November 2020

Laboratory Safety Survey Guidance Document

General safety

Housekeeping
Maintaining a clean and orderly workplace reduces the risk for work-related accidents (e.g. slips, trips, falls, etc.), injuries (e.g. cuts, needle sticks), and exposures (e.g. surface and equipment contamination). Additionally, organization and routine cleaning practices reduce the potential for sample, culture, and stock contamination.

Food or Drink in the Laboratory
HSC policy prohibits storage and consumption of food and drink within laboratories.

Safety Signage at Entrance
According to NFPA 400.6.1 8.1.3, posting of appropriate safety signs near the entry doors to our campus laboratories ensures both HSC personnel and emergency responders are aware of the hazardous materials stored and utilized in these areas. These provided safety signs shall not be obscured, shall be legible, and shall not be removed. They should have updated personnel and contact info at all times.

Safety Showers/Eye Washes Clearance
In the event of an emergency, functional and verified safety showers and eye washes must be readily available to all laboratory personnel. These may be located directly in the laboratory or within the hallway corridor. According to the ANSI Standard and the Americans with Disability Act (ADA), safety showers/eye washes must have at least 36” of clearance to allow immediate access and use at all times.

Fabric Chairs in Laboratory
According to the Biosafety in Microbiological and Biomedical Laboratories 5th Edition, laboratories are designed to be easily cleaned and decontaminated, including chairs. Chairs used in laboratory areas must be made of non-porous material that can be easily cleaned and decontaminated with appropriate disinfectant.

Fire Extinguisher Compliant
Fire extinguisher is available, mounted, clearly marked, charged with appropriate safety pins and seals

Fire Sprinklered Rooms - 18” Ceiling Clearance
No object may be stored within 18 inches of any fire suppression fixtures. This 18-inch clearance ensures compliance with NFPA 13.8.5.5.2.1.

Appropriate Personal Protective Equipment (PPE) Available
According to Texas Health and Safety Code Title 6 Subtitle D Chapter 502.0017(b) and the HSC Biosafety and Chemical Safety Manuals, principal investigators and department supervisors are required to provide employees and students with appropriate PPE. The minimal PPE required when working in research laboratories: gloves, lab coats, and eye protection.

Laboratory Personnel Wearing Personal Protective Equipment (PPE)
According to the HSC Biosafety and Chemical Safety Manuals, laboratory personnel must wear, at a minimum, a laboratory coat, gloves, and eye protection when engaged in any laboratory research activities (e.g. lab bench, fume hood, tissue culture hood, microscope station, etc.). Additional PPE (e.g. respirators, cryo-gloves, etc.) may be required based on the workplace, the hazard, and/or how the hazard is manipulated (e.g. aerosol production, etc.).

Personnel Attire Not Appropriate for Laboratory Operations
According to the HSC Biosafety and Chemical Safety Manuals, laboratory personnel must wear clothing appropriate for the workplace. Personnel must ensure pants or skirts/dresses cover the legs down to the ankles and shoes cover the complete foot up to the ankle.

Laboratory Personnel Wearing HSC Badges
HSC identification badges provided by the institution must be worn in a readily visible location at all times while on campus.

Compressed Gas Cylinders
According to NFPA 55 regulations, all gas cylinders must be secured and also capped when not in use.

Equipment to Promote Proper Laboratory Hygiene Available
According to the HSC Biosafety Manual, the Biosafety in Microbiological and Biomedical Laboratories 5th Edition, and the Bloodborne Pathogen 29 CFR 1910.1030, in BSL-1 and BSL-2 laboratories where sinks are present, a sink must be identified for hand washing. Personnel must have access to liquid handwashing soap to facilitate proper handwashing following the removal of gloves and prior to leaving the lab. Hand sanitizer must be available in BSL-2 laboratories that do not have sinks.

Ceilings/Walls Intact
No penetrations in the floors, walls, or ceiling/all ceiling tiles in place.

Plumbing Fixtures
Leaking faucets and drain lines can create an opportune environment for bacteria and mold to grow, increasing the risk for unwarranted exposures. Additionally, the presence of water can create a slip/trip/fall hazard. Please contact Facilities to evaluate any potential leaking pipes or drains.

Adequate Lighting
Poor lighting can create a hazardous working environment by limiting what personnel are able to see; therefore, it is important for all light fixtures to be working properly. Please contact Facilities to replace or repair nonfunctional light fixtures.

Egress Pathways: According to the NFPA and the ADA, a minimum of three feet (36”) must be maintained in walkways for proper egress during emergencies. All items must be kept to a minimum within laboratory bench bays, hallways, and walkways.

Electrical Panels
According to OSHA and NFPA standards, electrical panels cannot be blocked. Please remove the obstruction.

Appropriate Use of Power Strips (relocatable power taps)
The inappropriate use, overloading, and daisy-chaining of power strips/surge protectors can cause electrical fires. According to the National Electric Code and OSHA, power strips cannot be used as a substitute for fixed wiring structures (e.g., the use of a power strip as an extension cord is not allowed). Additionally, power strips and extension cords cannot run under doorways, through ceiling tiles, or along walkways and must be in good working order.

Emergency Shutoff Devices
According to the HSC Chemical Safety Manual, emergency shutoff valves must be visible, readily accessible, and capable of being reached quickly for operation without removing obstacles.

UV Light Safety Sign
Ceiling-mounted UV light systems used to decontaminate laboratory surfaces pose a significant exposure risk to personnel who may enter the room when these systems are active. To inform personnel that a location has a ceiling-mounted UV light system and to warn personnel to not enter the room when UV lights are active, safety signage must be posted. Safety can provide safety signage upon request.

Air Balancing Correct
If the room is BSL-1, BSL2, or BSL-2+ is the room negative to the hallway. For specific animal/procedure rooms in the DLAM is the room positive to the hallway.

Chemical Safety

Hazardous Chemical Inventory Maintained
According to Texas Hazardous Communications Act, all laboratories are required to maintain a real-time inventory of stored hazardous chemicals within each room and keep the list posted at the entrance.

Chemicals Properly Labeled
According to the Texas Health and Safety Code Title 6 Subtitle D Chapter 502 Section 502.007, labels on stock containers of hazardous chemicals must not be removed or defaced and must conform to the OSHA standard. Secondary containers must be labeled with at least the identity appearing on the Safety Data Sheet (SDS) and the appropriate hazard warnings.

Old Peroxide-Forming Chemicals
According to the HSC Chemical Safety Manual, many chemicals form potentially explosive peroxides upon storage. It is best-practice to date these chemicals when they are first received and when opened. Please contact the Safety Program at safety@unthsc.edu for assistance.

Flammables Stored in Flammable Cabinet
According to NFPA 45 rules, all flammable liquids not immediately in use must be stored in a flammable cabinet that meets the construction design in NFPA 30 (2000).

Proper Segregation of Hazardous Chemicals
According to NFPA regulations, all hazardous chemicals must be stored according to their hazard classification. Please separate hazardous chemicals accordingly. For more information, please refer to the HSC Chemical Safety Manual.

- ***Oxidizers:*** Oxidizers must be stored separately from flammable liquids and reducing agents, and cannot be stored on wooden shelves. Oxidizers, with the exception of nitric and perchloric acids also cannot be stored with corrosives. Please store oxidizers separately from incompatible chemical classes and in a proper cabinet (metal, plastic, or resin).
- ***Corrosives:*** Corrosives must be stored separately from flammable liquids and oxidizers. Additionally, acids and bases must be physically segregated from each other (in separate storage bins) if they are kept in the same cabinet. Please store corrosives separately from incompatible chemical classes and ensure acids and bases are physically separated.

- ***Nitric and Perchloric Acid:*** Nitric and perchloric acids are oxidizers which, like other oxidizers, cannot be stored with flammable liquids or reducing agents and cannot be stored on wooden shelves; however, they can be stored alongside standard corrosives unlike other oxidizers. Nitric and perchloric acid must be stored within plastic secondary containers to prevent further incidents in case of a spill or leak. Please store nitric and perchloric acid separately from incompatible chemical classes, in a proper cabinet (metal, plastic, or resin), and within secondary containment.

Hazardous Waste Containment
According to the HSC Chemical Safety Manual, all waste containers storing hazardous waste must be stored in secondary containment. Secondary containment must have sufficient holding capacity to contain the entire contents of the largest waste container.

Reuse of Chemical Containers for Hazardous Waste
Empty chemical containers can be reused to collect hazardous waste if the containers are compliant with EPA regulations. Hazardous waste chemicals collected must be compatible with the container itself and with any remaining residuals of the original product. Laboratory personnel must deface the original product label and mark the container with the words “Hazardous Waste” plus the container contents.

Hazardous Waste Containers Capped
According to EPA regulations, all containers containing hazardous waste must be capped at all times except when hazardous waste is being added to or removed from the containers.

Glass waste box
Glass waste boxes must only contain glass, not be overfilled, or over the boxes maximum weight.

Chemical Spill Kit

According to the HSC Chemical Safety Manual, all contiguous laboratory areas that utilize hazardous chemical materials must have a chemical spill kit. The spill kit contents must include materials capable of absorbing, neutralizing, and inactivating hazardous materials in the event of a spill. The location of the spill kit must be labeled and unobstructed. Many vendors like Fischer & Sigma sell complete kits, but a low cost kit can be easily assembled. Minimum requirements for a spill kit: Sodium Bicarb, citric acid (powder), gloves, goggles, hand broom, and dust pan all in a box or bucket labeled spill kit.

Chemical Fume Hood Free of Excessive Storage
According to the HSC Chemical Safety Manual, storing excessive amounts of chemicals, waste included, or equipment inside the fume hood may restrict the airflow required for proper function.

Chemical Fume Hood Annual Verification
The Office of EH&S verifies fume hoods on an annual basis. If a fume hood fails verification a warning sign explaining why the fume hood failed verification will be placed on the fume hood sash. **The Office EH&S will contact Facilities to re-evaluate the unit airflow, and will re-test the unit.**

Biological Safety

Biosafety Cabinet (BSC) Certification
According to the HSC Biosafety Manual and OSHA 29 CFR 1910.01030(e)(2)(iii)(B), biosafety cabinets must be certified annually according to the NSF 49 Standard. Biosafety cabinets must also be certified when installed, moved, or repaired.

Biosafety Cabinet (BSC) Work Surfaces
According to the HSC Biosafety Manual and the Biosafety in Microbiological and Biomedical Laboratories 5th Edition, to reduce the potential for spills and exposures, all BSC work surfaces and sub surfaces must be routinely decontaminated, cleaned, and free of excessive storage.

Biosafety Level 2 (BSL-2) Laboratory Doors Remain Closed (Tissue Culture Room)
According to the HSC Biosafety Manual and the Biosafety in Microbiological and Biomedical Laboratories 5th Edition, access to a BSL-2 laboratory must be restricted and the door must remain closed.

Biosafety Level 2 (BSL-2) Laboratory Door Sign (Tissue Culture Room)
According to the HSC Biosafety Manual and the Biosafety in Microbiological and Biomedical Laboratories 5th Edition, a Biohazard Door Sign must be posted on all entry doors to BSL-2 laboratories listing the BSL-2 agent and PPE required for entry.

Medical Waste Properly Managed
According to the HSC Biosafety Manual, all medical waste (e.g., bulk unprocessed human and animal tissue) must be properly packaged and stored prior to collection. Please correct the following items:

- **Medical waste boxes/bags:** Laboratory personnel must use The Office of EH&S-provided medical waste boxes and bags to hold solid medical waste.
- **Filling medical waste boxes/bags:** When 75% full, medical waste bags must be tied shut by laboratory personnel, placed in the provided medical waste box, and the box must be properly closed prior to onsite storage.
- **Medical waste storage:** Laboratory personnel should promptly submit a medical waste pick-up request following the generation of a full medical waste box.
- **Medical waste storage in public hallways:** At no time should medical waste be stored in public hallways.

Autoclave Waste Properly Managed
According to the HSC Autoclave Use and Verification Manual, all autoclave waste must be properly packaged, stored, and treated prior to disposal. Please correct the following items:

- **Autoclave waste containers:** Autoclave waste containers selected to hold solid biological waste must be composed of autoclave-safe material and leak-proof.
- **Autoclave waste bags:** To ensure the proper treatment and disposition of autoclave waste**,** appropriate autoclave waste bags must be used. Bags used for autoclave waste must be marked for autoclave treatment and be orange or translucent. At no time can red bags be used for onsite autoclave waste treatment.
- **Filling autoclave waste bags:** When 75% full, autoclave waste bags must be sealed by laboratory personnel prior to autoclave treatment.
- **Autoclave waste bag storage:** When autoclaves are not immediately available, biological waste must be properly stored until an autoclave is available. Laboratory personnel must place sealed autoclave waste bags in autoclavable bins, store the waste in areas under their control, and ensure the waste is promptly treated when an autoclave becomes available.
- **Autoclave waste storage in public hallways:** At no time should autoclave waste be stored in public hallways.

Sharps Properly Managed
According to TCEQ and the HSC Biosafety Manual, sharps must be properly managed in all laboratory areas.

- ***Metal Sharps*:** This includes needles and blades. Place in a commercially purchased sharps container. These must be provided by each laboratory. Never attempt to retrieve items from a sharps container. Do not place sharps in plastic bags or other non-sharps containers.
- ***Plastic Sharps*:** This includes plastic disposable pipettes and pipette tips that have not been in contact with any biological material or any chemical hazard. Place in a sturdy cardboard box lined with a plastic bag. Once full, seal securely and label "TRASH".
- ***Overfilled sharps container:*** Under no circumstances can sharps containers be filled passed their marked fill line or 75% of the containers capacity.

Aspiration Flasks in Secondary Containment
According to the HSC Biosafety Manual, aspiration flasks stored on the floor must be in secondary containment. This secondary containment must have sufficient holding capacity to contain the entire contents of the flask.

Aspiration Flasks/Tubing Properly Managed
According to the HSC Biosafety Manual, aspiration flasks and associated tubing must be maintained to prevent the growth of mold and other biological contaminants.

Aspiration Flasks Properly Labeled
Aspiration flasks used to collect liquids from infectious cultures must be properly labeled with the word "waste" and a biohazard sticker.

House Vacuum System Protection
According to the HSC Biosafety and Chemical Safety Manuals, a Polytetrafluoroethylene (PTFE) 0.45µm in-line disk filter, or equivalent, must be attached in line with the vacuum spigot to prevent house line contamination. This includes all aspiration flasks. VacuGuards containing PTFE filters can be purchased through many different vendors, a few of which are: Tisch Scientific part # 6720-5045, Sigma part # WHA67225000, and at Fischer part # 09-744-76.

Centrifuges Properly Maintained
According to the HSC Biosafety Manual, clean centrifuges reduce the risk of exposure. Spills or leaks that have previously occurred within a centrifuge can later become aerosolized leading to exposure.

Incubators Properly Maintained
According to the HSC Biosafety Manual, clean incubators reduce the risk of exposure. Spills or leaks that have previously occurred within an incubator can lead to uncontrolled growth of mold, bacteria, and fungi.

Proper Surface and Equipment Disinfectants Available: According to the HSC Biosafety Manual and the Biosafety in Microbiological and Biomedical Laboratories 5th Edition, the proper use of disinfectants will reduce biological contamination on laboratory surfaces, equipment, and reusable supplies. By reducing this contamination, the risk of exposure is reduced. Common laboratory disinfectants include alcohols, bleach, and quaternary ammonium compounds.

Biological Spill Materials: According to the HSC Biosafety Manual, biological spill materials must be present to all contiguous laboratory areas that utilize biological materials. The spill material contents must include materials capable of absorbing, neutralizing, and inactivating biological materials in the event of a spill.

Active Water Baths Properly Maintained
According to the HSC Biosafety Manual, water baths in use must have a sufficient amount of water to prevent the basin from drying out.

Inactive Water Baths Properly Maintained
According to the HSC Biosafety Manual, water baths with dry basins must be unplugged.

Hazardous Chemicals Stored in a Cold Room
According to the HSC Chemical Safety Manual, hazardous chemicals cannot be stored in an environmental room (i.e., warm/cold rooms). Hazardous chemicals may be utilized in small quantities for experimental procedures in environmental rooms.

Mold Present in Environmental Rooms
According to the HSC Biosafety Manual, preventing the unintentional growth of mold in environmental rooms (i.e., cold/warm rooms) is essential to protecting research personnel, equipment, and supplies. When mold infestation is severe, room decontamination should be considered.

Shaking Incubator Flask Holders/Clamps Properly Maintained:

materials, damage circulating shakers, and contaminate surfaces and warm rooms. Please inform staff members to properly secure flask clamps to the incubator's circulating stage and to utilize the appropriate clamps for each flasks size.

Recommendation for Proper Storage in Environmental Rooms (i.e. Cold/Warm Rooms)
Paper based products (e.g. cardboard) and porous materials (e.g. Styrofoam) can harbor and facilitate the growth of mold. The storage of these materials in environmental rooms can lead to mold infestations which can contaminant experiments and exposure personnel. The Office of EH&S recommends the removal of these materials from the identified environmental rooms.

- **Note:** Manufacturer-supplied cardboard boxes, designed for cold storage, can be stored in cold rooms and refrigerators. These boxes have special coatings that will delay the growth ofmold.

Recommendations for Labeling Equipment with Biohazard Stickers: Labeling laboratory equipment utilized to cultivate, manipulate, and store infectious agents or materials ensures laboratory personnel are aware that this equipment may harbor these agents or materials.

- **Note:** Laboratory equipment identified for the above purpose was not labeled with biohazard stickers.