Checklist for Site SOP Required Elements: Laboratory Safety

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| **GENERAL SAFETY REQUIREMENTS** |
| The SOP describes the following aspects of general laboratory safety:  Defines the bio-safety level (BSL) classification of the laboratory and any special department classifications as applicable, i.e., BSL-3 mycobacteriology lab.  Includes emergency numbers.  Defines specific employee safety requirements and management policies:  Describes personal protective equipment (PPE) and the appropriate use  Describes approved and/or prohibited clothing and shoes  Defines hand-washing and glove change requirements  Describes situations where long hair must be contained  Describes any unapproved jewelry or situations where jewelry must be removed  Prohibits eating, drinking, applying cosmetics, and handling contact lenses in the laboratory and designates clean areas where these activities can be performed  Prohibits the comingling of food items and biological materials in refrigerators and freezers and requires non-food refrigerators and freezers be labeled accordingly to prevent inappropriate storage of food items  Prohibits mouth-pipetting  Describes the presence and use of safety equipment (i.e., eye washers, fire blankets, safety shower, etc.)  Restricts laboratory access to authorized personnel and designates specific entry/exit procedures in BSL-3 laboratories  Describes methods for obtaining required vaccinations.  Includes procedures for safe needle handling and prohibits the recapping of needles.  Includes potential risk from splashing during pipetting and biological material transfer procedures and recommends using biosafety cabinets to minimize risk.  Includes potential risk from aerosolization during centrifugation procedures and provides recommended procedures that will minimize risk.  Defines procedures for cleaning and/or sterilizing reusable items such as glassware.  Includes work-surface decontamination procedures:  Defines frequency  Includes methods  Specifies approved decontamination solutions and their concentration  Includes procedures for clean-up and decontamination of biological spills:  Details any specific notification or evacuation procedures  Identifies the appropriate PPE to be used during the clean-up  Includes procedures to contain, cover, clean-up and decontaminate the spill and to handle broken glass ware  Includes the approved cleaning/decontamination solutions and their concentration  Includes annual safety training, education and documentation requirements. |
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| **STANDARD PRECAUTIONS** |
| The SOP states the nature of risk from exposure to blood or other potentially infectious material from at least the following organisms:  Hepatitis B  Hepatitis C  HIV  Defines the standard precautions principle.  Defines the specific risk related to the applicable job description i.e., risk level is different for a laboratory secretary and a phlebotomist.  Includes a list of the required barrier protection (personal protective equipment) available and provided for employee use.  Describes methods for obtaining required vaccinations.  Includes annual training and education requirements. |
| Comments: |

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| **ACCIDENT PROCEDURE AND REPORT FORM** |
| **Accident & Exposure Incident Procedures** |
| The SOP describes the procedure for immediate treatment of employee accidents and exposure incidents:  Provides examples of employee accidents and exposures, which includes needle sticks.  Includes separate procedures for life-threatening and non-life-threatening procedures, if applicable. If procedures are the same, SOP states that.  Includes separate procedures for emergencies that occur during normal work hours and after normal work hours, if applicable, and includes the work hours. If procedures are the same, SOP states that.  Includes separate procedures for employees, patients, and visitors. If procedures are the same, SOP states that.  The SOP includes procedures specific to exposure to blood or other potentially infectious materials by way of a needle stick, percutaneous injury, mucous membrane contact, or non-intact skin contact and includes the following details:  available counseling  confidentiality  prophylaxis provided at no cost  follow-up treatment requirement  special notification and documentation requirements, if applicable  Provides the name, location and phone number of the treatment facility that should be used for immediate emergency treatment.  Describes the requirements for internal notification to upper management and the required time frame for notification for all incidents. The SOP describes different requirements for special incidents (i.e., needle sticks, chemical burns, etc.) or different individuals (i.e., employees, patients, or visitors). If the procedures are the same, then the SOP states that.  Describes the documentation requirements for employee accidents and exposure incidents and indicates who is responsible for completing the documentation and the required time frame.  Applicable forms are included as appendices.  Describes the documentation requirements for patient and/or visitor accidents and exposure incidents and indicates who is responsible for completing the documentation and the required time frame. |
| Comments: |
| **Safety Incident Review** |
| Includes requirements and procedure to notify the laboratory director within a specified time-frame.  Includes requirements for safety team and quality committee review within a specified time-frame and includes team review requirements for each event, i.e.:  Appropriate procedures followed  Complete documentation  Lab director notification and signature  Considerations for immediate future preventive measures  Confirmation of employee follow-through for required follow-up treatments  Includes requirements to classify and statistically monitor safety incidents trends over time for purposes of performance improvement. |
| Comments: |

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| **FIRE SAFETY** |
| **Basic Fire Safety** |
| The SOP describes the following aspects of fire safety:  Appropriate action to take upon finding a fire - **R**escue the patient, Sound the **A**larm, **C**lose windows to remove ventilation, and **E**vacuate or **E**xtinguish the fire - **RACE**  Procedure for using a Fire Alarm – (If fire alarms are available), pull the nearest fire alarm box or call the operator and report the fire  If possible turn off gas, especially oxygen valves. Return flammable materials to approved storage cabinets. Remove ventilation by closing the windows and doors.  Procedure for using Fire Extinguishers.  Evacuation procedure - Leave the building by the nearest accessible fire exit. Use stairs or exit through a fire door to an adjacent building.  Evacuation Plan - The evacuation plan should be posted in the form of a diagram in all areas of the laboratory. Arrows should indicate the route to the nearest Fire exit.  Reporting a Fire Incident -Whenever a fire occurs a report of the Fire Incident must be submitted using the appropriate incident form. This report must be completed as soon as possible after the fire is extinguished.  Describe the ‘all clear” procedure following a fire or drill and appropriate documentation. |
| Comments: |
| **Fire Safety Training** |
| The SOP describes the following aspects of fire safety training:  Announced/Unannounced fire exit drills will be conducted at least annually to prepare employees to respond safely in the event of a fire.  The drills will ensure that fire exit corridors and stairwells are clear and that all fire exit doors open properly.  All personnel are required to participate and to exit the area.  All personnel must participate in at least one fire drill annually. Attendance will be documented on a personnel accountability roster, which will be filed with the appropriate site Incident form.  Personnel will be familiarized with the fire extinguisher location during their initial safety training  They will be instructed in the **PASS** method for fire extinguisher use: **P**ull the pin, **A**im at the base of the fire, **S**queeze the handle, **S**weep side to side  They will be knowledgeable in the fire classifications  Personnel will be familiarized with the fire blanket location during their initial safety training.  The fire blankets will be checked monthly to verify location. |
| Comments: |
| **Fire Extinguisher Training** |
| The laboratory is responsible for the inspection, maintenance and testing of all portable fire extinguishers.  Portable extinguishers (or hose) will be visually inspected monthly and documented.  Portable fire extinguishers will receive an annual maintenance check. The annual maintenance date will be documented and retained for one year after the last entry or for life of the shell, whichever is shorter. |
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| **BIOSAFETY** |
| **Containment** |
| The SOP outlines the importance of containment in Biosafety and includes:  A definition and description of "containment" as the term that is used in describing methods for managing infectious agents in the laboratory environment where they are being handled or maintained.  Explains the purpose of containment as the mechanism used to reduce exposure of laboratory workers, other persons, and the outside environment to potentially hazardous agents. The elements of containment include laboratory practices and techniques, safety equipment, and facility design.  Defines primary containment as the protection of personnel and the immediate laboratory environment from exposure to infectious agents, is provided by good technique and the use of appropriate safety equipment.  Defines secondary containment as the protection of external laboratory environment from exposure to infectious materials, is provided by a combination of facility design and operational practices. |
| Comments: |
| **Biosafety Level 1 (BSL-1)** |
| The SOP defines the Standard Microbiological Practices that should be included in a BSL-1 laboratory as listed below:  Access to laboratory should be limited or restricted at the discretion of lab director when work or experiments on cultures and specimens are in progress.  A biohazard sign should be posted at the entrance to the laboratory. The sign should include the name of the agents in use and the names and phone numbers of the lab contacts.  Lab coats, gowns or uniforms should be worn to prevent contamination or soiling of street clothes and should remain in the laboratory unless decontaminated  Gloves (non- latex) should be worn.  Protective eyewear must be worn for procedures in which splashes of microorganisms or other hazardous materials are anticipated.  Procedures are performed to minimize splashes or aerosols.  Staff must wash their hands after handling viable materials, after removing gloves, and before leaving lab.  Work surfaces must be decontaminated at least once a day and after any spill of viable material.  All cultures, stocks, and other regulated wasted must be decontaminated before disposal by an approved decontamination method such as autoclaving  Safety Equipment and Facilities  Lab doors have access control.  Each lab has a sink for hand washing.  Lab is easily cleaned. No carpet or rugs in lab area.  Bench tops are impervious to water.  Spaces between benches, cabinets, and equipment are accessible for cleaning |
| Comments: |
| **Biosafety Level 2 (BSL-2)** |
| The SOP defines the Standard Microbiological Practices that should be included in a BSL-1 laboratory as listed below:  All BSL-1 standards *plus* the following BSL-2 standards:  Biohazard sign must be posted on entrance to lab when etiologic agents in use. The sign must include names and telephone numbers of lab contacts, personnel protective equipment required in lab, agents or microbes in use and biosafety level of lab.  Lab personnel must receive appropriate immunizations or tests for the specific agents handled.  Biosafety procedures are incorporated into standard operating procedures. Personnel are advised of special hazards.  Lab director ensures the lab personnel receive appropriate training on potential hazards associated with work involved and precautions to prevent exposure and evacuation procedures. Personnel receive annual updates or training as necessary for policy and procedure changes.  Laboratory personnel use a high degree of caution with any contaminated sharp items. Plastic is substituted for glassware whenever possible  Cultures, tissues, body fluid specimens, or potentially infectious wastes are placed in a container with a cover that prevents leakage during collection, handling, processing, storage and transport.  Safety Equipment and Facilities  Primary barriers include: Biological safety cabinets, splash shields, face protection, protective lab coats, gowns and gloves.  Secondary barriers include: Hand washing and waste decontamination facilities to reduce potential environmental contamination.  Eyewash station is readily available.  Furniture is covered with non-fabric material that can be decontaminated.  Lockable doors are provided for restricted agents. |
| Comments: |
| **Biosafety Level 3 (BSL-3)** |
| The SOP defines the Standard Microbiological Practices that should be included in a BSL-3 laboratory - Applicable to work with indigenous or exotic agents, which may cause serious and potentially lethal infections or disease as a result of exposure by inhalation *i.e., Mycobacterium tuberculosis*  All BSL-1 and BSL-2 standards *plus* the following BSL-3 standards:  Laboratory doors are kept closed when work is in progress.  The laboratory director controls access and restriction to the lab.  Biosafety manual must be specific to the laboratory and prepared or adopted by the lab director and biosafety precautions are incorporated in the procedures.  All manipulations involving infectious material are conducted in biological safety cabinets. Clean up is facilitated by using plastic backed paper toweling on non-perforated work surfaces within biological safety cabinets.  Equipment must be decontaminated before removal from the facility for repair or maintenance or packaging for transport.  All spills and exposures are reported to the laboratory director. Appropriate medical evaluations, surveillance, and treatment are provided and records maintained by management.  Safety Equipment and Facilities  Biological safety cabinets (BSC) or other enclosed equipment must be used for ALL laboratory manipulations. No culture work should be done on open benches.  Protective clothing such as solid front or wrap-around gowns, scrub suits, or overalls must be worn by workers in the lab along with all barriers listed under BSL-1 and BSL-2. ***The 3M N95 respirator is highly recommended for use when working with all potentially airborne pathogens.***  Laboratory clothing that protects street clothing (i.e., solid front or wrap-around gowns, scrub suits, coveralls, etc.) must be worn in the laboratory. FRONT-BUTTON LABORATORY COATS ARE UNSUITABLE. Laboratory clothing must not to be worn outside of the laboratory and must be decontaminated before laundered.  The lab is separated from areas with unrestricted traffic.  Access to the laboratory is controlled. Laboratory doors are kept closed when cultures are being processed or identified. Access must be through a set of self-closing double doors. |
| Comments: |
| **Biological Safety Cabinets (BSC)** |
| The SOP includes the following information on BSCs:  A description of the class of BSC in use- either Class I, Class II or Class III  Information on the placement of the BSC for maximum effectiveness. For best results, Class I and II BSCs should be located away from traffic patterns, doors, ventilation systems, and air handling devices.  Biosafety instructions for BSC Operation to include the following points:  Do NOT place objects on or over front air intake grille.  Do NOT block rear exhaust grille.  Arrange materials to segregate contaminated and clean items.  Work should be performed at least six (6) inches back from front grille.  Inside the BSC, always use horizontal pipette discard pans, containing appropriate disinfectant.  Clean up all spills immediately. Wait 5 minutes before resuming work.  Biosafety instructions for BSC Maintenance to include the following points:  Cabinets should be decontaminated at least once per day after completion of work processes.  UV Lights should be maintained as indicated in Fac1.0-13 Appendix 5-Electrical & Mechanical Safety.  Cabinets must be certified at least annually to ensure that filters are functioning properly and that airflow rates meet required specifications. |
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| **ELECTRICAL AND MECHANICAL SAFETY** |
| **Electrical Safety** |
| The SOP describes electrical safety practices and includes the following:  All instruments and household appliances in use must be grounded.  All electrical shocks, including minor shocks, must be reported using the established reporting mechanism.  Any instrument that is causing shocks must be shut down and the electric supply should be unplugged.  No attempt should be made to repair an instrument unless it is unplugged. Refer work on switches or outlets to the maintenance department or equivalent.  New equipment should be checked by the Bio-electrical department or equivalent before use. |
| Comments: |
| **Compressed Gases** |
| The SOP describes the following safety practices for compressed gas:  All compressed gas cylinders must be secured in an upright position by means of a strap or chain. This includes cylinders in use or in storage (empty or full).  Suitable hand carts should be utilized when transporting gas cylinders. Cylinders must be attached to the hand cart by means of a strap or chain during transport.  Protective valve caps must be in place when cylinders are not in use.  All cylinders, lines, and equipment used with flammable compressed gases must be grounded.  All cylinders must be equipped with an appropriate regulating device while in use. All regulators must be marked to identify the gas (or group of compatible gases) with which the regulator may be used.  Regular threads must match cylinder valve outlet threads.  All cylinders must have an attached hand wheel, valve handle, spindle key, or special tool to open and close the cylinder valve while in use in the event of an emergency.  Cylinders containing compressed gases shall be used only in well-ventilated areas  Cylinders containing toxic or flammable gases must be stored in an approved storage area.  Cylinders containing oxidizing gases, such as oxygen and nitrous oxide, must be stored separately from flammable gases or liquids.  Empty cylinders must be identified as empty and stored separately from full or partially full cylinders.  Cylinders should not be stored with or near flammable materials.  Oil, grease or lubricants on should not be used on valves, regulators or fittings.  Laboratory staff should not attempt to repair damaged cylinders or to force frozen cylinder valves.  The SOP describes the following safety practices for flammable compressed gas:  No more than two cylinders should be manifolded together.  No more than one instrument or outlet is permitted for a single cylinder.  No more than one cylinder of highly flammable gas shall be in one room without specific approval by the Director (or Safety Officer).  Reserve or standby cylinders (full or empty) must not be stored in the lab.  Cylinder size is limited to 200 cubic feet. Valves on all flammable gas cylinders shall be shut off when the laboratory is unattended.  Pressure regulators and needle valves: Needle valves and regulators are designed specifically for different families of gases. Use only the properly designated fittings.  Threads and surfaces must be clean and tightly fitted. Do not lubricate.  Tighten regulators and valves firmly with the proper sized wrench. (Do not use adjustable wrenches or pliers. They damage the nuts.) Do not force tight fits.  Open valves slowly. Do not stand directly in front of gauges (in the event of an explosion the gauge face may blow out). |
| Comments: |
| **Liquid Nitrogen** |
| The SOP describes the hazards and safety practices associated with the use of liquid nitrogen:  Describes the common hazards associated with Liquid Nitrogen including burns, asphyxiation, over pressurization and explosion.  Describes appropriate PPE (Cryo-gloves, Face shield, safety goggles) and special handling equipment (Dewars, tongs and Cryo-claw) that must be used with liquid nitrogen.  The SOP includes safety practices to follow when handling liquid nitrogen:    Work with liquid nitrogen in a well-ventilated area. An O2 monitor in the LN area is strongly recommended.  Always use a Dewar or storage vessel rated for refilling or transporting liquid nitrogen.  Remove all metal jewelry from hands and skin as spill could freeze the metal to a lab employee’s skin.  Always wear cryo-gloves, face shield and safety goggles to protect eyes and mucous membranes.  Only fill a Dewar from a transfer line that has a phase separator attached to the end of the line. (Phase separators separate gas from liquid preventing an overabundance of gas from surrounding the end of the transfer line and allow only liquid nitrogen to fall into the Dewar).  Place the phase separator so that it rests on the bottom of the Dewar to prevent splashing.  Never use a funnel to dispense liquid nitrogen.  Never overfill a Dewar. This may cause liquid nitrogen to leak into the cryo-tubes and when they are removed, may explode.  Never leave the filling process unattended.  When cooling objects with liquid nitrogen lower them slowly into the liquid using tongs to prevent boiling and splashing.  Use a Cryo-claw to retrieve samples that have fallen into a Dewar.  Label all cryogen containers with a cryogen warning and the name of the cryogen.  Use only glassware rated for use with cryogens.  Do not overfill the Dewar. Where possible store cryogenic vials in the vapor phase of the liquid nitrogen (above the liquefied gas). Do not store vials in the liquid phase.  Use an appropriate wheeled cart to transport a Dewar or other storage vessel. |
| Comments: |
| **Mechanical Safety** |
| The SOP includes the following aspects of mechanical safety:  Includes potential mechanical hazards that may be encountered during instrument operation or when performing instrument maintenance including:  Pinch points (e.g. hinges, pliers, etc.)  Catch points (which may catch either a person or his clothing)  Shear points (doors, cabinet drawers)  Squeeze points (between moving parts)  Run-in points (rotating parts moving toward each other, e.g. meshing gears)  Flying objects (metal or glass from breakage or explosion) |
| Comments: |
| **UV lights** |
| The SOP includes the following aspects of UV light safety:  Recommends that all personnel should be instructed in the use of UV installations and that the following precautions should be followed:  Do not look directly at UV lamps;  Do not loiter in UV airlocks and door barriers;  Turn off UV lamps before cleaning;  Wear eye and skin protection if anticipated exposure to UV will be for more than a few seconds. |
| Comments: |
| **Safety Equipment** |
| The SOP contains the following information in regards to laboratory safety equipment. (Also refer to general laboratory safety and fire safety checklists).  Provides a list of Safety equipment that should be present in the laboratory, including:  Eyewash facility that may be plumbed or self-contained  Emergency shower/drench hose  Fire extinguishers  Sharps containers  Spill kit  An automatic fire detection (e.g., smoke detectors) or alarm system  A fire alarm station in or near the laboratory  A sink that can be utilized for hand washing  A basic first aid kit that is restocked periodically and is accessible  States that emergency equipment must be verified for proper maintenance. Documentation must be signed and dated by the personnel performing the task, and be retained in the laboratory for a minimum of two years after the life of the equipment or indefinitely. A recommended inspection schedule includes:  Plumbed eyewashes (attached to sinks or installed as “stand-alone” stations) should be flushed weekly.  Self-contained eyewash units should be visually examined weekly.  Sealed portable eyewash bottles should be inspected monthly for signs of contamination and replaced prior to expiration or as required by the manufacturer.  Refillable portable eyewash bottles should be cleaned and refilled weekly or as required by the manufacturer.  Emergency showers/drench hoses should be flushed weekly (preferred) but no less often than once per month, if applicable.  Fire extinguishers should be inspected monthly to ensure proper charge and recharged as required by local standards or the manufacturer’s requirements, if applicable. In addition, laboratories should make sure that access to fire extinguishers is not blocked, extinguishers are not damaged, seals are in place, nameplates are readable, and dates of inspection are documented.  Sharps containers should be inspected daily and replaced when three-fourths full.  Smoke detector inspections should follow manufacturer’s guidelines.  Specifies the time intervals for safety audits and that they should be performed in accordance with the requirements documented in the laboratory Safety Manual.  Outlines the specifications for Fire hose, fire blanket and fire extinguisher checks.  Explains the procedure for the repair of safety equipment including the documentation of repair and the corrective action.  Includes the specifications for training on emergency equipment: Any employee or student coming in contact with any hazardous material shall receive appropriate training during orientation and annually thereafter. Training documents should be retained in the employee’s training file. |
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| **CHEMICAL SAFETY** |
| The SOP contains the following information in regards to chemical safety:  Describe the laboratory policy for chemical hazards.  Material Safety Data Sheets (MSDS) for all chemicals used in the lab must be readily accessible to all personnel.  Train personnel to recognize potential hazards in the workplace and proper procedures for handling hazardous substances.  Prepare a list of potentially hazardous chemical used in the lab. Review and update this list at least annually.  The SOP should also include information on the following aspects of chemical safety  The classification of chemicals  Appropriate labeling of chemicals.  Chemical Storage (Including flammables and corrosives chemicals if used by the laboratory)  Procedure for handling chemical spills  If the laboratory uses the following substances, include the policy for usage, storage and disposal.  Mercury  Liquid nitrogen  Dry ice  Radioisotopes  Carcinogens |
| Comments: |

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| **WASTE MANAGEMENT** |
| **Waste Segregation and Safety Precautions** |
| The SOP includes the following information pertaining to waste management:  Use Standard Precautions when handling any type of waste.  Use clearly labeled containers for each type of waste.  Use appropriate type of Personal Protective Equipment (PPE) when handling any type of waste.  Include definitions of major types of waste as part of the procedure (Non-hazardous. Biohazardous, sharps, chemical, and Radioactive waste). |
| Comments: |
| **Sharps Disposal** |
| The SOP includes the following information pertaining to sharps:  Dispose of sharps in designated rigid, plastic puncture resistant containers that are labeled with the universal biohazard symbol.  Items considered as sharps are needles, glass tubes, syringes,scalpels, glass tubes and Pasteur pipettes  Fill sharps containers to no more than ¾ full.  Do not discard sharps waste in the biohazardous waste containers. |
| Comments: |
| **Biohazard Waste** |
| The SOP includes the following information pertaining to biohazard waste:  All other (non-sharp) biohazard waste should be disposed of in designated biohazard bags (usually red) that are clearly marked with the universal biohazard symbol.  Sharps should not be disposed of in the biohazard waste containers  Fill the container to no more than ¾ full  Seal closed with autoclave tape and autoclave waste in accordance with the Autoclave operation procedure. |
| Comments: |
| **Glass Disposal** |
| The SOP includes the following information pertaining to glass disposal:  All glass containers not containing a hazardous chemical and not contaminated by blood, body fluids or infectious agents is considered unregulated waste may be drained and discarded in appropriately marked “Glass Only” containers.  All glass contaminated by chemicals or blood and body fluids must be disposed of in an approved sharps container. |
| Comments: |
| **Storage and Transportation** |
| The SOP includes the following information pertaining to storage and transportation of waste:  The storage area will be posted prominently with the universal biohazard symbol.  Waste storage time should be minimized and ideally should not exceed 7 days.  Display the universal biohazard symbol prominently on regulated waste transport containers  Waste transport containers should be leak proof  Retain records of waste disposal. |
| Comments: |

References:

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2. CLSI. Clinical Laboratory Waste Management; Approved Guideline—Third Edition. CLSI document GP05-A3. Wayne, PA: Clinical and Laboratory Standards Institute; 2011.
3. CLSI. Clinical Laboratory Safety; Approved Guideline—Third Edition. CLSI document GP17-A3. Wayne, PA: Clinical and Laboratory Standards Institute; 2012.
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5. College of American Pathologists (CAP) 2023. Commission on Laboratory Accreditation, Laboratory Accreditation Program; Laboratory General Checklist, Revised 8/24/2023.
6. CDC-NIH U.S. Department of Health and Human Services. Biosafety in Microbiological and Biomedical Laboratories, June 2020, 6th Edition. (HHS Publication No. (CDC) 300859).
7. Occupational exposure to hazardous chemicals in laboratories, OSHA laboratory standards. 29CFR1910.1450.
8. Portable Fire Extinguishers, OSHA laboratory standards 29CFR 1910.157
9. Centers for Disease Control and Prevention. Infection Control in Healthcare Personnel: Infrastructure and Routine Practices for Occupational Infection Prevention and Control Services. 2019.