UA LITTLE ROCK



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Laboratory Safety Manual

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Thank you for taking the time to review Environmental Health & Safety's (EH&S) Laboratory Safety Manual. Our hope with this manual is to provide general operating guidelines in the areas of laboratory safety to assist in reducing and/or eliminating risk in the laboratory.

Much, if not most of this information can be found in Occupational Safety and Health Administration (OSHA), American National Standards Institute (ANSI), and other universal workplace standards and requirements. All faculty and staff on the UA Little Rock campus should maintain compliance with OSHA standards for lab safety. This document does not supersede, nor take the place of federal standards and guidelines, but only serves as a helpful guide in each of the covered areas.

If you cannot find a safety resource, please feel free to contact EH&S at (501) 916-6351 or ehs@ualr.edu.

AUTOCLAVES

Autoclaves are used in many areas to sterilize materials. Specific manufacturer operational manuals and guidelines should ALWAYS be referenced to provide applicable training and qualification for the safe operation of equipment. Principal Investigators or Lab Managers are responsible for providing instruction and demonstrating safe use of equipment to laboratory workers. Instruction should cover operating procedures written by the manufacturer and/or laboratory, as well as the associated hazards, the correct personal protective equipment (lab coats, gloves, and eye protection), and applicable emergency procedures.

However, that does not eliminate the user's responsibility to become familiar with both any applicable OSHA standards, as well as the manufacturer's operation and safety requirements specific for each piece of equipment. These additional safety guidelines outline any additional UALR recommendations for the safe use of equipment. For more information concerning operational procedures, ask your equipment supplier, vendor, and/or lab manager for assistance.

Due to the high heat and pressure created in autoclaves during operation and to prevent electrical shock and avoid some of the dangers of heating equipment, especially with open flames, use the following precautions for safety operating the equipment:

Best Safety Practices

1. Do not use an autoclave unless you have received specific operation instructions or are working under the direct supervision of an experienced autoclave worker.
2. Read and follow the recommendations made by the manufacturer in the owner's manual.
3. Ensure regular maintenance of autoclaves and ancillary equipment in accordance with the manufacturer's specifications
4. Use only those types of containers, bags, and lids that are designed for autoclaving.
5. Do not autoclave flammable liquids.
6. Report all malfunctions to your supervisor and conspicuously tag the equipment as "Out-of-Service."
7. Do not stack or store combustible materials next to an autoclave (cardboard, plastic, volatile or flammable liquids).
8. Wear eye protection and insulated gloves or mitts, while handing potentially hot items.
9. Burns can result from physical contact with the structure of the autoclave and steam burns can occur from contact with steam leaving the apparatus. Burns can also result from careless handling of vessels containing hot liquids.
10. Explosive breakage of glass vessels during opening and unloading as a result of temperature stresses can lead to mechanical injury, cuts, and burns.

Remember, hazardous waste and ionizing radiation regulations pertain to autoclaved waste as well, so it is imperative to consult with EH&S if your run contained any agars or other materials that may contain a regulated substance (e.g., heavy metal such as Pb, Hg, Ag, Se, Ba, As, Cd, Cr, or other potentially toxic constituent). Consult with EH&S prior to autoclaving radioactive materials.

Autoclaves that generate their own steam (e.g., not fed by central or building steam units) may be considered "boilers" under State Law and must have an annual boiler inspection/certification. The current certificate must be readily available. Facilities Management coordinates all boiler inspections. Contact EH&S to find out if your system requires state certification.

Disposal of Autoclaved Waste

Liquids that have been autoclaved may be poured down the sink if all chemical components are listed on the sewer disposal list. If the liquid contains chemicals that are not approved for sewer disposal, the vessel must be tagged for pick-up by EH&S.

Non-toxic solids that do not contain any chemical constituents that are regulated under the hazardous waste laws or radioactive material may be disposed in the regular trash following autoclaving and demarcation. Ensure the biohazard symbol has been completely obliterated, or secondarily contain the autoclaved material in a black trash bag. If any free liquids (i.e., condensate) are present, add sufficient absorbent to the bag. Tag autoclaved toxic and/or potentially regulated solids for collection by EH&S. Any medical waste that has been autoclaved must be labeled as "Treated Biohazardous/or Infectious/or Medical Waste" before disposing of it in the normal waste stream.

***Sample** Autoclave Log*

Autoclave logs must be kept for each autoclave for at least three years. Please refer to the Sample Autoclave Log as an example.

BIOHAZARDOUS MATERIAL DISPOSAL

For the purposes of this Manual, the term "biohazard" is applied to any waste material that is potentially infectious to humans or animals, genetically-modified organisms (including plants), or materials that contain or have come in contact with rDNA. General guidance as well as classes of biohazardous materials and their associated appropriate methods of disposal are described below.

General Guidance

1. Biohazardous waste that is managed through EH&S for off-site treatment must be accumulated in specific containers. Contact EH&S for additional information.
2. Biohazardous waste that is autoclaved on-site to render it non-infectious must have autoclave tape affixed to the container prior to treatment.
3. Biohazard labels and markings must be obliterated following treatment and prior to disposal.
4. Shredded red-bags must be placed in unmarked outer bags that are not see-through following autoclaving.
5. Any biohazardous waste that has been autoclaved must be labeled as "Treated Biohazardous/or Infectious/or Medical Waste" before disposing of it in the normal waste stream. All liquids must be absorbed into a solid media prior to placement in refuse containers or they may be disposed via the sanitary sewer. Sewer disposal is limited to nutrient medias that are otherwise non-hazardous (do not contain chemical constituents regulated under hazardous waste laws, such as heavy metals, solvents, etc.).

6. Biohazardous waste containing BSL-2 organisms or rDNA must be decontaminated in autoclaves or through other approved procedures.
7. Do not use red biohazard bags for any type of waste collection other than biohazardous waste (i.e., regular trash, radioactive materials not contaminated with biohazards).

Specific Waste Types

1. *Human blood and other potentially infectious body fluids* and contaminated materials must be treated prior to disposal as solid waste refuse. In some cases, waste can be collected by EH&S and delivered to Health Services for disposal by a contracted vendor. On-site treatment can be accomplished by autoclaving or approved chemical treatment.
2. *Laboratory waste from infectious agents* (e.g., rDNA, culture plates, and broths) must be autoclaved prior to disposal. Chemical disinfection is generally suitable for contaminated disposable and non-disposable laboratory equipment and consumables (e.g., pipette tips, glass, cuvettes, etc.).
3. *Diagnostic specimen shipping containers*, if contaminated, must be treated by autoclaving or chemical treatment prior to disposal.
4. *Sharps* include glass, pipette tips, razor blades, needles, and other objects that can penetrate the skin. Sharps potentially contaminated with bloodborne pathogens, or other potentially infectious materials or with human tissues, must be accumulated in rigid, leak-proof, labeled, containers specifically designed for use with bloodborne pathogens and purchased from a commercial supplier. See Sharps Handling and Disposing.
5. *Sharps* contaminated with other biohazards must be autoclaved or chemically disinfected prior to disposal. If accumulated prior to treatment, these types of sharps are to be collected in rigid, leak-proof, labeled containers. The word “Sharps” must be visible on the container.

BIOLOGICAL AEROSOLS

World-wide, there are many documented cases of laboratory-acquired infections resulting from the production and inhalation of infectious aerosols. If adequate precautions are not taken, aerosol production can occur when using laboratory equipment, even when the equipment is used properly and under normal conditions.

Specific manufacturer operational manuals and guidelines should ALWAYS be referenced to provide applicable training and qualification for the safe operation of equipment. Principal Investigators or Lab Managers are responsible for providing instruction and demonstrating safe use of equipment to laboratory workers. Instruction should cover operating procedures written by the manufacturer and/or laboratory, as well as the associated hazards, the correct personal protective equipment (e.g., lab coats, gloves, eye protection, etc.), and applicable emergency procedures.

However, that does not eliminate the user’s responsibility to become familiar with both any applicable OSHA standards, as well as the manufacturer’s operation and safety requirements specific for each piece of equipment. These additional safety guidelines outline any additional UALR recommendations for the safe use of equipment. For more information concerning operational procedures, ask your equipment supplier, vendor, and/or lab manager for assistance.

To help avoid the production of bioaerosols, use the general precautions for safety operating lab equipment:

Best Safety Practices

1. Use unbreakable tubes, not glass.
2. Avoid overfilling.

3. When possible, operate equipment and/or perform operations in a biological safety cabinet.
4. Do not open the lid during or immediately after operation. Allow the centrifuge to come to a complete stop and wait at least 30 minutes before opening. This allows time for aerosols to settle if leakage or breakage occurred during the centrifugation run.
5. Never exceed guidelines specified in the owner's manual.
6. Disinfect and decontaminate all surfaces before and after use.
7. When possible, install the equipment in an enclosed, specially ventilated area that discharges air from the space through a HEPA filter.
8. Check the condition of the equipment routinely for deterioration.
9. **Do not** use domestic (kitchen) equipment.

BIOSAFETY LABORATORY SECURITY

Laboratory security is an integral part of an effective biosafety program. Bio-security goals include preventing loss or contamination of valuable teaching and research materials and/or related sensitive information; preventing release of potentially harmful organisms into the environment; preventing accidental exposure to faculty, staff, students, and visitors; and reducing the risk of theft of biohazardous material for the purposes of hurting or threatening others.

Principal Investigators or Lab Managers are responsible for providing instruction and demonstrating laboratory safety and security to laboratory workers. Instruction should cover security procedures, equipment operating procedures written by the manufacturer and/or laboratory, as well as the associated hazards, the correct personal protective equipment (e.g., lab coats, gloves, eye protection, etc.), and applicable emergency procedures.

These general safety guidelines are recommended for all UA Little Rock laboratories, but especially for any utilizing recombinant DNA projects in a Biosafety Level 2 (BSL-2).

Note: Where applicable and possible, security measures should also be followed during analogous field research projects.

Best Security Practices

1. Employees, as day-to-day occupants of laboratories, provide the first line of laboratory security.
2. Laboratory access should be restricted to those with a need; the PI is responsible to determine who will be granted access rights.
3. Keep laboratory doors closed. This protects experiments from contamination and discourages individuals from wandering into the room. Lock the doors when the room is unoccupied.
4. Keep stocks of organisms locked during off hours and when not attended by laboratory personnel. Freezers and refrigerators in corridors are particularly susceptible to access, so they need to be locked at all times.
5. Do not leave keys or access cards in open or accessible areas. Do not disclose access codes or loan keys to other personnel. Limit the number of persons with access rights to the minimum required to conduct the work in an efficient manner.
6. Ask strangers (someone you do not recognize as a co-worker or support staff person) to exit the room if they are not authorized to be there. Laboratories are off limits to non-authorized persons when research is being conducted. If necessary, call the UA Little Rock Department of Public Safety for assistance or to report unusual occurrences.
7. Discuss how to handle strangers beforehand so that your response is proper and effective. The UA Little Rock Department of Public Safety can provide training and additional information upon request.

8. Know the building schedule for locking doors. If strangers are present in the building after it has been secured, call the UA Little Rock Department of Public Safety.
9. Visually inspect all packages of biohazardous materials arriving at the work area and open them within a biological safety cabinet. If stains are present on the package, the package is unexpected, or the package is damaged, isolate and secure the package, do not open it, and call EH&S. Out-going packages must be prepared in accordance with transport regulations and offered only by personnel who have completed shipping training within the past two years (Designated Shippers).
10. Keep an accurate record of stocks and cultures, project materials, growth media, and those equipment items that support project activities. Track and account for any missing organisms or other items. Discuss any discrepancies with the lab supervisor and other lab employees, including future measures that will be taken to prevent loss of these items. Report losses to the UA Little Rock Department of Public Safety and the Biosafety Officer/ EH&S.
11. Contaminated research waste items must be autoclaved before disposal. Also, ensure that autoclave areas are monitored. If possible, take autoclave bags to the outside waste container early in the day to ensure same- day pickup. Keeping biological support materials out of the waste containers overnight is a way to prevent access to these items.
12. When research is completed for the day, ensure that all biological materials have been properly stored and secured. Lock all laboratory doors.

For additional security measures that may also be appropriate based on one's research or organism specific considerations, consult with the Institutional Biosafety Committee, and/or review the Biological Safety Manual.

CHEMICAL FUME HOODS

Laboratory fume hoods are used to prevent harmful exposure to hazardous substances. Specific fume hood manufacturer operational manuals and guidelines should ALWAYS be referenced to provide applicable training and qualification for the safe operation of equipment. Principal Investigators or Lab Managers are responsible for providing instruction and demonstrating safe use of equipment to laboratory workers. Instruction should cover operating procedures written by the manufacturer and/or laboratory, as well as the associated hazards, the correct personal protective equipment (e.g., lab coats, gloves, eye protection, etc.), and applicable emergency procedures.

However, that does not eliminate the user's responsibility to become familiar with both any applicable OSHA standards, as well as the manufacturer's operation and safety requirements specific for each piece of equipment. These additional safety guidelines outline any additional UALR recommendations for the safe use of equipment. For more information concerning operational procedures, ask your equipment supplier, vendor, and/or lab manager for assistance.

Note: This section does not apply to biosafety cabinets or other exhausted enclosures.

Best Safety Practices

Laboratory fume hood performance can also be compromised by the following factors, thus ensure:

1. Sashes are closed when possible during research activity, which increases the hood's functional effectiveness.
1. Equipment is not blocking airflow to slots in baffle.
2. Equipment is not placed within 6" from the plane of the fume hood face.
3. Fume hood sashes or panels are replaced after equipment setup completed.

4. Cross drafts are minimized. These may be caused by ventilation supply ducts, personnel traffic, or blowers/exhaust related to nearby equipment.
5. Exhaust dampers are adjusted correctly.
6. That you avoid leaning into the fume hood
7. There are no leaks in exhaust ducting.
8. The fume hood fan is not turned off during use.
9. That you stop using and immediately notify EH&S if the low flow alarm is continuously activated on any fume hood (typically when the average face velocity drops below 80 feet per minute).
10. That you avoid using any fume hood with a red "DO NOT USE" sticker (see example to right) affixed anywhere on the hood, but commonly found to the left of the sash.

    A. If fume hood appears to have failed certification due to improper hood use/ setup (e.g., equipment blocking baffles), communicate to the Laboratory Manager for correction prior to any retesting.
    B. If fume hood appears to have failed certification due to mechanical deficiencies, immediately contact EH&S to initiate repairs to reduce hood downtime
11. That the fume hood has been tested and certified for use by EH&S. This is signified by an attached yellow "Approval" sticker (commonly found to the left of the sash). Click here to view Fume Hood Certification Protocols.



COMPRESSED GAS CYLINDERS

Compressed gas cylinders used on the UA Little Rock campus should maintain compliance with Occupational Safety and Health Administration (OSHA) standards governing the use of compressed gases in the workplace (29 CFR, Parts 1910.101 through 1910.105). Everyone who uses and works around compressed gas cylinders has the individual responsibility to become familiar with both any applicable OSHA standards, as well as the manufacturer's operation and safety requirements. These additional guidelines outline any additional UALR recommendations for the safe use of compressed gas cylinders, and serve as a safety-related guide only. For more information concerning operational procedures, ask your equipment supplier, vendor, and/or lab manager for assistance.

Depending on the particular gas, there is a potential for simultaneous exposure to hazards such as decompression, flammability, explosion, asphyxiation, toxicity, cold burns, and misc. physical hazards. To help reduce the likelihood of encountering these hazards, use the following safety precautions:

1. Ensure cylinder contents are easily identifiable by name (not just by color). If labeling on a cylinder becomes unclear or an attached tag is defaced to the point the contents cannot be identified, the cylinder should be marked "contents unknown" and returned directly to the manufacturer.
2. Ensure the cover cap should be screwed on hand tight and remain on until the cylinder is in place and ready for use. Remove the valve cap only after the cylinder has been safely installed.
3. Do not drop cylinders or otherwise allow them to strike each other.
4. Cylinders should never be rolled or dragged. When moving large cylinders, they should be strapped to a properly designed wheeled cart or hand truck to ensure stability.
5. Never transport a cylinder with a regulator in place. Always protect the valve during transport by replacing the valve cover.

6. Since gas cylinders are tall and narrow, they should be secured in an upright position at all times to prevent tipping. Never lay any cylinders, especially those containing flammable gases, on their sides.
7. Cylinders may be attached to a bench top, individually to the wall, placed in a holding cage, or have a non-slip base attached. Cylinders should be affixed with a bracket to a permanent building fixture such as a bench or wall during use. Brackets that can be screwed into the mounting surface are preferred over clamp-type brackets.
8. Cylinders containing flammable gases such as hydrogen should ***not*** be stored in close proximity to open flames, areas where electrical sparks are generated, or where other sources of ignition may be present.
9. All cylinders containing flammable gases should be stored in a well-ventilated area. If compressed gas cylinders are stored outside, use a well-drained, securely fenced area. Keep them on a level, raised concrete pad or non-combustible rack.
10. Always use safety glasses (preferably a face shield) when handling and using compressed gases, especially when connecting and disconnecting compressed gas regulators and lines.
11. In the event of any emergency involving a compressed gas cylinder, *evacuate the entire building immediately* by sounding the fire alarm, and follow the procedures for general evacuation as outlined in the laboratory's Chemical Hygiene Plan.
12. Under no circumstances will any university employee work with compressed gas cylinders until attending training in the safe use of these devices. Click here to find Compressed Gas Cylinder Training.
13. Further information on compressed gas cylinders may be found at these websites:
    - OSHA 29 CFR 1910.101 (Compressed Gases – General Requirements)
    - OSHA 29 CFR 1910.102 (acetylene)
    - OSHA 29 CFR 1910.103 (hydrogen)
    - National Fire Protection Agency (NFPA) (compressed gas)

DECOMMISSIONING OF LABS

Principal Investigators (PIs), who intend to leave employment at UA Little Rock, relocate to another UA Little Rock assigned space, or remodel an existing laboratory space must ensure that proper decommissioning takes place, as described in this document. PIs are accountable for all items and materials in their area, including research samples, used chemicals, and materials purchased, created, or inherited from former lab occupants, equipment, etc. Departments are responsible for all costs incurred when the decommissioning process is not followed.

The decommissioning process can take significant time to complete and may require coordination of several departments, so advance planning and notification to EH&S is necessary. This section can be used by PIs, laboratory staff, and department administrators as a checklist to assist in a smooth and efficient decommissioning process.

The recommended general timeframe is for the PI (or department) to contact EH&S 60-90 days prior to the laboratory change.

Chemicals

With respect to chemicals that are associated with the laboratory, please do the following:

1. Review all chemical containers (stocks, working solutions, used chemical collection containers) in the laboratory for appropriate labeling, container integrity, and seals/lids. Rectify all deficiencies. The cost for analysis of unknowns will be the responsibility of the PI and/or department.

2. Consult with the chemical stockroom manager in your department to determine disposition of chemicals that you no longer need. DO NOT leave chemicals for use by the next occupant. Tag all used chemical collection containers and remaining unwanted chemical stocks and/or working solutions for collection by EH&S.
3. Do not dispose of unwanted chemicals via the sewer or trash, unless approved in writing and in advance by EH&S. In certain circumstances, EH&S may be able to arrange an alternate procedure for significant quantities of chemicals to avoid the need for tagging individual containers.
4. Transport of chemicals over city streets is subject to dangerous goods/hazardous materials transport regulations, including current training by the person preparing the shipment and registration of the transporter as a hazardous materials transporter.
5. Arrange for pickup of all compressed gas cylinders by the supplier.
6. Notify EH&S if significant quantities (e.g., more than thermometer quantities) of heavy metals. EH&S will investigate with organizing removal.
7. Clean all work surfaces, durable equipment used with chemical agents, fume hoods, storage locations, etc. Notify EH&S if perchloric acid was used in any fume hood.

Open-source Radioactive Material

If the laboratory has been used with open-source radioactive material, please do the following:

1. Tag all radioactive waste for collection by the UA Little Rock Radiation Safety Officer (RSO).
2. Tag all stocks, samples, and sources that contain radioactive materials for collection by the RSO. If you wish to transfer any radioactive material to another laboratory, consult with EH&S & the RSO prior to the transfer so transfer and shipping paperwork can be completed.
3. Following removal of all radioactive waste and inventory, decontaminate all areas where radioactive *materials* were used or stored (including counters, floors where waste containers were stored (sinks, fume hoods, biological safety cabinets, refrigerators, freezers, etc.). Verify the efficacy of the decontamination process with swipe surveys.
4. Decontaminate all durable equipment used with radioactive material and verify the efficacy of the decontamination process with swipe surveys.
5. Survey results of decontaminated areas and equipment must be less than 200 dpm per 100 cm2.
6. Return all radiation laboratory documentation (RSO-8 forms, survey logs, and other associated records) to the RSO.
7. Return all dosimetry (badges and rings) to the RSO.
8. Contact the RSO to complete a decommissioning audit. At the time of the audit, inform EH&S of any equipment which has been used with radioactive material that will be transferred to inventory or another laboratory.

Biological Materials

If the laboratory has been involved in activities with biological materials (e.g., recombinant DNA, human/plant/animal pathogens, diagnostic specimens, biologically-derived toxins, etc.), please do the following:

1. Consult with EH&S prior to conducting any work in preparation for the move. Specific procedures must be followed.
2. Decontaminate all waste materials and unwanted stocks, generally by autoclaving or via UA Little Rock's infectious waste contractor. Dispose of autoclaved materials.
3. Consult with EH&S prior to transport of any viable biological agent. If offering for transport by carrier, the person preparing the shipment must have current dangerous goods/IATA shipment training, the material must be packaged in accordance with DOT/IATA specifications and accompanied by appropriate paperwork, and the transporter must be registered as a transporter of hazardous materials. Other transfer

permitting requirements may also apply (e.g., CDC or APHIS permits) depending on the agent.
4. Following removal of all waste and viable stocks, decontaminate all use (e.g., countertops, floors, sinks, biological safety cabinets, etc.) and storage areas (e.g., refrigerators, freezers, etc.).
5. Decontaminate all durable equipment used with biological agents.
6. Communicate in writing, if applicable, to the UA Little Rock Office of Research and Sponsored Programs to discontinue or modify all approved protocols, as appropriate. If leaving UA Little Rock or discontinuing work under approved protocols, include a description of the final disposition of all biological materials.
7. Contact the UA Little Rock Biosafety Committee for a final walk-through. A representative from the committee will remove agent placards/signage from doors, equipment, etc. at the time of the final walk-through and upon demonstration that decommissioning has been completed.
8. If the laboratory has been involved with live animals, contact the UA Little Rock IACUC for guidance.

ELECTRICAL AND HEATING EQUIPMENT SAFETY

Specific manufacturer operational manuals and guidelines should ALWAYS be referenced to provide applicable training and qualification for the safe operation of electrical equipment (e.g., electrophoresis units, heating mantels, hot plates, drying ovens, etc.). Principal Investigators or Lab Managers are responsible for providing instruction and demonstrating safe use of equipment to laboratory workers. Instruction should cover operating procedures written by the manufacturer and/or laboratory, as well as the associated hazards, the correct personal protective equipment (lab coats, gloves, and eye protection), and applicable emergency.

However, it is always the user's responsibility to become familiar with both any applicable OSHA standards, as well as the manufacturer's operation and safety requirements specific for each piece of equipment. These additional safety guidelines outline any additional UALR recommendations for the safe use of equipment. For more information concerning operational procedures, ask your equipment supplier, vendor, and/or lab manager for assistance.

To prevent electrical shock and avoid some of the dangers of heating equipment, especially with open flames use the following precautions for safety operating the equipment:

Best Safety Practices

1. Avoid unintentional grounding points and conductors (e.g., sinks and other water sources, metal plates, aluminum foil, jewelry, pipes, or other metal equipment).
2. Non-conducting benches (wood or plastic) and floors (and/or rubber mats) are recommended.
3. Do not ignore safety rules just because the voltage is low. Changes in load, equipment failure, or power surges could raise the voltage at any time.
4. Locate the equipment where it will not be easy to knock over or trip on.
5. Do not leave experiments unattended, and always take proper precautions. Fires and explosions can often result from the heating of chemical reaction mixtures. If one must leave heating devices unattended, they should always be protected with overload circuitry and with a temperature-sensing device that will turn the power off in the event of overheating.
6. Do not allow the cords to dangle down the front of the lab bench or out of the fume hood as this can be a snag or trip danger.
7. Burns and other injuries can occur when heating devices are not used properly.
8. Regardless of the type of heating device used, never heat a sealed container

9. Always use the device as intended, especially when used with or near flammable or combustible solvents or materials. Heating devices must be rated/approved for the use and the environment in which it will be used (e.g., flammable or explosive atmospheres, in the presence of combustible dust, indoors or outdoors, etc.).
10. Use thermal gloves or tongs to remove items from their heating units.
11. Use protective eyewear when using ovens, hot plates, or other heating devices.

EMERGENCY EYEWASH & SAFETY SHOWERS

Because the eyes provide a rapid route of entry into the body, OSHA 29 CFR 1910.151 requires that emergency eyewash and shower units be installed in work areas where there is a potential for exposure to the skin or eyes with any hazardous chemical (in addition to corrosives). Thus, in the event of harmful exposure to hazardous substances in one's eye and/or body, emergency eyewash and safety shower units are found strategically located throughout UA Little Rock buildings.

Principal Investigators or Lab Managers are responsible for providing instruction and demonstrating safe use of emergency eyewash and safety showers to laboratory workers. Instruction should cover operating procedures written by the manufacturer and/or laboratory, as well as the associated hazards, and applicable emergency procedures. However, that does not eliminate everyone's responsibility to become familiar with both any applicable OSHA standards, as well as the manufacturer's operation and safety requirements specific for the eyewash and showers. Prior to beginning laboratory work, workers with the potential for chemical exposure (e.g., faculty, students, staff, etc.) should also obtain formal Safety Shower and Eyewash Training on the proper procedure for use during an emergency.

The additional safety guidelines outlined in this section cover UALR recommendations for the safe use of the equipment. For more information concerning operational procedures, ask your equipment supplier, vendor, and/or lab manager for assistance. Specific manufacturer operational manuals and guidelines should ALWAYS be referenced to provide applicable training and qualification for the safe operation of equipment.

Best Practices

1. Laboratory personnel are expected to know and understand the hazards associated with chemicals and other materials that may require emergency flushing and drenching.
2. Workers must review all safety datasheets (SDS) frequently to know and understand all hazards prior to an accident happening.
3. Because of the infrequent use of an emergency shower, drains under emergency showers will go dry and allow sewer gas into the building. If needed, periodically pour water down the drain at regular intervals.
4. Keep eye wash and shower units completely clear from obstructions or other potential hazards, such as chemical bottles, that could be tipped over while locating the eyewash with impaired vision.
5. Do not place/store any items (especially electrical items) under or near eyewash and shower stations.
6. Laboratory and/or workplace personnel are responsible for performing ***monthly*** activation/hygiene tests on all eyewashes and dual-purpose eyewash/facewash/drench hoses, and ***quarterly*** flush tests on emergency showers in their respective work areas. Protocols explaining the specific procedures may be found here.
7. Training to perform periodic activation and maintain minimum performance requirements for eyewash and shower equipment may be provided by EH&S personnel upon request.
8. Malfunctions or deficiencies noted during periodic activations, inspections, or normal daily activities must be reported immediately to EH&S and your supervisor.

9. If use of the equipment is not possible, tag the unit "DO NOT USE." The supervisor must notify EH&S for repair or replacement.

LAB SAFETY PRACTICES

For the health and safety of all lab personnel, certain basic practices must be observed in laboratories. This section summarizes best practices and should be incorporated into laboratory-specific manuals and/or training materials.

Best Safety Practices for the Laboratory

Ensure that:

1. Laboratory access is restricted in accordance with UA Little Rock procedure.
2. Laboratory doors are equipped with current and accurate hazard warning placards.
3. Laboratory doors are closed at all times, and locked when not occupied.
4. Only persons who have been adequately trained, advised of the potential hazards, and who comply with all entry and exit procedures are allowed to enter the laboratory.
5. Access for minors is restricted or prohibited in accordance with Human Resources policies and/or labor laws.

Best Practices for Personal Hygiene

1. Eating, drinking, smoking, handling contact lenses, and applying cosmetics, and storing food for human consumption are not permitted in the work area.
2. Wash hands after handling potentially infectious materials, rDNA molecules, and/or animals, and before exiting the laboratory.
3. Appropriate Personal Protective Equipment (PPE) is available and used.
4. Utilize appropriate protective gloves when contact with rDNA, infectious materials, and/or animals is likely.
5. Change gloves when contaminated, integrity has been compromised, or when otherwise necessary.
6. Wash hands after removing gloves, before touching clean surfaces, before exiting the laboratory, and before donning new gloves.
7. Disposable gloves are not to be reused and are managed as potentially contaminated laboratory waste.
8. Laboratory clothing is not worn outside the laboratory, and it is decontaminated prior to laundering and disposal.
9. Use appropriate eye protection. Goggles or face shields may be required if there is substantial risk of splashes and/or aerosols.
10. Additional PPE may be required for special tasks (e.g., face shield, respirator, goggles).
11. Eye and face protection must be disposed of with other contaminated laboratory waste or decontaminated before reuse, as appropriate.

Best Practices for Disinfection & Decontamination

1. Work surfaces and laboratory equipment should be decontaminated once a day and/or after any spill, splash, or other potential contaminant. Clean with appropriate disinfectant (as specified in the applicable protocol).
2. Equipment should be decontaminated before repair, maintenance, or removal from the laboratory.
3. Spills involving infectious materials must be promptly contained, decontaminated, and cleaned up. Laboratory staff will be trained in spill clean-up and have appropriate spill clean-up materials readily available.
4. All contaminated liquid or solid wastes should be decontaminated before disposal. Contaminated materials that are to be decontaminated at a site away from the laboratory are placed in a durable leak-proof container which is closed before being removed from the laboratory. Materials to be transported by public highways or roads for off-site

decontamination are packed in accordance with applicable local, state, and federal regulations.
5. Take steps to minimize the creation of splashes and aerosols.
6. Avoid the use of sharps (e.g., needles, scalpels, pipettes, glassware), and take steps to substitute plasticware whenever possible. Used sharps should be carefully placed in puncture-resistant containers.
7. Needles should not be bent, sheared, broken, recapped, removed from disposable syringes, or otherwise manipulated by hand before disposal.
8. Broken glassware should not be handled directly, but with mechanical assistance (e.g., brush and dustpan, tongs, forceps).
9. Effective hand protection is used (e.g., molded guards, use of forceps when using scalpels, etc.).
10. Watch for signs of rodent or insect infestations, and report any immediately to the Principal Investigator (PI) and/or Facilities Management.
11. Prior to working in the Laboratory, all personnel should receive appropriate training regarding their duties, the necessary precautions to prevent exposures, and exposure evaluation procedures.
12. Lab personnel should receive annual updates or additional training when procedural or policy changes occur.
13. Personnel are encouraged to self-report conditions that may impact their immune competence or predispose them to infection so that they may seek counseling and guidance from UA Little Rock's Health Services.

References

For additional information regarding best safety practices for infectious materials in the lab:
- NIH Guidelines for Research Involving Recombinant DNA Molecules *(NIH Guidelines)*, National Institutes of Health
- UA Little Rock's Biological Safety Manual

For additional information regarding best safety practices for microbiological materials in the lab:
- Biosafety in Microbiological and Biomedical Laboratories, Centers for Disease Control and National Institutes of Health

For additional information regarding best safety practices Bloodborne Pathogens in the lab:
- *Bloodborne Pathogens Standard,* 29 CFR 1910.1030, Occupational Safety and Health Administration
- UA Little Rock's Bloodborne Pathogens Exposure Control Plan

For additional information regarding best safety practices for BSL-2 or higher labs:
- UA Little Rock's Biological Safety Manual

MINORS IN LABS

Persons under the age of 18 are prohibited from working in UA Little Rock laboratories as students, volunteers, or trainees except when:
1. The minor is employed by the university and has completed applicable training in safe laboratory procedures as specified by EH&S;
2. The minor is enrolled in a university course with a laboratory component;
3. The minor is participating in a university-sponsored program and has the following:
    a. received documented laboratory-specific training in safe laboratory procedures
    b. adult supervision at all times
    c. a signed assent and parental consent form on file for each laboratory activity

Unallowed Activities

Except for individuals in categories 1 and 2 above, minors may not participate in any laboratory activities involving:

1. Biosafety Level 2 containment or higher
2. Primate (including human) blood, fluids, or tissues
3. Living vertebrate animals
4. Human subjects
5. Ionizing or non-ionizing radiation
6. High voltage equipment

Form for Principal Investigators & Lab Supervisors
Principal Investigators and/or Lab Supervisors must complete the Activities Involving Minors in UA Little Rock Laboratories form if minors will be present where laboratory chemicals, high intensity light sources, biological specimens, pressurized gases or liquids, or machinery are in use. This form is intended for safety review purposes and does not wave other required consent forms. This form must be completed **before** you begin lab activities.

Minor & Guardian Consent Form
If minors will be present where laboratory chemicals, high intensity light sources, biological specimens, pressurized gases or liquids, or machinery are in use, then each minor and his/her parent or guardian must complete the Minor/Student – Parent/Guardian Consent for Activities Involving Minors in UA Little Rock Laboratories form **before** lab activities begin.

PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) is designed to prevent or lessen the severity of injuries to workers. Engineering controls, such as fume hoods, mechanical guards, and other safety devices are used to create a first line of protection. When engineering controls are not adequate to minimize hazards to acceptable levels, UA Little Rock departments must provide employees with adequate PPE. Use of an appropriate ensemble of PPE creates a second line of defense against exposure to hazards. Components selected for an adequate ensemble of PPE vary with the route and degree of exposure and nature of the hazard.

UALR adheres to standards located in OSHA CFR 1910.132d, to determine if hazards exist, and if so, recommendations for selecting appropriate PPE equipment. A hazard assessment should determine the risk of exposure to eye and face hazards, including those which may be encountered in an emergency. Employers should be aware of the possibility of multiple and simultaneous hazard exposures and be prepared to protect against the highest level of each hazard in accordance with OSHA CFR 1910 Subpart I App B.

NOTE: Supervisors are responsible for providing instruction and demonstrating safe use of PPE. Instruction should cover user instructions written by the manufacturer, as well as the associated hazards, and applicable emergency procedures. However, that does not eliminate everyone's responsibility to become familiar with both any applicable OSHA standards, as well as the manufacturer's operation and safety requirements specific for PPE. Prior to beginning hazardous work, workers with the potential for hazard exposure should also obtain formal Personal Protective Equipment training on the proper procedure for use during an emergency.

The additional safety guidelines outlined in this section cover UA Little Rock best practices for the safe use of the PPE. For more information, ask your equipment supplier, vendor, and/or supervisor for assistance. Specific manufacturer operational manuals and guidelines should ALWAYS be referenced to provide applicable training and qualification for the safe use of equipment.

Best Practices

1. *Selecting safety eyewear*. ANSI Z87.1 establishes performance criteria and testing requirements for devices used to protect the eyes and face from injuries from impact, non-ionizing radiation, and chemical exposure in workplaces and schools.
    a. Protective eyewear must be worn and meet the American National Standard for Eye Protection for Occupational and Educational Eye and Face Protection Z87.1, including students, faculty, staff, and visitors at UA Little Rock who observe or participate in any chemical laboratory course, research laboratory, or chemical demonstration.
    b. In accordance with OSHA CFR 1910.133(a)(3), 1915.153(a)(3), and 1926.102(a)(3), employers must ensure that employees who wear prescription (Rx) lenses or contacts use PPE that incorporates the prescription or use eye protection that can be worn over prescription lenses. Workers who wear prescription glasses must also wear required eye protection. Eye and face protection that fits comfortably over glasses is available. Safety goggles and spectacles may incorporate prescription lenses.
2. *Respiratory protection. When* engineering controls are not sufficient to reduce air contaminants to an acceptable level, respirators may be required.
3. *Hand protection*. All glove manufacturers provide permeability data for specific gloves. It is imperative to review this data before selecting the appropriate glove.
4. *Body Protection.* Protective body apparel may be required when there is potential for accidental spills or splashes.
5. *Foot Protection*. Street shoes are generally sufficient to provide protection in low-hazard operations (e.g., laboratory scale). Consult the manufacturer's permeability data when selecting the material of construction and follow the manufacturer's recommendations for cleaning or discarding.

RESPIRATORY PROTECTION

Control of occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, shall be the primary objective in preventing atmospheric contamination. This can be accomplished as much as possible by accepted engineering control measures (e.g., enclosure or confinement of the operation, general and local ventilation, substitution of less toxic materials, etc.). However, when effective engineering controls are not feasible, or while they are being instituted, appropriate respiratory protection (see Personal Protective Equipment) should be used.

Best Practices

1. Respirators shall be provided by the university when such equipment is necessary to protect the health of the employee or student. The university shall provide respirators which are applicable and suitable for the purpose intended.
2. Environmental Health and Safety shall be responsible for the establishment and maintenance of a respiratory protective program.
3. EH&S shall have the authority to require the use of respiratory protective equipment and to prohibit the use of such equipment.
4. Only respiratory protective equipment approved by EH&S shall be purchased or utilized.
5. Only employees authorized by the EH&S shall use respiratory protective equipment.
6. Respirators requiring a face to respirator seal shall not be worn when conditions prevent a good face seal. Such conditions are a growth of beard, side burns, a skull cap that projects under the facepiece or temple piece of glasses. Departments should make a reasonable effort to find alternative work for employees who may be religiously discriminated against by the facial hair policy.
7. Departments shall bear the cost of respiratory protective equipment, the cost of miscellaneous supplies and expenses, and the cost of medical evaluations required by the respiratory protection program.

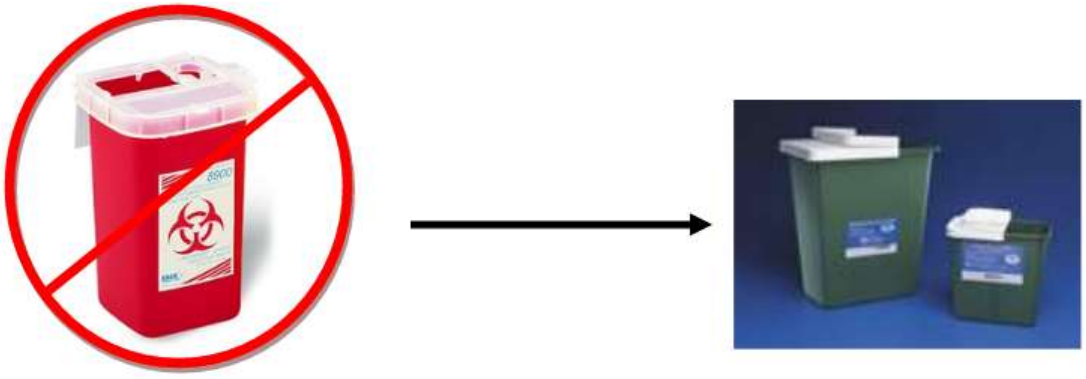
8. Medical evaluations shall be coordinated by Health Services, EH&S, or a licensed physician acceptable to EH&S and Health Services.
9. The supervising department shall notify EH&S prior to assigning an employee to a task that could require the use of a respiratory protective device.
10. Employees shall utilize and maintain respiratory protective equipment in accordance with procedures established by EH&S.
11. The supervising department shall ensure employees comply with the provisions of the respiratory protection program.
12. Exceptions to this policy and the respiratory protection program shall require the approval of EH&S.

SHARPS DISPOSAL

Sharps are items that can easily puncture the skin, such needles, razor blades, and broken glass, and must be handled and disposed in a manner that prevents you and others from being injured. In the event of a needle stick or other sharps-caused injury, seek medical attention immediately (see Bloodborne Pathogen Exposure Control Plan).

Best Practices

1. Used needles should not be bent, sheared, broken, recapped, removed from disposable syringes, or otherwise manipulated by hand before disposal.
2. Do not try to retrieve items from sharps containers.
3. Ensure that appropriate sharps containers are available in the immediate work area and adhere to the following:
    a. Must be labeled as “Sharps”
    b. Must be labeled with a biohazard symbol
4. Containers must be rigid, leak and puncture proof, and sealable.
5. A commercially available plastic container that cannot be easily opened after sealing must be used for sharps that are contaminated with potentially infectious human body fluids (bloodborne pathogens).
6. Contaminated sharps cannot be placed in the normal trash until effectively decontaminated, usually by steam autoclaving. Use autoclave indicator tape to demonstrate decontamination. (Note: Disinfected sharps must still be placed in a puncture resistant container, as noted above.)
7. You may mix non-infectious sharps with potentially infectious sharps only if the entire contents of the container is treated as infectious and it is decontaminated before disposal, as described above.
8. Deface the biohazard symbol after treating and prior to disposal. Place the sealed and defaced container in the regular trash.
9. Non-infectious syringes *may not* be disposed of in infectious biohazardous sharps containers. Non-infectious syringes must be disposed of in a proper, non-red, non-infectious sharps container, such as seen below.



10. Other non-infectious sharps such as broken glass may be place in a rigid puncture-proof container and labeled “SHARPS – NON-INFECTIOUS” and disposed of in the normal waste stream.

SURGE PROTECTORS

Portable surge protection devices (SPDs) and/or backup battery w/surge protection is recommended to protect electronic equipment against unwanted power surges or spikes, as it takes only a tiny amount of voltage increase to damage most of today's sensitive electronics. The use of older SPDs (power strips) is discouraged. Power strips marketed as SPDs may provide protection for one or possibly two spikes from power company anomalies, inductive surges, or transients from remote spikes. But, once the cumulative joules-based capacity of the SPD is exhausted, however, it will revert to a simple power strip (i.e., no protection). Consider replacing SPDs at least every three years or more often as funding permits.