification.
- c. The use of extension cords is not permitted.
- d. Prevent musculoskeletal disorders (MSD) in the workplace; use ergonomically designed chairs, computer keyboards, equipment, etc.
- e. All unsafe practices should be reported to the clinic supervisor and clinic administrator.

B. SECTION II: WARNING SIGNS AND LABELS

1. LABELS:

a. All reagents and chemicals must be labeled with the following information:

(1) Contents.

(2) Strength/concentration (when applicable).

(3) Date received or prepared.

(4) Date opened and/or placed into service.

(5) Expiration date. A reagent's expiration date changes once the reagent is opened; check the reagent's package insert for this information. If the expiration date does change, mark out the old expiration date; clearly write the new date above or below the old date, and initial.

(6) Appropriate hazard warnings.

(7) Manufacturer's information (if applicable).

2. STORAGE LOCKERS: All storage lockers containing flammable, corrosive or highly toxic reagents and chemicals will be clearly labeled externally as to contents.

3. POSTED AREAS: In most routine clinical laboratories there are no "high risk" areas except in the bacteriological hoods. The technical work areas will be considered to be "moderate risk" and restricted to laboratory personnel. Administrative, clerical and patient areas are considered to be "low risk" areas and are not restricted.

C. SECTION III: FIRE PREVENTION AND SAFETY

1. GENERAL POLICIES:

a. Although the laboratory has many dangerous fire hazards, most fires can be prevented by following established safety practices.

b. All personnel are expected, without exception, to be familiar with all aspects of fire prevention and safety as outlined in this section.

- (1) Periodic fire drills, once ANNUALLY for each shift, will be coordinated by the clinic/facility. Any worker may be questioned on his or her knowledge of fire procedures and tested on his or her ability to take action.
- (2) Fire safety and fire extinguisher training will be held annually. All laboratory staff is required to attend this training and have the training documented in their personnel record.

## 2. GENERAL INFORMATION:

### a. Fire:

- (1) Definition: A fire is the rapid oxidation of fuel (e.g. combustible or flammable material) by an oxidizer (e.g. O<sub>2</sub>), in the presence of an ignition source (e.g., flame, spark, and heat). For fire to occur, all three sides of the "fire triangle", fuel, oxygen and ignition, must be present concurrently.
- (2) The key to fire prevention, therefore, is to prevent the simultaneous convergence of these three elements.
- (3) Classes of Fire:
  - (a) CLASS A: Ordinary combustible materials such as wood, plastic, textiles, paper.
  - (b) CLASS B: Flammable liquids and flammable gases.
  - (c) CLASS C: Fires in energized electrical equipment.

### b. Extinguisher:

- (1) Extinguisher must be clearly labeled as to CLASS.
- (2) Different classes of extinguisher correspond to the classes of fires they extinguish.
- (3) CLASS A, B, or C CO<sub>2</sub> and/or dry chemical fire extinguishers are authorized.

## 3. FIRE PREVENTION AND SAFETY MEASURES:

### a. All personnel must be familiar with:

- (1) Classes of fires.
  - (2) Classes and locations of fire extinguisher and when and how to use them.
  - (3) Locations of Fire Alarm Pull Boxes.
  - (4) Locations of the safety shower and fire blankets.
  - (5) Posted evacuation instructions.
- b. No smoking is permitted within a CG health facility.
- c. All personnel must be aware of all sources of ignition including flames, cigarettes, heating elements and spark gaps (motors, light switches, static electricity, and automated machinery).
- d. Take all necessary precautions to assure that flammable materials, especially flammable liquids and their vapors, do not contact sources of ignition.
- e. The laboratory personnel, clinic supervisor, and clinic administrator are to ensure that fire extinguisher, safety shower and fire blankets are adequate in number, type, location and size, as applicable.
- (1) Extinguishers are inspected monthly.
  - (2) Extinguishers are to be serviced as needed.
- f. All aisles, doorways and exits must remain unobstructed at all times. Exits are to be clearly marked by exit signs or lighted directions.
- g. Flammable liquids:
- (1) Do not use flammable liquids in the presence of ignition sources and conversely keep ignition sources away from areas where flammable liquids are used and/or stored.
  - (2) Flammable liquids give off vapors which may ignite or explode. Be sure flammable liquids are properly stored in flammable lockers:
    - (a) Quantities of one gallon or more should be stored in safety cans.
    - (b) Bulk storage will be in a safety cabinet.



(c) Small quantities, "in use", can be stored in well ventilated areas.

(3) Do not store any flammable liquids in areas exposed to direct sunlight.

4. ACTION IN CASE OF FIRE:

- a. SOUND THE ALARM. Regardless of the size of the fire, simultaneously alert fellow personnel in the immediate area and alert the Fire Department through use of the Fire alarm.

KNOW BEFOREHAND THE LOCATION OF THE NEAREST FIRE ALARM IN YOUR AREA.

- b. Always use the R-A-C-E Fire Safety Procedures:

(1) Rescue and Remove- Move Patients, Visitors & Staff

(2) Activate the Alarm - Shout Code [REDACTED] in...call [REDACTED] and pull fire alarm pull box.

(3) Close/Contain - Close Doors and Windows

(4) Evacuate – Evacuate the area and proceed to your muster site. Every staff member must know his/her muster site!

- c. After sounding the alarm, if flames or smoke are visible, evacuate personnel, and patients if present.

- d. Each area must have a current and posted fire bill, and all personnel must be aware of their duties in case of an emergency.

(1) Fire duties include:

(a) Continuing to spread the alarm to personnel.

(b) Assisting and directing evacuation.

(c) Closing doors and windows.

(d) Attempting to extinguish the fire, if it is small and isolated. As a general rule, Coast Guard personnel shall not actively engage in structural fire fighting.

DO NOT TAKE ANY LIFE THREATENING CHANCES.

- (e) Directing Fire Department personnel to the scene.
  - e. Personnel are not to re-enter areas where the fire occurred until notified by the Fire Department that it is safe to do so.
  - f. Control of Fires:
    - (1) Evaluate the type and extent of the fire.
      - (a) **FACT: FIRES CAN INSTANTANEOUSLY ACCELERATE AND OVERWHELM YOU IN A FEW SECONDS WITH SMOKE, TOXIC FUMES, HEAT, FLAME OR EXPLOSION!!!**
      - (b) **DO NOT TAKE CHANCES!**
      - (c) Try to control only those fires that are clearly small and isolated.
      - (d) If the fire is large, looks like it will become large or involves highly hazardous materials (e.g. flammable gas cylinders, large volumes of flammable liquids, etc.), **GET OUT IMMEDIATELY!**
      - (e) It will be helpful if you can tell the firemen what kind of materials are involved in the fire.
        - (i.) Solid Combustibles (CLASS A).
        - (ii.) Flammable Liquids (CLASS B).
        - (iii.) Flammable gases (CLASS B).
        - (iv.) Electrical (CLASS C).
5. BURNING CLOTHING OR BURNING FLAMMABLES ON THE SKIN:
- a. Rip off light clothing (if necessary) with concurrent use of one of the following methods:
    - (1) First choice: Use The EMERGENCY SHOWER.
    - (2) Use the Stop, Drop and Roll technique.

- b. Apply cold water to first and second degree burns to relieve pain and to minimize damage. Never apply ointments or other topical remedies to burned skin.
  - c. Administer CPR to victims with cardiac and/or pulmonary arrest.
  - d. Evacuate burned personnel to the nearest Hospital Emergency Department as soon as possible.
6. EVACUATION ROUTES:
- a. The laboratory has prominently displayed the floor diagrams of the laboratory space which depicts all evacuation routes.
  - b. All personnel are to be familiar with the prescribed evacuation routes.
  - c. Exits are clearly marked by exit signs or lighted directions.
  - d. Patients with disability (on wheelchair or crutches) are to be transported safely using “buddy-support”; carry patients using “two-man carry” or strapped on back going downstairs to a safe place.
  - e. Evacuation routes are not to be obstructed by carts, wheel chairs, boxes, etc.
  - f. Exit doors are not to be blocked, obstructed, locked, or otherwise fastened so as to prevent exit while spaces are occupied.

D. SECTION IV: ELECTRICAL SAFETY

1. GENERAL:

- a. Standard alternating current is found everywhere. It is particularly dangerous because 60 Hertz periodicity easily induces ventricular fibrillation if current flows across the heart. Personnel in the laboratory are protected from becoming part of an electrical circuit because:
  - (1) Properly maintained electrical equipment and outlets usually do not provide a source of current.
  - (2) Personnel are usually not well grounded.
  - (3) Dry skin has a very high electrical resistance.

- b. A breach in one or more of the above circumstances can significantly increase the chance of serious electrical shock.
  - c. The damage done by electrical shock depends on many factors, such as current path and duration, but the most important factor is the amount of current (amperes or amps) that flow. The following figures point out that small amounts of electrical current can have serious and even fatal effects:
    - (1) 1 milliampere could cause a tingling sensation.
    - (2) 16-20 milliamperes could cause muscular paralysis (can't let go).
    - (3) 100 milliamperes could cause ventricular fibrillation.
2. PRECAUTIONS:
- a. All laboratory instruments and appliances must be adequately grounded and checked for current leakage before initial use, after repair or modification, and when a problem is suspected.
  - b. Report all shocks, no matter how small. If you feel a tingle from equipment:
    - (1) Discontinue its use immediately.
    - (2) Unplug or turn off the power.
    - (3) Notify the clinic supervisor and/or clinic administrator immediately.
    - (4) Have the equipment examined by Biomedical Repair or a technical service representative.
  - c. Eliminate abnormal sources of current:
    - (1) All instruments and receptacles must have periodic grounding checks.
    - (2) Protect cords from traffic and other sources of wear. Never use a frayed cord. The use of extension cords is prohibited.
    - (3) Never bypass electrical safety devices.
    - (4) If moisture falls on electrical equipment, cut the power and dry all parts before using. Water is a great conductor and may contact energized parts.

d. Avoid being grounded:

- (1) Sources of grounding include metal pipes, drains and standing water. Stay away from these items when working with electrical equipment.
- (2) Stand on a dry surface at all times. Depending on construction, floors may or may not be good conductors.

e. Keep skin dry and protect cuts:

Cuts circumvent the skin's resistive barrier. The skin of dry hands has a resistance of approximately 100,000 ohms. This falls drastically to 1000 ohms when the skin is wet.

- f. Only authorized, properly trained personnel will perform electrical repairs on instruments or on the electrical supply.
- g. Use ground fault interrupters in all areas where electrical equipment is used under damp or otherwise hazardous conditions. Ground fault interrupters are part of the outlet and a few milliamperes of leaking current will cause interruption of the circuit.
- h. Remember that all electrical hazards are also fire hazards.
  - (1) Never use gang plugs (they may overload circuits).
  - (2) FOR COMPUTER EQUIPMENT ONLY, power strips [Underwriters Laboratory (UL) approved] with internal circuit breakers are authorized.

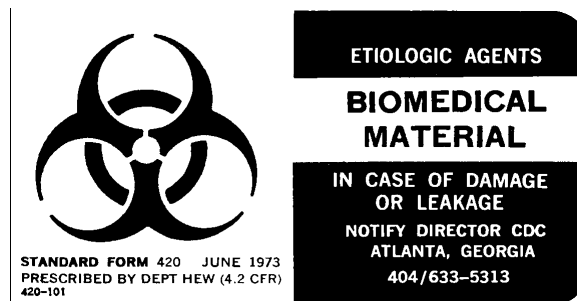
3. ELECTRICAL MISHAPS:

- a. DO NOT BECOME PART OF A CIRCUIT AND AN ADDITIONAL VICTIM!
- b. Shut off electricity to the involved equipment or to the entire area if necessary. If this is not possible and the victim is still in contact with the electrical circuit, carefully separate the victim and the electrical with an insulated, non-conducting extension (e.g. wood, glass, plastic trash can, etc.).
- c. Administer CPR if the victim has arrested and obtain medical assistance as needed.
- d. Obtain assistance from authorized, properly trained, personnel to evaluate the problem prior to turning the power back on.

## E. SECTION V: MICROBIOLOGIC SAFETY

1. **BIOSAFETY LEVELS:** The Centers for Disease Control and Prevention (CDC) recognizes four levels of biosafety practices and has assigned most organisms to different levels according to pathogenicity and virulence:
  - a. Biosafety Level I: Organisms that are ubiquitous and do not cause disease in or colonize healthy adults.
  - b. Biosafety Level II: Moderate risk organisms that are common but are able to cause disease, particularly in compromised hosts (e.g. Staphylococcus, Streptococcus, E. coli, Pseudomonas, most parasites, Aspergillus, most common viruses).
  - c. Biosafety Level III: Moderate to high risk organisms that are likely to cause serious or lethal disease if contacted (e.g. TB, Coccidioides, Histoplasma, Brucella, Francisella, most arboviruses, the rickettsiae).
  - d. Biosafety Level IV: Extremely dangerous and exotic organisms (e.g. Lassa fever).
2. **BACTERIOLOGY SPECIFIC POLICIES:**
  - a. Biosafety Level: Most organisms encountered in bacteriology are in Biosafety Level II and can be manipulated on the open bench with standard bacteriology precautions.
  - b. Avoid aerosols: Use disposable inoculating loops only!
  - c. Disinfect benches at the end of each shift or after each spill with clinic approved disinfectant. Disinfect floors weekly.
  - d. Wash hands frequently and always before leaving the laboratory area.
3. **MYCOBACTERIOLOGY, SPECIFIC POLICIES:** All Mycobacteriology (e.g. AFB) specimens must be sent out to a reference laboratory. This is due to the lack of a suitable biosafety hood and the lack of negative pressure ventilation in the laboratory. Follow packaging instructions provided by the reference laboratory for transport.
4. **WASTE DISPOSAL:** All culture materials are to be disposed of as infectious waste as outlined in SECTION VIII.
5. **SHIPMENT OF KNOWN ETIOLOGIC AGENTS:**

- a. Regulations for the shipment of etiologic agents (viable microorganisms) have been published in 42 CFR Part 72.
- b. Regulations:
  - (1) Place less than 50 mL of specimen in a watertight container and wrap in thick absorbent material that is sufficient to absorb the entire specimen if spilled.
  - (2) Place this pack into a secondary durable watertight container.
  - (3) Place cushioning material around the canister and place snugly inside another strong canister of metal or heavy cardboard with a tightly fitting lid that cannot be dislodged.
  - (4) Each set of primary and secondary containers shall then be enclosed in an outer shipping container constructed of corrugated fiberboard, cardboard, wood, or other material of equivalent strength.
  - (5) The outer shipping container of all materials containing etiologic agents transported in interstate traffic must bear a label as illustrated and described below:
    - (a) The color of material on which the label is printed must be white, the symbol red, and the printing in red or white as illustrated.
    - (b) The label must be a rectangle measuring 51 millimeters (mm) (2 inches) high by 102.5 mm (4 inches) long.
    - (c) The red symbol measuring 38 mm (1½ inches) in diameter must be centered in a white square measuring 51 mm (2 inches) on each side.
    - (d) Type size of the letters of label shall be as follows with example below:
      - (i.) Etiologic agents--10 pt. rev.
      - (ii.) Biomedical material--14 pt.
      - (iii.) In case of damage or leakage--10 pt. rev.
      - (iv.) Notify Director CDC, Atlanta, Georgia--8 pt. rev.
      - (v.) 404-633-5313--10 pt. rev.



F. SECTION VI: SPILLS OF INFECTIOUS MATERIALS

1. GENERAL LABORATORY

- a. Specimen spills and splatters are to be cleaned up immediately.
- b. Wipe up with clinic approved disinfectant.

2. MICROBIOLOGY/VIROLOGY

- a. Spills of bacteriological, mycological or mycobacteriological culture materials:
  - (1) Wear disposable gloves (and mask if needed for highly virulent organisms).
  - (2) Cover spill with absorbent paper or gauze.
  - (3) Saturate area with clinic approved disinfectant. Avoid splashing and aerosol formation. Allow to stand for 10 minutes.
  - (4) Place disinfected trash in a biohazardous bag and treat as infectious waste.
- b. Spills of virological culture materials
  - (1) Wear disposable gloves and surgical mask if needed for highly virulent organisms.
  - (2) Cover spill with spill control pillows or if not available, absorbent paper or gauze.
  - (3) Saturate the area with clinic approved disinfectant. Avoid splashing and aerosol formation. Allow to stand for 30 minutes.
  - (4) Place disinfected trash in a biohazard bag and treat as infectious waste.



3. USING THE EYEWASH STATION

- a. In the event a chemical or small particles come into contact with the eyes, use the following procedure when operating the eyewash station:
  - (1) Remove any contact lenses immediately if a chemical or other substance gets into your eye. The contact can hold the substance to the eye, increasing the damage to the cornea.
  - (2) Forcibly hold your eyes open and place them on the designated spot on the eyewash station. This is probably the hardest thing to do but also the most important.
  - (3) Activate the eyewash station, seek available assistance, and begin flushing the face, eyelid folds, and eyes for at least 15 minutes.
  - (4) Hold eyelids open during flush and roll eyeballs to expose flushing fluid to all possible surfaces of the eyeball.
  - (5) After flushing, promptly seek medical attention.

G. SECTION VII: ACCIDENT AND INCIDENT REPORTING

1. GENERAL POLICIES:

*THE REPORTING OF ACCIDENTS AND INCIDENTS IS REQUIRED BY LAW.*

- a. Laboratory policy requires the reporting of all accidents, incidents, and unsafe conditions to the clinic supervisor and clinic administrator that:
  - (1) Involve patients or staff, with or without injuries.
  - (2) Result in damage to equipment and/or the building.
  - (3) Have a potential for injury, hazard to health, or damage to property.
- b. Clinic policy requires the reporting of accidents and incidents to the clinic administrator or, if after working hours, to Officer of the Day (OOD) that result in:
  - (1) Significant injury.

- (2) Potential for future harm to involved person(s).
  - (3) Absence from work.
  - (4) Possible lawsuit.
  - (5) Significant adverse impact on clinic's mission.
- c. Examples:
- (1) Needle-stick injuries.
  - (2) Technician receives a "tingle" from equipment but is not harmed. Equipment is shut down until repaired. Technician receives severe electrical shock from equipment, is treated for hand burns, and is sent home (injury, absence from work).
  - (3) Someone skinning their knee on an open drawer.
  - (4) Injury resulting from a syncopal event.
  - (5) Worn or frayed electrical cord. Carefully, remove the electrical cord from the power source.
  - (6) Patient falls in the rest room with or without injuries (possible lawsuit).
- d. Medical device adverse event reporting:
- (1) FDA Form 3500A- Medical Device Reporting (MDR) is the mechanism for the Food and Drug Administration to receive significant medical device adverse events from manufacturers, importers and user facilities, so they can be detected and corrected quickly. Report immediately to the clinic supervisor and clinic administrator using the Patient Safety Form. FDA Form 3500A and instructions are available at <http://www.fda.gov/cdrh/mdr/mdr-forms.html>
- NOTE: An annual report/Form 3419 of device-related deaths and serious injuries must be submitted by January 1 of each year if any such event was reported during the previous year. Keep MDR reports for 2 years. Form and instructions are available at <http://www.fda.gov/cdrh/mdr/mdr-forms.html>
- (2) All workplace injuries to military and civilian staff members must be reported using the Coast Guard [E-Mishap Report System](#) or Preliminary Message Report

(Refer to CIM 5100.47(series), chapter 3). This report must be submitted within two working days of the injury, unless there is a resulting loss of workdays; then the form must be submitted immediately. \*\*\*All serious mishaps resulting in fatalities or in hospitalization of three or more employees must be reported within 8 hours to OSHA using forms 300, 300A, and 301 as directed. Refer to [www.osha.gov](http://www.osha.gov) for appropriate forms and instructions. Guidance can be found in COMDTINST 5100.43, Chapter 3.

(3) Traumatic injuries involving federal civilian employees require completion of Federal Employees Notice of Traumatic Injury and Claim for Continuation of Pay Compensation Form CA-1. These forms are available at:

<http://www.fedworkerscomp.net/survival.htm>

(4) Reports of all mishaps/ incidents which occur within the clinic will be sent through the chain of command using the [E-Mishap Report System](#) Preliminary Message Report (Refer to CIM 5100.47(series), chapter 3).

- e. Refer to COMDTINST M6000.1C, CH13.J.14 (Managing Exposures Bloodborne Pathogen Exposure Control) for reporting procedures after percutaneous, mucous membrane or abraded skin exposure to blood or body fluids.
  - f. If the accident or incident is of a very serious nature, the clinic administrator and the OOD should be contacted immediately, regardless of the hour.
2. IN THE EVENT OF AN ACCIDENT AND/OR INCIDENT, THE LABORATORY HS IS TO:
- a. Respond to the scene of serious problems and provide assistance and supervision, if necessary.
  - b. Investigate the surrounding circumstances.
  - c. Communicate with chain of command, and prepare appropriate reports.
  - d. Present final recommendations to the appropriate individuals for action.
  - e. Perform follow-up surveillance to assure resolution of the problem.
3. MEDICAL CARE: In the event of occupational injury to laboratory personnel:
- a. Notify supervisory personnel immediately.

- b. Refer both civilian and military to the most appropriate facility for acute care and follow-up.
- c. Prepare reports as indicated above.

#### H. SECTION VIII: WASTE DISPOSAL AND HAZARDOUS MATERIALS

##### DISPOSAL OF INFECTIOUS WASTE:

- a. Infectious waste is defined as all human and animal body fluids, excretions, blood, blood products and tissues, and any objects, such as specimen containers, swabs, dressings, needles, syringes or culture related materials that are contaminated by any item as listed above.
- b. General Policies:
  - (1) All infectious waste is to be bagged in red bags and placed immediately into biohazardous containers. Several small bags can be double-bagged into one larger bag.
  - (2) Under no circumstances are red bags ever to be disposed of in the regular, noninfectious trash. Likewise, infectious waste disposal areas should be used **ONLY** for infectious waste items as outlined above.
  - (3) Sharps containers will be properly secured.

#### I. SECTION IX: HAZARD COMMUNICATION PROGRAM

##### 1. GENERAL:

- a. A written hazard communication program enhances our employees' health and safety.
- b. Container Labeling: No container of hazardous substances will be released for use until the following label information is verified:
  - Containers are clearly labeled as to the contents.
  - Appropriate hazard warnings are noted.
  - The name and address of the manufacturer is listed.
- c. Hazardous chemicals must always be stored below eye level to minimize the likelihood of exposures to the face and eyes.

d. MATERIAL SAFETY DATA SHEETS (MSDS):

- (1) The assigned laboratory HS will be responsible for obtaining and maintaining MSDS's in a clearly marked binder.
- (2) The assigned laboratory HS will review incoming MSDS's for new and significant health/safety information. He/she will see that any new information is passed on to the affected employees.
- (3) The assigned laboratory HS will review MSDS's for completeness. If an MSDS is missing or obviously incomplete, a new MSDS will be requested from the manufacturer.
- (4) MSDS's are available to all employees for review. If MSDS's are not available or new hazardous substance(s) in use do not have a MSDS, please contact the assigned laboratory HS immediately.

e. HOW TO LOCATE MATERIAL SAFETY DATA SHEETS

- (1) Immediately determine the name of the chemical and locate in the MSDS binder. All MSDS's are listed alphabetically.
- (2) If any questions or concerns arise pertaining to a specific MSDS form, inform the assigned laboratory HS and clinic supervisor or clinic administrator.

f. EMPLOYEE INFORMATION AND TRAINING:

- (1) Employees are to attend a health and safety orientation during clinic orientation as well as departmental safety training prior to starting work for information and training on the following:
  - (a) Operations in their work area where hazardous substances are present.
  - (b) Laboratory safety manual
  - (c) Emergency evacuation procedures.
  - (d) Risk factors, physical work activities associated with work-related musculoskeletal disorders (MSD) and methods to prevent and reduce the risks of ergonomic distress, disorders and accidents.
  - (e) Physical and health effects of the hazardous substances in their work areas.

- (f) Methods and observation techniques used to determine the presence or release of hazardous substances in the work area.
- (g) Methods to reduce and/or prevent exposure to these hazardous substances through usage of control, work practices and personal protective equipment.
- (h) Steps the laboratory has taken to reduce or prevent exposure to these substances.
- (i) Emergency and first aid procedures to follow if employees are exposed to hazardous substance(s).
- (j) How to read labels and review MSDS to obtain appropriate hazard information.

NOTE: IT IS CRITICALLY IMPORTANT THAT ALL OF OUR EMPLOYEES UNDERSTAND THE TRAINING. IF YOU HAVE ANY ADDITIONAL QUESTIONS, PLEASE CONTACT LABORATORY PERSONNEL.

- (2) All in-service training records will be maintained for all employees receiving training.

#### V. REFERENCES:

1. OSHA Laboratory Standards, 29 CFR 1910.1450, January 1, 2007, pages 482-497.
2. NCCLS Protection of Laboratory Workers, M29-A3.
3. OSHA Hazard Communication Standard, 29 CFR 1910.1200, January 1, 2007, pages 460-482.
4. Interstate Shipment of Etiologic Agents, 42 CFR 72, pages 434-437.
5. Safety and Environmental Health Manual, CIM 5100.47 (series), Chapter 3.
6. Medical Manual, CIM 6000.1C (series).

#### VI. ENCLOSURES:

Safety Checklist

## SAFETY CHECKLIST

Initial and date the appropriate blocks for monthly/quarterly tasks performed and notify the clinic supervisor of any discrepancies. The clinic supervisor must review, date, and initial this form on a quarterly basis.

**WEEKLY:**

1. Activate and inspect each eyewash station. Allow the water to flow freely for 3 minutes to ensure adequate flushing of the lines and see that the units are clean and free of debris.
2. Ensure laboratory and storage areas are free of clutter.
3. Ensure the availability of personal protective equipment, gloves, goggles, face shields, and lab coats.

**MONTHLY:**

1. Check the charges, inspection tags, and general appearance of each fire extinguisher.
2. Inspect the power cords of all electrical equipment for proper condition and storage.
3. Check hazardous material spill kits for proper contents and expiration date.
4. Inspect acid, base, and flame lockers for proper contents and labeling.

**QUARTERLY:**

1. Check the emergency shower for cleanliness and operation.
2. Review MSDS to see that new entries are properly documented.
3. Ensure that safety related in-service is given every quarter, coordinated with the Education HS.

<u>YR</u>	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Monthly	Qtrly	QTR	Quarterly Supervisor Review
JAN								1	DATE:
FEB									SIGNATURE:
MAR									DATE:
APR								2	SIGNATURE:
MAY									DATE:
JUN									SIGNATURE:
JUL								3	DATE:
AUG									SIGNATURE:
SEP									DATE:
OCT								4	SIGNATURE:
NOV									DATE:
DEC									SIGNATURE:

COMMENTS: