LAB SAFETY
It's no accident.
Safety in UW Chemistry Laboratories

Presentation Overview
- Departmental safety - roles and responsibilities
- Hazards in our laboratories
- Prudent Practices
- TA responsibilities

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Chair of the safety committee
New Student Orientation August 24, 2017
“All students, post docs, staff, and faculty share in the responsibility for creating and maintaining a safe working environment within the chemistry department. Our shared responsibility is based on the individual responsibility of each of us to perform all work according to best safe practices. If we minimize the risk of our own operations, then we minimize the risk to everyone in the department.”
Research groups
• Principle Investigator (PI)
• Chemical Hygiene Officer (CHO)
• Chemical Hygiene Plan (CHP)
• Safe Operating Procedures (SOP)
• Lab Specific Safety Training

Support Facilities
• Chemistry Instrument Center (CIC) (NMR, MS, and X-ray)
• Shops (glass, machine, electronics)
Instructional Laboratories

- Laboratory Director
  The laboratory director will provide safety rules, safety hazards, and proper safety procedures to the students, typically included in the laboratory manual or other handouts.

- Teaching Assistant (TA)
  The TAs are responsible for communicating and enforcing the safety rules and guidelines within their lab sections.

Other Departmental/University Support

- Jeff Nielsen Building manager
- Safety Committee
- Department Chair
- UW Safety
Safety is an integral part of laboratory work

• Know the hazards of the chemicals, equipment, and procedures for the experiment. Know what risks are present due to these hazards. **Do not be afraid to ask questions!!!**

• Know how you to protect yourself and others from these risks. Follow proper procedures and use personal protective equipment (PPE).

• Plan your response for various types of incidents that might occur.

• Know how to properly dispose of waste and excess chemicals generated during the experiment.

Be sure your lab activities are consistent with overall university, departmental, laboratory and/or course policies.
Fires

In 2009 Sheri Sangjii, a 19 year old lab tech in a chemistry research group at UCLA, died from injuries sustained when her sweater caught fire while working with pyrophoric t-butyllithium.
Fire alarm!!!!!!!!!!
In 2011, Adrian Martin, a researcher for a small company, was killed in a laboratory methane explosion.
Toxic effects of chemicals

In 1988, a student at Pierce College in Tacoma WA died after drinking a sodium azide solution in her analytical lab. She mistakenly thought the solution was saline.
Sickness or disease caused by biological hazards

- anthrax
- H1N1 virus
- Human stem cell

In 2012, Richard Din, a 25-yr old VA hospital lab worker died from exposure to a bacterial strain causing septicemia and meningitis.
In 1934, Nobel laureate Marie Curie died from aplastic anemia contracted from exposure to radiation.
In China in 1992, a university instructor and graduate student suffocated in a cold room when liquid nitrogen was spilled. The victims names are unknown.
Electrocution

In 1966 John Gallant, a high school student, was electrocuted when using an oscilloscope in his physics class.
Slips, falls, lacerations, etc.

In 2011 Michelle Dufault, a senior at Yale, was accidentally strangled when her hair was caught in a chemistry department lathe.
In 2007, 32 people were shot and killed at Virginia Tech. Many of the victims were students.
What should I do to mitigate these risks?

• Always be “thinking” in the lab
• Follow appropriate laboratory protocols
• Use equipment and tools properly
• Use minimum amounts of reagents
• Always wear eye protection!!!
• Wear appropriate clothing
• Do not eat or drink in the laboratory
• Work in a fume hood if necessary
• Wear gloves when appropriate
How do I prepare for, and handle, emergencies?

- Quickly assess the situation and respond accordingly
- Enlist help of others
- Fire Extinguishers
- Safety Showers
- Eye wash stations
- Spill Kits
- First Aid Kits
- Dial 911
- Evacuation routes
Use the correct online form to report incidents

http://www.chem.wisc.edu/content/safety
How do I properly dispose of waste and excess chemicals after the experiments are completed?

- Hazardous Glass
- Sharps and Bio-hazardous waste
- Excess and Waste Chemicals
- Regular Trash
- Sanitary sewer or “down the sink”
Ask yourself

- Would I be embarrassed if an outsider observed my daily laboratory practices?

- If something goes wrong, did I take all reasonable precautions to prevent this, and to minimize the potential impact?

- Would I be in serious trouble if a safety incident occurred in my laboratory?
TA Safety Responsibilities

Your students will be even less experienced than you...

...better be prepared for the worst case scenario
Come Prepared

What are the hazards?
&
What are the risks?
&
What will I do if things go wrong?
&
What are the proper disposal methods?
Prepare your students for working Safely in the lab

Check that the students are well prepared and is aware of the risks, Especially for “troublesome” experiments
Students need to wait for their TA to enter a lab
A lab is not a kitchen, a lounge, or a play room

no elbows on the table
no sitting on the table
no eating, drinking, or smoking
no horseplay
no napping
no headphones or earbuds
Enforce proper personal protection

- **Eye protection**
- **Disposable Gloves** (in lab only)
- **Shoes covering entire foot**
No shorts or open shoes!
Most “common” incidents

- **Fainting:** position the person on his or her back, elevate legs above heart level, check for breathing, if breathing help restore blood flow by legs feet above head, loosen belts collars or other restrictive clothing, Call 911. **If person is not breathing, dial 911 immediately.**

Whenever someone appears to have lost consciousness (“went down”), **always dial 911**
**Bleeding:** for small cuts and wounds the individual should treat themselves by cleaning the wound and applying a bandage. If wound is more significant have them apply pressure and elevate the wound while you alert the stockroom to call 911. If wound is incapacitating, and you have to apply pressure, wear gloves so you do not expose yourself to their blood, warn others to stay away from the area, and send someone immediately to the stockroom to call 911.

**Burns:** Flush area in cold water. Alert stockroom and call 911 if necessary.
Chemical Spill on the Skin: If affected area is small rinse 5-10 minutes in the sink. If the area is on the face, keep goggles in place during rinsing. If spill is over a larger area, use the safety shower. You may have to remove contaminated clothing before using the shower. Call 911 if necessary.
Less “common” but does happen

• **Clothing Fire:** Use the safety shower to douse the fire and call 911.

• **Chemical Spill in the Eyes:** Escort person to eyewash station or sink and flush their open eyes at least 15 minutes with water. Call 911 if necessary.

• **Chemical Inhalation:** close containers, move to area of fresh air, alert stockroom and call 911 if necessary

• **Chemical Ingestion:** alert stockroom, call poison center 2-3702, do not induce vomiting unless instructed to by center, call 911 if necessary.
Responding to a chemical spill

- Alert Persons in the area that a spill has occurred and cordon off the area

- Alert the stockroom and evaluate the toxicity, flammability and other hazardous properties of the spilled chemical.

- Clean up accordingly. Acid spills neutralized with sodium bicarbonate, base spills with citric acid, mercury spills with mercury spill powder, blood pathogens with bleach solution, etc
Dealing with a fire in the lab

• smother small fires with another object or extinguisher

• Pull the fire alarm and evacuate immediately if fire is larger than you can handle with a fire extinguisher
How do you do to report “an accident” in the teaching labs?

• Lab director determines if the incident rose to the level of submitting a report

• Lab Director submits the official report, with the details provided by the TA

• any accident where 911 was called (e.g., student lost consciousness) have to be reported to the safety committee via the website form
Be Sure Your Section Follows Proper Disposal Procedures !!!
What if you decide not to prepare properly and/or enforce safety in your laboratory section?

1) Lab director will talk to you.
2) Head of the safety committee will invite you for an uncomfortable chat.
3) Department chair will like to meet with you.
4) Your guaranteed position is contingent upon your professional behavior.