ENVIRONMENTAL HEALTH AND SAFETY

# Lab Chatter

EHS Newsletter • Summer 2021

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## SAFETY SPOTLIGHT

### Visitor Access to UNE Academic, Research and Clinical Laboratories

*By Ronnie Souza*

Summer is upon us, colleagues. As sure as the sun will shine hotter and brighter, construction projects and campus tours for accepted and prospective students will also heat up. The arrival of summer weather is the perfect time to review the basics of visitor access to academic, research, and clinical laboratories.

Visitor access to University of New England (UNE) property, especially laboratories, can create a risk for injury and additional liability. UNE policy requires that all visitations to academic, research, and clinical laboratories, both on and-off campus, must be under the direct supervision of an authorized Responsible Person or Visitor Host.

RESPONSIBILITIES/DEFINITIONS:

Laboratory - Any part of a building used or intended to be used for scientific or technical activities that may store or use hazardous agents, including academic, research, or clinical laboratories at on and off-campus locations.

Primary Responsibility - The department chair/director, laboratory principal investigator, and laboratory manager, bear primary responsibility for ensuring that UNE students, faculty, and staff members under their direction are aware of and adhere to this policy.

Responsible Persons - Any person approved by the department chair/director, laboratory principal investigator, department head, or supervisor to oversee and/or supervise the teaching, research or clinical laboratories day to day activities or visitor access in the particular location.

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Visitor Host - Any person hosting visitors to academic, research, or clinical laboratories, at on and off- campus locations.

Visitor - Any person not employed by or associated with UNE who enters an academic, research or clinical laboratory for a service call, admissions tour, or observation of activities in the applicable location.

PROCEDURES

To protect the visitor(s) and reduce the risk to the University, the following parameters for visitors to laboratories are required at a minimum.

The Responsible Person or Visitor Host Primary Responsibilities:

- Must have full knowledge of all potential hazards.
- Assumes full responsibility for the safety of each visitor.
- Ensure all visitors wear the appropriate personal protective equipment or clothing including, at a minimum, but not limited to, ANSI approved eye protection and gloves as dictated by the activities in the lab.
- Ensure each visitor is accounted for and accompanied during the entire visit.
- Ensure the visitor(s) will touch nothing in the lab/shop that is not pertinent to the visit.
- Ensure that the visitor is informed of all pertinent safety training(s) required for the laboratory. Note: This training may or may not be the responsibility of the UNE Responsible Person or Visitor Host, i.e. lock-out-tag-out would be the visitor's employer's responsibility.
- Visitors must have long hair tied back, no strings or other materials dangling from clothing, and no outerwear in labs (bulk coats can knock things over).
- It must be ensured that no other laboratories or operations in the area pose a threat or risk to the visitor's safety.
- There should not be any equipment with unguarded moving parts or unprotected chemical reactions active in the lab or shop.
- Ensure all hazardous material is secured in such a manner that it poses no hazard.
- The visitor(s) will thoroughly wash hands and other exposed skin upon leaving the area.
- Visitors to a lab where animal research is taking place but not having contact with animals must comply with procedures per the department's risk assessment

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## FOOT PROTECTION IN THE LABORATORY

*By Peter Nagle*

Summertime often brings a more casual attitude to UNE. This can result in relaxed dress codes, flexible working hours, and a laid-back approach. It's important that this does not reduce your focus on laboratory safety, however. Accidents are just as likely to occur in the summer as at any other time, so it's imperative to remain vigilant of potential hazards in the lab.

Footwear is an area of concern in the summer as many people opt to wear sandals, flip-flops or Crocs. However, open toed shoes are prohibited in labs at UNE. They offer no protection to the feet in case of a spill or any other accident. Many injuries have occurred because of this. The following are examples of foot injuries that occurred in college laboratories simply due to improper footware:

- A student dropped a two-liter aspirator flask of tissue culture media on their foot while wearing sandals. This required a trip to the emergency room and many stitches.
- A researcher pulled a two-liter flask of agar out of an autoclave and bumped the bottom of the flask against the lip, causing it to break. Boiling agar spilled over their bare legs and feet. They received second and third-degree burns.
- A researcher wearing sandals accidently kicked a piece of glassware, causing a six-inch laceration requiring stitches.

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**Visitors and children of employees under age 18:**
• Children of UNE students, faculty, or staff members are not authorized to be in laboratories or shops on either an attended or unattended childcare basis.
• Signed parental/guardian consent forms and liability waivers are required for all visitors under 18, and must be obtained prior to the visit. The sponsoring faculty or staff member, or program director must keep the completed form on file for at least three years.
Additional minimal requirements for minors visiting laboratories are:
• The Responsible Person or Visitor Host ensures that the presence of minors in an academic, research, or clinical research laboratory has a clearly defined educational purpose.
• Visitors under 18 are restricted from laboratories where radioactive material, select agents, or explosives are used.

**Regardless of outdoor weather conditions, personal attire worn in the laboratory and/or animal care facility should ALWAYS provide full coverage of the legs, feet, and torso. For exact requirements of each lab, please carefully read the sign on that specific laboratory's door.**

## Are They Compatible?

*By Jesse Millen-Johnson*

Although there can be storage limitations in university laboratory settings, it's important to properly separate and store laboratory chemicals by compatibility group. After reading the article below, please see the convenient Fisher Scientific chemical compatibility chart (attached in Lab Chatter distribution email). Separation of incompatible chemicals can prevent accidental mixing which could cause fires, explosions, or toxic gases.

Causes of chemical reactions include:

- Accidental breakage
- Container failure
- Fires and earthquakes
- Mixing of gases or vapors from poorly closed containers
- Mistakenly storing incompatibles together because of improperly labeled containers

Store the chemical groups listed below separately from one another, either in separate cabinets or in appropriate tubs or secondary containers. Clearly label each container and storage location to indicate its compatibility group:

- Flammable liquids (flashpoint <100°F) — Examples: All alcohols, acetone, acetaldehyde, acetonitrile, amyl acetate, benzene, cyclohexane, dimethyldichlorosilane, dioxane, diethyl ether, ethyl acetate, histoclad, hexane, hydrazine, methyl butane, picolene, piperidine, pyridine, some scintillation liquids, all silanes, tetrahydrofuran, toluene, triethylamine, and xylene

o Flammable liquids may be stored with volatile poisons or liquid bases, but not with both bases and poisons.

- Compressed gases — Examples: Oxygen, nitrogen, hydrogen, arsine, and acetylene

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OSHA isn't specific about laboratory footwear, but still requires employers to ensure the use of appropriate personal protective equipment (PPE), including proper foot protection. UNE requires all personnel to wear closed toed shoes while in the laboratory. In addition, all footwear must meet the following conditions:

- Be constructed of a leather or synthetic upper (the part of the shoe that covers the toes, top, and sides of the foot and the back of the heel), particularly in labs where hazardous or corrosive chemicals pose a risk.
- Upper cannot be canvas or mesh as these are easily permeable.
- Have a thick and durable rubber outsole that has a sufficient tread for grip and traction.

Comfort and support need not suffer in order to meet these requirements. Lab work can take a toll on feet, especially when standing all day. A comfortable athletic shoe with ample cushion and arch support is recommended, as long as it has a leather or synthetic upper that liquids cannot permeate.

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- Store securely mounted.
- Segregate oxygen from flammable gases.
- Store acutely toxic and toxic gases in gas cabinets or fume hoods.

• Volatile poisons — Examples: Poisons, toxics, and carcinogens, such as carbon tetrachloride, chloroform, dimethylformamide, dimethyl sulfate, formamide, formaldehyde, halothane, mercaptoethanol, methylene chloride, and phenol

- Store in a ventilated cabinet.
- May be stored with flammable liquids if bases are not present.

• Acids — IMPORTANT: Segregate acids from chemicals which could generate toxic or flammable gases upon contact (e.g., cyanide salts, metal sulfides, calcium carbide) and reactive metals (e.g., sodium, potassium, magnesium).

- Store in a ventilated corrosive storage cabinet if possible.
- Store in non-corrosive secondary container (e.g., appropriate sized plastic tub).
- Avoid contact with bases
- Inorganic acids:
  I. Examples: Sulfuric, nitric, chromic, perchloric, hydrochloric, hydrofluoric, phosphoric, hydroiodic
  II. Highly reactive with most substances, these acids must be double contained (i.e., the primary container must be kept inside a non-corrosive canister, tray, or tub).
  III. Store separately from organic acids.
  IV. Perchloric acid presents special hazards. Carefully isolate it from acetic anhydride, bismuth and its alloys, alcohol, paper, wood, oil, ether, grease, and sulfuric acid.
  V. Hydrofluoric acid is particularly hazardous and must be handled with utmost care.
- Organic acids – Examples: Acetic, butyric, formic, propionic
  I. Store separately from inorganic acids.
  II. Store in a ventilated corrosive storage cabinet if possible.
  III. Can be stored with organic solvents unless otherwise noted on the Safety Data Sheet.
  IV. Keep acetic acid away from perchloric acid.

• Liquid bases — Examples: Sodium hydroxide, ammonium hydroxide, calcium hydroxide, glutaraldehyde

- Store in tubs or trays in a normal cabinet.
- Avoid contact with acids.
- Liquid bases may be stored with flammables in the flammable cabinet if volatile poisons are not present.

• Liquid oxidizers — Examples: Ammonium persulfate, hydrogen peroxide

- Store in a ventilated corrosive storage cabinet.
- Oxidizing liquids react with nearly everything. They may potentially cause explosions, and must be double contained (i.e., the primary container must be kept inside a canister, tray, or tub).

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The photo below shows burns on a researcher's feet after acid spilled while they wore flip-flops:

Remember, appropriate attire in the lab is important for maintaining a safe environment. We often think of standard PPE (gloves, safety glasses and lab coats) as crucial but do not consider footwear. However, serious foot injuries can and do occur in labs

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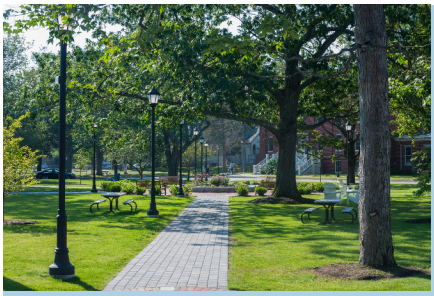

- Non-volatile liquid poisons — Examples: Acrylamide solutions, coomassie blue stain, diethylpyrocarbonate, diisopropyl fluorophosphate, uncured epoxy resins, ethidium bromide, triethanolamine

Note: This group contains carcinogens and highly toxic chemicals.

- o Store in a normal cabinet, preventing contact with other materials.
- o May be stored with non-hazardous liquids, such as buffer or salt solutions.
- o Double contain quantities greater than one liter.

- Metal hydrides and pyrophorics (air or water reactive) — Examples: Sodium borohydride, calcium hydride, lithium aluminum hydride.
  - o Most metal hydrides react violently with water.
  - o Store in a waterproof double container in a normal cabinet.
  - o May be stored with dry solids.
- Dry solids — Examples: All hazardous and non-hazardous powders, such as cyanogen bromide, ethylmaleimide, oxalic acid, potassium cyanide, and sodium cyanide
  - o Store dry solids above liquids in a normal cabinet or on open shelves. It is particularly important to keep liquid poisons below cyanide- or sulfide-containing poisons (solids). A spill of aqueous liquid onto cyanide- or sulfide-containing poisons would cause a reaction that would release poisonous gas.
  - o If properly double contained, dry solids can be stored with metal hydrides.
  - o Solid picric acid or picric sulfonic acid may be stored with dry solids, but should be checked regularly for dryness. When completely dry, picric acid is explosive and may detonate upon shock or friction.

Please reach out to EHS with any questions or concerns.

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