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Universal precautions under the BBP by Jessica Tyre

UNE has developed a strict Blood Borne Pathogens Exposure Control Plan per OSHA 29CFR1910.1030. One of the key portions of this plan is observing **universal precautions**. Universal precautions are prudent practices that apply to the prevention of infectious disease transmission. These precautions, based on the recommendations from the CDC, must be used routinely on all persons, animals and contaminated items. Under normal circumstances, however, contact with sweat and tears does not require gloves or other personal protective equipment. These precautions must be used whenever differentiation of body fluids is difficult. At a minimum, the following universal precautions will be taken when dealing with blood and Other Potentially Infectious Materials (OPIM). Each department is encouraged to develop their own specific universal precautions to address departmental needs. The following are in place for all labs:

- Assume that all blood and bodily fluids are infectious for HBV, HIV, and other blood borne pathogens.
- Wear appropriate PPE when handling potentially infectious waste (i.e. gloves, aprons, eye wear etc.) based upon the task being performed.
- Hand washing: this is the single *most important* means of preventing the spread of infection. It is also an important measure to decrease occupational exposure to blood-borne pathogens.
- Sharps disposal: Used sharp items (i.e. needles, scalpel blades, glass pipettes, and other sharp instruments) should be considered potentially infectious and be handled with extraordinary care to prevent accidental injuries.

This is just the tip of the iceberg as far as the blood borne pathogens program is concerned. To read the entire Exposure Control Plan, please see **Chapter 9** of the **UNE Safety Manual** on the EHS portion of the UNE website.

Lab Refrigerators and Freezers by Peter Nagle

In laboratories, flammable liquids are frequently stored in refrigerators, occasionally in fridges not designed for flammable storage. Flammable vapors present a fire or explosion hazard in many refrigerators because they can come in contact with electrical sparks that occur in the normal operation of thermostats, interior light switches, defrost control switches and other electrical components. This is especially true in domestic and commercial display refrigerators which are abundant on campus. Additionally, the compressors in domestic refrigerators increase the hazard because they are typically located at the bottom of the units where flammable vapors tend to accumulate. Furthermore, the compressors are not vapor proof, thus adding ignition sources from inside the compressors themselves to the ones already mentioned above. If vapors ignite from any of these ignition sources a powerful explosion occurs that can cause serious injury or death to someone in the vicinity.

There are primarily three types of refrigerators/freezers that can be used for chemical storage:

- **Domestic Refrigerator:** These are not recommended for laboratory use; however, innocuous materials such as aqueous buffer solutions and lab media can be safely stored in these units.
- **Flammable Materials Refrigerator:** To eliminate any sparking hazards, all the electrical components and sources of ignition have been moved outside of the refrigerator. The compressors are either sealed or located at the top of the unit away from any possible vapors.
- **Explosion Proof Refrigerators:** These units are designed to operate in areas where the air **outside** the refrigerator may have flammable vapors in the environment around the unit.
 - In most lab settings an explosion proof refrigerator is not necessary

When selecting a refrigerator for your lab, consider the type of material that will be stored inside the unit and the surrounding environment where it will be installed. This way we can avoid any costly or fatal accidents in our labs. The link below demonstrates what can happen if flammable vapors are released inside a domestic refrigerator.

<http://www.uvm.edu/safety/lab/refrigerator-explosion>

Compressed Gas Cylinder Safety by Jessica Tyre



The use of compressed gas cylinders is a frequent aide to a laboratory's daily operations. These cylinders can contain gases that vary in chemical properties from inert and harmless to toxic and explosive. The high pressures of these gases constitute a serious hazard in the event that the cylinders are exposed to physical damage and/or high temperatures.

Compressed gas cylinders need to be legibly marked, with either the chemical or trade name of the gas, for the purpose of identifying gas content. Cylinders will be marked by the distributor with stencil, stamp, or securely attached label. Whenever practical, the marking will be on the shoulder of the cylinder. Markings, labels, decals, tags, or stencil marks used for the identification of contents should not be defaced. No marks or numbers stamped into a cylinder will be changed or obliterated. Painting of cylinders is prohibited as most are color coded for the type of gas that is inside the cylinder.

Cylinders, valves, or safety-relief devices will not be repaired or altered except by the vendor. Compressed gas cylinders will be inspected by the user prior to and during

use to determine that cylinders are in safe condition for use. Inspect for corrosion, valve damage or leaks, evidence of tampering, etc. Never use a flame to detect gas leaks. Cylinders should only be moved or transported by an experienced vendor or a trained employee who has the appropriate equipment (cylinder cart with chains). At the time of delivery a standard cylinder status tag will be placed on all cylinders reading "Full". When the cylinder is placed in use, the bottom of the tag with the word "Full" will be removed. When the cylinder is no longer required, the "In Use" section of the tag will be removed and the vendor will be called for pick-up. All cylinders will be treated as though residual gas remains.

Compressed and liquefied gases in portable cylinders will be stored in accordance with NFPA standard 55 and will be chained to a stand or the wall at all times when not in use to prevent them from being knocked over. Cylinders should be chained or strapped individually and nesting of cylinders should be avoided. Cylinders will be secured by a safety chain provided with a positive locking device such as a nylon strap with locking

buckle or self-locking hook to prevent accidental release of cylinder or a nylon strap and buckle assembly with attachment fixture may be used. If it is unavoidable due to spatial constraints to chain the cylinder individually, please contact EHS to evaluate the individual situation and make a recommendation. Cylinder storage areas will be posted prominently with the types of gases to be stored. Where gases of different types are stored at the same location, cylinders should be grouped by types of gas, and the groups arranged to take into account the types of gas contained, e. g., flammable gases will not be stored next to oxidizing gases. Cylinders will not be stored near highly flammable or combustible substances. Charged and empty cylinders will be stored separately. Old stock should be stored in an accessible area so as to be removed first. The gas cylinder storage area will be dry, cool, well ventilated, and fire resistant, where practical. Heated storage areas will be arranged so that stored cylinders cannot be spot-heated or heated above 125 degrees F (51.7C). For more information on cylinder safety please see [Chapter 10](#) of the [UNE Safety Manual](#) or contact the EHS Department (see contact information on back page).



Safety Spotlight



Submitted to EHS Lab Chatter by:
Ronnie Souza via the ME CDC

For our **January Safety Spotlight** will be looking at a notice sent out by the **Maine Center for Disease Control and Prevention** about incidents at Maine academic institutions where several cases of **Salmonella** exposure were documented due to lab work being conducted between May 2013 and March 2014 in certain teaching environments in higher education. This case study reminds us all of the importance of lab safety and the measures that should be taken to prevent lab injuries and illnesses at UNE.

Source: **Maine Center for Disease Control and Prevention**

In May of 2013 and March of 2014, there were severe Salmonella infections associated with laboratory science courses in Maine academic institutions. With the second occurrence of a teaching laboratory associated Salmonella infection, in less than a year, Infectious Disease Epidemiology is writing to urge your institution and staff to review the attached national guidance for laboratory safety in academic institutions and to consider an onsite laboratory review for your institution. Infections such as these can be avoided with proper implementation of national guidance and training of students in proper laboratory etiquette. An onsite technical assistance and laboratory evaluation from the Maine State Health and Environmental Testing Laboratory (HETL) microbiologists is available upon request.

The Salmonella infections were found to be linked to Maine college of microbiology courses with concurrent lab sections. In both instances, the students were working with "mystery organisms" and the organisms provided to beginning microbiology students were pathogenic Salmonella species. The infections were identified by clinical laboratories and reported to the Maine CDC. Samples collected from the respective college labs, during a site visit, tested positive for Salmonella and the DNA fingerprints were indistinguishable from the DNA fingerprints of the Salmonella isolated from the students. Further, the strain from both events matched large national outbreaks associated with clinical and teaching laboratories throughout the country. This is clearly not a transmission exposure risk isolated to Maine, but the Maine CDC would like to provide clear guidance and stress the importance of reviewing and implementing this guidance for the safety of all involved.

You are aware that lab safety is essential. Current and recommended practices and procedures should be in place. Please review, update, and utilize your institution's lab safety manual and implement all protocols for staff, students, volunteers, and visitors. Following the national outbreak in 2010/2011 the U.S. Center for Disease Control and Prevention developed recommendations to reduce risk of laboratory acquired illness (listed below). The full outbreak summary and recommendations for both 2014 and 2010/2011 national outbreak investigations can be found on the CDC website: <http://www.cdc.gov/salmonella/typhimurium-labs-06-14/index/html>.

Specific recommendations based on site visits at the two universities and a survey of lab students at one Maine University:

- Non-pathogenic or attenuated bacterial strains should be used when possible, especially in teaching laboratories. The biosafety level of an organism should not exceed the rating of the lab.
- Be aware that bacteria used in microbiology laboratories can make you or others who live in your household sick.
 - Avoid taking laboratory supplies outside the laboratory to limit contamination.
 - Avoid bringing personal items such as phones, books, utensils into lab work spaces.
- Persons working with any infectious agents, including Salmonella bacteria, must be aware of potential hazards, and must be trained and proficient in biosafety practices and techniques required for handling such agents safely:
 - Wash hands frequently while working and immediately before leaving the laboratory and follow proper hand washing practices.
 - Leave food, drinks, phones, and other personal items outside the laboratory. These items may become contaminated if you bring them into the laboratory or touch them while working in the laboratory.
- Wear a lab coat or other protective garment over personal clothing when working in a microbiology laboratory. Remove protective garment before leaving for non-laboratory areas. Dispose of lab coat appropriately or deposit for laundering.
- Remind students to always wear goggles and gloves while in lab, and demonstrate how to remove gloves safely.
- If you work with Salmonella bacteria in a microbiology laboratory, be aware that these bacteria can make you sick. Watch for symptoms of Salmonella infection, such as diarrhea, fever, and abdominal cramps. Call your healthcare provider if you or a family member has any of these symptoms.

What You Work With Can Make You Sick

Follow safe lab practices—and don't bring germs home with you.



Always wash your hands with soap and water...

- ▶ Right after working in the lab
- ▶ Just before you leave the lab

Avoid contamination while in the lab.

Don't eat, drink, or put things in your mouth (such as gum)

Don't touch your mouth or eyes

Don't put on cosmetics (like lip balm) or handle your contact lenses



Don't carry dangerous germs from the laboratory home with you.

Leave personal items outside of the lab so you don't contaminate them: cell phone, car keys, tablet or laptop, MP3 player

Keep work items off of bench areas where you do experiments: backpacks, notebooks, pencils, pens

Leave lab supplies inside the lab.

If you must take supplies out of the lab, keep them in a separate bag so you don't contaminate anything else

Leave your experiment inside the lab so you can stay healthy outside the lab.



Centers for Disease Control and Prevention
National Center for Emerging and Zoonotic Infectious Diseases

CONTACT US:

Ronnie Souza,

Director of EHS

UNE Extension: 2488

Cell: 207-391-3491

Email: rsouza@une.edu



Peter Nagle,

EHS Specialist

UNE Extension: 2791

Cell: 207-468-3599

Email: pnagle@une.edu



Jessica Tyre,

EHS Specialist

UNE Extension: 2046

Cell: 603-244-0081

Email: jtyre@une.edu



Alethea Cariddi,

Sustainability Coordinator

UNE Extension: 2507

Email:

acariddi@une.edu



Ethyl Ether by Peter Nagle

Ethyl Ether (Diethyl Ether, Ether), a common flammable solvent found in many labs at UNE, exhibits hazards that require specific handling procedures when received or stored on campus. Ethyl Ether is a peroxide forming chemical, meaning that it can form shock sensitive peroxide crystals under normal storage conditions that may violently detonate when subjected to heat or mechanical shock. Furthermore, exposure to air and light can accelerate the formation of peroxides.

To mitigate the hazard, vendors treat ethyl ether with an inhibitor, butylated hydroxyl toluene (BHT) that counters the peroxide formation. The BHT scavenges oxygen in the solvent and prevents it from reacting with the solvent to form peroxides. However, over time, the BHT can become exhausted, thus allowing peroxides to potentially form.

Because of the hazards associated with Ethyl Ether, the following precautions are recommended for safe handling and usage:

1. Purchase the minimum amount needed to complete your work
2. Mark each with the **date received** and **date opened**
3. Store in a dark cool place and avoid sunlight
4. Do not distill or evaporate Ethyl Ether. Doing so tends to concentrate the peroxides in the distillation pot increasing the explosion hazard.
5. Dispose of all unopened ethers after one year, and all opened ethers after six months
6. Dispose of all expired material
7. Consider substituting a safer chemical that does not form peroxides, such as Petroleum Ether
8. **Never, under any circumstances, attempt to open a container of ether which has crystals around the cap or in the bottle.** The friction of unscrewing the cap may detonate the bottle. Call EHS immediately if you notice any crystallization.

To see UNE's procedure for handling Ethyl Ether and other peroxidizable material, refer to **Appendix C in the UNE Chemical Hygiene Plan.**



UNE Chemical Sharing Listing

The UNE Chemical Sharing Program is a great way to reduce hazardous waste, reduce costs for your department, and have a positive environmental impact on campus.

If you have any commonly used lab chemicals you are thinking of disposing, please contact EHS so they can be listed in the next issues of EHS Lab Chatter as available for the UNE Chemical Sharing Program.

Chemicals currently available:

Available through the College of Pharmacy:

<u>Chemical name</u>	<u>Volume (approximate)</u>	<u>Manufacturer</u>	<u>Known Expiration dates</u>
1,4- Dichlorobenzene	2.5 kg	Alfa Aesar	
Dimethyl Sulfoxide	1 L	Sigma	
Ethoxy Diglycol	500ml	Letco Medical	
Copper (II) Sulfate	50g	Aldrich	
Potassium Iodide	100g	Fisher	
Sodium Carbonate	500g	Fisher	
Nicotinamide	100g	Sigma	
Nystatin	4 tubes of 30g	Taro	
Omeprazole	25g	Medisca	July, 2015
Zinc Oxide	500g	Fisher	
Zinc Sulfate Monohydrate	1kg	Acros	
Phenol Red	5g	Sigma-Aldrich	
Betamethasone Valerate	3 tubes of 45g	Actavis	
Sodium Chloride, reagent ACS 99%	1kg	Acros	
Sodium Metabisulfite	500g	Letco Medical	
Charcoal	500g	Fisher	
Calcium Chloride	2 containers of 500g	Sigma-Aldrich	
Calcium Gluconate, anhydrous	500g	Sigma-Aldrich	
kaolin	4 containers of 500g	Fisher	
Ketoprofen USP	100g	Letco Medical	August, 2016

Please contact the EHS office if you are interested in obtaining any of the chemicals listed for your laboratory. We will do the official transfer from one department to the other.