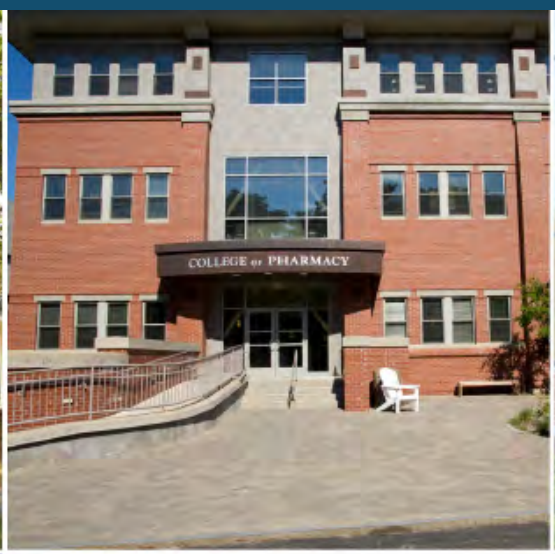
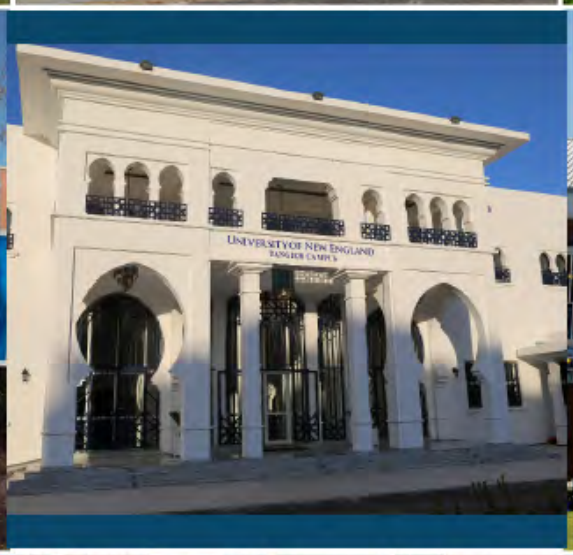
Volume 6, Issue 3 | November/December 2019

EHS Lab Chatter





UNIVERSITY OF NEW ENGLAND
INNOVATION FOR A HEALTHIER PLANET

EHS
ENVIRONMENTAL HEALTH AND SAFETY

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Safety Spotlight:

A student burned his eye in a University of Utah lab.

The U. knew about dangers beforehand, an audit finds, but didn't take action.

By Courtney Tanner via the Salt Lake Tribune

Published: May 14, 2019

THE UNIVERSITY OF UTAH®

The student was working on an experiment with sodium hydroxide — a solution that can melt a soda can in seconds and dissolve a chicken wing to the bone.

The chemical compound, known as lye, is perfect for research because it's so corrosive. But that also makes it dangerous to handle. As the student carried a beaker across the lab at the University of Utah, some of it splashed and landed in his eye.

Covering his face with one hand, he ran around the room looking for an emergency eyewash. There wasn't one. So he dodged down hallway after hallway in the science building. Thirty seconds later, he was able to flush his face with water. But his cornea had already been severely burned.

Two months before that July 2017 accident, the lab was inspected and found to have nine major deficiencies, including the missing eyewash, no chemical hygiene plan, no safety instructions, improper chemical labels and no spill kit. A year after, those issues were still not resolved.

In fact, they were not addressed until August 2018, after another student was burned on his legs and feet.

Those injuries — and a handful of others — are documented in a new state audit released Tuesday. The report condemns U. administrators and the school's health and safety team for allowing a hazardous lab environment across all science departments.

Auditors said the U. has known about serious deficiencies for years. It hired a consultant in 2017 to review its research practices. But it never put into place the recommendations to reduce risks, such as requiring staff to wear protective lab coats and restricting the volume of caustic chemicals that students can use. Since then, similar accidents have repeated nearly every year.

And if the state's flagship research institution continues to ignore the issues and delay fixes, the audit said, it's at risk for much worse injuries, maybe deaths.

"Any given one of them could be very serious or unfortunate," said Brian Dean, audit manager for the Office of the Utah Legislative Auditor General. "Ultimately, this system is broken. The department that is required to [oversee] this isn't tracking the problems."

The audit comes after a trio of high-profile tragedies at other research universities in the country; it was requested by state lawmakers who feared similar events could happen at the U. In 2008, a researcher at UCLA died after she spilled a chemical on her torso and the highly reactive liquid caught fire. In 2010, a graduate student at Texas Tech University lost three fingers from a chemical burn. In 2016, a lab assistant at the University of Hawaii had her arm amputated after an explosion.

Incompatible Chemical Mixtures

Incompatible chemicals are combinations of substances, usually in concentrated form, that react with each other to produce very exothermic reactions that can be violent and explosive and/or can release toxic substances, usually as gases. Care should be taken when handling, storing, or disposing of chemicals in combination.

Buffalo Wild Wings Manager Dies After Chemical Incident

By Derrick Bryson Taylor and Neil Vigdor, New York Times

Thirteen other employees and patrons were treated at hospitals after being exposed to a toxic mix of cleaning agents at a Massachusetts location, the authorities said. A Buffalo Wild Wings general manager died and 13 workers and patrons were sickened after being exposed to a toxic mixture of cleaning agents at a Massachusetts location on Thursday evening, the authorities said.

The Fire Department in Burlington, about 12 miles northwest of Boston, responded to calls at the restaurant and found a man outside being treated by paramedics, Assistant Fire Chief Michael Patterson said at a news conference on Thursday.

The episode occurred after a restaurant employee mixed an acidic detergent called Scale Kleen with a bleach-like cleaner sold as Super 8 to clean the kitchen floor, causing a chemical reaction, the authorities said.

That person, who the authorities said was not the manager who died, exited the restaurant to get fresh air.

Super 8 is used as a sanitizer in the food processing and food service industry, according to Auto-Chlor System, the company that makes the solvent, as well as Scale Kleen.

A product information sheet for Super 8 states that it is not compatible with strong acids.

Joseph Pawlak, chief operating officer of Auto-Chlor System, said in a statement on Friday that the company was cooperating with investigators and trying to determine how the accident happened.

“First and foremost, our condolences are with the individual and their family as well as those affected yesterday during the incident,” Mr. Pawlak said. “The safety and well-being of our customers are our first priority, always.”

State workers who specialize in dealing with hazardous materials were called to the scene, the chief said. An investigation was continuing.

“We are shocked and saddened to learn of this tragic accident at our franchise-owned sports bar and are working closely with our franchisee and the authorities while they conduct an investigation,” a spokeswoman for Buffalo Wild Wings said in a statement on Friday.

Source: https://www.nytimes.com/2019/11/08/us/buffalo-wild-wings-death.html

Still Not Convinced?

By Ronnie Souza

In the spring 1997 semester of at the University of Kentucky, incompatible wastes were accidentally mixed resulting in a fire and explosion. It is believed that nitric acid and halogenated organic solvents were involved, but the exact cause may never be known.

It is miraculous that there were no serious injuries from this explosion and fire. The student who last used the waste bottle reported that he saw some brown fumes coming from the waste bottle when he added his methylene chloride. He capped the bottle and walked away. A minute or two later it exploded.

The explosion blew glass shrapnel across the laboratory. Students on the other side of the laboratory were hit with glass fragments, including at least one who reported that the glass bounced off his safety goggles. Thankfully, this student was following the rule you must wear your safety glasses at all times in the laboratory even if you are not "doing anything."

A fire immediately followed. The hood was completely engulfed in flames and the laboratory (approximately 2000 square feet) quickly filled with smoke so black, thick and acrid that one could not see across the lab. Fortunately, everyone was evacuated and there were no injuries. The fire was contained by faculty members who took a serious (and some would say extremely foolish) risk in battling this large and dangerous fire themselves

Serious injuries were avoided only because the student who normally works opposite that hood was not present when explosion occurred. Explosions of this nature can have an induction period ranging from one second to one hour or more. The last student to use this waste bottle was incredibly lucky.

Figure 1. View of the fume hood where the accident occurred. Notice the large number of chemicals involved in the conflagration and the broken/melted chemical containers. Notice the large number which did not shatter or break, but could have detonated while the fire was being extinguished.

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Figure 2. A second view of the fume hood involved in the fire. Notice the severe charring of the cabinetry.

Figure 3. Shrapnel damage. The hood involved in the fire is in the rear of the photo (notice the soot/char above the hood). The white material on this benchtop (3 hoods away) is the remains of the overhead fluorescent lights which were shattered by flying debris. Other glass fragments from the explosion traveled up to 10 meters from the hood; some were found imbedded up to 20 mm deep in the fume hood ductwork insulation.

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Preventing Mistakes of This Nature

There are several ways that incidents of this nature can be avoided or the damage minimized:

- Pay Attention to what you are doing! Lab accidents happen most often when you are cleaning up or doing something you think isn't dangerous. If you notice an unusual fog etc. coming from a waste bottle do not cap it. Close the hood sash and notify your supervisor immediately.
- Always double check the label before pouring anything (waste or otherwise). In the case above, someone in the lab did not read the tag on the waste bottle. Never assume that a bottle is reagent or waste just by its color or size! Again, pay attention to what you are doing!
- Properly label your reactions and containers. A label is not just crossing out "Hydrochloric acid" and writing "waste", "waste acid" etc. in magic marker. There are specific rules and procedures to follow!
- Hoods are not meant for chemical storage. In the case above, the hood was being used for the storage of well over 30 different chemicals as well as waste materials. If you're not using certain chemicals, put them away. If the hood has to be used for storage of nasty chemicals, find a different hood to run your reaction.
- Never run experiments in hoods where waste is stored. Do not use or store incompatible materials in the same fume hood. In the case above, the combination of organics, acids and bases contributed to the resulting fire, forced the closure of the building for several hours and costing a lot of time and money for cleanup.
- Minimize potential injury. When possible, avoid performing benchtop work immediately across from a fume hood that is being used for waste collection or an experiment.
- Use the fume hood correctly. Keep the fume hood sash closed except when necessary to contain accidental fires, ejecta and shrapnel (as well as fumes). Read more about fume hoods here.
- Do not perform unauthorized experiments. Not only is this generally forbidden, but it increases the chance of an accidental mixing of incompatible chemicals. A student doing this in a lab course may be expelled from the laboratory, charged with a crime, and/or receive a failing grade in the course. Don't risk injury to yourself and others, your GPA, those dreams of med school, or whatever by pulling a stupid lab stunt.

If you see any potentially dangerous situations in your laboratory, notify your supervisor immediately. Make sure that the situation is rectified -- supervisors can get very busy; if necessary, go to your supervisor's supervisor. If necessary, create a paper trail to pressure them into action. Don't assume that all is well just because you've reported the problem!

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Incompatible materials:

- Acids with cyanide salts or cyanide solution--generates highly toxic hydrogen cyanide gas
- Acids with sulfide salts or sulfide solutions-generates highly toxic hydrogen sulfide gas
- Acids with bleach--generates highly toxic chlorine gas--an example of this would be mixing bleach and vinegar
- Ammonia with bleach--releases toxic chloramine vapors
- Oxidizing acids (e.g., nitric acid, perchloric acid) with combustible materials (e.g., paper, alcohols, other common solvents). May result in a fire.
- Solid oxidizers (e.g., permanganates, iodates, nitrates) with combustible materials (e.g., paper, alcohols, other common solvents)--may result in a fire
- Hydrides (e.g., sodium hydride) with water--may form flammable hydrogen gas
- Phosphides (e.g., sodium phosphide) with water--may form highly toxic phosphine gas
- Silver salts with ammonia in the presence of a strong base--may generate an explosively unstable solid
- Alkali metals (e.g., sodium, potassium) with water--may form flammable hydrogen gas
- Oxidizing agents (e.g., nitric acid) with reducing agents (e.g., hydrazine)--may cause fires or explosions
- Unsaturated compounds (e.g., substances containing carbonyls or double bonds) in the presence of acids or bases--may polymerize violently
- Hydrogen peroxide/acetone mixtures when heated in the presence of an acid--may cause explosions.
- Hydrogen peroxide/acetic acid mixtures--may explode upon heating
- Hydrogen peroxide/sulfuric acid mixtures--may spontaneously detonate

WARNING! Before you pour two different chemicals into your hazardous waste container,

YOU MUST CHECK TO MAKE SURE THAT THE WASTES ARE COMPATIBLE!!

*You may also reference the "Chemical Segregation Chart" in **Appendix S** of the UNE Safety Manual.*

Broken glass and sharps containers

By Peter Nagle

Broken glass containers and sharps containers are a common sight in labs throughout both campuses. Both are used to safely package certain material in order to prevent injuries to university staff. Below is a review of how to use these containers correctly and effectively.

Broken Glass Containers

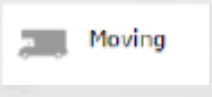
Broken glass containers serve as a safety precaution that prevents accidental cuts to housing staff who collect trash. Not only broken glass, but anything capable of puncturing bags and causing injury must be discarded in a broken glass container. The following material must be discarded here:

- Non Infectious Slides
- Vials
- Pasteur Pipettes
- Empty Chemical Bottles
- Broken or Fragile glass or plastic
- Pipettes
- Pipette Tips

Please do not overflow or put more than 20 pounds of material in a broken glass container. An over-stuffed container can defeat the purpose of the box and cause injury to personnel handling the container.

Disposal

When a broken glass container is full, seal the container shut with tape and put aside for Facilities. Facilities will not pick up any bins that are not sealed shut. Submit a work order under Facilities, making sure to click the moving icon so the work order is given to the right personnel.



Sharps containers continued on next page...

Sharps Containers

Sharps containers are for items that have **been in contact with infectious material** or items that are designed for cutting or scraping, such as razor blades and scalpels. Any tool meant for cutting or scraping must be discarded in the sharps container regardless of whether it has come in contact with infectious material or not. The following items must be discarded in sharps containers:

- Hypodermic Needles
- Syringes
- IV tubing with needles attached
- Lancets
- Scalpel Blades
- Razor Blades

Any items listed under broken glass that have come into contact with infectious material must also be discarded in the sharps container.

Disposal

Please do not overflow a sharps container as they become difficult to close when overfilled. There is a fill line on each sharps container. Once the material in the container reaches the fill line, seal the container closed, discard it in an open biohazardous waste box and start a new sharps container. If you do not have an open biohazardous waste box readily available, then contact EHS for disposal.

To contact EHS:

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INDOOR AIR QUALITY AT UNE

Submitted by Jessica Tyre

The Indoor Air Quality (IAQ) program at UNE was created to make certain that all occupants of all buildings on both campuses are able to breathe clean, healthy air that is not harmful to their health or safety in an acute or chronic way. Good IAQ should include comfortable temperature and humidity, adequate supply of fresh outdoor air, and control of pollutants from inside and outside of the building.

Per OSHA, "The right ventilation and building care can prevent and fix IAQ problems. Although OSHA does not have IAQ standards, it does have standards about ventilation and standards on some of the air contaminants that can be involved in IAQ problems. OSHA responds to questions about standards with letters of interpretation". Per the EPA, "A healthy indoor environment is one in which the surroundings contribute to productivity, comfort, and a sense of health and well-being. The indoor air is free from significant levels of odors, dust and contaminants and circulates to prevent stuffiness without creating drafts. Temperature and humidity are appropriate to the season and to the clothing and activity of the building occupants. There is enough light to illuminate work surfaces without creating glare and noise levels do not interfere with activities. Sanitation, drinking water, fire protection, and other factors affecting health and safety are well planned and properly managed".

There are several factors or causes that can produce Indoor Air Quality issues that include but are not limited to:

1. Sources outside the building: These sources include contaminated outdoor air, pollen, dust, fungal spores, industrial pollutants, general vehicle exhaust, emissions from nearby sources, exhaust from vehicles on nearby roads or in parking lots, or garages, loading docks, odors from dumpsters, re-entrained (drawn back into the building) exhaust from the building itself or from neighboring buildings, unsanitary debris near the outdoor air intake, soil gas radon leakage from underground fuel tanks, contaminants from previous uses of the site (e.g., landfills), pesticides, moisture or standing water promoting excess microbial growth, rooftops after rainfall, and crawlspaces.

2. Equipment: HVAC system dust or dirt in ductwork or other components, microbiological growth in drip pans, humidifiers, ductwork, coils, improper use of biocides, sealants, and/or cleaning compounds, improper venting of combustion products, refrigerant leakage, emissions from office equipment (volatile organic compounds, ozone), supplies (solvents, toners, ammonia), emissions from shops, labs, cleaning processes, elevator motors and other mechanical systems.

3. Human activities: Smoking, cooking, body odor, cosmetic odors.

4. Housekeeping activities: Cleaning materials and procedures, emissions from stored supplies or trash, use of deodorizers and fragrances, airborne dust or dirt (e.g., circulated by sweeping and vacuuming).

5. Maintenance activities: Microorganisms in mist from improperly maintained cooling towers, airborne dust or dirt, volatile organic compounds from use of paint, caulk, adhesives, and other products, pesticides from pest control activities, emissions from stored supplies.

6. Unsanitary conditions: Water damage that causes microbiological growth on or in soiled or water-damaged furnishings, microbiological growth in areas of surface condensation, standing water from clogged or poorly designed drains, and dry traps that allow the passage of sewer gas.

7. Chemicals released from building components or furnishings: Volatile organic compounds or inorganic compounds.

IAQ continued...

8. Accidental events: Spills of water or other liquids, microbiological growth due to flooding, leaks from piping, and fire damage (soot, PCBs from electrical equipment, odors).

9. Special use areas and mixed use buildings: Laboratories, print shops, art rooms, exercise rooms, and food preparation areas.

10. Building redecorating/remodeling/repair: Emissions from new furnishings, dust and fibers from demolition, odors and volatile organic and inorganic compounds from paint, caulk, adhesives, and micro biologicals released from demolition or remodeling activities.

Procedures for Reporting an Indoor Air Quality Issue:

Please have the following information ready before calling to report an Indoor Air Quality Issue:

1. Your name, location, and a phone number where you can be reached,
2. The location of the air quality problem (building, room, area within the room).
3. Be able to describe any odors that may be present and dates and times they occur,
4. How many people have been affected by the problem (please provide their names and numbers as well),
5. List any symptoms associated with the problem such as headaches, dizziness, etc. Report any chemicals or agents used in the area that may affect the investigation.

After you are prepared with the information requested, call UNE Security at X-366 and they will notify the Environmental Health and Safety office. If it is off hours or it is an emergency, you will still call UNE Campus Security at X-366 as they are available 24 hours a day. Circumstances requiring immediate response include but are not limited to:

- There have been complaints of headaches, nausea, and combustion odors. (As this could be a sign of a carbon monoxide or gas leak).
- One or more occupants of your building have been diagnosed as having Legionnaire's disease.
- Staff report that water from a leak has flooded a portion of the carpeting.
- The building occupant feels the threat is dangerous to life or health (evacuation will be necessary in this circumstance).

Once you have reported the issue, an investigation will begin through EHS and Security. If there is no immediate danger, an investigation may take several days or weeks depending on how many parties will need to be involved and what action may need to be taken. All complaints will be investigated in a prompt manner and the EHS department will update the person reporting the problem as information becomes available. The following are considered high priority investigations, but not emergencies:

- Inspection of the humidification system reveals an accumulation of mold.
- A group of occupants has discovered that they share common symptoms of headaches, eye irritation, and respiratory complaints and decided that their problems are due to conditions in the building.
- Immediately after delivery of new furnishings (furniture or carpeting), occupants complain of odors and discomfort.
- Immediately after heavy cleaning has been done in the occupants work area.
- Local news articles suggest that some buildings in the area have high indoor radon levels.
- Renovations are causing irritant dusts of concern to occupants.

IAQ continued...

Prevention for Poor Indoor Air Quality:

The following steps will be taken to attempt to prevent poor indoor air quality in all facilities:

- Review of older records of indoor air quality complaints.
- Ensure up-to-date manufacturers' operating instructions and maintenance records for HVAC system components have been reviewed and filed.
- Make sure up-to-date schedules and procedures for facility operations and maintenance have been reviewed and filed.
- Guarantee HVAC “as built” blueprints have been updated to indicate current HVAC configuration and filed.
- Drawings of tenant build-out and interior building renovations should be updated and information on major space use changes (e.g., office space to kitchen or laboratory, significant increases or decreases in occupant density) have been updated and filed.
- Ensuring the HVAC system was designed to deliver a specific CFM of outside air which translates into the appropriate CFM of outside air per occupant.
- A review of occupant thermal comfort complaints and indoor temperature and relative humidity readings indicates that current peak heating and cooling loads do not exceed HVAC system capacity.
- Information on pressure relationships between areas and/or zones within the building have been examined, updated, and filed.
- Safety Data Sheets (SDS) for products used in the building are requested from suppliers and kept on file.
- Building walk throughs addressing: odors, dirty or unsanitary conditions, visible fungal growth or moldy odors, evident moisture in inappropriate locations (e.g., moisture on walls, floors, etc), staining or discoloration of building material(s) or "Smoke damage", presence of hazardous substances, potential for soil gas entry (e.g., cracks or holes in building surfaces), unusual noises from light fixtures or equipment, poorly-maintained filters, uneven temperatures, overcrowding, personal air cleaners (e.g., ozone generators, portable filtration units) or fans, inadequate ventilation, inadequate exhaust air flow , or blocked vents.
- HVAC Preventative Maintenance Programs
- Housekeeping Services
- Procedures for unscheduled maintenance events
- Remodeling/Renovation plans and communications in place
- Pest Control Services
- Shipping/Receiving Policies and Procedures for loading and unloading (exhaust fumes)
- Smoking policies
- Mold remediation services

This information was taken from Section 23-Indoor Air Quality in the

UNE Safety Manual.

To read the policy in its entirety, please visit: https://www.une.edu/campus/ehs and click on the “Safety Manual” button on the homepage.

Top 10 Holiday Safety Tips

1. Inspect electrical decorations for damage before use.
Cracked or damaged sockets, loose or bare wires, and loose connections may cause a serious shock or start a fire.

2. Do not overload electrical outlets.
Overloaded electrical outlets and faulty wires are a common cause of holiday fires. Avoid overloading outlets and plug only one high-wattage appliance into each outlet at a time.

3. Never connect more than three strings of incandescent lights.
More than three strands may not only blow a fuse, but can also cause a fire.

4. Keep tree fresh by watering daily.
Dry trees are a serious fire hazard.

5. Use battery-operated candles.
Candles start almost half of home decoration fires (NFPA).

6. Keep combustibles at least three feet from heat sources.
A heat source that was too close to the decoration was a factor in half of home fires that began with decorations. (NFPA).

7. Protect cords from damage.
To avoid shock or fire hazards, cords should never be pinched by furniture, forced into small spaces such as doors or windows, placed under rugs, located near heat sources, or attached by nails or staples.

8. Check decorations for certification label.
Decorations not bearing a label from an Independent testing laboratory such as Underwriters Laboratories (UL), Canadian Standards Association (CSA) or Intertek (ETL) have not been tested for safety and could be hazardous.

9. Stay in the kitchen when something is cooking.
Unattended cooking equipment is the leading cause of home cooking fires (NFPA).

10. Turn off, unplug, and extinguish all decorations when going to sleep or leaving the house.
Unattended candles are the cause of one in five home candle fires. Half of home fire deaths occur between the hours of 11:00 p.m. and 7:00 a.m. (NFPA)

UNE Chemical Sharing Program

The UNE Chemical Sharing Program is a great way to reduce hazardous waste, reduces costs for your department, and have a positive environmental impact on campus. If you have any commonly used lab chemicals or lab equipment that 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.

Available now:

ChemGuard General Purpose Fume Hood Bench mount Model FH-6
(located at Facilities Bldg. dimensions are 72" W x 58" H x 32" D

Please make sure that your space can accommodate the equipment and that any hookups needed are in place or can be put in place reasonably and safely before claiming the equipment.

Contact EHS if interested in the above equipment.